S. No. 6547 2020

VIJAY C. SHAH
NOTARY
GOVT. OF INDIA

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
AT ITS WESTERN ZONE BENCH AT PUNE

12 NOV 2020

(Appeal under Section 16(h) of the National Green Tribunal Act, 2010)

APPEAL NO. 35 OF 2020 (WZ)

IN THE MATTER OF:

Kheti Vikas Seva Trust ... Appellant

Versus

Adani Enterprises Limited and others ... Respondents

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Date: 20/11/2020
Place: Pune

Advocate of the Respondent No.1

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BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
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(Appeal under Section 16(h) of the National Green Tribunal Act, 2010)

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AFFIDAVIT IN REPLY ON BEHALF OF THE RESPONDENT NO. 1 – ADANI ENTERPRISES LIMITED

I, Santosh Kumar Singh, son of Shri Bhuwaneshwar Singh, aged about 50 years, Indian inhabitant, having my office at Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382 421, do hereby solemnly affirm and state as under:

1. I am the Authorized Representative of Adani Enterprises Limited – the Respondent No.1 (hereinafter referred to as the 'answering respondent') in the aforesaid Appeal No.35 of 2020 (hereinafter

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referred to as the 'said appeal'). I have perused the memo of the said appeal, and I am conversant with the facts of the present case. I am duly authorized to file the present affidavit in reply to the said appeal.

2. At the outset, I deny all the statements, averments, contentions and allegations raised/made in the said appeal. My not dealing with any of the statements, averments, contentions or allegations raised/made in the said appeal may not be construed as an admission on my part or on the part of the answering respondent, and I deny the same as if the same are specifically set out herein and traversed in seriatim.

Relevant factual background

3. The Appellant is an alleged trust, which alongwith Mr. Naran Bharubhai Gadhvi, has been actively initiating proceedings against the answering respondent and its group companies, by making unsubstantiated allegations. I crave leave to produce and refer to a list of litigations that have been initiated by the Appellant and/or Mr. Naran Bharubhai Gadhvi against the answering respondent and/or

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its group companies. Such particulars alongwith the submissions in the following paragraphs would demonstrate that the Appellant is not aggrieved by the environmental clearance dated 8.5.2020 (hereinafter referred to as 'said EC') issued by the Ministry of Environment, Forest and Climate Change ('MoEF') to the answering respondent for its Greenfield Copper Refinery Plant (having capacity of 1 Million Ton p.a.) located, inter alia, within the Special Economic Zone ('SEZ') of Adani Ports and Special Economic Zone Limited ('APSEZ') at Mundra (hereinafter referred to as the 'said project'). I would also demonstrate in the following paragraphs that the said appeal is malicious, without merit, and that the same has been filed only with a view to harass the answering respondent. I further state and submit that Mr. Naran Bharubhai Gadhvi claims to be the President of the Appellant Trust and duly authorized to sign the affidavit, however, no supporting document of whatsoever nature corroborating his claim to be President and that he is authorized by the Appellant Trust has been placed on record. As such the said appeal is liable to be dismissed on this ground alone.

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4. I state that APSEZ proposes to encompass 1576.81 ha of forest land (i.e. the forest land in question) within the aforementioned SEZ/Industrial Park at Mundra. I state that APSEZ had applied for diversion of the forest land in question way back on 19.7.2004 (i.e. more than 16 years ago). I state that the MoEF has granted Stage-1 forest clearance in respect of the forest land in question on 16.11.2018 for the development of SEZ/Industrial Park at villages Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Tehsil Mundra, under Forest Division and District Kutch, Gujarat. I state that the said Stage-1 Forest clearance has not been challenged either by the Appellant or any other person.

5. In the meantime, sometime around the year 2016, the answering respondent was desirous of setting up a greenfield copper refinery plant (i.e. the said project). In the circumstances, on 21.4.2016, the answering respondent made an application to the MoEF for obtaining Terms of Reference ('TOR') as per the Environment Impact Assessment Notification, 2006 (hereinafter referred to as 'EIA Notification'). A copy of the said application dated 21.4.2016

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and a copy of the Form-1 dated 21.4.2016 submitted alongwith the said application is annexed hereto and marked as **Annexure-R1**. I state that the answering respondent had provided 3 sites for the said project and had proposed to set up the plant at Site-2 (hereinafter referred to as the 'project site'), as the same was more suitable environmentally and technically as compared to Site-1 and Site-3. A map showing all the three aforesaid sites is annexed hereto and marked as **Annexure-R2**. The project site, inter alia, comprises of 102.39 ha of forest land and 154.19 ha of notified SEZ land of APSEZ. The said 102.39 ha of forest land is a part of the aforementioned 1576.81 ha forest land, for which APSEZ has already received Stage-I Forest Clearance.

6. I state that the said project was appraised by the Expert Appraisal Committee (Industry) (hereinafter referred to as 'EAC') during its 6th meeting held on 4.5.2016, and it prescribed the TOR to the said project for undertaking detailed Environment Impact Assessment ('EIA') study for obtaining environmental clearance in respect of the said project at the project site suggested by the answering

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respondent. Accordingly, MoEF prescribed TOR to the said project on 21.6.2016. A copy of the TOR dated 21.6.2016 prescribed by the MoEF is already annexed to the said appeal at ANNEXURE A-4.

7. I state that for the purpose of undertaking the aforementioned EIA, the answering respondent engaged a consultant – Vimta Labs Limited, which is accredited by the National Accreditation Board for Education and Training ('NABET') and National Accreditation Board for Testing and Calibration Laboratories ('NABL'). The aforesaid consultant engaged by the answering respondent is also recognized by MoEF.

8. On 29.4.2017, a public hearing was held in accordance with the provisions of the EIA Notification, wherein the draft Environment Impact Assessment Report amongst other documents was placed for perusal of all concerned. It may be pertinent to note that Mr. Naran Bharubhai Gadhvi, who claims to have knowledge of the contents of the said appeal, was present at the aforesaid public hearing, but did not raise the concerns/issues in respect of the alleged grievances as

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raised in the said appeal. I state that the answering respondent answered all the concerns/queries/objections that were raised during the course of the public hearing, and also prepared an action plan in respect of each issue that was discussed during the public hearing. The said details of public hearing, the responses of the answering respondent, as well as the action plan was submitted to the EAC as a part of the final Environment Impact Assessment Report ('EIA Report'). I state that the answering respondent submitted the EIA Report in respect of the said project to the EAC on 6.12.2018. A copy of the EIA Report and annexures thereto is annexed hereto and marked as **Annexure-R3**.

9. In the meantime, the answering respondent also entered into a Memorandum of Understanding with APSEZ on 5.12.2018, thus agreeing for future transfer of leasehold rights in its favour in respect of the project site.

10. I state that the EAC in its meeting held during 9th to 11th January 2019 considered the EIA Report submitted by the answering

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respondent in respect of the said project. The EAC made various observations in respect of the proposal of the answering respondent, sought additional details/clarifications from the answering respondent, and recommended the formation of a sub-committee and a site visit by such sub-committee. The EAC observed that the proposal of the answering respondent would be considered after submission of the Additional Details Sought ('ADS') and after submission of the report by the sub-committee based on the site visit. A copy of the minutes of the said EAC meeting held during 9th to 11th January 2019 has been annexed to the said appeal at ANNEXURE A-14.

11. Sometime in June 2019, the answering respondent submitted the ADS covering 33 observations to the EAC, thereby responding to each and every observation that was made by the EAC in its meeting held during 9th to 11th January 2019. A copy of the ADS submitted by the answering respondent to the EAC in June 2019 is annexed hereto and marked as **Annexure-R4**. Thereafter, the EAC once again discussed the proposal of the answering respondent in respect

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of the said project in its meeting held during 22nd to 23rd August 2019. The EAC requested for clarifications in respect of some of the responses that were given by the answering respondent in the ADS submitted in June 2019, and, inter alia, reiterated that a sub-committee should carry out a site visit as recommended in the earlier meeting. A copy of the minutes of the said EAC meeting held during 22nd to 23rd August 2019 is annexed hereto and marked as **Annexure-R5**.

12. The sub-committee of the EAC made a site visit on 9th and 10th December 2019, and placed a site visit report in the EAC meeting for further deliberations. After detailed deliberations on the aforesaid site visit report and the ADS submitted by the answering respondent, the EAC sought responses in respect of further 19 observations in the form of further ADS for further consideration of the proposal of the answering respondent. A copy of the minutes of the said EAC meeting held during 23rd to 24th December 2019 is annexed to the said appeal at ANNEXURE A-15.

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13. Thereafter, as per the directions of the EAC in its meetings held during 22nd to 23rd August 2019 and 23rd to 24th December 2019, the answering respondent submitted (i) revised version of the ADS submitted in June 2019, and (ii) further ADS in response to other 19 observations of EAC, on 5.2.2020. A copy of the both the aforesaid ADS submitted by the answering respondent on 5.2.2020 is collectively annexed hereto and marked as **Annexure-R6**.

14. The EAC further considered the proposal of the answering respondent in light of the further ADS submitted on 5.2.2020 during the EAC meeting held during 24th to 25th February 2020. After considering all the particulars submitted by the answering respondent over a period of time, (i.e. the EIA Report (including the public hearing details), the ADS reply submitted in June 2019, the further ADS reply submitted on 5.2.2020), the report of site visit of the sub-committee of EAC, and after having comprehensive discussions during 4 EAC meetings as stated above, the EAC recommended the said project for environmental clearance to the MoEF. Copy of the extracts of the minutes of the EAC meeting held

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during 24th to 25th February 2020 is annexed to the said appeal at ANNEXURE A-16.

5. In view of the positive recommendation of the EAC, the MoEF issued the said EC in favour of the answering respondent for the said project on 8.5.2020. A copy of the said EC has been annexed to the said appeal at ANNEXURE A-1. It is pertinent to note that MoEF granted EC after giving due consideration to the various conditions recommended by EAC as a part of EC recommendation.

16. The Appellant has challenged the said EC by way of the said appeal. I state and submit that the said appeal is untenable, misconceived, and an abuse of process of law, as would be evident from the submissions made in the upcoming paragraphs.

17. Before dealing with the contents of the said appeal, I seek to raise the following preliminary contentions with regard to the maintainability of the said appeal, for the consideration of this

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Hon'ble Tribunal, which are set out without prejudice to one another.

Preliminary Objections

18. The Appellant is not aggrieved by the said EC, but has filed the said appeal only with a view to harass the answering respondent. At the outset, I state that the Appellant has not disclosed as to how it is aggrieved by the said EC. I submit that an application under Section 16 of the National Green Tribunal Act, 2010 ('NGT Act') can be filed only by a person aggrieved by the decision/clearance under challenge. However, the Appellant has failed to demonstrate as to how it is aggrieved by the said EC. The Appellant has not disclosed as to how it has the *locus standi* to file the said appeal. I state and submit that the Appellant and Mr. Naran Bharubhai Gadhvi, have been actively initiating proceedings against the answering respondent and its group companies, by making unsubstantiated allegations. I submit that the Appellant and Mr. Naran Bharubhai Gadhvi both have made a career out of initiating litigations and arm-

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twisting the answering respondent and its group companies. I state that the Appellant and Mr. Naran Bharubhai Gadhvi specifically keep track of the proposed projects of the answering respondent and its group companies, and challenge the clearances/approvals granted in respect of the such projects without any basis and only with a view to harass and arm-twist the answering respondent and its group companies for the reason best known to them. To the best of my knowledge, neither the Appellant nor Mr. Naran Bharubhai Gadhvi have filed any proceedings against any other company or corporate group, inspite of the presence of various other companies or corporate groups in the Mundra region. In the facts of the present case, it may be pertinent to note as to how the Appellant had taken photographs of areas outside the project site on 7.8.2018 (i.e. almost two years prior to the said EC) and have annexed the same to the said appeal, thereby misleading the Hon'ble Tribunal in attempt to make the plausible case. The same shows as to how the Appellant and its President is in the habit of keeping track of the proposed project specifically of the answering respondent and its group

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companies, and challenging only the clearances granted in favour of the answering respondent and its group companies.

19. The said appeal is an abuse of process of law. As would be evident from my paragraph wise reply to the said appeal, the Appellant has made contradictory submissions at different points in the said appeal, and has taken such contrary stands at its convenience to suit the respective allegations. Further, the Appellant has placed heavy reliance upon the 'Report of the Committee for Inspection of M/s Adani Port & SEZ Ltd. Mundra, Gujarat' of April 2013 (hereinafter referred to as the 'Sunita Narain Committee Report') in its challenge to the said EC. The name of the said report is itself clear that the said report pertains to APSEZ, and has no relevance to the said project. It is obvious that a report of April 2013 would in any case have no bearing on the said project, which was proposed only in 2016. The Appellant is aware that the MoEF has already issued directions to APSEZ pursuant to the recommendations of the Sunita Narain Committee Report. Inspite of the aforesaid, the Appellant has referred to the Sunita Narain Committee Report and other reports in

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respect of APSEZ in the said appeal only with a view to prejudice this Hon'ble Tribunal. In view of the said facts, it becomes clear that the said appeal is an abuse of the process of law.

20. I state and submit that the Appellant has made false statements on oath in the verification clause as well as the affidavit of the said appeal. Mr. Naran Bharubhai Gadhvi has claimed as to how the contents of the said appeal are true and correct, and has signed and affirmed the affidavit on 25.6.2020. However, in the I.A. No.68 of 2020 filed in the said appeal, seeking condonation of delay, it has been stated that the said appeal was ready by 29.7.2020. Further, from the bare perusal of the affidavit as well as Page No.53 of the said appeal, it is apparent that the Appellant had signed the last page of the said appeal and the affidavit, much before the said appeal was finalized. Therefore, it is clear that the Appellant has not only made false statements on oath in the verification clause and affidavit of the said appeal, but it is also evident that someone else is driving the proceedings and the Appellant, who has animosity with the Adani Group, has merely lent his name to institute the said appeal. The said

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appeal is nothing but an abuse of process of law. I submit that the said appeal is required to be rejected on this ground alone as Appellant has not approached the Hon'ble Tribunal with clean hands. Assuming for the sake of argument that the said appeal has been affirmed by Mr. Naran Bharubhai Gadhvi after perusing the said appeal, then there is a complete lack of explanation as to why was the said appeal, which was affirmed on 25.6.2020, filed only on 29.7.2020.

21. I shall now deal with the present application, paragraph-wise.

Paragraph-wise reply

22. The contents of paragraphs I to III of the said appeal are a matter of record, and I deny anything contrary to the record.

23. With reference to paragraph 1 of the said appeal, I reiterate the factual background narrated in the foregoing paragraphs of the

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present reply. The contents of the paragraph under reply are a matter of record, and I deny anything contrary to the record.

24. With reference to paragraph 2 of the said appeal, I deny that the said EC suffers from illegalities or infirmities or that the same is liable to be set aside, as alleged or as sought to be alleged or otherwise. I deny that the answering respondent (i.e. the Project Proponent) has concealed facts or misrepresented data, as alleged or as sought to be alleged or otherwise. I deny that the EAC has failed to appraise the project or apply the laws in force, as alleged or otherwise. As would be evident from the submissions in the following paragraphs, the Appellant has miserably failed in proving the allegations made in the paragraph under reply and the said appeal.

25. With reference to paragraphs 3 and 4 of the said appeal, I state and submit that the information presented in Form-1 is not the only information/particulars that are submitted for the purpose of appraisal process under the EIA Notification. I state and submit that various other details, particulars, data, etc., including Form-2, EIA

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Report, etc. are submitted by a project proponent for the purpose of appraisal under the EIA Notification.

26. With reference to paragraph 5 of the said appeal, I deny that the answering respondent has given incorrect information or concealed facts in the Form-1 submitted to the EAC, as alleged or otherwise. I deny that the answering respondent has not provided information as to how many trees have to be cut at the project site, as alleged or otherwise. I deny that the Reserved Forest land forming part of the project site has fully grown trees, as alleged or otherwise. I deny that the document produced by the Appellant as ANNEXURE A-2 is the Form-1 submitted by the answering respondent. It is evident from a bare perusal of the ANNEXURE A-2 to the said appeal, that the said document is the Form-2 filed by the answering respondent, and not Form-1. I deny that the photographs produced by the Appellant as ANNEXURE A-3 are photographs of the trees on the project site, as alleged or otherwise. I state and submit that the photographs produced by the Appellant as ANNEXURE A-3, reflect (i) the coordinates (longitude and latitude) of the location of the said

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photographs, and (ii) the date on which the said photographs have been taken i.e. 7.8.2018. I state and submit that on plotting the aforesaid coordinates on the map, it becomes evident that the said photographs are of locations that are outside the project site. A map whereupon the coordinates as mentioned in the photographs are plotted, and also showing the boundaries of the project site, is annexed hereto and marked as **Annexure-R7**.

27. With reference to paragraph 6 of the said appeal, I state and submit that the judgment referred to in the paragraph under reply has no application to the facts of answering respondent. I submit that the Appellant is placing reliance on the judgment referred to in the paragraph under reply on the unfounded presumption that the answering respondent has concealed information regarding presence of trees on the project site. As demonstrated by way of the map annexed to the present reply at Annexure-R7, the photographs produced by the Appellant at ANNEXURE A-3 to the said appeal are of locations outside of the project site.

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28. With reference to paragraph 7 of the said appeal, I deny that the information provided by the answering respondent is contradicted by the information provided in Table-1.1 of the EIA Report. I deny that the information provided in alleged Form-1 is misleading or incorrect or that impact on all water bodies has not been studied, as alleged or otherwise. I reiterate that the document produced and relied upon by the Appellant at ANNEXURE A-2 is Form-2. I state and submit that information provided by the answering respondent in Form-2 (ANNEXURE A-2 to the said appeal) is in response to the specific particulars sought in the form. On perusal of the aforesaid Form-2, it becomes apparent that the particulars that were sought were: (i) Details of Presence of Water Bodies in Core Area, and (ii) Details of Presence of Water Bodies in Buffer Area. As far as details relating to presence of water bodies in the Core Area is concerned, there is no alleged contradiction in Form-2 and Table-1.1 of the EIA Report. The existence of the water bodies in the vicinity of the project site is mentioned in the Form-1. Further, the fact about the other water bodies within the buffer area is clearly stated in the EIA Report, which is also admitted in the paragraph

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under reply. The EIA Report was submitted to the EAC, and the EAC has granted the said EC after examining the EIA Report, which clearly mentions all the water bodies that are in the buffer area. Therefore, there does not arise any question of misleading the EAC. In fact, the EIA Report in Chapter 4, section 4.2.4 specifically deals with "Impact on Water Resources and Water Quality". The EIA Report, inter alia, clearly states that: (i) The total water requirement for the said project will be sourced from the desalination plant of APSEZ, (ii) No ground water will be abstracted during the operation phase, (iii) Dhaneshwari river (which is a seasonal river) flowing through the project site will not be diverted, but will be suitably trained along the boundary, and (iv) The total wastewater generated would be treated in the effluent treatment plant, and the treated wastewater would be fully utilized within the plant for process, cooling, and other purposes. No wastewater will be discharged outside the plant. Plant will operate on a Zero Liquid Discharge (ZLD) concept. The aforesaid contents of the EIA Report which has been examined by the EAC demonstrates that there would be no impact on the water bodies in the vicinity of the project site because

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of the said project. However, the Appellant has produced only some extracts of the EIA Report at ANNEXURE A-7, thereby conveniently excluding the observations relating to "Impact on Water Resources and Water Quality". I state that the said facts are also recorded in the said EC at paragraphs 16 and 18. Accordingly, while granting the said EC, the MoEF at paragraph 35(III) has set out specific conditions in relation to Water quality monitoring and preservation, including adherence to 'Zero Liquid Discharge'. Further, the MoEF at paragraph 34 (xxvi) of the said EC has acknowledged the fact that flow of water from the Dhaneshwari Nadi shall not be disturbed.

29. With reference to paragraph 8 of the said appeal, I deny that the said EC granted to the answering respondent is liable to be cancelled, as alleged or otherwise. I state and submit that the judgment referred to in the paragraph under reply has no application to the facts of answering respondent. I submit that the Appellant is placing reliance on the judgment referred to in the paragraph under reply on the unfounded presumption that the answering respondent has failed to

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make mandatory disclosures in the alleged Form-1. As demonstrated in the foregoing paragraph, there has been no failure whatsoever on the part of the answering respondent in making mandatory disclosures before the EAC.

30. With reference to paragraph 9 of the said appeal, I deny that the answering respondent has failed to carry out compliance with the TOR. I submit that the Appellant has made vague averments without any particulars in the paragraph under reply.

31. With reference to paragraphs 10 and 11 of the said appeal, I seek to clarify that the term of reference quoted in paragraph under reply has been claimed to be point no.5(xii). However, the term of reference "*R&R details in respect of land in line with state Government Policy*" is at point no.4(xii) of the Annexure-I – Generic Terms of Reference (TOR) in respect of Industry Sector. The said term is generic, and not specific. I state and submit that generic terms of reference may or may not be applicable to a particular project depending upon the facts and circumstances. The contents of the

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paragraph under reply relate to the alleged impact on the local community in view of the diversion of forest land. I reiterate that the project site is located within the SEZ, being developed by APSEZ. Thus, it is APSEZ that has applied for diversion of forest land. I reiterate that APSEZ has already received Stage-I approval for diversion of 1576.81 ha forest land, including 102.39 ha of forest land forming part of the project site. The alleged grievances raised in the paragraphs under reply pertain to the diversion of forest land, which has been sought by APSEZ in accordance with law. However, it may be noted that the Appellant has not challenged the Stage-1 approval granted to APSEZ for diversion of 1576.81 ha of forest land either in the said appeal or any other proceedings to the best of my knowledge. In the circumstances, there does not arise any question of agitating alleged grievances relating to the diversion of forest land in the said appeal.

32. With reference to paragraph 12 of the said appeal, I seek to clarify that the term of reference quoted in paragraph under reply has been claimed to be point no.5(xii). However, the term of reference

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"*Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines*" is at point no.6(iv) of the Annexure-I – Generic Terms of Reference (TOR) in respect of Industry Sector. I state and submit that generic terms of reference may or may not be applicable to a particular project depending upon the facts and circumstances. The alleged grievance raised in the paragraph under reply is that the answering respondent collected samples from only 4 locations for testing the surface water quality instead of 8 locations. I state that identification of a surface water sampling location depends on (i) the density of surface drainage in the study area and (ii) availability of surface water source. In the facts pertaining to the project site, there are no perennial water bodies within the study area of 10 km radius, but for Arabian Sea. In the circumstances, the baseline data was collected by NABET approved EIA consultant during the post-monsoon season in the months of October-December 2016. During this period, there were no other surface water bodies besides the 4 locations in question, that had availability of surface water for sampling. The EAC in its meeting

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held on 9th to 11th January 2019 has also taken note of the fact that surface water samples were analysed from the available 4 locations. The EIA Report describes in detail the locations for the surface water sampling as well as the results. Once again, the Appellant has purposefully excluded the relevant pages of the EIA Report, extracts of which are annexed at ANNEXURE A-7 to the said appeal.

33. With reference to paragraph 13 of the said appeal, I deny that the studies are not as per the Terms of Reference or that the said EC ought to be set aside, as alleged or otherwise. I state and submit that the judgment referred to in the paragraph under reply has no application to the facts of answering respondent. I submit that the Appellant is placing reliance on the judgment referred to in the paragraph under reply on the unfounded presumption that the studies undertaken for EIA of the said project is not as per the Terms of Reference.

34. With reference to paragraph C.a. and paragraphs 14 to 19 of the said appeal, I deny that the answering respondent has submitted a faulty

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EIA to the EAC, as alleged or otherwise. I deny that alternative sites have not been properly studied, as alleged or otherwise. I deny that 'connectivity' is the only reason for choosing the location of the project site, as alleged or as sought to be alleged or otherwise. I deny that the Site-3 is more compatible with an industrial land use, as alleged or otherwise. I deny that the EIA Report makes no mention as to how the project site is advantageous in terms of environmental criteria, as alleged or otherwise. I deny that the project site is in close proximity to mangrove forests, as alleged or otherwise. I deny that multiple natural streams pass through the project site, as alleged or otherwise. I deny that the answering respondent has failed to appreciate the alleged ecological sensitivity of the area or has given weightage to technical feasibility over ecological feasibility, as alleged or as sought to be alleged or otherwise. I deny that Site-3 was environmentally more feasible or that the same should have been chosen, as alleged or as sought to be alleged or otherwise. In the paragraphs under reply, the Appellant has placed reliance upon the Technical Guidance Manual for Metallurgical Industry (hereinafter referred to as the 'Guidance Manual') prepared by

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IL&FS Ecosmart Limited. I submit that the said Guidance Manual neither has any binding authority nor any legal force. Thus, the reliance placed upon the same by Appellant in alleging that the project site is not in accordance with such alleged guidelines, is misconceived. Without prejudice to the said submission, I state that the EIA Report has an exclusive chapter dealing with the analysis of alternative sites. In the EIA Report, a detailed comparative analysis has been undertaken in respect of the alternative sites, and thereafter it has been concluded that Site-2 (i.e. the project site) is substantially advantageous in terms of environmental and technical criteria. The project site is superior to Site-3 in terms of availability and closeness of water and power source, land development, closeness to road and rail, etc. The Appellant's stand in treating the aforesaid factors as only technical and not environmental is misconceived. I submit that greater distances from water source, power source, port, and construction of a fresh approach road, absence of a conveyor belt system for transportation of coal, etc. translate into high environmental impact. Greater distances from port, absence of corridor for utilities, etc. would mean that essential requirements

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would have to be provided for by transportation through vehicles resulting into high vehicular pollution. Greater distance from water source would mean higher power consumption for pumping the water resulting into high environmental impact. On the other hand, it is the Appellant's case that the project site is environmentally ill suited because of (i) the alleged proximity of mangrove forests, and (ii) alleged presence of multiple natural streams in the project site. As mentioned in the EIA Report, there is no presence of mangroves within the project site. The project site is outside the CRZ area, and thus the requirement that metallurgical activity should be carried out outside CRZ area is fulfilled. The mangroves are at a distance of around 200 meters away from the project site of the answering respondent. Therefore, the said project would not have any impact on such mangroves. As submitted in the earlier paragraphs, only Dhaneshwari river is passing through the project site. It is stated that the said Dhaneshwari river is a seasonal river. In any case, as per the conditions of the said EC, the said Dhaneshwari river is not getting diverted and that there will be bridges across the two land parcels for accessibility as mentioned in EC. Thus, in view of the foregoing

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facts, it becomes clear that the project site is environmentally better suited than Site-3.

35. With reference to paragraphs 20 to 22 of the said appeal, I reiterate that the Guidance Manual is not a regulatory document and has no legal force. Thus, the reliance being placed by the Appellant on the Guidance Manual in the paragraphs under reply is misconceived. I deny that the answering respondent has failed to carry out a cumulative impact assessment of the project, as alleged or as sought to be alleged or otherwise. I deny that the EIA Report has not determined impact due to the addition of copper plant or upcoming future projects, as alleged or otherwise. Chapter 4 of the EIA Report comprehensively deals with the cumulative impact of the existing projects, the upcoming projects proposed at the relevant point of time, as well as the said project. I state and submit that while annexing the extracts of the EIA Report with the said appeal, the Appellant has conveniently excluded the relevant figures and pages of the EIA Report demonstrating cumulative impact assessment undertaken for the said project.

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36. With reference to paragraphs 23 and 24 of the said appeal, I state and submit that the judgment referred to in the paragraphs under reply has no application to the facts of answering respondent. I submit that the Appellant is placing reliance on the judgment referred to in the paragraph under reply on the unfounded presumption that cumulative impact assessment has not been done for the said project.

37. The contents of paragraph 25 of the said appeal are denied. I state and submit that the cumulative impact assessment has been carried out in accordance with clause 7(i) of TOR. I reiterate that Chapter 4 of the EIA Report comprehensively deals with the cumulative impact of the existing projects, upcoming projects as proposed at the relevant point of time, and the said project. I state and submit that while annexing the extracts of the EIA Report with the said appeal, the Appellant has conveniently excluded the relevant figures and pages of the EIA Report demonstrating cumulative impact assessment undertaken for the said project. I submit that the said

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project is proposed with Zero Liquid Discharge to mitigate any water pollution and Secured Landfill to mitigate any impact on soil and groundwater. As I am not aware, I do not admit the averments made in the paragraph under reply in respect of other projects and project proponents. I state and submit that the averments made in respect of other projects and project proponents have no bearing on the facts of the answering respondent and the said project.

38. The contents of paragraph 26 of the said appeal pertain to APSEZ, and the same are not germane either to the alleged issues raised in the said appeal or to the said project. Thus, the contents of the paragraph under reply are not required to be considered for the purpose of adjudicating the said appeal.

39. The contents of paragraphs 27 to 30 of the said appeal are denied. I deny that there is a misleading or deficient impact assessment on the fishing community, as alleged or otherwise. I deny that there is no discussion about the probable change in the fishermen community or the fish yield, as alleged or otherwise. I deny that the said project

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will destroy fisheries set up or block access for fishermen or cause conflict, as alleged or as sought to be alleged or otherwise. I state that the project site is located at a distance of 3.9 kms from the Gulf of Kutch, where fishing activities are taking place. In any case, there is no intake or outfall facilities planned in the seafront. The Dhaneshwari river which is passing through the project site is a seasonal river, and no fishing activity takes place therein. I state that there are no fish landing centres within the project site. The existing roads used by the fishermen do not pass through the project site, and the roads used by the fishermen will not be disturbed due to the said project. As stated in the foregoing paragraphs, the total water requirement for the said project will be sourced from the desalination plant of APSEZ, and the plant of the said project will be operated on Zero Liquid Discharge concept. Thus, there will be no impact on the water regime due to the wastewater generated from the plant complex. Further, provision of separate storm water system to collect and store run-off water during rainy season and utilization of the same in the process is proposed. From the foregoing facts, it becomes clear that there will be no damage to the fishing activities

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due to the said project. I state that the EIA Report in Chapters 3 and 4, and Annexure-XII, discuss in detail the status of the fishermen community, the impact on it because of the said project, and the proposed plans of the answering respondent in respect of the fishermen community. I further state that the aforesaid total water requirement of the said project will be fulfilled by sourcing the same from the desalination plant of APSEZ, which would be within the capacity approved by MoEF in the environmental clearance granted to APSEZ, including its intake and outfall. I am not offering any comments in respect of the allegations made against APSEZ in the paragraph under reply. I state and submit that such allegations in respect of APSEZ, have no bearing on the said project of the answering respondent. The said allegations have been made by the Appellant against the group company of the answering respondent only with a view to prejudice this Hon'ble Tribunal against the answering respondent. I state that to the best of my knowledge, the MoEF has already issued directions to APSEZ in respect of fishermen community pursuant to the recommendations of Sunita

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Narain Committee, and that APSEZ has already complied with such directions or is in the process of complying with such directions.

40. With reference to paragraphs 31 to 33 of the said appeal, I deny that there is concealment of the alleged presence of agriculture and pastoral community, as alleged or otherwise. I deny that the EIA Report has disregarded the agricultural and pastoral community, as alleged or otherwise. I deny that 80% of the population surrounding the project site include agriculturalists and pastoralists, as alleged or otherwise. I deny that the project ought to be rejected, as alleged or otherwise. It may be pertinent to note that in paragraph 27 of the said appeal, the Appellant has made a sweeping statement that there is no discussion about the change in fishermen community and in the paragraphs under reply, the Appellant has stated as to how the EIA Report has considered the fishermen community and has allegedly disregarded agricultural and pastoral community. This clearly shows that the Appellant is raising contradictory allegations based on its convenience to support its alleged stands at different points. I state that no agricultural or pastoral community is present in the project

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site. Further, there is no specific record of pastoral community in the Census data 2011. As per the 2011 census data, the study area (i.e. 10 km radius from the project site) consists of 11.76% of agricultural labourers, 77.5% of other workers, 10.45% of cultivators, and 0.64% of household industry workers. I state that the nearest agricultural land is situated 1.7 km to the North of the project site, whereas the maximum ground level concentration envisaged due to the said project is occurring at a distance of 2.2 km to the North-East of the project site. I crave leave to rely upon the figures and particulars forming part of the EIA Report in support of the aforesaid facts. I state and submit that the project site does not encompass any gauchar/grazing land. I reiterate that the reliance being placed by the Appellant on the Sunita Narain Committee Report is misconceived. I state and submit that the Sunita Narain Committee Report is in respect of the entire SEZ of APSEZ, and that APSEZ is already complying with the directions issued by the MoEF pursuant to the recommendations of the Sunita Narain Committee Report.

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41. The contents of paragraphs 34 to 38 of the said appeal are denied. I deny that there is a deficient impact assessment on the marine environment or ecology, as alleged or otherwise. I state and submit that the project site is about 3.9 kms away from the Gulf of Kutch. I deny that the marine environment or the mangroves will be affected, as alleged or as sought to be alleged or otherwise. I deny that there is a lack of studies or that the EIA Report is faulty, as alleged or otherwise. As submitted earlier, the proposed project will be sourcing water from APSEZ through APSEZ's desalination plant, for which necessary environmental clearance has already been granted to APSEZ. I state that there is neither any intake nor any outfall channel for the said project. I state and submit that the project site is outside the CRZ Area. I state and submit that the Appellant has tried to confuse the facts in paragraph 34 of the said appeal by referring to the reverse osmosis plant as "*reverse osmosis (RO) desalination plant*". The reverse osmosis plant proposed within the project site is part of Zero Liquid Discharge scheme for the said project. I state that the inlet to the proposed reverse osmosis plant is for treating water from the Effluent Treatment Plant, and the product

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from the reverse osmosis plant will be reused in the plant operation. The aforesaid desalination plant of APSEZ has otherwise no relation to the reverse osmosis plant proposed in the project site. Thus, the said project has no direct interference with marine environment and ecology. Consequently, there does not arise any question of killing of larval or juvenile fish species from the shore waters. I state and submit that the intake and outfall channels referred to in the response of the answering respondents during the public hearing are those of APSEZ, for which APSEZ has already received the requisite environment clearance. The said environmental clearance of APSEZ is not under challenge. I reiterate that the total water requirement of the said project is going to be fulfilled by the water to be obtained from the desalination plant of APSEZ. I reiterate that there is no discharge of any kind into the sea as a result of the said project. I reiterate that there will be no blockage of water stream as a result of the said project. I state and submit that there is going to be no extraction of ground water for the purpose of the said project. Thus, as far as the said project is concerned, there is going to be no

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interference, much less any impact, with marine environment and ecology.

42. The contents of paragraphs 39 to 42 of the said appeal are denied. I deny that there is a deficient impact assessment in respect of the Dhaneshwari river, as alleged or otherwise. I deny that Figure-2.1 does not show flow of the river, as alleged or otherwise. I deny that the answering respondent is seeking to destroy the Dhaneshwari river, as alleged or in the manner alleged or otherwise. I state and submit that Dhaneshwari river is a seasonal river, which is passing through the project site. I state and submit that Chapters 3 and 4 of the EIA Report clearly state the impact of the project site on Dhaneshwari river, which is well within the limits prescribed by CPCB. I state and submit that the said EC has already laid down conditions with a view to protect the Dhaneshwari river. I state that the said EC has clearly stated that the Dhaneshwari River passing through the project site will be maintained, and has, inter alia, laid down the following condition:

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"*xxvi. There will be bridges across the two land parcels for accessibility. Flow of water from the Dhaneshwari Nadi will not be disturbed. A green belt alongwith safety zone (towards riverbank with gabion and gully plugs to avoid erosion of plant if any) 50 meter wide shall be developed along the banks (side) of Dhaneshwari Nadi and 100 meter wide wherever storage of solid waste is proposed. This green belt would be developed by giving protection to the area and planting local species so that a natural ecosystem is created that may promote wilderness.*"

I submit that the judgment referred to in the paragraphs under reply has no application to the facts of the present case. The Appellant is relying upon the said judgment on the unfounded presumption that the answering respondent is illegally changing the course of the Dhaneshwari river.

43. The contents of paragraphs 43 to 46 of the said appeal are denied. I deny that there is concealment or misleading information about the alleged presence of rivers in the project site, as alleged or otherwise. I deny that there is any contradiction in the EIA Report, as alleged or otherwise. I deny that the alleged impact on alleged creeks within the project has been concealed or that no information has been provided of the said project on the creeks and water bodies, as

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alleged or otherwise. I state that the Appellant itself has reproduced selected portion of the EIA Report in the paragraphs under reply, wherein the facts are stated about the presence of Dhaneshwari river in the project site and presence of other water bodies within 10 km radius. I state and submit that in Chapter 4 of the EIA Report, the impact on all such water bodies is clearly discussed and presented for the consideration of the EAC. I reiterate that the reliance placed by the Appellant on the Sunita Narain Committee report in the said appeal is misconceived.

44. The contents of paragraphs 47 to 52 of the said appeal are denied. I deny that misleading or incorrect information about the alleged presence of mangroves within the project site is given, as alleged or otherwise. I deny that the responses given by the answering respondent are misleading, as alleged or otherwise. I deny that there is an absence of impact assessment on mangroves or that there is a deliberate concealment of mangroves or that there will be destruction of mangroves, as alleged or as sought to be alleged or otherwise. I reiterate that the project site is outside the CRZ area and

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that there are no mangroves within the project site. It is an admitted fact that the presence of mangroves to the south of the project site has been disclosed in the Form – 1 and the EIA Report. I state and submit that a Wildlife Conservation Plan & Mangrove Conservation Plan for the said project has been prepared, which has been submitted to the Divisional Forest Officer (Kutch-East), and the same has been in turn forwarded to the Chief Conservator of Forests and Chief Wildlife Warden of Gujarat State. I state and submit that a perusal of the EIA Report would reveal that a comprehensive impact assessment has been undertaken by the answering respondent in respect of the entire study area (i.e. 10 km radius from project site), including the mangroves found in the study area. I reiterate that the observations and recommendations in the Sunita Narain Committee Report pertain to the activities of APSEZ, and that the MoEF has already issued directions to APSEZ pursuant to the Sunita Narain Committee Report. To the best of my knowledge, APSEZ is complying with such directions of MoEF. I state and submit that the observations and recommendations of the Sunita Narain Committee Report have no bearing on the said project.

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45. The contents of paragraphs 53 to 57 of the said appeal are denied. I deny that information about the flora/fauna surrounding the project site is concealed, as alleged or otherwise. I deny that the correct faunal distribution of the proposed reserved forest is not complete, as alleged or otherwise. I deny that the presence of the said project will have an impact on the faunal species, as alleged or as sought to be alleged or otherwise. I deny that the presence of the said project will push animals into agricultural areas or impact the produce, as alleged or otherwise. I state that it is APSEZ that has applied for diversion of the said forest area admeasuring 1576.81 ha, and Stage-1 forest clearance has already been granted for such proposed diversion. The proposal for diversion of 1576.81 ha forest land also specifies that land use of 125 ha forest land out of the aforesaid total area would be for copper smelter plant of 1 million tonne capacity. However, the said Stage-1 forest clearance is not under challenge in the said appeal. I state and submit that part of the project site is a part of the aforesaid forest area admeasuring around 102.39 ha (i.e. less than 10% of the total forest land proposed to be diverted). I state that

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the forest area in question is proposed to be diverted, irrespective of whether the said project or some other project is developed on a part of such forest land. The Appellant has not initiated any proceedings challenging the diversion of the aforesaid forest land. I state and submit that the EIA Report submitted by the answering respondent pertains to the said project and the study area. Thus, the predominant focus in the said EIA Report is on the forest land that is a part of the project site. During the appraisal of APSEZ's proposal for diversion of 1576.81 ha forest land, a sub-committee of the Forest Advisory Committee ('FAC') made a site visit on 6-7.9.2018, and made the following observations:

A. *The forest land of 1576.81 ha, as proposed for diversion, consists of eight disjunct land parcels within the approved APSEZ area. Each parcel of forest land is surrounded by non-forest lands most of which form part of the SEZ. The vegetation of the forests is predominantly Prosopis juliflora, in bushy form, with occasional occurrence of Acacia nilotica particularly in the forest patch around Sirocha village. The vegetation is thus typical of semi arid climatic area. The forest density ranges from 0.1 to 0.5.*

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As per the latest report of CWLW, Government of Gujarat, the area is not important from wildlife point of view. During the visit, the Sub-Committee observed that most of the forest area consists of Prosopis juliflora in bushy form. Moreover, as observed by the Sub-Committee, the forest areas are not a continuous patch and after the whole 10000 ha area is developed more like an industrial area, the forest patches will hold still less value as true forests."

(emphasis supplied)

A copy of the minutes of the meeting of FAC held on 20.9.2018 reflecting the aforesaid observations is annexed hereto and marked as **Annexure-R8**. In any case, Chapter 3 of the EIA Report discusses the flora and fauna present in the study area and impact on the same in detail.

46. The contents of paragraphs 58 to 62 of the said appeal are denied. I deny that the project site or the study area is a proposed Biodiversity Heritage Site ('BHS'), as alleged or otherwise. I deny that the project site or the study area is a biodiversity rich area, as alleged or otherwise. I deny that the proposal for the said project requires a

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biodiversity impact assessment, as alleged or otherwise. I state and submit that at present there is no proposal to declare any area within the study area as a BHS. As clearly mentioned in the EIA Report, earlier there was a proposal to declare some area as BHS, but such proposal was shelved by Gujarat State Biodiversity Board. I state that the National Biodiversity Authority, India has issued "Guidelines for Identification, Notification and Management of Biodiversity Heritage Sites", wherein BHS are defined and a comprehensive procedure has been laid down for identification and notification of BHS. I state and submit that no area within the study area has been identified or notified as BHS as per the aforesaid guidelines. The Appellant has failed to point out any evidence to demonstrate as to how the project site or the study area is a biodiversity rich area or that the same has the requirements for being declared as BHS. I submit that a mere proposal in the past to declare an area as BHS does not by itself make the area in question a BHS or a biodiversity rich area.

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47. With reference to paragraph 63 of the said appeal, I state that acid mist is not a parameter under the National Ambient Air Quality Standards 2009. Thus, there does not arise any question of measuring acid mist in the Ambient Air Quality. I state that the said project is a greenfield project, and therefore there is no existing emission of acid mist in the said project. It is to be noted that no source of generation of acid mist exist in the study area during the monitoring period. Consequently, there does not arise any question of collecting baseline data regarding emission of acid mist from the project site. It may be pertinent to note that EAC in its recommendations had specified the limits for acid mist emission from the proposed sulphuric acid plant stack. I state that the answering respondent has proposed to monitor acid mist from the proposed sulphuric acid plant stack on monthly basis during plant operation phase as mentioned in Chapter-6 of the EIA Report.

48. With reference to paragraph 64 of the said appeal, I state and submit that the locations of the eight monitoring stations within the study area were finalized in accordance with the applicable guidelines in

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the EIA Manual of MoEF. Further, the justification for choosing each of the aforesaid eight locations for monitoring stations has been explained in the EIA Report at Chapter 3 at Section 3.6.1. I state and submit that the eight monitoring stations, provides the baseline data for the entire study area, one of which is also at the boundary of Danderi Reserve Forest. I deny that the answering respondent has not determined the impact on the reserved forests, as alleged or otherwise. I state and submit that the EIA Report clearly mentions the impact on the reserved forests at Chapter 4.

49. The contents of paragraphs 65 to 68 of the said appeal are denied. In the paragraphs under reply, the Appellant has deliberately compared the data of air quality for 3 separate periods of three to six months in 3 separate years against the limits prescribed for yearly average. As per the National Ambient Air Quality Standards 2009, the yearly average is the annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week, twenty four hourly, at uniform intervals. Therefore, comparison of three-month data of air quality with prescribed limit of yearly

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average is untenable. On perusal of the figures reproduced in the paragraphs under reply, it becomes evident that the three-month of air quality in respect of the said project is well within the limits for 24 hourly standards.

50. With reference to paragraph 69 of the said appeal, I deny that the EIA Report has provided concealed information or has provided misleading data or that there is incorrect determination of the effect on air quality, as alleged or otherwise. I state and submit that the data on Ambient Air Quality mentioned in the EIA Report pertains to the period of October to December 2016. On the other hand, the data relating to the Ambient Air Quality produced in the six monthly EC compliance report by Adani Power Limited and Coastal Gujarat Power Limited are admittedly for the period July-September 2019. Therefore, there cannot be any comparison of both the aforesaid set of data. Therefore, there is no concealment or misrepresentation of data.

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51. With reference to paragraphs 70 to 72 of the said appeal, I state that the air dispersion modelling studies were conducted as per the TOR. Air dispersion modelling was conducted using the air dispersion modelling software (AERMOD version 7.1.0) for predicting of maximum Ground Level Concentrations (GLCs). AERMOD is steady state advanced Gaussian Plume Model that simulates air quality and deposition fields upto 50 km radius. The maximum GLCs due to the point sources was occurring 2.2 km in the NE direction of the said project. This modelling was carried out in line with CPCB modelling guidelines. Following deliberation over the answering respondent's application for environmental clearance, air dispersion modelling studies were repeated using CALPUFF model as per the advice of EAC. As part of ADS reply dated 05.02.2020 (i.e. Additional Details Sought), air dispersion modelling using CALPUFF model was carried out and submitted to EAC. EAC in its minutes of meeting dated 24.02.2020 has acknowledged at paragraph no. 16.11.52 that "*Air Quality Modelling Study was revised using CALPUFF with all site features*.....". As per the said CALPUFF air modelling study, the concentration of PM, SO_2, and

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NO_2 were found to be 0.3 $\mu g/m^3$, 2.0 $\mu g/m^3$ and 0.0070 $\mu g/m^3$, respectively, at a 25 km distance in south direction of the project site. I state that the Marine National park is located more than 30 km in south direction of proposed copper refinery plant project boundary. Thus, the expected concentration of pollutant will be further lower at the Marine National Park as compared to the concentration at a distance of 25 km from the project site, which are already within permissible limits.

52. The contents of paragraphs 73 to 76 of the said appeal are denied. I state that the studies and the guidelines referred to in the paragraphs under reply are neither binding authorities nor have they been recognized in the provisions of law applicable in India. On the basis of such alleged studies/guidelines, it is the argument of the Appellant in the paragraphs under the reply that the secondary formation of particulate matter takes place when SO_2 and NO_x get converted into sulphates and nitrates, resulting into higher concentration of PM_{10} and $PM_{2.5}$. Without prejudice to the foregoing submission, I state that the said argument of the Appellant is untenable, in as much as,

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the data relied upon by the Appellant is a three-monthly data, whereas the comparison being made by the Appellant of such three-monthly data is with the yearly average prescribed under the National Ambient Air Quality Standards 2009. Moreover, the answering respondent has already undertaken CALPUFF air modelling study, wherein chemical transformations (which include the secondary formation of pollutants) are already taken into consideration. As per the CALPUFF air modelling study undertaken for the said project, the results have been found to be within prescribed limits.

53. The contents of paragraph 77 of the said appeal are denied. I deny that no model was run while predicting the GLC using the stack emission details of both existing power plants i.e. CGPL and Adani Power Limited. I state that the impact due to the nearby existing industries (the aforesaid 2 thermal power plants) has been predicted based on AERMOD model and the results have been presented in Table 4.8 of the EIA Report. I state that, in any case both the aforesaid power plants (i.e. CGPL and Adani Power Limited) were

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operational at the time of collection of baseline data. Thus, the baseline data encompasses the impacts due to operation of the said two power plants as well as other sources within the study area. I state that in the EIA Report, the predicted maximum GLC due to the aforesaid two power plants have been compared with the maximum baseline GLC of Station AAQ-8. However, isopleths shown in Figures-4.7 to 4.9 of the EIA Report clearly show that the maximum impact is at a distance of 4.2 kms in the NE direction on CGPL, which is almost 3 kms east of AAQ-8. The resultant cumulative GLC shown in Table 4.6 is for the worst-case scenario, where the maximum GLC of the study area has been added to the maximum predicted incremental concentration due to the said project and the proposed cement grinding unit. The resultant cumulative GLC is within the prescribed limits stipulated by CPCB.

54. The contents of paragraphs 78 to 85 of the said appeal are denied. I deny that forest land can be used only for non-site specific activities, as alleged or otherwise. I deny that 'connectivity' is the only reason for choosing the location of the project site, as alleged or as sought

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to be alleged or otherwise. I deny that the only criteria taken into consideration while selecting the project site is proximity of the site to existing source of power and water and existing approach road, as alleged or otherwise. I deny that the Site-3 is more compatible with an industrial land use, as alleged or otherwise. I deny that multiple natural streams pass through the project site, as alleged or otherwise. I deny that that there is concealment of information in Form 1 by the answering respondent, as alleged or otherwise. In the paragraphs under reply, the Appellant has placed reliance upon the Technical Guidance Manual for Metallurgical Industry (hereinafter referred to as the 'Guidance Manual') prepared by IL&FS Ecosmart Limited. I reiterate that the said Guidance Manual neither has any binding authority nor any legal force. Thus, the reliance placed upon the same by Appellant in alleging that the project site is not in accordance with such alleged guidelines, is misconceived. Without prejudice to the said submission, I submit that the paragraphs under reply reflect the misconceived notion of the Appellant that the 102.39 ha forest land is sought to be diverted for the said project. I reiterate that the forest land in question admeasuring 1576.81 ha is

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sought be diverted for the purposes of developing SEZ/Industrial Park. The proposal for diversion of 1576.81 ha forest land also specifies that land use of 125 ha forest land out of the aforesaid total area would be for copper smelter plant of 1 million tonne capacity. It may be pertinent to note that the Appellant has not challenged the Stage-1 approval granted to APSEZ for diversion of 1576.81 ha of forest land either in the said appeal or any other proceedings to the best of my knowledge. The aforementioned 102.39 ha forest land is part of 1576.81 ha forest land being diverted for SEZ/Industrial Park. Thus, irrespective of the development of the said project, the 102.39 ha forest land is sought to be diverted. Clearly, the averments of the Appellant that 102.39 ha forest land is being diverted for alleged non-site specific activity are misconceived. In any case the applicable provisions of law do not completely bar location of non-site specific projects on forest land. I reiterate the submissions made in the earlier paragraphs in respect of how the project site is a better compared to Site-3, environmentally and technically, for the said project.

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55. With reference to paragraphs 86 to 90 of the said appeal, I deny that the answering respondent has not made a correct representation to the EAC, as alleged or as sought to be alleged or otherwise. I deny that the social impact assessment in EIA Report does not discuss issues raised during public hearing, as alleged or otherwise. I deny that the EAC has failed to consider the objections or has failed to independently determine whether the said project should have been allowed, as alleged or otherwise. I deny that the answering respondent or the EAC have disregarded the objections raised during the public hearing, as alleged or otherwise. I state and submit that the objections raised during the public hearing and the response of the answering respondent is a matter of record, and I deny anything contrary to the record. I state that all the concerns raised during the public hearing were considered and suitably responded to by the answering respondent. Accordingly, the answering respondent prepared an action plan and proposed a Corporate Environment Responsibility ('CER') budget of Rs.58 crores. Further, the details of the public hearing alongwith the action plan was produced before the EAC in Chapter 7 of the EIA Report. The Appellant has

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conveniently not annexed the said relevant portion of the EIA Report. I state and submit that the EAC has examined the various concerns/ objections raised during the public hearing as well as the written communications received by MoEF, and has also examined the responses and action plan submitted by the answering respondent. After consideration of the aforesaid material, EAC has recommended the said project for environmental clearance with specific conditions to protect the environment and to ensure socio-economic development of the people residing in the study area. I submit that the judgment referred to in the paragraph under reply has no application to the facts of the present matter.

56. With reference to paragraphs 91 to 101 of the said appeal, I state and submit that the facts pertaining to the meetings of EAC for consideration of the application of the answering respondent seeking environmental clearance for the said project is a matter of record, and I deny anything contrary to the record. I reiterate that no mangroves are present within the project site. The said fact has also been recognized by the sub-committee of the EAC during the site

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visit and is recorded in the minutes of the meeting of EAC held during 23-24.12.2019. I deny that there is a faulty appraisal by the EAC, as alleged or otherwise. I deny that the EAC accepted statements of the answering respondent without verifying ecological sensitivity of the area or without directing for a robust EIA, as alleged or otherwise. I deny that the EAC failed to carry out a detailed scrutiny of the said project or failed to give reasoning, as alleged or otherwise. I deny that there is presence of thousands of trees in the project site, as alleged or otherwise. I deny that objections in the public hearing have not been considered in the EIA Report, as alleged or otherwise. I reiterate the averments made in the foregoing paragraphs narrating as to how the EAC held 4 detailed meetings, and also appointed a sub-committee for inspection of the project site, considered the comprehensive EIA Report, including the details of the public hearing, and granted the said EC only after being satisfied by the responses of the answering respondent to all the concerns/queries raised by the EAC during detailed scrutiny of the said project. I state and submit that the judgment referred to in

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the paragraphs under reply is not applicable to the facts of the present case.

57. The contents of Ground A of the said appeal are denied. I deny that the said EC has been obtained by fraud or concealment or misrepresentation, as alleged or otherwise. I deny that the answering respondent has carried out a faulty EIA, as alleged or in the manner alleged or otherwise. I state and submit that the Appellant has only made bald allegations without any substantiation. As would be evident from the submissions in the earlier paragraphs, none of the allegations made by the Appellant have merit.

58. With reference to Ground B of the said appeal, I deny that the answering respondent has illegally chosen to use the project site for construction, as alleged or otherwise. I reiterate that the Appellant's averments in the paragraph under reply are made on the basis of a misconceived notion that the 102.39 ha of forest land which is a part of the project site is being diverted for the said project. I reiterate that the 102.39 ha of forest land is part of 1576.81 ha of forest land

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which is sought to be diverted by APSEZ for SEZ/Industrial Park. I reiterate that Guidance Manual being relied upon by the Appellant has no legal force and is not a binding authority.

59. With reference to Ground C of the said appeal, I reiterate that the answering respondent has carried out a cumulative impact assessment in respect of the said project, and the same is evident from the EIA Report.

60. With reference to Grounds D and E of the said appeal, I deny that the answering respondent has concealed crucial information in Form-1, as alleged or as sought to be alleged or otherwise. I state and submit that there does not arise any question of invalidating the EC process, as alleged or otherwise. I reiterate the contents of the earlier paragraphs in respect of the submission of Form-1 and other particulars by the answering respondent. I submit that the judgments referred to in the paragraph under reply have no application to the present matter.

NOTARY

For, Adani Enterprises Limited

Authorised Signatory

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61. With reference to Ground F of the said appeal, I deny that the EAC failed to verify the statements made by the answering respondent, or that the EAC simply accepted the statements of the answering respondent and its consultant without application of mind, as alleged or otherwise. I submit that the judgment referred to in the paragraph under reply have no application to the present matter.

62. With reference to Ground G of the said appeal, I deny that the answering respondent has failed to carry out an EIA of the project, as alleged or otherwise. I deny that the baseline parameters for air quality have been incorrectly taken, as alleged or otherwise. I reiterate that the said EC has been recommended by the EAC after examining the comprehensive EIA Report, ADS filed by the answering respondent and EAC Sub-committee's site visit. Once again, the 102.39 ha forest land is not sought to be diverted for the said project, but is sought to be diverted for SEZ/Industrial Park of APSEZ. The said project is being set up, inter alia, in the SEZ of APSEZ, and proposes to include aforesaid 102.39 ha forest land.

For, Adani Enterprises Limited

Authorised Signatory

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63. With reference to Ground H of the said appeal, I deny that the EIA Report is lacking or it is not in compliance of the TORs issued to the answering respondent, as alleged or otherwise. I deny that the said EC is liable to be quashed, as alleged or otherwise. I submit that the judgment referred to in the paragraph under reply have no application to the present matter.

64. With reference to Ground I of the said appeal, I deny that the EAC or MoEF have not considered issues or have not conducted appraisal in accordance with Precautionary Principle or Principle of Sustainable Development, as alleged or otherwise. I deny that EAC has appraised the said project in haste or without scrutinizing the EIA Report or other documents submitted by the answering respondent, as alleged or otherwise. I deny that the said EC is liable to be quashed, as alleged or otherwise. I submit that the judgment referred to in the paragraph under reply have no application to the present matter.

NOTARY VIJAY C. SHAH AHMEDABAD

For, Adani Enterprises Limited

Authorised Signatory

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65. With reference to Ground J of the said appeal, I deny that the EAC has failed to carry out appraisal through detailed scrutiny, as alleged or as sought to be alleged or otherwise. I deny that there has been an abject failure of the due process of law, as alleged or otherwise. I deny that the said EC must be invalidated, as alleged or otherwise. I submit that the judgment referred to in the paragraph under reply have no application to the present matter.

66. With reference to the unnumbered paragraph in respect of 'LIMITATION' after Ground J, I deny that the said appeal was made within a period of 60 days from the date of issuance of the said EC. I state that the said EC was issued on 8.5.2020, whereas the said appeal was admittedly filed on 29.7.2020 (i.e. after a period of 82 days). I state that the pandemic is a mere excuse being given by the Appellant for delay in filing of the said appeal. I state that the unlocking process following the lock-down had already started from 1.6.2020 in the State of Gujarat. Further, the documents annexed to the said appeal are available in public domain on the internet and therefore there does not arise any question of collecting the same or

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sending it to counsel. The President of the Appellant has affirmed the affidavit in the said appeal on 25.6.2020 at Mundra, Gujarat. It may be pertinent to note that the President of the Appellant has also affirmed the affidavit in IA no. 68 of 2020 (seeking condonation of delay) on 25.6.2020, and in the very IA has claimed that the said appeal was ready only by 29.7.2020. I state and submit that the neither the said appeal nor the IA no. 68 of 2020 discloses any sufficient cause for the delay in filing of the said appeal. In the circumstances, the said appeal is required to be dismissed as barred by the limitation prescribed under Section 16 of the NGT Act.

67. In light of the aforesaid submissions, I state and submit that the said appeal is required to be dismissed with costs. I state and submit that the Appellant is not entitled to any reliefs, much less the relief sought in the said appeal.

NOTARY VIJAY C. SHAH AHMEDABAD

What is stated in paragraphs 1, 17(part), and 21 is true to my knowledge and belief, what is stated in paragraphs 3(part), 4 to 15, 16(part), 18(part), 19(part), 20(part), 25(part), 26(part), 27(part), 28(part), 31(part), 32(part), 34(part), 35(part), 37(part), 39(part), 40(part), 41(part), 42(part), 43(part),

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44(part), 45(part), 46(part), 47(part), 48(part), 49(part), 50(part), 51(part), 52(part), 53(part), 54(part), 55(part), 56(part), 58(part), 59(part), 60(part), 62(part), and 66(part) is based on information and record, which I believe to be true, and what is stated in paragraphs 2, 3(part), 16(part), 17(part), 18(part), 19(part), 20(part), 22 to 24, 25(part), 26(part), 27(part), 28(part), 29, 30, 31(part), 32(part), 33, 34(part), 35(part), 36, 37(part), 38, 39(part), 40(part), 41(part), 42(part), 43(part), 44(part), 45(part), 46(part), 47(part), 48(part), 49(part), 50(part), 51(part), 52(part), 53(part), 54(part), 55(part), 56(part), 57, 58(part), 59(part), 60(part), 61, 62(part), 63 to 65, 66(part), and 67 are legal submissions.

Solemnly affirmed at Ahmedabad this 12th day of November 2020.

Identified by

Adv. for R-1.

For, Adani Enterprises Limited

DEPONENT Authorised Signatory

NOTARY VIJAY C. SHAH AHMEDABAD GUJARAT STATE

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BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
AT ITS WESTERN ZONE BENCH AT PUNE

(Appeal under Section 16(h) of the National Green Tribunal Act, 2010)

APPEAL NO. 35 OF 2020 (WZ)

IN THE MATTER OF:

Kheti Vikas Seva Trust ... Appellant

Versus

Adani Enterprises Limited and others ... Respondents

VERIFYING AFFIDAVIT IN SUPPORT OF THE REPLY FOR AND ON BEHALF OF THE RESPONDENT NO. 1 – ADANI ENTERPRISES LIMITED

I, Santosh Kumar Singh, son of Shri Bhuwaneshwar Singh, aged about 50 years, being the Authorized Representative of Adani Enterprises Limited, having address at Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382 421, do hereby on solemn affirmation state and declare as follows:

NOTARY VIJAY C. SHAH AHMEDABAD

For, Adani Enterprises Limited

Authorised Signatory

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1. I state that I am the Authorized Representative of Adani Enterprises Limited – the Respondent No.1 in the aforesaid Appeal No.35 of 2020. I am fully aware of the facts of the case and have been authorized to swear this affidavit on behalf of the Respondent No.1.

2. I hereby verify and state that what is stated in paragraphs 1, 17(part), and 21 of the accompanying reply is true to my knowledge and belief, what is stated in paragraphs 3(part), 4 to 15, 16(part), 18(part), 19(part), 20(part), 25(part), 26(part), 27(part), 28(part), 31(part), 32(part), 34(part), 35(part), 37(part), 39(part), 40(part), 41(part), 42(part), 43(part), 44(part), 45(part), 46(part), 47(part), 48(part), 49(part), 50(part), 51(part), 52(part), 53(part), 54(part), 55(part), 56(part), 58(part), 59(part), 60(part), 62(part), and 66(part) of the accompanying reply is based on information and record, which I believe to be true, and what is stated in paragraphs 2, 3(part), 16(part), 17(part), 18(part), 19(part), 20(part), 22 to 24, 25(part), 26(part), 27(part), 28(part), 29, 30, 31(part), 32(part), 33, 34(part), 35(part), 36, 37(part), 38, 39(part), 40(part), 41(part), 42(part), 43(part), 44(part), 45(part), 46(part), 47(part), 48(part), 49(part),

NOTARY VIJAY C. SHAH AHMEDABAD GUJARAT STATE

For, Adani Enterprises Limited

Authorised Signatory

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50(part), 51(part), 52(part), 53(part), 54(part), 55(part), 56(part), 57, 58(part), 59(part), 60(part), 61, 62(part), 63 to 65, 66(part), and 67 of the accompanying reply are legal submissions.

For, Adani Enterprises Limited

Place: Ahmedabad
Date: 12th November 2020

DEPONENT
Authorised Signatory

VERIFICATION

I, Santosh Kumar Singh, son of Shri Bhuwaneshwar Singh, aged about 50 years, being the Authorized Representative of Adani Enterprises Limited, having address at Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382 421, do hereby state that what is stated in the aforesaid affidavit is true and correct to the best of my knowledge, belief, and information.

Identified by
Adv. for R-1.

For, Adani Enterprises Limited

Place: Ahmedabad
Dated: 12th November 2020

DEPONENT
Authorised Signatory

SOLEMNLY AFFIRMED
BEFORE ME

VIJAY C. SHAH
NOTARY
GOVT. OF INDIA

NOTARY
VIJAY C. SHAH
AHMEDABAD
GUJARAT STATE
REGD. NO. 2260
GOVT. OF INDIA

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ANNEXURE - R1

adani

AEL/Copper/Mundra/MoEFCC/Env/Amd/April/Out-1

Date: 21 April 2016

To,

The Director (IA-Industry-1)
Ministry of Environment, Forest & Climate Change
3rd Floor, Indira Paryavaran Bhawan
Jorbagh, New Delhi – 110003

Kind Attn: Dr. Satish C. Garkoti

Subject: Application in Form-1 to obtain TOR for setting up new Copper Smelter plant at Mundra, District Kutch, Gujarat.

Dear Sir,

I, Santosh Kumar Singh, authorized by resolution dated 1st March 2016 of the Board of Directors of the company "Adani Enterprises Limited (AEL)", hereby apply in Form-1 to obtain the Terms of Reference (TOR) for environmental studies and clearance process for setting up a new Copper Smelter plant at Mundra, District Kutch, Gujarat.

Form-1 with proposed TOR and Project Feasibility Report for the above mentioned project is being submitted online for your kind consideration to grant the TOR please.

Thanking You.

Sincerely,

Authorised Signatory

For, Adani Enterprises Limited

(Santosh Kumar Singh)

Head – Environment

Adani Enterprises Ltd
Sambhaav House
Judges Bungalow Road, Bodakdev
Ahmedabad 380 015
Gujarat, India
CIN: L51100GJ1993PLC019067

Tel +91 79 2555 7235
Fax +91 79 2555 7216
info@adani.com
www.adani.com

Registered Office: Adani House, Nr Mithakhali Circle, Navrangpura, Ahmedabad 380 009, Gujarat, India

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APPENDIX I

(See Paragraph-6)

FORM 1

Note : If space provided against any parameter is inadequate,Kindly upload supporting document under 'Additional Attachments if any' at the last part of the Form1. Please note that all such Annexures must be part of single pdf document.

(I)Basic Informations

S.No.	Item	Details
1.	Name of the Project	Proposed 10 LTPA Copper Project
2.	Project Sector	Industrial Projects - 1
3.	Location of the project	Mundra, Gujarat
4.	Shape of the project land Uploaded GPS file Uploaded copy of survey of India Toposheet	Block (Polygon) Annexure-GPS file Annexure-Survey of india toposheet
5.	Brief summary of project	Annexure-Brief summary of project
6.	State of the project	Gujarat

Details of State of the project

S.no	State Name	District Name	Tehsil Name
(1.)	Gujarat	kutch	Mundra

7.	Town / Village	Siracha and Navinal
8.	Plot/Survey/Khasra No.	APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), un-surveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL
9.	S. No. in the schedule	3(a) Metallurgical industries (ferrous & non ferrous)
10.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number or wells to be drilled	Proposed Production Capacity: a. Copper Smelter Plant - 9 LTPA b. Copper Scrap Melting Facility - 1 LTPA c. Copper Refinery Plant - 10 LTPA d. Continuous Cast Copper Rod Plant - 5 LTPA e. Sulphuric Acid Plant - 30 LTPA f. Phosphoric Acid Plant - 5 LTPA g. Aluminum Fluoride Plant - 30,000 TPA h. Selenium Recovery Plant - 288 TPA i. Precious Metal Recovery Plant i. Gold – 50 TPA ii. Silver – 500 TPA j. Oxygen (Industrial) Plant – 90,000 TPM (95% Purity) k. Waste Heat recovery boiler b ha.
11.	New/Expansion/Modernization	New
12.	Category of project i.e. 'A' or 'B'	A
13.	Does it attract the general condition? If yes, please specify	No
15.	Does it attract the specific condition?	No

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16.	Is there any litigation pending against the project?	No
17.	Nearest railway station along with distance in kms.	Adipur/Gandhidham, 65 km
18.	Nearest airport along with distance in kms	Bhuj, 55 km
19.	Nearest Town/City/District Headquarters along with distance in kms	Mundra , 22 km
20.	Details of alternative sites examined shown on a toposheet	Yes
	Uploaded details	Annexure-Uploaded details
21.	Whether part of interlinked projects?	No
22.	Whether the proposal involves approval/clearance under the Forest (Conservation)Act,1980?	Yes
	Status	Forest Clearance Under Process
	MoEF file number	8-04/2016-FC
	MoEF file number	1576.81ha.
23.	Whether the proposal involves approval/clearance under the wildlife (Protection)Act,1972?	No
24.	Whether the proposal involves approval/clearance under the C.R.Z notification,2011?	No
25.	Whether there is any Government Order/Policy relevent/relating to the site?	No
26.	Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	No
27.	Project Cost(in lacs)	1000000

Activity

1 Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S.No	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
	Permanent or temporary change in land use, land cover		381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Permanent change in land cover

1.1	or topography including increase in intensity of land use (with respect to local land use plan)	Yes	and topography will occur due to construction of the proposed industry. Further, forest land of 253 acres (102.38 ha) is also involved which will be converted for industrial use. Forest Clearance is under pursuance, file number is 8-04/2016-FC.
1.2	Clearance of existing land, vegetation and buildings?	Yes	Some shrubs / weeds (mainly prosopis juliflora) present at the site shall be cleared.
1.3	Creation of new land uses?	Yes	381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Permanent change in land cover and topography will occur due to construction of the proposed industry. Further, forest land of 253 acres (102.38 ha) is also involved which will be converted for industrial use. Forest Clearance is under pursuance, file number is 8-04/2016-FC.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	Yes	Will be done prior to construction
1.5	Construction works?	Yes	Construction of manufacturing plants and related ancillary facilities will be carried out
1.6	Demolition works?	No	Not envisaged
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	The temporary labour colony will be constructed for construction workers.
1.8	Above ground buildings, structures or earthworks including linear structures,cut and fill or excavations and fill or excavations	Yes	Construction of manufacturing plants and related ancillary facilities will be carried out.
1.9	Underground works including mining or tunneling?	No	Not envisaged
1.10	Reclamation works?	No	Not envisaged
1.11	Dredging?	No	Not envisaged
1.12	Offshore structures?	No	Not envisaged
1.13	Production and manufacturing processes?	Yes	Covered in Pre-feasibility report
1.14	Facilities for storage of goods or materials?	Yes	There will be storage of Copper Concentrate and Rock Phosphate in covered sheds, storage and handling area, other required raw materials & chemical, Furnace Oil, LPG/ NG for process requirement and HSD for DG set as power backup.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	Solid waste management and effluent treatment will be provided and the details are given

			in the Pre-Feasibility Report.
1.16	Facilities for long term housing of operational workers?	No	About 2000 operation workers will be employed. No separate township has been planned for Copper complex. The house for O&M personnel would be provided at APSEZ existing township by augmenting the township, which is around 30 km away from the proposed Copper Complex.
1.17	New road, rail or sea traffic during construction or operation?	Yes	New approach road will be constructed.
1.18	New road, rail, air water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	Yes	New approach road will be constructed. In addition, conveyor belt for transfer of Copper Concentrate and Rock Phosphate from existing Adani West Port to the site will be built.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	Not anticipated.
1.20	New or diverted transmission lines or pipelines?	Yes	New transmission line shall be constructed for construction and operational power tapping from APSEZ Ltd through M/s. Mundra Utility Pvt Ltd.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No	Not envisaged
1.22	Stream crossings?	Yes	Natural drainage passing through the site will be suitably trained and maintained. There will not be any diversion. Further, conveyer for Copper Concentrate and Rock Phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required.
1.23	Abstraction or transfers of water from ground or surface waters?	No	Desalinated water will be supplied by APSEZ Ltd.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	Not envisaged
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Existing approach road to site shall be initially used for movement of personal and transport. For permanent and long term movement of personal and transport of material, new approach road construction or strengthening of existing approach road shall be done as submitted above in Sr. No. 1.17. During operational phase, Copper Concentrate and Rock Phosphate supply will be through conveyor belt and transportation of products through Trucks/ Trailers

			and tankers etc.
1.26	Long-term dismantling or decommissioning or restoration works?	No	Not envisaged
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	Not envisaged
1.28	Influx of people to an area in either temporarily or permanently?	Yes	Approximately 3000 persons will be employed during construction phase and about 2000 people will be employed during operation phase.
1.29	Introduction of alien species?	No	Not envisaged
1.30	Loss of native species or genetic diversity?	No	Not envisaged
1.31	Any other actions?	No	Not envisaged

2 Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	The total land required for Copper project is 634 acres (256.57 ha). Identified land area is not an agricultural land but part of land already designated/recorded as Industrial Land under APSEZ and presently undeveloped. Remaining part of the above land is reserve forest land (253 acres (102.38 ha)), which has been applied for forest clearance.
2.2	Water (expected source & competing users) unit: KLD	Yes	Total 32,800 KLD desalinated water will be sourced from APSEZ Ltd.
2.3	Minerals (MT)	Yes	Total Copper Concentrate consumption for Copper plant is about 32 LTPA and will be imported from Chile/ Brazil/ Canada/ Australia, etc. and also from domestic market as available. Total Rock Phosphate consumption for Phosphoric Acid Plant is about 17.5 LTPA and will be imported from Morocco/ Jordan/ Egypt/ Australia, etc. and also from domestic market as available.
2.4	Construction material – stone, aggregates, sand / soil	Yes	Construction material such as sand, steel, aggregates, etc. will be used. However, the quantification of these materials

	(expected source – MT)		will be done during detailed engineering stage. These materials will be sourced from local areas.
2.5	Forests and timber (source – MT)	No	Not envisaged
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT),energy (MW)	Yes	Construction phase: The construction power need of around 20 MW would be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd. Operational phase: The estimated power demand for the Copper Smelter plant is 300 MW. Out of this, 40 MW will be generated from internal process steam by heat recovery. Whereas, the remaining 260 MW power will be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd.
2.7	Any other natural resources (use appropriate standard units)	Yes	Silica Sand – 320,000 TPA Quartz – 144,000 TPA Limestone – 80,000 TPA

3 Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies	Yes	A detailed risk assessment will be done for the hazardous installations as per applicable Acts and Rules and Emergency plan will be drawn up.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	Not envisaged
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	Approximately 3000 persons will be employed during construction phase and approx. 2000 people will be employed during operation phase and it would generate employment opportunities for local people and indirect employment also.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	No	Not envisaged
3.5	Any other causes	No	Not envisaged

4 Production of solid wastes during construction or operation or decommissioning (MT/month)

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	
4.2	Municipal waste (domestic and or commercial wastes)	Yes	Canteen waste will be vermi-composted and used as manure for green belt development. Other municipal waste, if any, will be properly collected and disposed off as per the provision of Municipal Waste Rules.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	The hazardous waste such as spent oil, batteries etc. will be generated which will be disposed as per HW rule. Sludge from ETP will be disposed as per Hazardous waste management rule. Details are mentioned in the PFR Report
4.4	Other industrial process wastes	Yes	Approx. average 5,500 TPD Copper Slag (Iron Silicate/ Ferro Sand) from Copper Smelting Process will be generated. Approx. average 7,000 TPD of Phospho Gypsum from Phosphoric Acid Plant will be generated. The Copper Slag (Iron Silicate/ Ferro Sand) will be utilized in Road/ Embankment Making, Land development, Cement Manufacturing, Shot Blasting, etc. & Phospho Gypsum will be used largely in Cement Manufacturing and as fertilizer.
4.5	Surplus product	Yes	Covered in Pre-feasibility report
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Sewage sludge will be used as manure and Sludge from ETP will be disposed as per Hazardous Waste Management Rules.
4.7	Construction or demolition wastes	Yes	All the construction waste will be re-used for filling up in low lying areas on which soil cover will be given and will be used for as filler materials in landscaped areas.
4.8	Redundant machinery or equipment	Yes	For each equipment there would be always redundant machinery or equipments to cater during the Break-down/Planned maintenance
4.9	Contaminated soils or other materials	No	Not envisaged
4.10	Agricultural wastes	No	Not envisaged
4.11	Other solid wastes	No	Not envisaged

5 Release of pollutants or any hazardous, toxic or noxious substances to air(Kg/hr)

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	Exhaust emissions from vehicles and equipment deployed during the construction and operational phases result in marginal emissions of SO2, NOX and CO.
5.2	Emissions from production processes	Yes	The emissions will be reduced with the latest environmental technology and will be well within the permissive levels, as: Sulphur Dioxide (SO2): Wet Scrubbers and dispersed through adequate stack height. Hydrogen Fluoride (HF): Scrubbing and dispersed through adequate stack height. Particulate Matter: Bag Filters, ESP, Wet Scrubbers and Cyclones.
5.3	Emissions from materials handling including storage or transport	Yes	Copper concentrate and Rock phosphate will be transported through closed conveyor system. Bag filters will be installed as required. Other raw material and chemicals required for the production processes will be transported with covered truck to ensure that no dust is generated during transportation.
5.4	Emissions from construction activities including plant and equipment	Yes	Fugitive dust is envisaged from transportation of sand, soil etc. during construction activity. These will be transported with covered truck to ensure that no dust is generated during transportation.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	Please refer S. No. 5.4. There will be no odour generation substances.
5.6	Emissions from incineration of waste	No	Not envisaged
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	Not envisaged
5.8	Emissions from any other sources	No	Not envisaged

6 Generation of Noise and Vibration, and Emissions of Light and Heat:

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	All the equipment would be designed on enclosure type so that noise level will be restricted within the permissible limit of exposure.
6.2	From industrial or similar processes	Yes	The other sources of noise will be large rotating machines (e.g., compressors, turbines, pumps, electric motors, air coolers, and fired heaters). But regular maintenance of the equipment will help in reducing these noise levels. Acoustic enclosures & anti-vibration pads will be provided. Necessary PPEs will be provided to employees. The green belt proposed at the periphery of the plant. General recommendations for noise management are provided in the General EHS Guidelines.
6.3	From construction or demolition	Yes	During construction stage, the noise level would be kept within the permissible limit.
6.4	From blasting or piling	Yes	Blasting is not envisaged. Piling work will be carried out for different foundation requirements. Sufficient protection to workers will be provided. Vibrations are expected during initial construction stage.
6.5	From construction or operational traffic	Yes	The noise levels from traffic will be maintained well within norms specified by CPCB / GPCB. Minor noise will be generated during the construction phase.
6.6	From lighting or cooling systems	No	Not envisaged
6.7	From any other sources	No	Not envisaged

7 Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
			Minor spills/leakage of liquids occurs on rare occasions, typically

7.1	From handling, storage, use or spillage of hazardous materials	Yes	during normal maintenance activities. Appropriate system available to route the spills/leakage liquids for treatment. No contamination of land or water because of appropriate flooring.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	Yes	Treated wastewater from STP and ETP will be reused for Horticulture/Gardening. ETP sludge will be sent to authorized disposal facility.
7.3	By deposition of pollutants emitted to air into the land or into water	No	Not envisaged
7.4	From any other sources	No	Not envisaged
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	Not envisaged

8 Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	Petroleum Products (e.g. Furnace Oil, Diesel & LPG) and Met Coke & Pet Coke would be stored in plant Battery Limit. Appropriate fire-fighting arrangement would be set up on the site. No other hazardous substances are envisaged to be used including use of explosives in the Copper Smelter Plant projects. Proper approval and design of storage &handling systems as per "Indian Explosive Act" would be taken. Risk assessment study will be carried out.
8.2	From any other causes	No	Not envisaged
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	Yes	Earthquakes and floods can occur. Earthquake risks: The project site falls in seismic zone-V as per IS 1893 (Part-I): 2002. The plant facility will be designed as per the BIS requirements for earth quake resistant. Flood risk: Chances of occurrence of flood is minimal due to Evacuation of floodwater through natural drainage and drainage system, as the terrain in the study area is flatter with gentle slope towards SW direction.

9 Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting.lities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: ◦ Supporting infrastructure (roads, power supply,waste or waste water treatment, etc.) ◦ housing development ◦ extractive industries ◦ supply industries ◦ Other	Yes	The proposed plant will result in considerable growth of service sector, which will lead to supporting and ancillary development in the region. There will be a possibility of extractive and supply industries in the region.
9.2	Lead to after-use of the site, which could have an impact on the environment	No	Not envisaged
9.3	Set a precedent for later developments	Yes	Ancillary industries and extractive industries may develop as a consequence.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	Existing Coastal Gujarat Power Ltd. (CGPL) (5x800 MW), Adani Power Limited (4620 MW) and proposed Copper Smelter plant will have cumulative effect. Cumulative impact assessment will be included in the detailed EIA study.

(III) Environmental Sensitivity

S.No	Areas	Name/Identity	Aerial distance (within 15km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	No	Nil
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yes	Reserve Forests: Dandedri RF (within project area) Mundra Mangrove RF (south of project area) Navinal RF (0.5 km, E) Mundra Dhoa RF (0.7 km, SE) Water Bodies Kotri creek (0.5 km, S) Khari Nadi (1.9 km, W) Gulf of Kachchh (3.9 km, S) Nagavanti Nadi (4.7 km, E) Phot Nadi (8.7 km, ENE)

3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Yes	Mundra Mangrove RF (south of project area)
4	Inland, coastal, marine or underground waters	Yes	Gulf of Kachchh (3.9 km, S) Kotri creek (0.5 km, S)
5	State, National boundaries	No	Nil
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	Nil
7	Defence installations	No	Nil
8	Densely populated or built-up area	Yes	Mundra (22 km)
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Yes	Hospitals, schools, places of worship and other general community facilities exist in the study area.
10	Areas containing important, high quality or scarce resources.(ground water resources,surface resources,forestry,agriculture,fisheries,tourism,minerals)	Yes	Kotri creek (0.5 km, S) Khari Nadi (1.9 km, W) Gulf of Kachchh (3.9 km, S) Nagavanti Nadi (4.7 km, E) Phot Nadi (8.7 km, ENE)
11	Areas already subjected to pollution or environmental damage.(those where existing legal environmental standards are exceeded)	No	Nil
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects	Yes	The project area falls under seismic zone-V as per IS: 1893 (Part-1): 2002.

(IV) PROPOSED TERMS OF REFERENCE FOR EIA STUDIES

1	**Uploaded Proposed TOR File**	Annexure-TOR file
2	**Uploaded scanned copy of covering letter**	Annexure-scanned copy of covering letter
3	**Uploaded Pre-Feasibility report(PFR)**	Annexure-PFR

(V) Undertaking

The aforesaid application and documents furnished here with are true to my knowledge

V. (i)	**Name of Applicant**	Santosh
	Designation	Head Env and Authorised Signatory for AEL
	Name of Company(Applicant Name should not be given here)	ADANI ENTERPRISES LTD
	Address	Adani House, Near Mithakali Circle, Navrangpura, Ahmedabad 380009, Gujarat

ANNEXURE - R2


Deshalpar
Bidada
SITE-1
Gundala
Moti Bhujpar
Mota Kapaya
Shekhadiya
Mota Kandagra
Shiracha
Mundra
Tragadi gham
Jarpara
SITE-2
Vandh
SITE-3

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

FINAL EIA REPORT

Volume -I

Sponsor :

adani™

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

Prepared by :

Vimta
Driven by Quality, Inspired by Science.

Vimta Labs Limited
142, IDA, Phase-II, Cherlapally
Hyderabad–500 051, Telangana State
env@vimta.com, www.vimta.com
(NABL Accredited and ISO 17025 Certified Laboratory,
Recognized by MoEF&CC, New Delhi)

December, 2018

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PREFACE

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

Volume-I
Final EIA Report

For and on behalf of VIMTA Labs Limited

Approved by : **M. Janardhan**

Signed :

Position : **Head & Vice President (Env)**

Date : 6th December, 2018

The report has been prepared inline with the prescribed TORs issued vide letter No.J-11011/113/2016-IA.II(I) dated 21st June 2016 of Ministry of Environment, Forests and Climate Change, New Delhi.

This report has been prepared by **Vimta Labs Limited** with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

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DECLARATION

Declaration by Experts Contributing to the Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA Coordinator: M. Janardhan

Name: **M. Janardhan**

Signature & Date: 2018/12/06

Period of Involvement: June 2016 to November 2018

Contact Information: 040-27264141/ 9000711309

Functional Area Experts:

Sr. No.	Functional Areas	Name of the Expert/s	Involvement		Signature & Date
			Period	Task	
1	AP	M. Janardhan	Jun 2016 to Nov 2018	Selected AAQ stations based on IMD data. Identified the sources of pollution and suggested mitigation measures and management plan.	2018/12/06
2	WP	Bh. Durga Bhavani	Jun 2016 to Nov 2018	Selecting the water sampling location. Identified the wastewater streams and effective treatment measures are suggested.	06.12.2018
3	SHW	M. Janardhan	Jun 2016 to Nov 2018	Effective solid waste and hazardous management for the entire project is suggested	2018/12/06
4	SE	Ch. Venkatesham	Jun 2016 to Nov 2018	Social changes arising due to the project has been assessed.	06/12/2018
5	EB	Rajashekar Tummala	Jun 2016 to Nov 2018	Conducted primary survey in the study area and identified impacts & suggested	2018/12/6
6	HG	J Rajendra Prasad	Jun 2016 to Nov 2018	Reviewed secondary and primary data and identified impacts & mitigation measures and environment management plan	06/12/2018
7	NV	M. Janardhan	Jun 2016 to Nov 2018	Identified monitoring location suggested suitable mitigation measures for construction and operation phases	2018/12/06
8	AQ	M. Janardhan	Jun 2016 to Nov 2018	Quantified the emissions using AERMOD. Suggested Management Plan.	2018/12/06

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Sr. No.	Functional Areas	Name of the Expert/s	Involvement		Signature & Date
			Period	Task	
9	LU	J Rajendra Prasad	Jun 2016 to Nov 2018	Present land use pattern as per satellite imagery has been studied and presented. Identified impacts and management plan.	06/12/2018
10	RH	Rajgopal Krishnan	Jun 2016 to Nov 2018	Identified the hazards and recommended the suitable measures	06/12/2018
11	SC	B. S. Lole	Jun 2016 to Nov 2018	Involved in baseline soil sampling. Identified the impacts and suggested suitable mitigation measures.	06/12/2018

Other Team Member involved in EIA Report preparation:

Sr. No	Functional Areas	Name of the Expert/s	Involvement		Signature & Date
			Period	Task	
1	WP	K S Vishnu Teja	Jun 2016 to Nov 2018	Identified the impacts and mitigation measures related to water consumption and treatment process	2018/12/06
2	RH	K S Vishnu Teja	Jun 2016 to Nov 2018	Identified the hazards and data collection	2018/12/06
3	SE	CH Narendra	Jun 2016 to Nov 2018	Prepared the demographics as per 2011 census	2018/12/06
4	HG	K Rajeshwar	Jun 2016 to Nov 2018	Assisted in preparation of report	06/12/2018

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DECLARATION BY THE HEAD OF THE

ACCREDITED CONSULTANT ORGANIZATION/AUTHORIZED PERSON

I, M. Janardhan, hereby, confirm that the above mentioned experts prepared the **Environmental Impact Assessment for the Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat.**

I also confirm that EIA Coordinator (EC) has gone through the report, and the consultant organization shall be fully accountable for any misleading information.

It is certified that no unethical practices, plagiarism involved in carrying out the work and eternal data/text has not been used without proper acknowledgement while preparing this EIA report.

Signature: 2018/12/06

Name : M. Janardhan

Designation : Head & Vice President

Name of the EIA Consultant Organization: Vimta Labs Limited, Hyderabad

NABET Certificate No. & Issue Date: NABET/EIA/1619/RA0043 Issued date: 22nd March 2017

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TOR Compliance

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TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
A	**Specific TOR**	
i	The Public Hearing for the project should be conducted by Gujarat Pollution Control Board	Public hearing for the proposed project was conducted by Gujarat Pollution Control Board on 29th April, 2017 at Community Premises Centre (Samajwadi), opposite Tunda Primary School, Tunda village, Mundra Taluk, Kutch district in the presence of Resident Additional Collector/Additional District Magistrate.
ii	The issues raised During public hearing and commitment of the project proponent on the same along with time bound action plan to implement the commitment and financial allocation there to should be clearly provided.	The public hearing comments along with time bound action plan and financial allocation is given in Section-7.1 of Chapter-7.
iii	The project proponent should carry out social impact assessment study as per the OM No.J-11013/25/2014-IA.I dated 11-08-2014 issued by the Ministry regarding the guidelines on Environmental Sustainability and CSR related issue. The SIA study so carried out should from part of EIA and EMP report.	The social impact assessment study was conducted and same report is given as Annexure-XII of the EIA Report.
iv	Plan for management of Arsenic bearing sludge should be submitted.	The Arsenic bearing sludge will be recycled within the system and balance of any will be given to authorized recyclers. Hazardous and non-hazardous waste generation, mode of disposal and waste characterisation are given in Section-2.4.3 of Chapter-2. The impacts on waste generation and management details are given in Section-4.2.5 of Chapter-4.
v	Hazardous management plan for handling of all hazardous material including minerals, products and waste, like H_2SO_4 and Arsenic sludge should be prepared by the project proponent and submitted.	
B	**Generic TOR**	
1	**Executive Summary**	The executive summary is enclosed in EIA report
2	**Introduction**	
	i. Details of the EIA Consultant including NABET accreditation	Vimta Labs Limited, a NABET accredited EIA consultant and NABL approved laboratory has been assigned the task for carrying out EIA studies.
	ii. Information about the project proponent	M/s. Adani Enterprises Limited. The details are given in Section-1.2 of Chapter-1.
	iii. Importance and benefits of the project	Details are given in Section-1.3.2 of Chapter-1.
3	**Project Description**	
	i. Cost of project and time of completion.	The total cost for the proposed project is estimated as Rs.10,000 Crores. Implementation schedule for copper project post all relevant approvals and consents will be 36 months.
	ii. Products with capacities for the proposed project	The proposed production details are given in Table-2.2 of Chapter-2.
	iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.	The proposed project is a green field project. Hence, it is not applicable.
	iv. List of raw materials required and their source along with mode of transportation.	The details of raw material requirement and source for the proposed project are given in Table-2.4 of Chapter-2.
	v. Other chemicals and materials	The fuel consumption quantity and source are given

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TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
	required with quantities and storage capacities	in Table-2.6 of Chapter-2.
	vi. Details of Emission, effluents, hazardous waste generation and their management.	Details of air emissions, wastewater generation and solid waste generation is given in Section-2.4 of Chapter-2.
	vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)	The total water requirement for the project is about 32,800 KLD (32.8 MLD). The total estimated power requirement for proposed project is 300 MW out of which 40 MW would be generated from internal process steam and balance 260 MW power would be sourced from APSEZ Ltd. The water and power will be sourced from APSEZ Limited, through M/s. Mundra Utility Private Limited (MUPL). Water balance diagram for phase-I & II are shown in Figure-2.2(A) & 2.2(B) of Chapter-2. During construction phase, about 2000-3000 persons on average per day are required and during the operation phase about 2000 direct employment and about 5000 indirect employment would be generated.
	viii. Process description along with major equipment's and machineries, process flow sheet (quantitative) from raw material to products to be provided	Process description is given in Section-2.3 of Chapter-2.
	ix. Hazard identification and details of proposed safety systems.	Hazard identification has been carried out for the entire plant. Details are given in Table-7.6 of Chapter-7.
	X. Expansion/modernization proposals: a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report. b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and	Proposed project is a green field project. Hence, it is not applicable.

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TOR COMPLIANCES

<table>
<tr><th>Sr. No.</th><th>Terms of Reference (TOR)</th><th>Compliance</th></tr>
<tr><td></td><td>Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.</td><td></td></tr>
<tr><td>4</td><td>Site Details</td><td></td></tr>
<tr><td></td><td>i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.</td><td>The proposed project is located in Siracha and Navinal Villages at APSEZ Mundra Taluka, Kutch District in the state of Gujarat. Analysis of alternative sites is discussed in Chapter-5.</td></tr>
<tr><td></td><td>ii. A topo sheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)</td><td>Toposheet showing the 10 km radius study area map on 1:50,000 scale is shown in Figure-1.2 of Chapter-1.</td></tr>
<tr><td></td><td>iii. Co-ordinates (lat-long) of all four corners of the site.</td><td><table><tr><th>Corner Point</th><th>Latitude</th><th>Longitude</th></tr><tr><td>A</td><td>22°48'55.40"N</td><td>69°33'34.74"E</td></tr><tr><td>B</td><td>22°49'44.92"N</td><td>69°34'13.74"E</td></tr><tr><td>C</td><td>22°50'1.88"N</td><td>69°34'59.78"E</td></tr><tr><td>D</td><td>22°48'57.23"N</td><td>69°35'8.42"E</td></tr><tr><td>E</td><td>22°48'13.26"N</td><td>69°34'35.43"E</td></tr></table></td></tr>
<tr><td></td><td>iv. Google map-Earth downloaded of the project site.</td><td>Google imagery showing the 10 km radius study area map is shown in Figure-1.3 of Chapter-1.</td></tr>
<tr><td></td><td>v. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.</td><td>Overall plant layout is shown in Figure-2.1 of Chapter-2.</td></tr>
<tr><td></td><td>vi. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.</td><td>The proposed site photographs are shown in Figure-1.4 of Chapter-1.</td></tr>
<tr><td></td><td>vii. Land use break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)</td><td>The total land required for the proposed project is about 256.58 ha (634 acres), in which 154.18 ha (381 acres) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Further, forest land of 102.38 ha (253 acres) is also involved which will be converted for industrial use. Necessary Forest Clearance (stage-I) has also been obtained vide letter 8-04/2016-FC dated 16th November, 2018.</td></tr>
<tr><td></td><td>viii. A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of the study area</td><td>• Adani Power (Mundra) Limited (Adjacent, W)
• Coastal Gujarat Power Limited (2.0 km, W)
Land use details of study area is given in Scetion-3.3 of Chapter-3.</td></tr>
<tr><td></td><td>ix. Geological features and Geo-hydrological status of the study area shall be included.</td><td>Geological and hydrogeological features are described in Section-3.2 of Chapter-3.</td></tr>
<tr><td></td><td>x. Details of Drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based</td><td>No major river exists within 1 km from the project site. However, Dhaneswari river passes through the project site which will be suitably trained.</td></tr>
</table>

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TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
	on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)	
	xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	The 381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company). Balance 253 acres is forest land for which Stage-I forest clearance has been obtained vide letter No.8-04/2016-FC dated 16th November,2018.
	xii. R&R details in respect of land in line with state Government policy	There is no Resettlement and Rehabilitation involved in the project.
5	**Forest and wildlife related issues (if applicable)**	
	i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable).	Forest land of 102.38 ha (253 acres) is also involved which will be converted for industrial use. MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. The stage-I Forest Clearance (FC) is enclosed as Annexure-V of EIA Report.
	ii. Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).	Land use map based on 5 m resolution showing the forest land is shown in Figure-3.3.2 of Chapter-3.
	iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted	MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. The stage-I Forest Clearance (FC) is enclosed as Annexure-V of the EIA Report.
	iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.	There are no National Parks, Sanctuaries, Biosphere Reserves within 10 km radius study area. Toposheet showing the 10 km radius study area map on 1:50,000 scale is shown in Figure-1.2 of Chapter-1.
	v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.	As per the primary data collected and also from the secondary data sources, Peacock belongs to Schedule-I as per Wildlife Protection Act, 1972. Conservation plan is provided in Section-3.9.9 of Chapter-3.
	vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.	Not applicable
6	**Environmental Status**	
	i. Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using	Site specific atmospheric inversion level study has been carried out by using Sodar. The study report is enclosed as Annexure-XI of the EIA Report.

TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
	temperature, relative humidity, hourly wind speed and direction and rainfall.	The site-specific micro-meteorological data using temperature, relative humidity, wind speed and direction and rainfall details are given Section-3.5 of Chapter-3.
	ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.	Ambient air quality was monitored during post monsoon and partly winter season of 2016 (October-December, 2016). Details are given in Section-3.6 of Chapter-3.
	iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with – min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.	Raw data of all AAQ measurement for three months is enclosed as Annexure-IX of the EIA Report.
	iv. Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.	Surface water quality has been analysed and the results are given in Table-3.7.2 of Chapter-3.
	v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC.	Dhaneshwari river also referred as Danesri Nadi (as per Topo sheet no: F42 J9 & 10). Dhaneshwari, a seasonal river which flows in the western part of the proposed site. The river will not be diverted but suitably trained along the boundary. The flow of the river will be maintained, as shown in the Plant Layout in Figure-2.1 of EIA Report. There are no other rivers nearby the proposed plant site.
	vi. Ground water monitoring at minimum at 8 locations shall be included.	Ground water quality in the study area has been analysed and the results are given in section-3.7 of Chapter-3.
	vii. Noise levels monitoring at 8 locations within the study area.	Noise levels were monitored at 8 locations and the details are given in section-3.8 of Chapter-3.
	viii. Soil Characteristic as per CPCB guidelines.	Soil analysis was carried out at 8 locations and the details along with results are given in section-3.4 of Chapter-3.
	ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.	Traffic studies have been conducted to know the prevailing traffic volumes in the area, details are given in Setion-3.11 of Chapter-3. It is estimated that the number of additional trucks due to the proposed project is about 700 trucks per day.
	x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a	Ecological studies within the study area has been carried out and the details are described in Section-3.9 of Chapter-3.

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TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
	Wildlife Conservation Plan shall be prepared and furnished.	
	xi. Socio-economic status of the study area.	Details of socio-economic status of the study area is discussed in Section-3.10 of Chapter-3.
7	**Impact Assessment and Environment Management Plan**	
	i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	For prediction of maximum Ground Level Concentrations (GLC's), the air dispersion modelling software (AERMOD version 7.1.0) was used. Details are given in Section-4.2.2 of Chapter-4.
	ii. Water Quality modelling – in case, if the effluent is proposed to be discharged into the local drain, then Water Quality Modelling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain.	Not applicable as the unit will be operating on zero discharge process.
	iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail cum road transport or conveyor-cum-rail transport shall be examined.	The major raw material i.e. copper concentrate will be received at Adani west port and will be transported to the plant through pipe conveyor. Impact of traffic on air quality is addressed in Section-4.2.3 of Chapter-4.
	iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under EP Rules.	Wastewater generation, treatment and its management are given in section-2.4.2 of Chapter-2.
	v. Details of stack emission and action plan for control of emissions to meet standards.	Details of stack emissions are given in Table-2.6 of Chapter-2.
	vi. Measures for fugitive emission control	Fugitive emission control measures are given in section-4.2.2.1 of Chapter-4.
	vii. Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste	Details are given in Section-2.4.3 of Chapter-2.

TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
	shall also be included. EMP shall include the concept of waste-minimization, recycle/ reuse/ recover techniques, Energy conservation, and natural resource conservation.	
	viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	Not applicable as there will not be any generation of fly ash due to the proposed plant.
	ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.	About 85.79 ha (212 acres) is allotted for greenbelt/green cover development. Details are given in Section-4.3 of Chapter-4.
	x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.	Rainwater harvesting structures will be provided to recharge the groundwater resources in the region. Details are given in section-4.2.4.4 of Chapter-4.
	xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	The total cost for the proposed project is estimated as Rs.10,000 Crores. The total capital cost for environmental protection is about Rs. 1044 Crores. The recurring cost/ annum for environmental protection is about Rs. 5 Crores.
	xii. Action plan for post-project environmental monitoring shall be submitted.	Details are given in Chapter-6.
	xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan	Details are given in Section-7.3 of Chapter-7.
8	**Occupational health**	
	i. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved	Detail are given in Section-7.4 of Chapter-7.
	ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-	

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TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
	placement and periodical examinations give the details of the same. Details regarding last month analysed data of abovementioned parameters as per age, sex, duration of exposure and department wise.	
	iii. Annual report of health status of workers with special reference to Occupational Health and Safety.	
	iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.	
9	**Corporate Environment Policy**	
	i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	The Corporate Environment Policy and the list of Board of Directors is enclosed in Annexure-XVI of the EIA Report.
	ii. Does the Environment Policy prescribe for standard operating process /procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.	
	iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.	
	iv. Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	
10	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.	All infrastructure facilities such as sanitation, fuel, restroom etc. will be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.
11	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	Nil
C	**Additional TOR**	
1	Complete process flow diagram describing each unit, its process and operations long with material and energy	Process flow diagram, details of material and energy balance are given in Figure-2.4 to Figure-2.6.

TOR COMPLIANCES

Sr. No.	Terms of Reference (TOR)	Compliance
	inputs & outputs (material and energy balance)	
2	Emission from sulphuric acid plant and sulphur muck management	Details of stack emissions for proposed plant are given in Section-2.4 of Chapter-2.
3	Details on installation of continuous emission monitoring system with recording with proper calibration system	Continuous emission monitoring system with recording with proper calibration system will be provided in the proposed plant. The details of emission monitoring system installation is given in the Table-6.4 of Chapter-6.
4	Details on toxic metals including fluoride emissions	The gas clearing systems is given in Section-2.3.9 of Chpater-2.
5	Details on stack height	Details of stack for proposed plant is given in Table-2.7 of Chapter-2.
6	Details on ash disposal and management	There will be no ash generation in the proposed project.
7	Complete process flow diagram describing process of lead/zinc/copper/aluminium etc.	The process flow diagram is shown in Figure-2.3 of Chapter-2.
8	Details on smelting, thermal refining, melting, slag fuming and Waelz kiln operation	The process description in detail is given in Section-2.3 of Chapter-2.
9	Details on Holding and de-gassing of molten metal and smelting of secondary aluminium, materials pre-treatment, and from melting and smelting of secondary aluminium	The secondary off gas will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO_2 before it is discharged to the atmosphere. The process flow diagram of smelter furnace is shown in Figure-2.8 of Chapter-2.
10	Details on toxic metal content in the waste material and its composition and end use (particular of slag)	The process flow diagram of slag cleaning furnace flow sheet is shown in Figure-2.11 and precious metal recovery plant is shown in Figure-2.18 of Chapter-2. The waste generation, mode of disposal and waste characterisation are given in Section-2.4.3 of Chapter-2. The impacts on waste generation and management details are given in Section-4.2.5 of Chapter-4.
11	Trace metals in waste material especially slag	
12	Plan for trace metal recovery	
13	Trace metals in water	

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Executive Summary

1.0 INTRODUCTION

M/s. Adani Enterprises Limited (AEL) intends to set up a greenfield copper refinery project at Adani Port Special Economic Zone (APSEZ) land, Mundra taluka, Kutch district, Gujarat state.

The proposed greenfield copper refinery project would require a total land area of 256.58 ha (634 acres) earmarked with state of art environment friendly technology. The estimated cost for the proposed project is about Rs. 10,000 Crores.

1.1 Purpose of the Report

As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category 'A' of project activity 3(a). Hence, construction and operation of copper refinery project requires Environmental Clearance (EC) from Ministry of Environment, Forest and Climate Change (MOEF& CC).

Terms of Reference (TOR) for EIA study for the proposed project was accorded by MoEF&CC vide Letter F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016. In accordance with the TOR conditions, the draft EIA report is prepared by M/s. Vimta Labs Limited, Hyderabad based on three months site specific baseline environmental data monitored during 1st October 2016 to 31st December 2016.

The public hearing for the proposed project was conducted by Gujarat Pollution Control Board (GPCB) on 29th April 2017 at Community Premises Centre (Samajvadi), opposite Tunda primary school, Tunda village, Mundra taluk, Kutch district, Gujarat, in the presence of Resident Additional Collector/Additional District Magistrate as per the EIA Notification dated 14th September, 2006. Based on the proceedings of the public hearing, the draft EIA report is updated and finalized report is submitted for consideration for EC to the MoEF&CC, New Delhi.

2.0 BRIEF DESCRIPTION OF THE PROJECT

2.1 Environmental Setting of the Project Site

The proposed project site is located in Siracha and Navinal villages at APSEZ Mundra taluka, Kutch district in the state of Gujarat. The proposed site is well connected by the existing national/state highways and cargo rail link, which is about 2 km away from the Navinal railway station. The nearest airport is at APSEZ, Mundra located at 17.5 km of the project site and another is at Bhuj located at a distance of 50 km from the proposed project site. The nearest railway station is Adipur/Gandhidham, which is about 64 km from project site and nearest town is Mundra which is about 13.9 km from the proposed project site. The national highway NH-8A is passing at about 5 km away from the site. State highway SH-6 is about 0.3 km from the proposed site. The site is well connected with Ahmedabad city located at about 460 km. The study area map of 10 km radius around the project site is shown in **Figure-1** respectively.

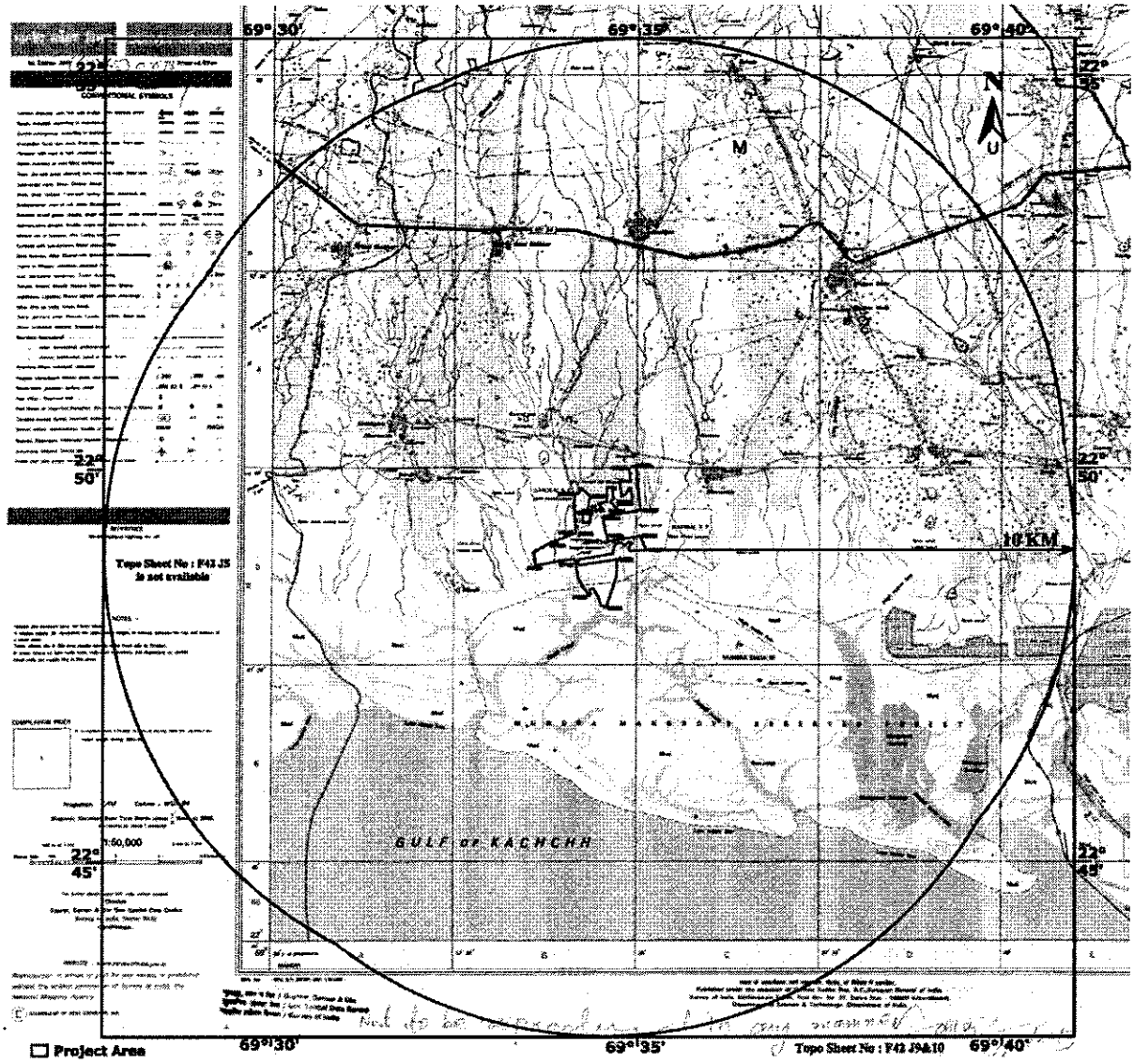


FIGURE-1
STUDY AREA MAP

2.2 Project Features

2.2.1 Land Requirement

The total land required for the proposed project (phase-I & pashe-II) is about 256.58 ha (634 acres), out of which 154.19 ha (381 acres) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Memorandum of Understanding (MoU) is in place between Adani Ports & Special Economic Zone Limited (APSEZL) and Adani Enterprises Ltd (AEL) for 154.19 ha (381 acres). Further, forest land of 102.39 ha (253 acres) is also involved which will be converted for industrial use. MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. There is no resettlement and rehabilitation involved in this project.

2.2.2 Water Source and Requirement

The total water requirement for the project is about 32,800 KLD (32.8 MLD). The total desalinated water requirement for the project would be sourced from APSEZ Ltd.

2.2.3 Power Requirement

The total estimated power requirement for proposed project is 300 MW out of which 40 MW would be generated from internal process steam and balance 260 MW power would be sourced from APSEZ Ltd.

2.2.4 Product Details

The proposed copper refinery project would produce products and by-products with state of art environment friendly technology and the proposed production details are given in **Table-1**.

It is proposed to adopt pyrosmelting technology and electro refining process to produce copper cathode. The sulphur dioxide generated during the smelting of copper concentrate is converted into sulphuric acid by Double Conversion Double Absorption (DCDA) process. A part of this sulphuric acid is captively utilized for production of phosphoric acid.

TABLE-1
DETAILS OF PRODUCTION CAPACITY

Sr. No.	Products	Units	Phase-I	Phase-II	Overall Plant Capacity
I	**Main Products**				
1	Copper Cathode	TPA	5,00,000	5,00,000	**10,00,000**
2	Sulphuric Acid (> 98%)	TPA	15,00,000	15,00,000	**30,00,000**
3	Continuous Cast Copper Wire Rod	TPA	2,50,000	2,50,000	**5,00,000**
4	Gold	TPA	25	25	**50**
5	Silver	TPA	250	250	**500**

Sr. No.	Products	Units	Phase-I	Phase-II	Overall Plant Capacity
6	Phosphoric Acid (as 100% P_2O_5)	TPA	2,50,000	2,50,000	**5,00,000**
7	Aluminum Fluoride	TPA	15,000	15,000	**30,000**
II	**By-Products**				
8	Anode Slime	TPM	250	250	**500**
9	Selenium	TPM	12	12	**24**
10	PGM Concentrate	TPM	3	3	**6**
11	Ferro Sand/ Iron Silicate - Copper Slag (Granulated)	TPM	92,500	92,500	**1,85,000**
12	Phosphogypsum	TPM	1,04,167	1,04,167	**2,08,334**
13	Hydro Fluro Silicic Acid (~20% as H_2SiF_6)	TPM	1,250	1,250	**2,500**
14	Copper Telluride	TPM	21	21	**42**
15	Tellurium	TPM	4	4	**8**
16	Nickel	TPM	8	8	**16**
17	Bismuth Bisulphate	TPM	60	60	**120**
18	Calomel (Mercury Chloride)	TPM	9	9	**18**
19	Mercury	TPM	8	8	**16**
20	CCR Mill Scale	TPM	25	25	**50**

2.3 Process Description

The principal raw material for the production of copper metal is copper concentrate blend containing about 25-35% copper, 25-34% sulphur, iron 25-35% and 7-10% moisture. Approximately 3 LTPA copper scrap and electronic scrap is also used as input to proposed copper smelting plant and copper scrap melting facility.

The major steps in copper extraction include:

- Blending of different grades of concentrates;
- Smelting of concentrate in smelting furnace to produce an intermediate copper rich product known as "matte" containing 58 - 63% copper;
- Converting of liquid matte to blister copper (98- 99% Cu) in Pierce-smith converter;
- Fire refining of blister copper to produce anode copper (99.5% Cu) in anode furnace and casting of the anodes; and
- Electrolytic refining of anodes to produce copper cathodes (99.99% Cu).

In the process of extraction of copper metal, sulphuric acid is recovered as a byproduct from the off-gases generating from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for phosphoric acid production and rest will be sold in the market based on market requirement. Hydro fluro silicic acid generated from phosphoric acid plant will be partly sold to fluoride based industries and rest will be converted in value added aluminum fluoride. Aluminum fluoride produced will be sold to aluminum manufacturing companies.

The precious metal in the form of anode slime is collected during electrolytic refining of copper will be processed to produce gold, silver and Platinum Group of Metals (PGM) concentrate.
The copper cathode produced from copper refinery will be melted and drawn in the form of copper wire rod on continuous basis from a continuous casting and

rolling machine. Copper rod will be of various sizes as per market requirement such as 8 to 32 mm.

The wastewater generated from copper smelter, sulphuric acid plant and copper refinery will be treated in state of art effluent treatment facility. Treated effluent will be consumed within the plant operations to maximum extent. A secondary RO will be installed at the outlet of treated effluent to reuse water internally and reduce water consumption.

The major technological units envisaged for the copper refinery plant are as given below:

- Raw material handling system;
- Smelting furnace;
- Pierce smith converter;
- Ferro sand cleaning furnace (FSCF);
- Copper scrap melting system;
- Anode furnace & anode casting wheel;
- Off gas handling;
- Sulphuric acid plant;
- Oxygen plant;
- Refinery unit
- Precious metal recovery plant;
- Continuous cast copper wire rod plant;
- Phosphoric acid plant;
- Aluminum fluoride plant; and
- Effluent treatment plant (ETP).

3.0 BASELINE ENVIRONMENTAL STATUS

Baseline environmental status has been established for various environmental attributes within a study area of 10 km radius from the project site. The major environmental disciplines covered in the EIA report includes ambient air quality, water quality, noise, soil, ecology (terrestrial and aquatic), land use, geology, hydrology and demographic & socio-economic conditions.

3.1 Soil Characteristics

The soil samples were collected within the study area during post-monsoon and partly winter season of 2016. It has been observed that the pH of the soil in the study area ranged from 7.7 to 8.4. The electrical conductivity was observed to be in the range of 137 to 6300 µmhos/cm. The nitrogen values range between 4.8 kg/ha to 23.8 kg/ha. The phosphorus values range between 42.2 kg/ha to 154.4 kg/ha. The potassium values range between 178.2 kg/ha to 1125.3 kg/ha. Soluble chlorides in the region varied from 354.4 mg/kg to 12400.9 mg/kg. Organic matter concentrations ranged from 0.05% to 0.22%. Organic carbon concentrations ranged from 0.03% to 0.13%.

3.2 Climatology and Meteorology

The recorded temperature at site during study period ranges between 9.2°C to 40.6°C and relative humidity ranges in between 47% to 98%. Predominant winds from SSW and SW directions were observed during the study period.

3.3 Ambient Air Quality

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at eight locations during post-monsoon and partly winter season of 2016. The $PM_{2.5}$ and PM_{10} are observed to vary from 19.2 $\mu g/m^3$ to 43.9 $\mu g/m^3$ and 35.2 $\mu g/m^3$ to 84.2 $\mu g/m^3$ respectively. The SO_2 and NO_2 are observed to vary from 14.8 $\mu g/m^3$ to 42.6 $\mu g/m^3$ and 13.1 $\mu g/m^3$ to 32.8 $\mu g/m^3$ respectively. The CO is observed to vary from 262 $\mu g/m^3$ to 412 $\mu g/m^3$ respectively. The remaining parameters as per 16th Nov, 2009 CPCB Notification are observed to be within permissible limits.

3.4 Water Quality

The baseline water quality status in the region is established by collecting water samples in study area.

- *Surface Water Quality*

The analysis results indicate that pH is found to be 7.2 to 8.0, which is well within the specified standard 6.5-8.5. The TDS was observed to be 41,645 to 43,572 mg/l. Dissolved oxygen was observed to be 5.6 to 5.9 mg/l. The chlorides and sulphates were found to be 16,078.9 to 20,915.5 mg/l and 2,139.1 to 2,734.0 mg/l respectively. Bacteriological studies reveal the 5 MPN/100ML. The surface water is observed to be brackish in nature.

- *Ground Water Quality*

The analysis results indicate that the *pH* ranges in between 7.3 to 7.8. Total hardness was observed to be ranging from 125.0 to 392.0 mg/l. Chlorides were found to be in the range of 282.6 mg/l to 978.4 mg/l. Sulphates were found to be in the range of 27.8 mg/l to 115.4 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging between 1372 to 2930 mg/l.

Fluorides were observed to be ranging between 0.9 to 1.5 mg/l and are found to be within the permissible limit. Nitrates are found to be in range of 8.2 to 22.0 mg/l. Bacteriological studies reveal that no coliform bacteria are present in the samples. The heavy metal contents were observed to be well within the limits except few parameters. It can be observed that the ground water quality in influenced by sea water quality possibly due to proximity to the sea.

3.5 Noise Level Survey

The noise monitoring has been conducted in the study area. Day time, night time noise levels were found to be varying from 48.5 dB(A) to 56.6 dB(A) and 42.3

dB(A) to 48.8 dB(A) respectively in the study area. The noise levels in general found within the acceptable levels as per standards prescribed by Central Pollution Control Board (CPCB).

3.6 Ecological Studies

Flora and fauna studies were conducted during the study period to assess the existing floristic and faunal components in study area. Floral species are mainly dominated by *Prosopis juliflora and Acacia Senegal.* Primary survey and Literature survey reveals that there are no wildlife sanctuaries, national parks and biospheres and no migratory paths of birds and animals in 10 km radius study area. The faunal species were categorized as per conservation status of Wildlife Protection Act, 1972 reveals peacock is the only Sch-I species in the study area. Mangroves are predominantly composed of *Avicenna marina*, Species known for its high tolerance of salinity and other environmental stresses.

3.7 Demography and Socio-Economic Profile

The information on socio-economic aspects of the study area has been compiled from secondary sources, which mainly include census data of 2011. The salient features of the demography and socio-economic profile are as follows:

- Total population is 60,525;
- The scheduled castes (SC) are 9.72% and scheduled tribes (ST) are 1.29%;
- Overall literacy rate in the study area according to 2011 census is 67.62%, out of which male literacy is 73.42% while female literacy is 26.58%; and
- The percentage of main workers and marginal workers are 90.57% and 9.43% respectively.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The summary of anticipated environmental impacts due to the proposed project during operation phase and mitigation measures are given below:

4.1 Air Environment

Sulphur dioxide (SO_2) and particulate matter emissions will be the main pollutants in the copper refinery complex and there will be no major source of NOx emissions. The incremental ground level concentrations due to proposed project have been estimated by dispersion modeling and are observed to be within the National Ambient Air Quality standards (NAAQ's).

- In the present case, air dispersion modeling software (AERMOD version 7.1.0) dispersion model is used to simulate the effect of emissions from point sources on air quality
- Air pollution modelling carried out for proposed Copper Smelter plant shows that resultant concentrations of SO_2 and PM due to the proposed project for the study period will remain well within the National Ambient Air Quality Standards;

- Modelling studies reveal that the maximum incremental short term 24 hourly ground level concentrations (GLC) will be 17.90 $\mu g/m^3$ for SO_2 and 1.26 $\mu g/m^3$ for PM_{10} at a distance of 2.2 km in NE direction. The resultant concentrations are predicted to be well within the standards specified by CPCB.

Following air pollution control schemes and techniques are suggested which shall be used to minimize and control the emission of air pollutants as well as their effective dispersion into the atmosphere:

- Sulphur Dioxide (SO_2): High efficiency collection and scrubbing system with lime and caustic;
- Fluorine (F): High efficiency collection and scrubbing system with water to produce hydro fluro silicic acid, which will be the input to aluminum fluoride plant; and
- Particulate Matter: Wet scrubbers, cyclones, electrostatic precipitators, bag filters, vacuum trucks, road vacuum sweepers, etc.; based on the application.

The final gaseous emissions from the copper refinery complex would be well within the permissible limits as prescribed by GPCB/CPCB/MoEF&CC.

4.2 Water Environment

No ground water is proposed to be extracted for the proposed project. The total water requirement for the project is about 32,800 m^3/day which will be sourced from desalination plant of M/s. APSEZ Ltd.

The total waste water generation from the proposed project will be about 5,432 m^3/day. This will be treated in the effluent treatment plant and the treated waste water will be fully utilized within the plant for process, cooling and other purposes. No wastewater will be discharged outside the plant. Hence, there is no impact on the water regime due to the wastewater generated from the plant complex.

Water Pollution Management and Water Conservation Measures:

- Maximum recycling of treated wastewater into process;
- Provision of appropriate treatment facility to treat domestic sewage from plant;
- Utilization of treated domestic wastewater in greenbelt development and dust suppression;
- Provision of separate storm water system to collect and store run-off water during rainy season and utilization of the same in the process; and
- Treatment of storm water to remove contaminants, if any, before discharging into water streams.

4.3 Solid Waste Management

The main solid waste envisaged from the proposed project are:

- Copper slag from copper smelter plant;
- Phosphogypsum from phosphoric acid plant;
- Hazardous cake produced from effluent treatment plant; and
- Scrubber cake from fugitive gas handling scrubbers.

Hazardous cake, ETP waste sludge, scrubber cake, spent catalyst and spent resins (from DM, RO & refinery) will be stabilized and stored in secured land fill of 13.35 ha as per guidelines of MoEF&CC/ CPCB/ GPCB. Further, an area of 18.62 ha and 20.63 ha are identified for the intermediate/emergency storage of copper slag and phosphogypsum. Provision would be made to reclaim the disposed copper slag and phosphogypsum from gypsum pond at a later stage for various utilization ventures. The used oil, oil sludge, nickel sludge and arsenic bearing sludge (As-Cu precipitate) will be given to authorized recycler.

4.4 Noise Environment

The main noise generating sources from the entire project will be blower, fan, crusher, vibrating screen, pumps, compressors etc. The noise levels at the sources for these units will be in the range of 80-90 dB(A).

The predicted noise levels at the project boundaries are estimated through computer based mathematical model. The predicted noise levels at the boundary due to various activities are found ranging in between 40 to 46 dB(A). It is seen from the simulation results that the incremental noise levels will be well within the CPCB standards.

The following control measures will be implemented for the proposed project:

- High noise generating sources shall be insulated adequately by providing suitable enclosures;
- The air compressor, process air blower, pneumatic valves shall be provided with acoustic enclosure;
- All the design/installation precautions as specified by the manufacturers with respect to noise control shall be strictly adhered to;
- Design and layout of building to minimize transmission of noise, segregation of particular items of plant and to avoid reverberant areas;
- The oxygen plant shall be installed in double wall building and no operator shall be working within the building; and
- Other than the regular maintenance of the various equipment, ear plugs/muffs shall be recommended for the personnel working close to the noise generating units.

4.5 Biological Environment & Greenbelt Development

The main sources of air pollution from the project will be from the process stacks. The pollutants from the plant include sulphur dioxide and particulate matter. The

air dispersion modeling simulations are done to evaluate SO_2 and PM likely to be contributed by the plant. The incremental concentrations were found to be well within the limits as per National Ambient Air Quality Standards. Hence, only marginal impact is envisaged due to copper smelter plant on the terrestrial ecology. Hence, no impact is envisaged on the terrestrial ecology of the area. Further, the unit will be operating on zero discharge process and no perennial nallahs or streams present in the project area, hence no impact on aquatic ecology is envisaged.

Out of the entire area of proposed copper smelter complex, 33% which is around 85.79 ha of land is reserved for greenbelt / green cover development as per prevailing guidelines from GPCB/CPCB/MoEF&CC.

4.6 Socio- Economics

The requirements of skilled/unskilled manpower during operation will be met from nearby villages as far as possible. The project will also help in generation of significant indirect employment. This will be a positive socio-economic development for the region and general upliftment of standard of living in the region.

AEL is strictly committed and is going to implement the proposal to uplift the social infrastructure surroundings the project area. Positive impact is envisaged on the infrastructure of the region.

5.0 ENVIRONMENTAL MONITORING PROGRAM

The environmental monitoring program is important in terms of evaluating the performance of pollution control equipments installed in the project. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/GPCB. The frequency of air, noise, surface water and ground water sampling and location of sampling will be as per the directives of pollution control board.

The total project cost for the proposed project is about Rs. 10,000 Crores, which may further escalate depending upon the project execution period. Out of this, about Rs. 1044 Crores will be spent on environmental protection.

6.0 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

Risk assessment has been carried out to quantify the extent of damage and suggest recommendations for safety improvement for the proposed copper refinery project. Risk mitigation measures based on maximum Credible Accident Analysis (MCA) and engineering judgments are incorporated in order to improve overall system safety and mitigate the effects of major accidents.

An effective Disaster Management Plan (DMP) to mitigate the risks involved has been prepared. This plan defines the responsibilities and resources available to respond to the different types of emergencies envisaged. Training exercises will

be held to ensure that all personnel are familiar with their responsibilities and that communication links are functioning effectively.

7.0 PROJECT BENEFITS

AEL has undertaken a cost benefit analysis to ascertain the benefits that would accrue to India and Gujarat in particular from its proposed copper smelter project. The study results show that the copper smelter project would create substantial amount of tax revenue for India over 25 years of project life. The copper smelter project venture is expected to employ about 5,000 direct and indirect employees.

The beneficial impact of proposed project on the civic amenities will be substantial after the commencement of project activities. The basic requirement of the community needs will be strengthened by extending healthcare, educational facilities to the community, building/strengthening of existing roads in the area. AEL is already providing the above amenities and would further strengthen the activities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities.

AEL believes that an effective growth policy must also take into account the fulfillment of basic needs of the masses, especially of those living in rural areas. AEL has one of the best social infrastructure proposals which are based on the implementation already done by APSEZ and APL at Mundra, in the core area of health, education, sustainable livelihood options & women empowerment, community infrastructure, youth sport & cultural activities, calamity management. AEL is strictly committed and is going to implement the proposal to uplift the social infrastructure surroundings the copper refinery project area.

8.0 CONCLUSIONS

The proposed copper refinery project of AEL is one of the important projects. AEL believes that the copper refinery project would add significant value to Indian economy. The project will not only help ensuring by becoming self-sufficient in terms of copper, phosphoric acid and sulphuric acid for India but will also drive macroeconomic growth.

The proposed project would have few adverse impacts on the environment. However, with proper and judicious implementation of the mitigation and environment management measures, the impacts can be minimized and can be maintained well within the permissible limits specified by the regulatory authorities.

Thus, it can be concluded that with the strict implementation of the pollution control and mitigation measures, with proper environment management system in place the proposed project will be beneficial to the society and will contribute to the economic development of the state in particular and the country in general.

Chapter-1
Introduction

1.0 INTRODUCTION

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha (634 acres) of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminum fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology, which will be located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat.

1.1 Purpose of the Report

As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity.

The application No: IA/GJ/IND/53004/2016 for prior EC (Form-1 and Pre-Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April 2016 and same was reviewed by the Expert Appraisal Committee (Industry-I) the meeting held on 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. TOR has been issued by MoEF&CC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016. A copy of the ToR letter, along with its compliance is enclosed as **Annexure-I**.

With a view to assess the environmental impacts arising due to the proposed Greenfield copper refinery project, **M/s. Adani Enterprises Limited (AEL)** has retained the services of NABET accredited EIA Consultant **M/s. Vimta Labs Limited (VLL)**, Hyderabad to prepare EIA report for various environmental components including air, noise, water, land and biological components along with parameters of human interest which may be affected and to prepare an Environment Management Plan (EMP) for mitigating possible adverse impacts.

The public hearing for the proposed project was conducted by Gujarat Pollution Control Board (GPCB) on 29th April 2017 at Community Premises Centre (Samajvadi), opposite Tunda primary school, Tunda village, Mundra taluk, Kutch district, Gujarat, in the presence of Resident Additional Collector/Additional District Magistrate as per the Environmental Impact Assessment Notification dated 14th September, 2006. Based on the proceedings of the public hearing, the draft EIA report has been updated and the finalized report is submitted for consideration for environmental clearance to the MoEF&CC, New Delhi.

The proposed project will be completed within 36 months from the start of the construction activity at project site. The project construction start date will be decided after obtaining all the statutory clearances and tie up of the finance for

the project. After receiving Environment Clearance from MOEF&CC, the necessary clearances such as Consent to Establishment (CTE) and Consent to Operate (CTO) from GPCB shall be obtained.

1.2 Identification of Project and Project Proponent

1.2.1 Identification of Project

AEL proposes to set up a greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha (634 acres) of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminum fluoride plant, effluent treatment plant, utilities such as storage of water and fuel, etc. with the state of the art environment friendly technology. The proposed project will be located in Siracha and Navinal villages at APSEZ Mundra taluka, Kutch district, Gujarat.

1.2.2 Project Proponent

The Adani Group is one of India's leading global integrated infrastructure player holding a company of M/s. Adani Enterprises Limited (AEL). It was ranked among the top 50 Asian companies by Forbes Asia in 2009. Adani Enterprises is quoted on the Indian stock exchange, together with its two subsidiary companies - Adani Ports & SEZ and Adani Power. M/s. Adani Enterprises Limited is listed on the Bombay Stock Exchange (BSE) and National Stock Exchange of India (NSE).

1.2.3 Environment Consultant

M/s. Vimta Labs Limited, a NABET accredited EIA consultant (NABET/EIA/1619/RA0043 valid upto 19th May 2019) and NABL approved laboratory (TC-5418 valid upto 30th March 2019) has been assigned the task for carrying out EIA studies and to prepare an EMP to mitigate any adverse impacts.

1.3 Brief Description of the Project

1.3.1 Nature & Size of the Project

The proposed greenfield copper refinery project would produce 10 LTPA (1.0 MTPA) of copper cathode; 30 LTPA of sulphuric acid; 5 LTPA of copper wire rod; 96,000 TPM of oxygen plant; 50 TPA of gold; 500 TPA of silver; 5 LTPA of phosphoric acid (as 100% P_2O_5); 30,000 TPA of aluminum fluoride etc. within the total land area of 256.58 ha (634 acres) earmarked with the state of art environment friendly technology. The estimated cost for the proposed project is about Rs. 10,000 Crores.

1.3.2 Importance to Country & Region

Copper, the world's most widely used metal next to iron and aluminium is an important element in global industrial development. It is considered a barometer

of economic expansion. Although copper is neither a precious metal nor an energy source, it is inarguably one of the most important commodities in today's world.

Entire infrastructures are based on this reddish metal. Plumbing, construction, telecommunication, transportation etc. are dependent on this metal. The increase in copper price and demand supply imbalance are evident from the exponential growth of infrastructures in China & India.

India also provides a very compelling case for copper demand and one only has to look as far as their power needs. According to the International Energy Agency, India's power production needs to rise by 15-20% annually and to meet that, India needs to invest $1.25 trillion by 2030 into energy infrastructure. From this new infrastructure, India's annual copper demand is expected to be more than double.

For the last 3 years the industry production is growing at an average rate of 7% to 8%. The growth rate is expected to remain similar in the future. For improving efficiency in the core industry sector, India needs more reliable electricity at cheaper cost. This will create demand for more energy efficient wires, bus-bars and additional potential in heat exchange products. All this can be achieved with copper.

The current growth rate in appliances market is about 20% per annum and is expected to grow with same pace for the next 5 years. There is a large potential for improvement in the levels of energy efficiency, which would increase the density of copper usage in the sector.

The per capita consumption of copper in India is less than 1 kg as compared to 2.7 kg as the world average. There is, therefore, a great potential for development of copper-based industries in the country. In view of the above, the proposal of setting up copper smelting and refining capacity at Mundra is the most appropriate and a timely decision.

1.3.3 Location of the Project

The proposed project site is located in villages Siracha and Navinal at APSEZ taluka Mundra, district Kutch in the state of Gujarat. The total area earmarked for the proposed project is 256.58 ha (634 acres), in which 154.19 ha (381 acres) of land belongs to APSEZ area and 102.39 ha (253 acres) of land belongs to forest area for promoting industrial development.

- *Connectivity (in areal distances)*

The proposed site is well connected by the existing national/state highways, cargo rail link, which is about 2 km away from the Navinal railway station. The nearest APSEZ airstrip is located around 20 km from the project site and Bhuj airport is located at a distance of 50 km from the proposed project site. The nearest railway station is Adipur/Gandhidham, which is about 64 km NE from project site and nearest town is Mundra, which is about 13.9 ENE km from the

proposed project site. The national highway NH-8A is passing at about 5 km away from the site. The state Highway SH-6 is about 0.3 km from the proposed site. The site is well connected with Ahmedabad city, which is located at about 460 km.

The location map and study area of 10 km radius of the project site is shown in **Figure-1.1** and **Figure-1.2** respectively. Google imagery of the study area and the proposed site photographs are shown in **Figure-1.3** and **Figure-1.4** respectively and the environmental setting of the project site is given in **Table-1.1.**

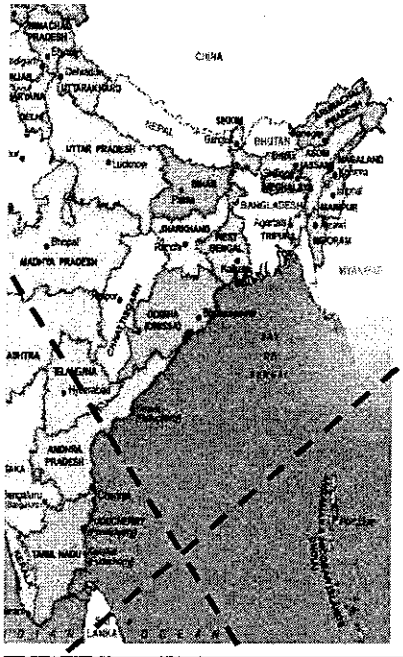
TABLE-1.1
ENVIRONMENTAL SETTING OF THE PROJECT SITE

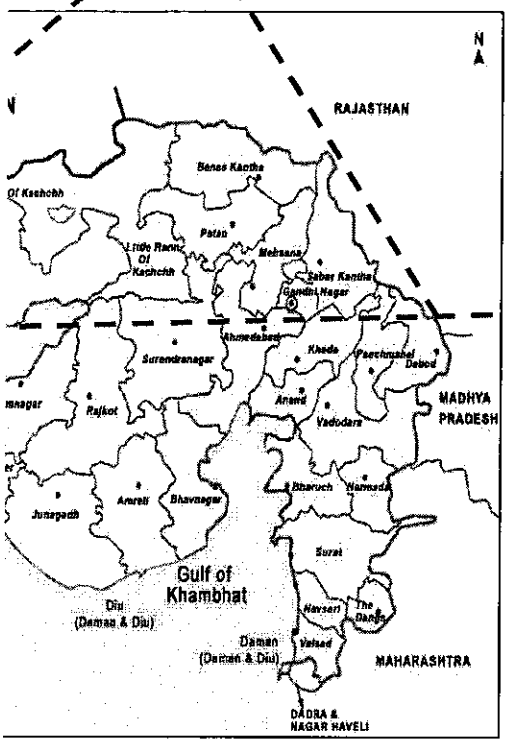
Sr. No.	Particulars	Details
1	Coordinates	Corner Point / Latitude / Longitude A / 22°48'55.40"N / 69°33'34.74"E B / 22°49'44.92"N / 69°34'13.74"E C / 22°50'01.88"N / 69°34'59.78"E D / 22°48'57.23"N / 69°35'08.42"E E / 22°48'13.26"N / 69°34'35.43"E
2	Survey No.	APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), unsurveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL
3	Toposheet no.	F42, J 9 & 10
4	Elevation above MSL	7 - 10 m above Mean Sea Level
5	Climatic conditions	As per IMD New Kandla: • Annual Mean Max Temp : 47.1° C • Annual Mean Min Temp : 4.4° C • Average Annual Total Rainfall : 397.44 mm
6	Present land use	Industrial Area 154.19 ha (381 acres) and Forest land 102.39 ha (253 acres)
7	Nearest Highway	• SH-6 (0.3 km, N) • NH-8A (5 km, N)
8	Nearest HFL (distance from project boundary)	3.9 km
9	Nearest Railway Station	Adipur/ Gandhidham (64 km, NE)
10	Nearest Airport	• APSEZ airstrip and VFR Airport at Mundra (around 20 km, ENE) • Bhuj airport (50 km, NNE)
11	Nearest Town/City	Mundra (13.9 km, ENE)
12	Hills/valleys	Nil within 10 km radius
13	Archaeologically important places	Nil within 10 km radius
14	National Parks/ Wildlife Sanctuaries	Nil within 10 km radius
15	Reserved / Protected Forest	• Dandedri RF (within project area) • Mundra Mangrove RF (south of project area)

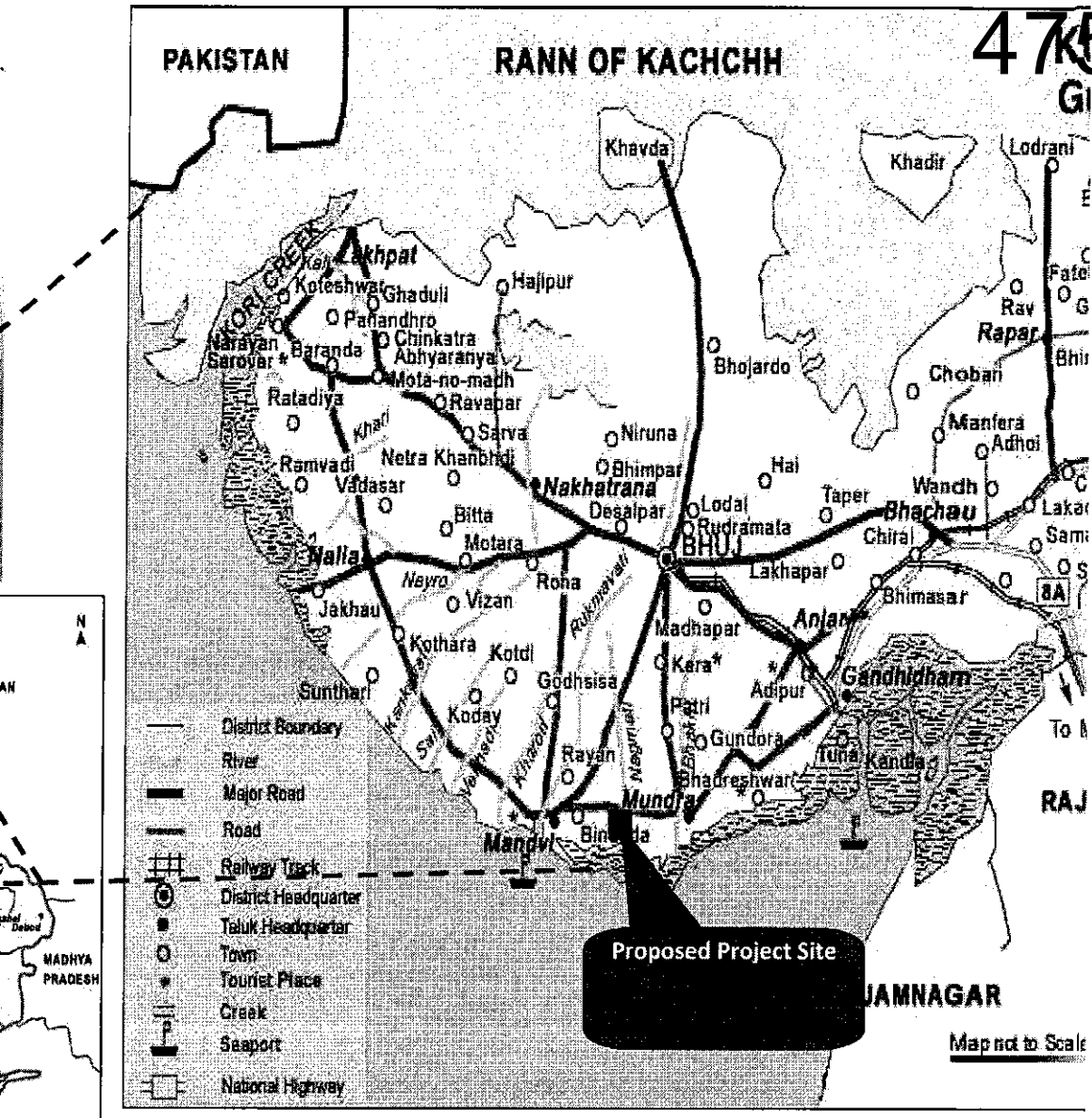
Sr. No.	Particulars	Details
		• Navinal RF (0.5 km, E) • Mundra Dhoa RF (0.7 km, SE)
16	Seismicity	The project area falls under seismic zone-V as per IS: 1893 (Part1): 2002
17	Streams/Rivers	• Dhaneswari river also referred as Danesri nadi (within the project site, W) • Kotri creek (0.5 km, S) • Khari nadi (1.9 km, W) • Gulf of Kachchh (3.9 km, S) • Nagavanti nadi (4.7 km, E) • Phot nadi (8.7 km, ENE)
18	Defence Installations	Nil within 10 km radius
19	Port	• Mundra West Port (5.1 km, SSW) • Mundra South Port (13.9 km, SE)
20	List of Industries	• Adani Power Plant (Adjacent, W) • Tata Mundra Power Plant (2.0 km, W) • Proposed ACL Cement Grinding Unit (2.2 km, NW)
21	Others	Salt pans (5 km, WSW)

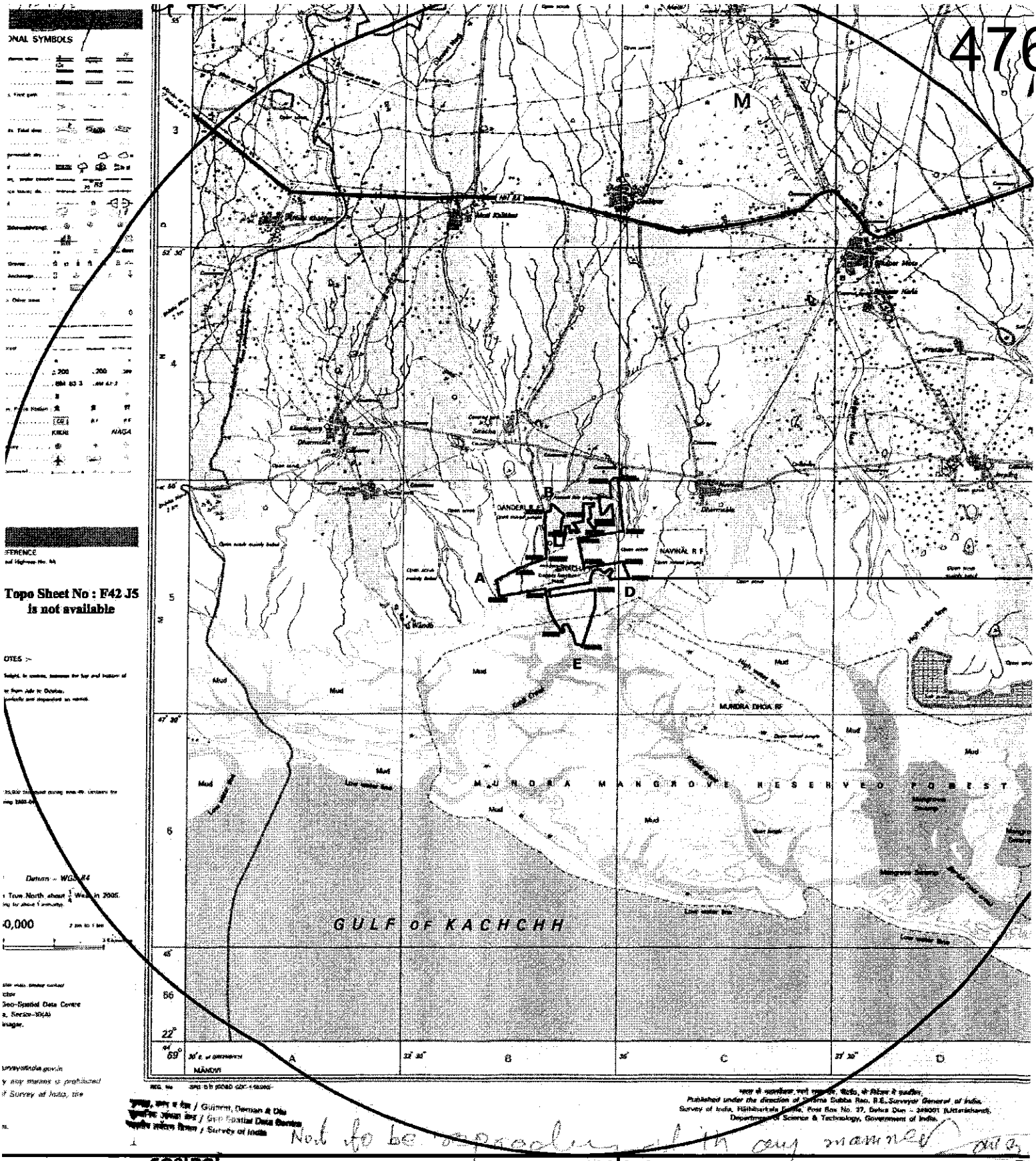
1.3.4 CRZ Regulation Mapping

The map of proposed project is superimposed on Costal Regulation Zone (CRZ) map of the area prepared in 2011 by Centre for Earth Science Studies (CESS) Thiruvanantapuram, an institution recognized by Government of India. The proposed project site is outside CRZ and doesn't attract CRZ clearance. The proposed project layout map superimposed on CRZ map is shown in **Figure-1.5.**


CHINA
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRI LANKA
INDIAN OCEAN


RAJASTHAN
MADHYA PRADESH
MAHARASHTRA
Gulf of Khambhat
Diu (Daman & Diu)
Daman (Daman & Diu)
DADRA & NAGAR HAVELI
Banas Kantha
Patan
Mehsana
Sabar Kantha
Gandhi Nagar
Ahmedabad
Surendranagar
Kheda
Panchmahal
Dahod
Anand
Vadodara
Rajkot
Amreli
Bhavnagar
Junagadh
Bharuch
Narmada
Surat
Navsari
The Dangs
Valsad


PAKISTAN
RANN OF KACHCHH
Khavda
Khadir
Lodrani
Lakhpat
Kori Creek
Koteshwar
Ghaduli
Hajipur
Pathandhro
Chinkatra
Abhyaranya
Mota-no-madh
Narayan Sarovar
Baranda
Ratadiya
Ravapar
Sarva
Niruna
Bhojardo
Rapar
Choban
Manfera
Adhoi
Ramvadi
Vadasar
Netra Khanbhdi
Bhimpar
Nakhatrana
Hai
Taper
Wandh
Bhachau
Chirai
Desalpar
Lodai
Rudramata
BHUJ
Lakhapar
Bhimasar
Halla
Bitta
Motara
Nayro
Roha
Vizan
Jakhau
Kothara
Kotdi
Sunthari
Godhsisa
Koday
Madhapar
Kera
Patri
Adipur
Gandhidham
Anjar
Gundora
Rayan
Bhadreshwar
Tuna
Kandla
Mundra
Mandvi
Proposed Project Site
JAMNAGAR
RAJ
To M
8A
District Boundary
River
Major Road
Road
Railway Track
District Headquarter
Taluk Headquarter
Town
Tourist Place
Creek
Seaport
National Highway
Map not to Scale

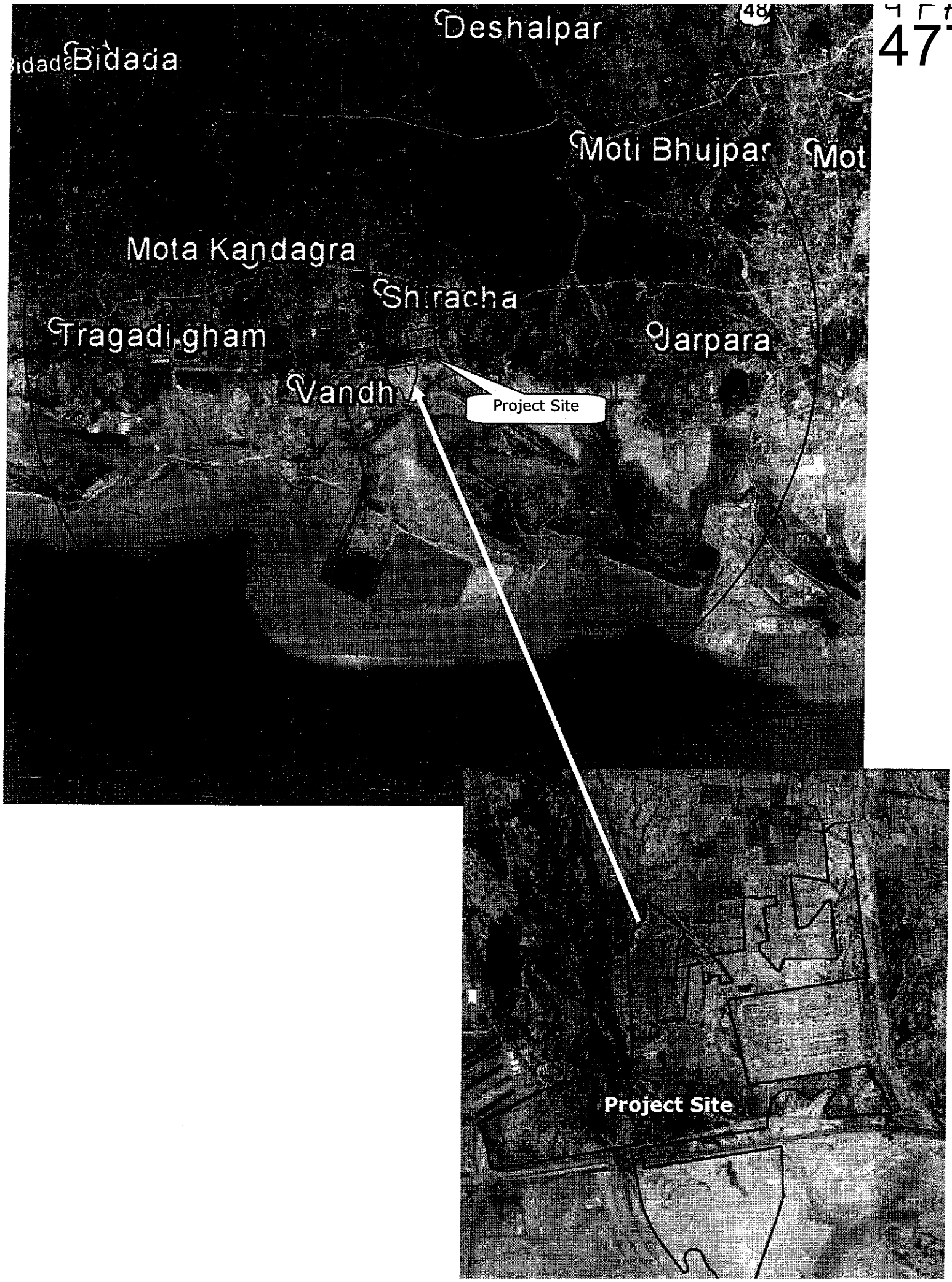


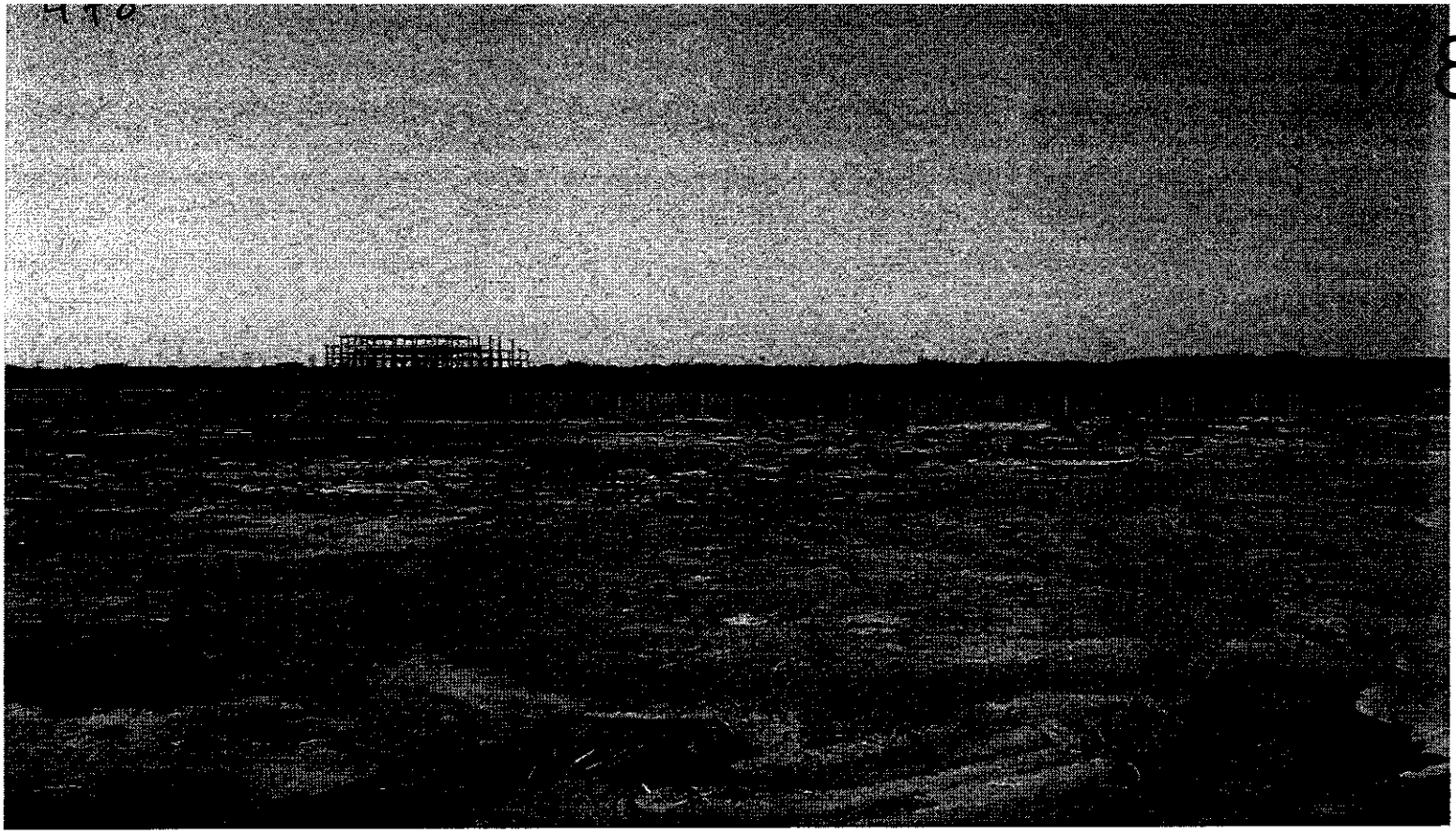
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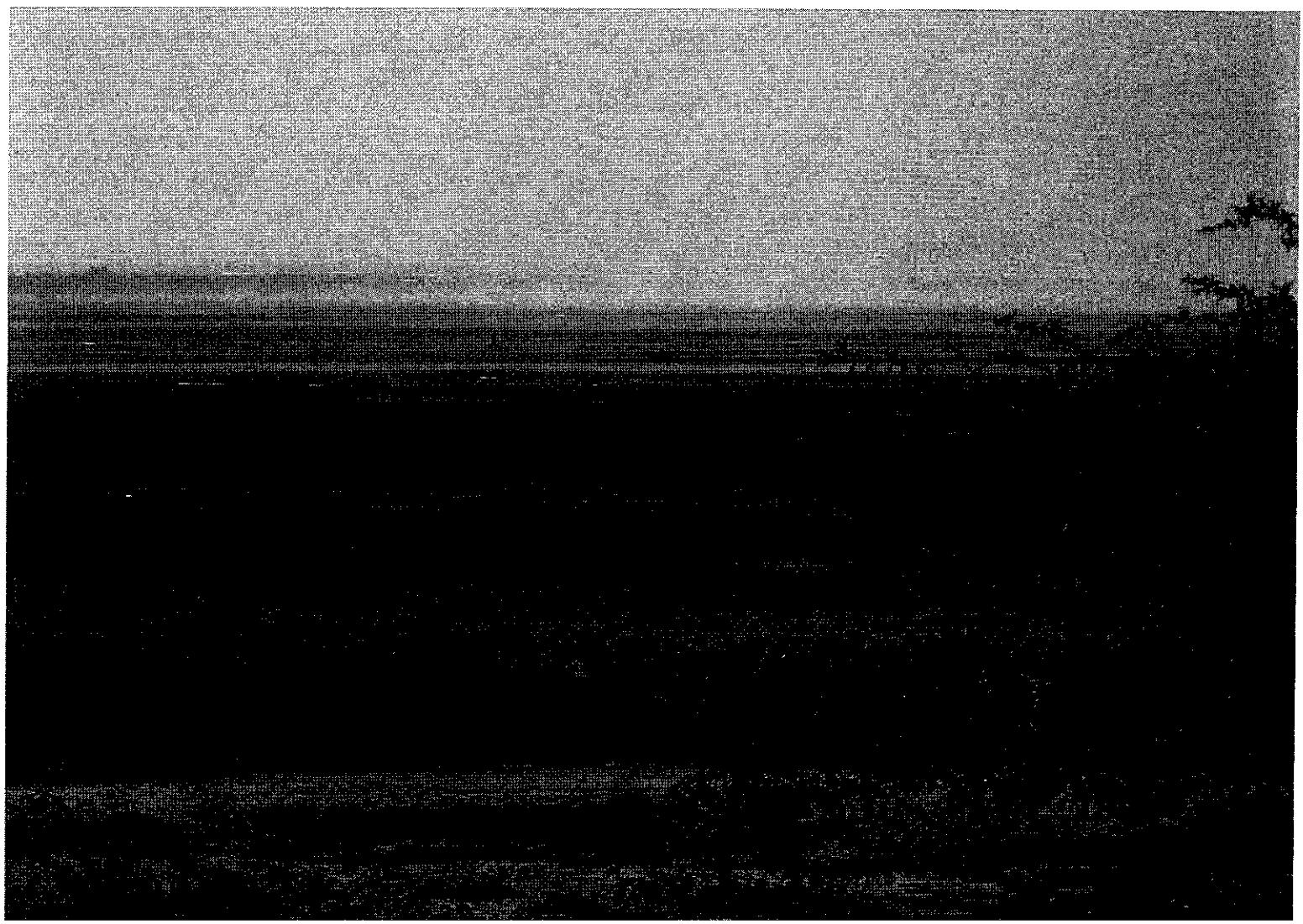
Corner Point	Latitude	Longitude

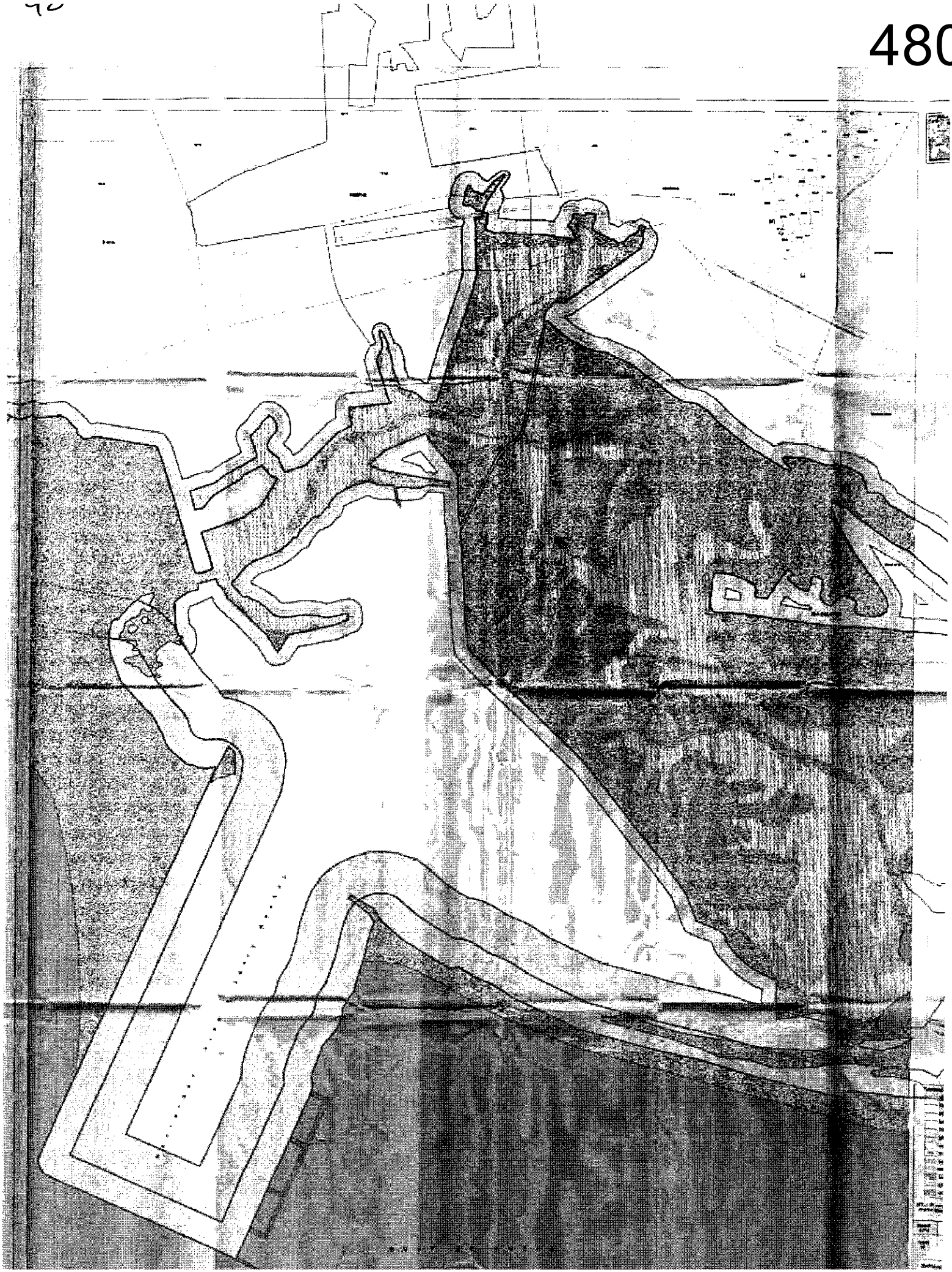

Deshalpar
Bidada
Moti Bhujpar
Mot
Mota Kandagra
Shiracha
Tragadi gham
Jarpara
Vandh
Project Site
Project Site











1.4 Scope of the Study

The scope of this study broadly includes:

- Conducting literature review and to collect data relevant to the study area;
- Field sampling of environmental attributes at various representative locations in the study area to establish the baseline environmental status;
- Collate and compile secondary data including socio-economic data from published literature/government publications;
- Identifying various existing pollution loads due to various activities;
- Predicting incremental levels of pollutants in the study area due to the proposed activities;
- Evaluating the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted Environmental Impact Assessment (EIA) methodologies;
- To prepare an Environment Management Plan (EMP), outlining the measures for improving the environmental quality in view of future project for environmentally sustainable development; and
- Identifying critical environmental attributes that are required to be monitored in the post-project scenario.

1.5 Methodology of the Study

The baseline studies have been conducted from 1st October 2016 to 31st December 2016 (post-monsoon and partly winter season) to determine existing conditions of various environmental attributes as outlined in **Table-1.2** and the methodology of sampling and analysis is given in **Annexure-II.**

TABLE-1.2
ENVIRONMENTAL ATTRIBUTES AND FREQUENCY OF MONITORING

Sr. No.	Attributes	Parameters	Frequency	No of Sampling Locations in the Study Area
1	Meteorology	Wind speed, wind direction, temperature, relative humidity, rainfall, and other non-instrumental observations	Continuous for three months with hourly recording at one central location and secondary data collected from nearest IMD	1 location
2	Ambient Air Quality	As per NAAQ's 2009	24 hourly samples twice a week for 13-weeks. CO is monitored for three 8 hourly samples in 24 hours for twice a week for	8 locations

Sr. No.	Attributes	Parameters	Frequency	No of Sampling Locations in the Study Area
			thirteen weeks	
3	Water Quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected from surface water (SW) and ground water (GW) sources. Sampling and analysis is carried out for once during study period	8 locations (GW) + 4 Location (SW)
4	Soil Quality	Soil profile with chemical constituents	Once during study period	8 locations
5	Land use	Trend of land use change for different categories	Based on secondary data and satellite imagery	Study area
6	Ecology	Terrestrial and aquatic flora and fauna in the study area	Primary survey through field studies during study period and supplemented with published data	5 locations
7	Noise levels	L_{day}, L_{night}, L_{eq}	Hourly readings for 24 hours at eight locations, once during study period	8 locations
8	Socio-Economic aspects	Socio-economic characteristics	Based on data published in district census handbooks and field study	Once during study period

1.6 Contents of the Report

The report has been framed in twelve chapters and presented as follows:

Chapter-1.0: Introduction

This chapter provides background information of the project, brief description and objectives of the project, description of the area, scope, methodology and organization of the study.

Chapter-2.0: Project Description

This chapter presents the information on the proposed project activities, technology being adopted, sources of pollution and proposed control measures.

Chapter-3.0: Description of the Environment

This chapter presents the methodology and findings of field studies undertaken to establish the baseline conditions.

Chapter-4.0: Anticipated Environmental Impacts & Mitigation Measures

This chapter details the inferences drawn from the environment impact assessment of the project during development and operational phase. It describes the overall impacts of the project and underscores the areas of concern which need mitigation measures.

Chapter-5.0: Analysis of Alternatives (Technology & Site)

This chapter presents the analysis of alternative sites and technologies considered for the proposed project.

Chapter-6.0: Environmental Monitoring Program

This chapter provides recommendations for Environment Management Plan (EMP) including mitigation measures for minimizing the negative environmental impacts of the project. Environmental monitoring requirements for effective implementation of mitigative measures during operation of the project along with required institutional arrangements for their implementation.

Chapter-7.0: Additional Studies

This chapter covers the details of risk involved in the project, public hearing, Disaster Management Plan (DMP), Occupational Health and Safety (OHS) and summary of other special studies as per TOR conditions.

Chapter-8.0: Project Benefits

This chapter presents the details of proposed Corporate Social Responsibility (CSR) activities and the benefits of the project to the community.

Chapter-9.0: Environmental Cost Benefit Analysis

This chapter has to be carried out if specifically required as per scoping. As this is not specifically mentioned in scoping, further detailed study is not carried out in this project.

Chapter-10.0: Environment Management Plan

This chapter presents the details of institutional arrangements for environment protection and conservation. Organization structure for environment management is also brought out.

Chapter-11.0: Summary & Conclusion

This chapter contains the summary and conclusion of the overall EIA report.

Chapter-12.0: Disclosure of Consultants Engaged

This chapter contains the list of various experts engaged in preparing the EIA report along with brief description of the consultancy services.

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Chapter-2
Project Description

2.0 PROJECT DESCRIPTION

This chapter addresses the process details of proposed copper refinery project including basic raw material requirement, utilities and services, infrastructural facilities and sources of pollution, their quantity, treatment and disposal of the waste.

2.1 Type of Project

The proposed copper refinery project (phase-I & phase-II) would produce 10 LTPA (1.0 MTPA) of copper cathode; 30 LTPA of sulphuric acid; 5 LTPA of copper wire rod; 11,52,000 TPM of oxygen plant; 50 TPA of gold; 500 TPA of silver; 5 LTPA of phosphoric acid (as 100% P_2O_5); 30,000 TPA of aluminum fluoride etc. with the state of art environment friendly technology. The plant configuration details of proposed copper refinery project are given in **Table-2.1**.

TABLE-2.1
DETAILS OF PLANT CONFIGURATION OF PROPOSED PROJECT

Sr. No.	Plant	Units	Phase-I	Phase-II	Overall Plant Configuration
1	Copper Smelter Plant	TPA	4,50,000	4,50,000	**9,00,000**
2	Copper Refinery Plant	TPA	5,00,000	5,00,000	**10,00,000**
3	Continuous Cast Copper Rod Plant	TPA	2,50,000	2,50,000	**5,00,000**
4	Copper Scrap & E-Scrap Melting Facility	TPA	50,000	50,000	**1,00,000**
5	Sulphuric Acid Plant	TPA	15,00,000	15,00,000	**30,00,000**
6	Phosphoric Acid Plant (100% P2O5)	TPA	2,50,000	2,50,000	**5,00,000**
7	Aluminum Fluoride Plant	TPA	15,000	15,000	**30,000**
8	Oxygen (Industrial) Plant	TPM	48,000	48,000	**96,000**
9	Precious Metal Recovery Plant				
a	Gold	TPA	25	25	**50**
b	Silver	TPA	250	250	**500**
10	Selenium Recovery Plant	TPA	144	144	**288**
11	Waste Heat recovery boiler based power plant	MW	20	20	**40**

Source: Feasibility Report

It is proposed to adopt pyrosmelting technology and electro refining process to produce copper cathode. The sulphur dioxide generated during the smelting of copper concentrate is converted into sulphuric acid by Double Conversion Double Absorption (DCDA) process. A part of this sulphuric acid is captively utilized for production of phosphoric acid. The proposed phase-I & Phase-II production details are given in **Table-2.2.**

TABLE-2.2
DETAILS OF PRODUCTION CAPACITY

Sr. No.	Products	Units	Phase-I	Phase-II	Overall Plant Capacity	Mode of Transportation
I	**Main Products**					
1	Copper Cathode	TPA	5,00,000	5,00,000	**10,00,000**	Road & Sea
2	Sulphuric Acid (> 98%)	TPA	15,00,000	15,00,000	**30,00,000**	Road & Sea
3	Continuous Cast Copper Wire Rod	TPA	2,50,000	2,50,000	**5,00,000**	Road & Sea
4	Gold	TPA	25	25	**50**	Road & Sea
5	Silver	TPA	250	250	**500**	Road & Sea
6	Phosphoric Acid (as 100% P_2O_5)	TPA	2,50,000	2,50,000	**5,00,000**	Road & Sea
7	Aluminum Fluoride	TPA	15,000	15,000	**30,000**	Road & Sea
II	**By-Products**					
8	Anode Slime	TPM	250	250	**500**	Road & Sea
9	Selenium	TPM	12	12	**24**	Road & Sea
10	PGM Concentrate	TPM	3	3	**6**	Road & Sea
11	Ferro Sand/ Iron Silicate - Copper Slag (Granulated)	TPM	92,500	92,500	**1,85,000**	Road, Rail & Sea
12	Phosphogypsum	TPM	1,04,167	1,04,167	**2,08,334**	Road, Rail & Sea
13	Hydro Fluro Silicic Acid (~20% as H_2SiF_6)	TPM	1,250	1,250	**2,500**	Road
14	Copper Telluride	TPM	21	21	**42**	Road & Sea
15	Tellurium	TPM	4	4	**8**	Road & Sea
16	Nickel	TPM	8	8	**16**	Road & Sea
17	Bismuth Bisulphate	TPM	60	60	**120**	Road & Sea
18	Calomel (Mercury Chloride)	TPM	9	9	**18**	Sea
19	Mercury	TPM	8	8	**16**	Road & Sea
20	CCR Mill Scale	TPM	25	25	**50**	Road

Source: Feasibility Report

2.1.1 Need of the Project

Copper application areas cover wide varieties of different disciplines like architectural, electrical, automotive, tube, pipe, fuel gas, industrial, marine and machine products which give a great demand.

Copper is a strategic metal for development of industry in India. It is considered to be the third most important industrial metal next only to iron and aluminium. Combination of its excellent properties such as high electrical and thermal conductivity, high strength, malleability, easy workability, corrosion resistance and its ability to produce alloys with other metals in an attractive range of colours has made copper a strategic metal for the engineering industry. Specific applications of copper include power cables and wires, jelly filled cables, building wires, air conditioning and refrigeration tubing, telecom, power, construction, transportation, handicrafts, engineering, consumer durable, defence etc.

With Indian economy poised for growth, development in infrastructure and power sector will lead to demand of copper. Dedicated focus by Government of India and various state governments under "Make in India" is an additional driver for growth story of Indian manufacturing, which will further propel the requirement of copper within the country. Prior to setting up of the greenfield copper refinery project at Mundra by the Company (M/s. Adani Enterprises Limited), the country

is a net importer of copper. Post setting up of the copper refinery plant by the company, the country will be able to earn valuable foreign exchange and hence improves the Current Account Deficit.

2.1.2 Location of the Project

The proposed project site is located in villages Siracha and Navinal at APSEZ taluka Mundra, district Kutch in the state of Gujarat. The location map and study area of 10 km radius of the project site is shown in **Figure-1.1** and **Figure-1.2** respectively. Google imagery of the study area and the proposed site photographs are shown in **Figure-1.3** and **Figure-1.4** in the **Chapter-1**.

2.1.3 Cost of the Project

The total cost for the proposed project is estimated as Rs.10,000 Crores. The environmental protection cost is about Rs. 1044 Crores.

2.1.4 Proposed Schedule for Approval and Implementation

Implementation schedule for copper project after receiving all relevant approvals and consents will be 36 months.

2.2 Resources and Requirements of the Project

2.2.1 Land use of the Proposed Project

The total land required for the proposed project (phase-I & phase-II) is about 256.58 ha (634 acres), out of which 154.19 ha (381 acres) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. The APSEZ notification is enclosed as **Annexure-III**.

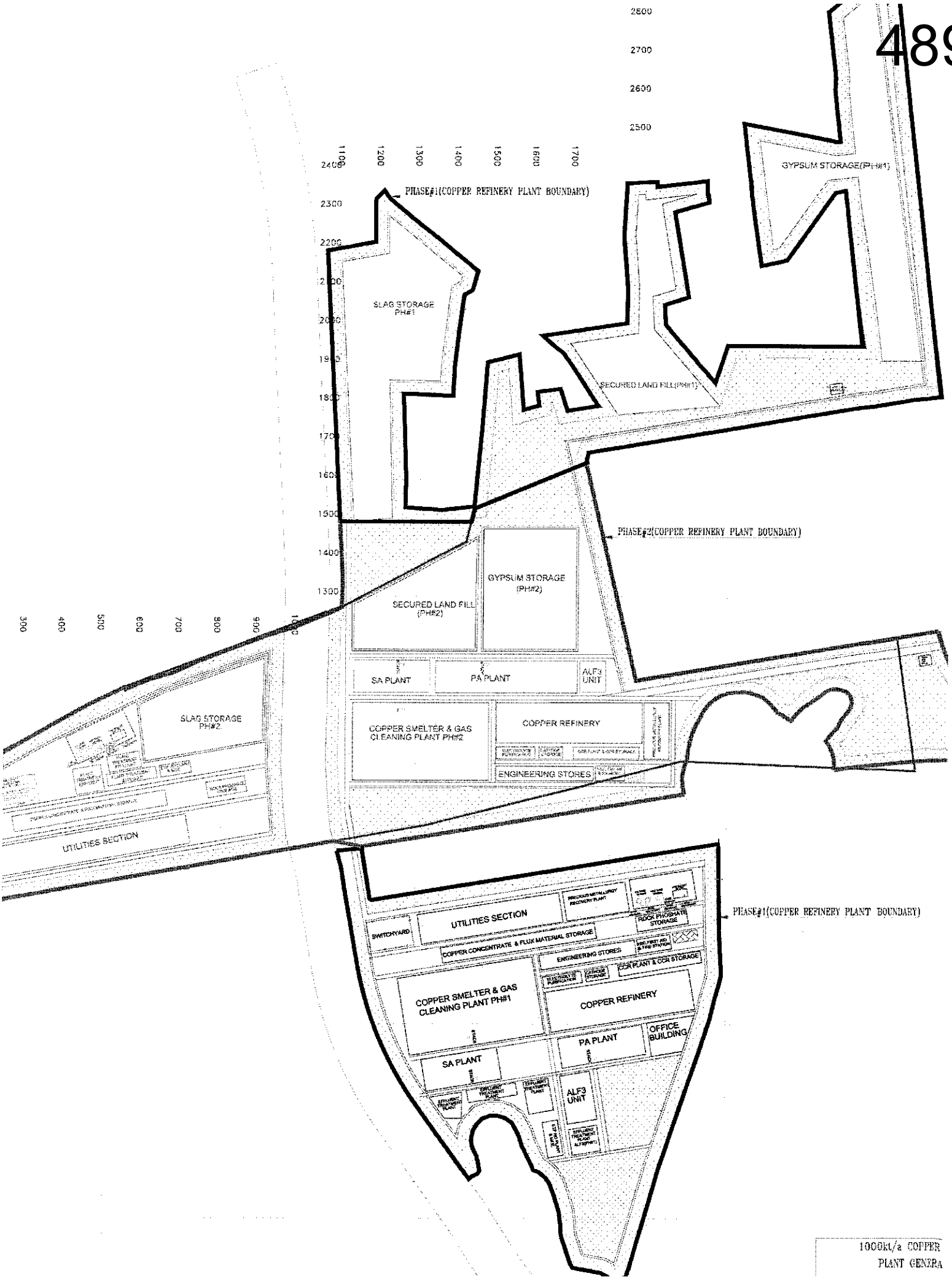
Memorandum of Understanding (MoU) is in place between Adani Ports & Special Economic Zone Limited (APSEZL) and Adani Enterprises Ltd (AEL) for 154.19 ha (381 acres). Land allotment letter is enclosed as **Annexure-IV.** Further, forest land of 102.39 ha (253 acres) is also involved which will be converted for industrial use. MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. The stage-I Forest Clearance (FC) is enclosed as **Annexure-V**. There is no resettlement and rehabilitation involved in this project. The land use of the proposed project phase-I and phase-II are given in **Table-2.3.** The overall plant layout showing the location of various units is given in **Figure-2.1.**

TABLE-2.3
LAND UTILIZATION PATTERN

All values in ha

Sr. No.	Description	Phase-I	Phase-II	Total Area
A	**Plant Area**	**21.04**	**21.04**	**42.08**
1	Smelter	6.88	6.88	13.76
2	Refinery, CCR & PM RP	6.88	6.88	13.76
3	Sulphuric acid plant	2.02	2.02	4.04
4	Phosphoric acid Plant & AIF3	2.83	2.83	5.66
5	Effluent Treatment Plant (ETP)	2.43	2.43	4.86
B	**Utility Area**	**8.49**	**8.49**	**16.98**
1	Utilities (O2 plant, water reservoir, air compressor, fuel oil system & LPG)	3.64	3.64	7.28
2	Incoming SUB-ancillary 2	0.81	0.81	1.62
3	Officers, fire station, change room – ancillary 4	1.21	1.21	2.42
4	Material stores & fabrication yard	0.81	0.81	1.62
5	Raw material storage	2.02	2.02	4.04
C	**Waste Storage Area**	**33.58**	**19.02**	**52.60**
1	Slag yard	12.95	5.67	18.62
2	Gypsum	13.35	7.28	20.63
3	Secured land fill (SLF)	7.28	6.07	13.35
D	**Roads, drains, support infrastructure & free space**	**27.16**	**31.97**	**59.13**
E	**Greenbelt/ Greencover**	**48.56**	**37.23**	**85.79**
	Total (A+B+C+D+E)	**138.83**	**117.75**	**256.58**
	GRAND TOTAL (PHASE-I & PHASE-II)	**256.58 ha (634 acres)**		

Source: Feasibility Report



1000kt/a COPPER
PLANT GENERA

2.2.2 Raw Material Requirement

The details of raw material requirement and source for the proposed project are given in **Table-2.4.**

TABLE-2.4
RAW MATERIAL REQUIREMENT AND SOURCE

Sr. No.	Description	Raw Material Quantity (TPA)			Source	Mode of Transport	Source Distance from Plant Site (km)
		Phase-I	Phase-II	Total Quantity			
1	Copper Concentrate	16,00,000	16,00,000	**32,00,000**	Local & Import	Road and pipe conveyor	12
2	Silica	1,60,000	1,60,000	**3,20,000**	Local	Road	500
3	Lime Stone	40,000	40,000	**80,000**	Local	Road	150
4	Quartz	72,000	72,000	**1,44,000**	Local	Road	500
5	Quick Lime	30,000	30,000	**60,000**	Local & Import	Road	12
6	Copper Scrap & E-Scrap	1,00,000	1,00,000	**2,00,000**	Local & Import	Sea & road	12
7	Rock Phosphate	8,75,000	8,75,000	**17,50,000**	Local & Import	Road and pipe conveyor	12
8	Aluminum Hydrate	18,750	18,750	**37,500**	Local	Road & sea	12

Source: Feasibility Report

2.2.3 Water Requirement

The total water requirement for the project (phase-I & phase-II) is about 32,800 KLD (32.8 MLD). The total desalinated water requirement for the project would be sourced from APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). The water allocation letter is enclosed as **Annexure-VI.**

An integrated water system is proposed. The effluent from the process units is treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEE) for further recovery and solids generated will be sent to Secured Land Fill (SLF).

Water demand is made up of the following:

- Water for product purpose like sulphuric acid and phosphoric acid;
- Make-up losses for copper slag granulation preparation;
- Make-up losses in the cooling towers and heat exchangers/ circuits;
- Steam losses from the steam and power systems; and
- Steam consumed directly in the process, etc.

This water would be utilized to meet the DM water and plant/utility requirement of proposed project. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).

The details of usage of water and water balance for phase-I and Phase-II is presented in **Table-2.5** and shown in **Figure-2.2(A) & 2.2(B).**

TABLE-2.5
WATER REQUIREMENT FOR COPPER REFINERY PLANT

All values are given in KLD

Sr. No.	Purpose	Water Consumption (in KLD)					
		Raw (Fresh) Water			Treated/ Recycled Water		
		Phase-I	Phase-II	Total	Phase-I	Phase-II	Total
1	Phosphoric Acid Plant	4000	4000	**8,000**	-	-	-
2	Sulphuric Acid Plant	7510	7510	**15,020**	720	720	**1440**
3	Copper Smelter Plant + Scrap Melting Furnace	3600	3600	**7,200**	720	720	**1440**
4	Copper Refinery & PMR	765	765	**1,530**	-	-	-
5	CCR Plant	320	320	**640**	-	-	-
6	Domestic	200	200	**400**	-	-	-
7	Greenbelt/ Green Cover	-	-	-	198	198	**396**
8	Lime slurry preparation	-	-	-	720	720	**1440**
9	Reverse Osmosis Plant & Multi Effect Evaporator	-	-	-	356	356	**712**
Grand Total		**16,395**	**16,395**	**32,790**	**2,714**	**2,714**	**5,428**

Source: Feasibility Report

2.2.4 Power Requirement

The total estimated power requirement for the proposed project is 300 MW out of which 40 MW would be generated from internal process steam and balance 260 MW power would be sourced from APSEZ Limited, through M/s. Mundra Utility Private Limited (MUPL). The power allocation letter is enclosed as **Annexure-VII.**

Waste Heat Recovery based Power Plant

With focus on recovery of heat energy, waste heat recovery based power plant with ~50 MW capacity will be installed in the project.

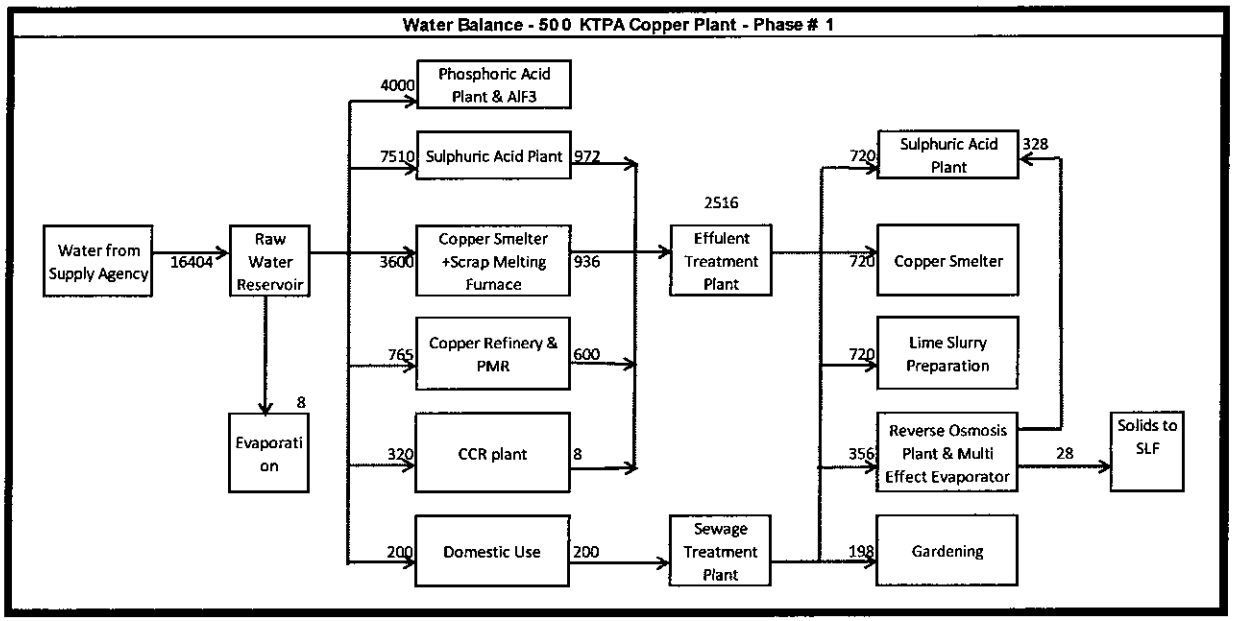


FIGURE-2.2(A)
WATER BALANCE FOR PHASE-I

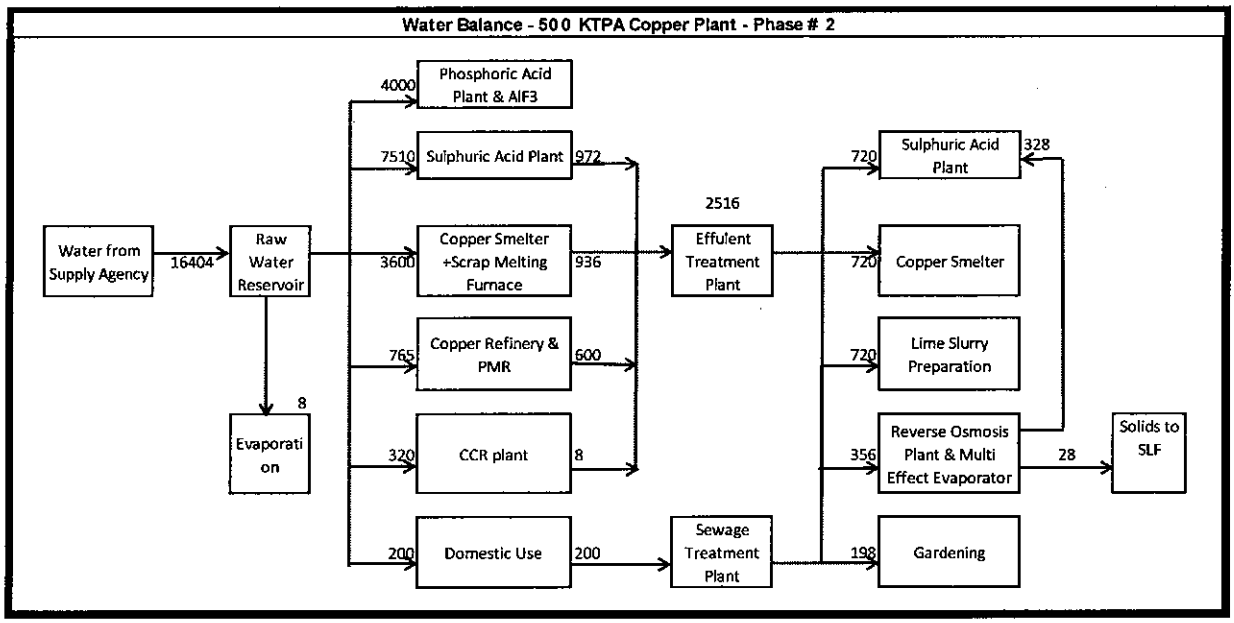


FIGURE-2.2(B)
WATER BALANCE FOR PHASE-II

2.2.5 Fuel Requirement

Fuel oil storage facility will be built as per requirement in accordance with guidelines from Petroleum and Explosives Safety Organization (PESO). Capacity of the system will be based on the design requirement after finalization of the engineering. The fuel consumption quantity and source for phase-I & phase-II are given in **Table-2.6.**

TABLE-2.6
FUEL CONSUMPTION QUANTITY & SOURCE

Sr. No.	Description	Units	Fuel Consumption			Source	Source Distance from the Project Site (km)	Mode of Transport
			Phase-I	Phase-II	Total Quantity			
1	High Speed Diesel (HSD)	KLD	25	25	50	Local	12	Road
2	Furnace Oil (FO)	TPD	150	150	300	Local	60	Road
3	Liquefied Petroleum Gas (LPG)	TPD	50	50	100	Local	60	Road
4	Coal / Pet Coke	TPD	50	50	100	Local	60	Road
5	Met Coke	TPD	50	50	100	Local	300	Road

Source: Feasibility Report

2.2.6 Manpower Requirement

During construction phase, about 2000-3000 persons on average per day will be required and during the operation phase about 2000 direct employment and about 5000 indirect employment would be generated.

2.2.7 Infrastructure Facility

The APSEZ industrial complex is a fully developed industrial estate provided with all types of infrastructure facilities such as road, rail and goods yard, water supply drainage etc. The APSEZ area is well connected by road and rail. Power is readily available through separate sub-stations. Adani west port is located at a distance of 5.1 km on SW direction and south port is located at a distance of 13.9 km on SE direction, which provides additional advantage and facilities for import and export of materials required by the industries in the region. The concentrate, which is the main raw material will be imported from across the world by ship at the port. The unloaded concentrate will be conveyed to the plant ware house in pipe conveyor. As a part of the requirement for the proposed project, the existing roads will be strengthened by widening or upgrading and extended to approach the proposed site.

2.3 Technology and Process Description

The principal raw material for the production of copper metal is copper concentrate blend containing about 25-35% copper, 25-34% sulphur, iron 25-35% and 7-10% moisture. Approximately, 3 LTPA copper scrap and electronic scrap is also used as input to proposed copper smelting plant and copper scrap melting facility. The process flow diagram of copper refinery plant is shown in

Figure-2.3. The material balance for phase-I & phase-II are shown in **Figure-2.4(A) & 2.4(B).** The electrical energy (MW & GJ/hr) balance for phase-I & phase-II are shown in **Figure-2.5(A) to 2.5(B)** and **Figure-2.5(C) to 2.5(D). T**hermal energy balance for phase-I & phase-II are shown in **Figure-2.6(A)** to **2.6(B).**

The major steps in copper extraction are as follows:

- Blending of different grades of concentrates;
- Smelting of concentrate in smelting furnace to produce an intermediate copper rich product known as "matte" containing 58 - 63% copper;
- Converting of liquid matte to blister copper (98 - 99% Cu) in Pierce-Smith converter;
- Fire refining of blister copper to produce anode copper (99.5% Cu) in anode furnace and casting of the anodes; and
- Electrolytic refining of anodes to produce copper cathodes (99.99% Cu).

In the process of extraction of copper metal, sulphuric acid is recovered as a byproduct from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for phosphoric acid production and rest will be sold in the market based on market requirement. Hydro fluro silicic acid generated from phosphoric acid plant will be partly sold to fluoride based industries and rest will be converted in value added aluminum fluoride. Aluminum fluoride produced will be sold to aluminum manufacturing companies. The precious metal in the form of anode slime is collected during electrolytic refining of copper will be processed to produce gold, silver and Platinum Group of Metals (PGM) concentrate. The copper cathode produced from copper refinery will be melted and drawn in the form of copper wire rod on continuous basis from a continuous casting and rolling machine. Copper rod will be of various sizes as per market requirement such as 8 to 32 mm.

The wastewater generated from copper smelter, sulphuric acid plant and copper refinery will be treated in state of art effluent treatment facility. Treated effluent will be consumed within the plant operations to maximum extent. A secondary RO plant will be installed at the outlet of treated effluent to reuse water internally and reduce water consumption. The major technological units envisaged for the copper refinery project are as given below:

- Raw material handling system;
- Smelting furnace;
- Pierce smith converter;
- Ferro Sand Cleaning Furnace (FSCF);
- Copper scrap melting system;
- Anode furnace & anode casting wheel;
- Off gas handling;
- Sulphuric acid plant;
- Oxygen plant;
- Refinery unit;
- Precious metal recovery plant;
- Continuous cast copper wire rod plant;
- Phosphoric acid plant;

- Aluminum fluoride plant; and
- Effluent Treatment Plant (ETP).

2.3.1 Raw Material Handling

To have the raw materials handling as the most environment friendly process, the following are planned:

i. Concentrate transportation from port to plant concentrate warehouse by pipe conveyor;
ii. Covered concentrate warehouse;
iii. Internal transportation of the concentrate by covered conveyor to the furnace;
iv. Covered bin building for intermediate storage of concentrate; and
v. Covered storage for other raw material during rainy season.

The concentrate and flux material handling process flow chart is shown in **Figure-2.7.**

2.3.1.1 Concentrate Warehouse

The concentrate will be imported from across the world by ship at port. The unloaded concentrate will be conveyed to plant warehouse in pipe conveyor and stored separately in different heaps based on the quality of the material. Warehouse will be built to store at least 25 days consumption quantity. This will help to take care of the shipping schedule as well as blending requirement as per furnace feed design.

2.3.1.2 Flux Storage Area

The silica sand, lime stone and coal will be required for addition in the concentrate for effective smelting. They will be stored in open space. However, a covered storage will be provided for minimum of 15 days storage, which will be required during rainy season continuous operations.

2.3.1.3 Bin Building

The bin building will have intermediate storage bins to store different quality of the copper concentrate, flux material along with coal and process reverts. These bins will be equipped with weighing system for effective blending and maintaining the metallurgy of the furnace.

2.3.1.4 Paddle Mixer/ Dryer

Based on the type of the smelting process selected (TSL – Top Submerged Lance Technology or Flash Smelting Technology) Paddle mixer or steam based dryer is used either for adding moisture in the concentrate mix or drying of the concentrate mix. This is a online mixing system to mix effectively different ratio of concentrate with flux material and will have provision to add moisture or dry the feed mix to get required mix material, suitable for furnace feed.

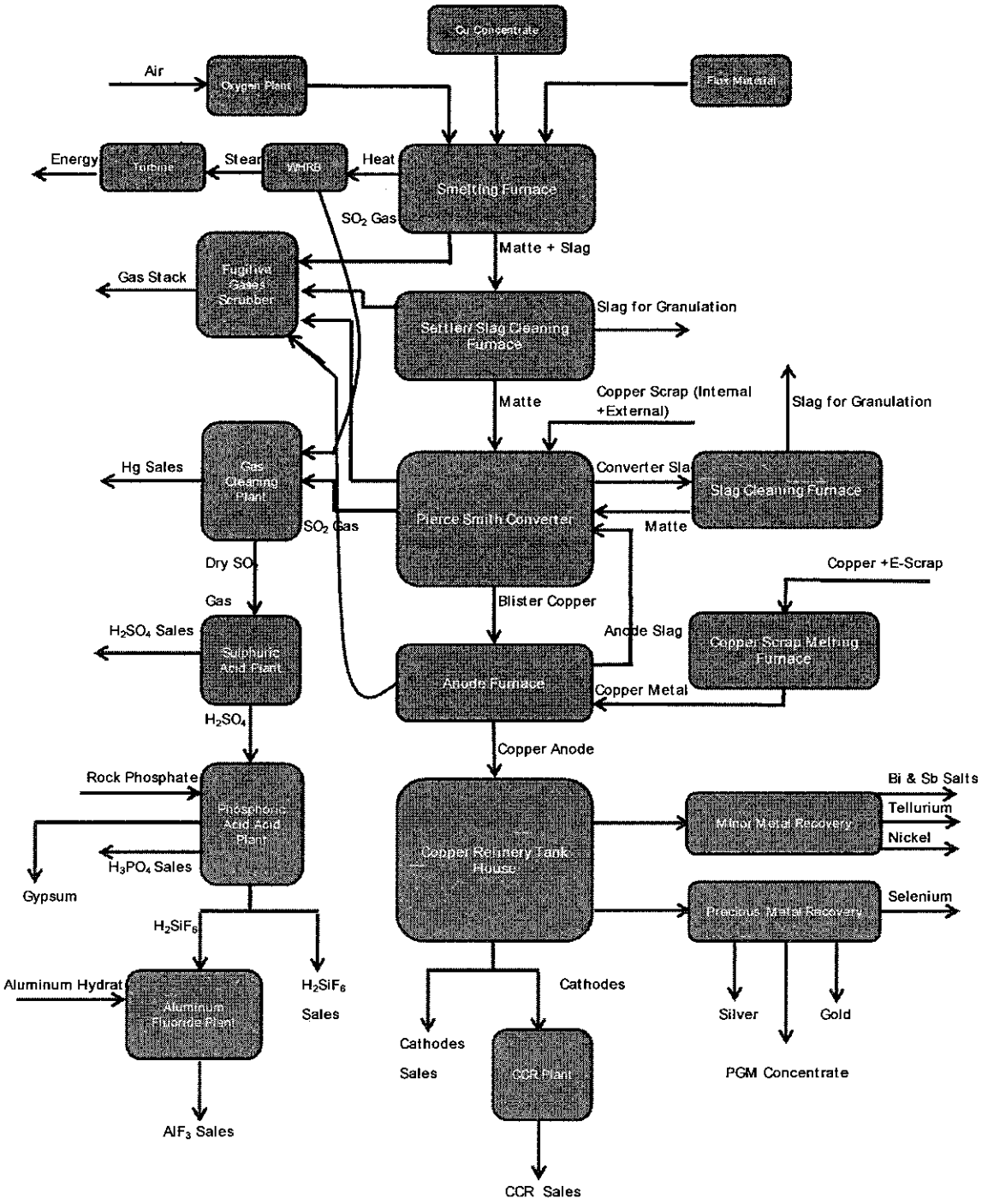


FIGURE-2.3
PROCESS FLOW DIAGRAM OF COPPER REFINERY PLANT

Material Flow Sheet (Tentative) - 500 KTPA Copper Plant - Integrated (Stage # 1)

Raw Material		
Copper Concentrate	TPA	16,00,000
Silica	TPA	1,60,000
Lime Stone	TPA	40,000
Quartz	TPA	72,000
Quick Lime	TPA	30,000
Copper Scrap & E-Scrap	TPA	1,00,000
Rock Phosphate	TPA	8,75,000
Alumina Hydrate	TPA	18,750
Fuel		
High Speed Diesel	KLPD	25
Furnace Oil	TPD	150
Liquefied Petroleum Gas	TPD	50
Coal / Pet Coke	TPD	50
Met Coke	TPD	50

Copper Plant Integrated (Copper Smelter, Oxygen Plant, Copper Refinery, CCR Plant, PMR Plant, Sulphuric Acid Plant, Phosphoric Acid Plant, Aluminum Fluoride Plant, etc)

Waste		
ETP Waste Sludge & Scrubber Waste	TPM	9,000
Nickel Sludge	TPM	265
Arsenic bearing sludge. As-Cu precipate	TPM	111
Used Oil	KL/Yr	100
Oil Sludge	T/yr	25
Spent Catalyst	KL/Yr	200
Spent Resins from DM, RO & Refinery Plant	KL/Yr	10
ETP Treated Water	KL/Day	2,516
Input to Reverse Osmosis Plant	KL/Day	356
Rejects from Multi Effect Evaporator	KL/Day	28

Products		
Copper Cathode	TPA	5,00,000
Sulphuric Acid (> 98%)	TPA	15,00,000
Continuous Cast Copper Wire Rod	TPA	2,50,000
Oxygen (Technical)	TPM	48,000
Gold	TPA	25
Silver	TPA	250
Phosphoric Acid (as 100% P2O5)	TPA	2,50,000
Aluminium Fluoride	TPA	15,000
Byproducts		
Anode Slime	TPM	250
Selenium	TPM	12
PGM Concentrate	TPM	3
Ferro Sand/ Iron Silicate - Copper Slag (Granulated)	TPM	92,500
Phosphogypsum	TPM	1,04,167
Hydro Fluro Silicic Acid (~20% as H2SiF6)	TPM	1,250
Copper Telluride	TPM	21
Tellurium	TPM	4
Nickel	TPM	8
Bismuth Bisulphate	TPM	60
Calomel (Mercury Chloride)	TPM	9
Mercury	TPM	8
CCR Mill Scale	TPM	25
Waste Heat Recovery Boiler based power	MW	20

FIGURE-2.4(A)
MATERIAL BALANCE DIAGRAM FOR PHASE-I

Material Flow Sheet (Tentative) - 500 KTPA Copper Plant - Integrated (Stage # 2)

Raw Material		
Copper Concentrate	TPA	16,00,000
Silica	TPA	1,60,000
Lime Stone	TPA	40,000
Quartz	TPA	72,000
Quick Lime	TPA	30,000
Copper Scrap & E-Scrap	TPA	1,00,000
Rock Phosphate	TPA	8,75,000
Alumina Hydrate	TPA	18,750
Fuel		
High Speed Diesel	KLPD	25
Furnace Oil	TPD	150
Liquefied Petroleum Gas	TPD	50
Coal / Pet Coke	TPD	50
Met Coke	TPD	50

Copper Plant Integrated (Copper Smelter, Oxygen Plant, Copper Refinery, CCR Plant, PMR Plant, Sulphuric Acid Plant, Phosphoric Acid Plant, Aluminum Fluoride Plant, etc)

Waste		
ETP Waste Sludge & Scrubber Waste	TPM	9,000
Nickel Sludge	TPM	265
Arsenic bearing sludge. As-Cu precipate	TPM	111
Used Oil	KL/Yr	100
Oil Sludge	T/yr	25
Spent Catalyst	KL/Yr	200
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ETP Treated Water	KL/Day	2,516
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Products		
Copper Cathode	TPA	5,00,000
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Continuous Cast Copper Wire Rod	TPA	2,50,000
Oxygen (Technical)	TPM	48,000
Gold	TPA	25
Silver	TPA	250
Phosphoric Acid (as 100% P2O5)	TPA	2,50,000
Aluminium Fluoride	TPA	15,000
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Selenium	TPM	12
PGM Concentrate	TPM	3
Ferro Sand/ Iron Silicate - Copper Slag (Granulated)	TPM	92,500
Phosphogypsum	TPM	1,04,167
Hydro Fluro Silicic Acid (~20% as H2SiF6)	TPM	1,250
Copper Telluride	TPM	21
Tellurium	TPM	4
Nickel	TPM	8
Bismuth Bisulphate	TPM	60
Calomel (Mercury Chloride)	TPM	9
Mercury	TPM	8
CCR Mill Scale	TPM	25
Waste Heat Recovery Boiler based power	MW	20

FIGURE-2.4(B)
MATERIAL BALANCE DIAGRAM FOR Phase-II

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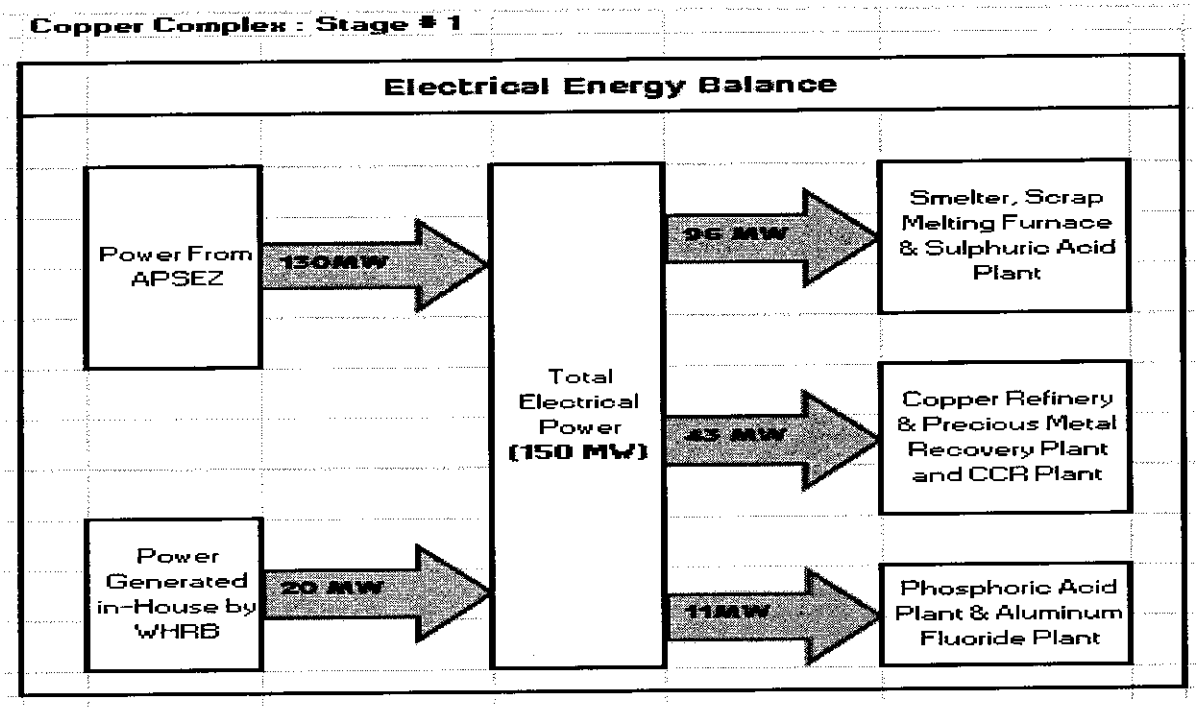


FIGURE-2.5(A)
ELECTRICAL ENERGY BALANCE DIAGRAM FOR PHASE-I

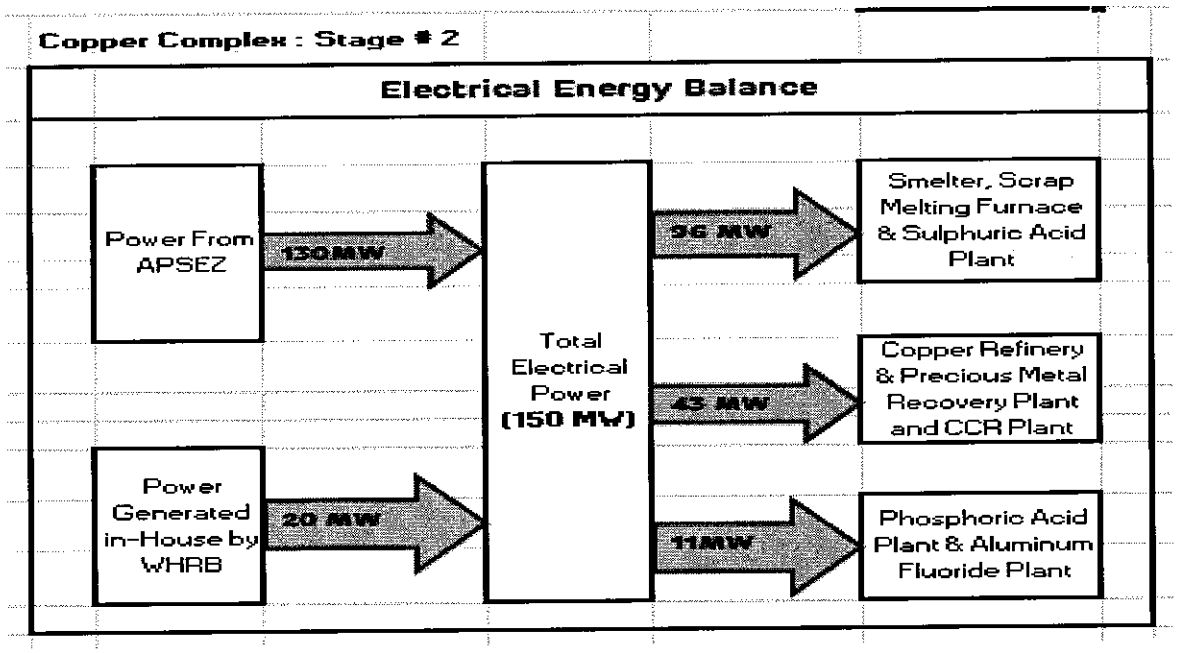


FIGURE-2.5 (B)
ELECTRICAL ENERGY BALANCE DIAGRAM FOR PHASE-II

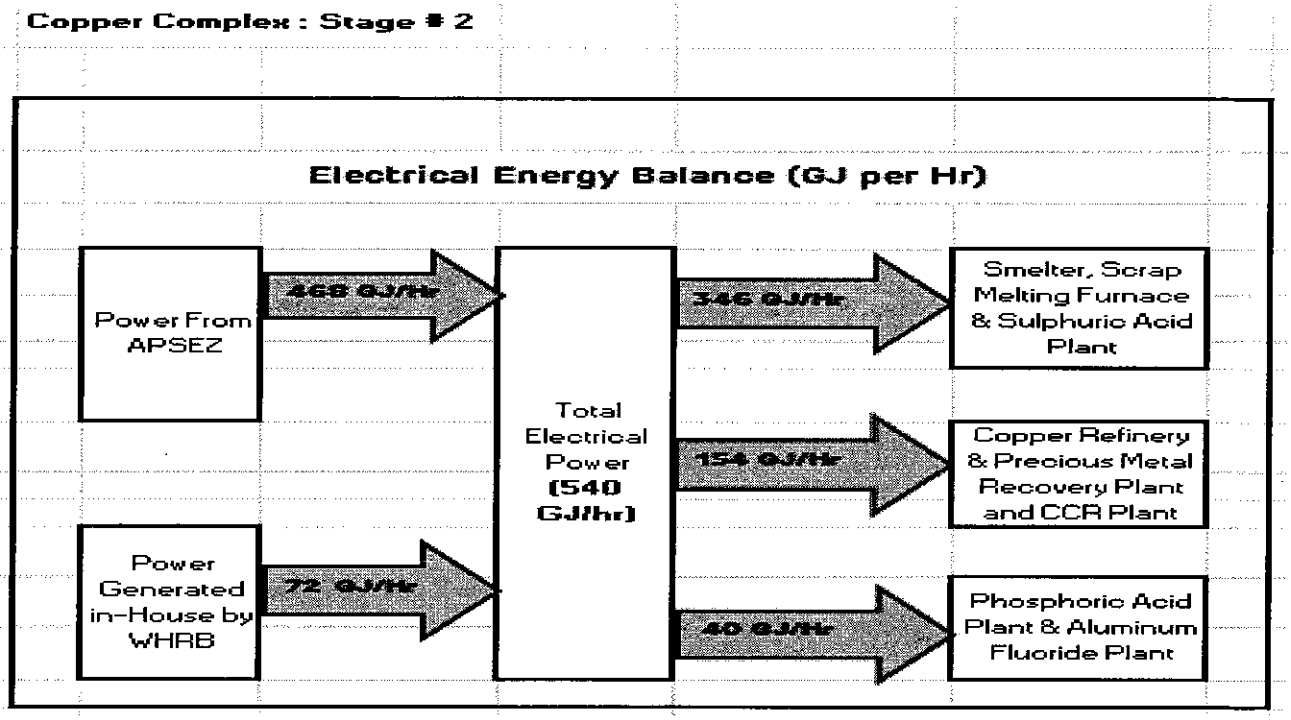


FIGURE-2.5(C)
ELECTRICAL ENERGY BALANCE DIAGRAM FOR PHASE-I

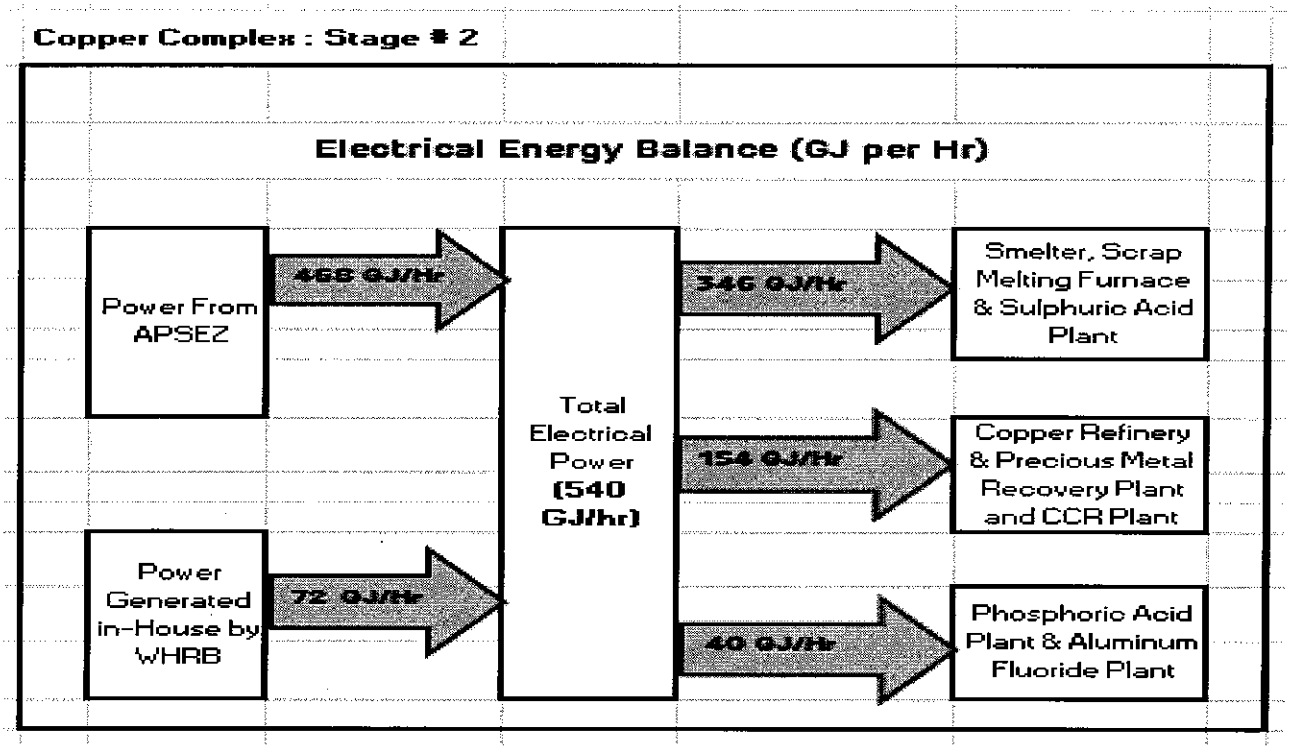


FIGURE-2.5(D)
ELECTRICAL ENERGY BALANCE DIAGRAM FOR PHASE-II

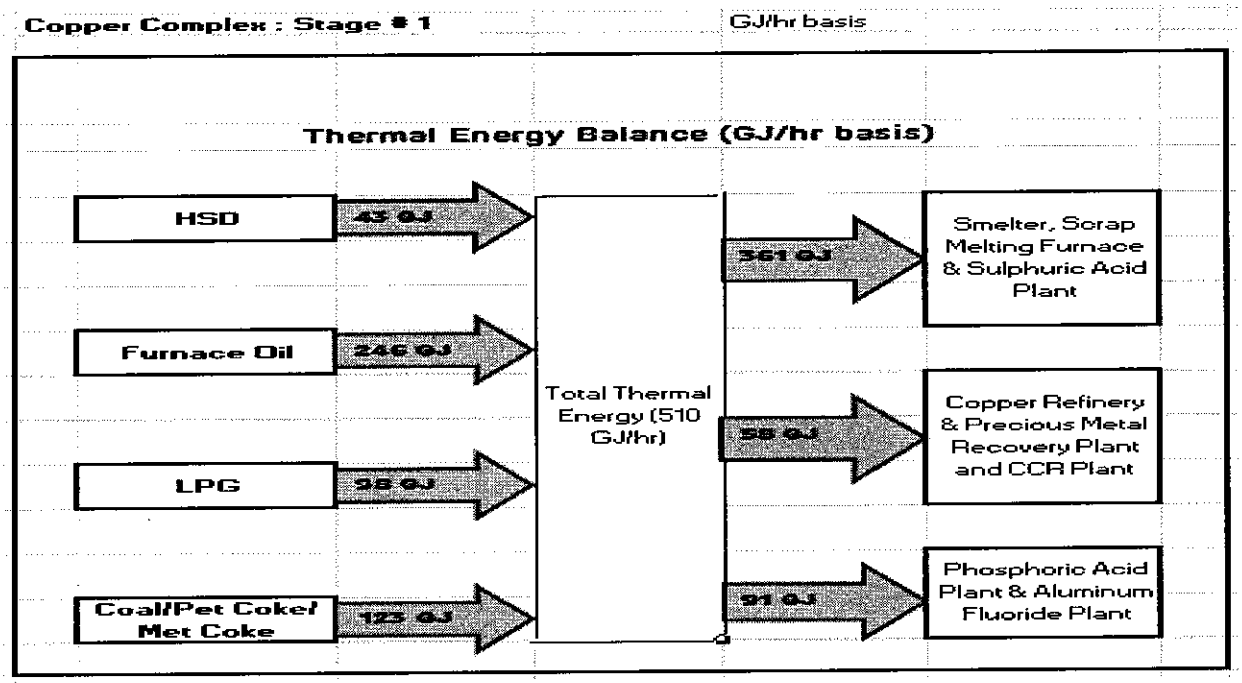


FIGURE-2.6(A)
THERMAL ENERGY BALANCE DIAGRAM FOR PHASE-I

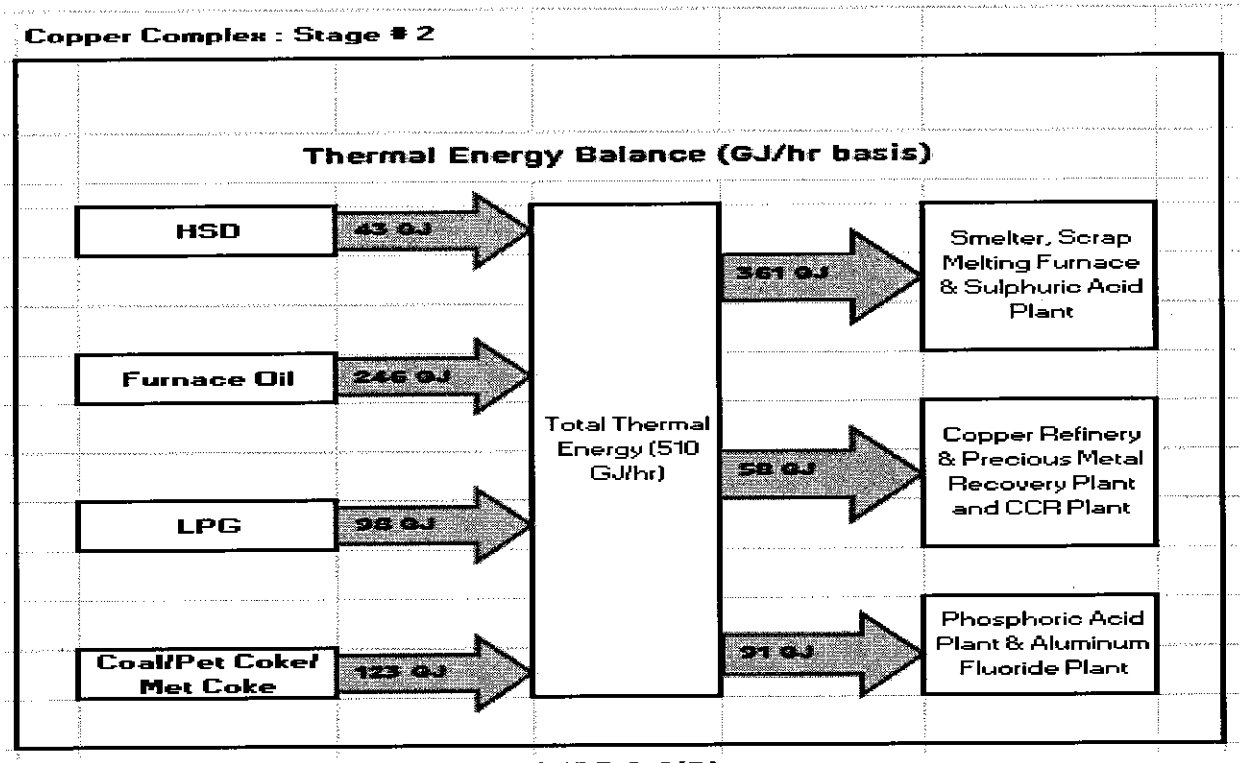


FIGURE-2.6(B)
THERMAL ENERGY BALANCE DIAGRAM FOR PHASE-II

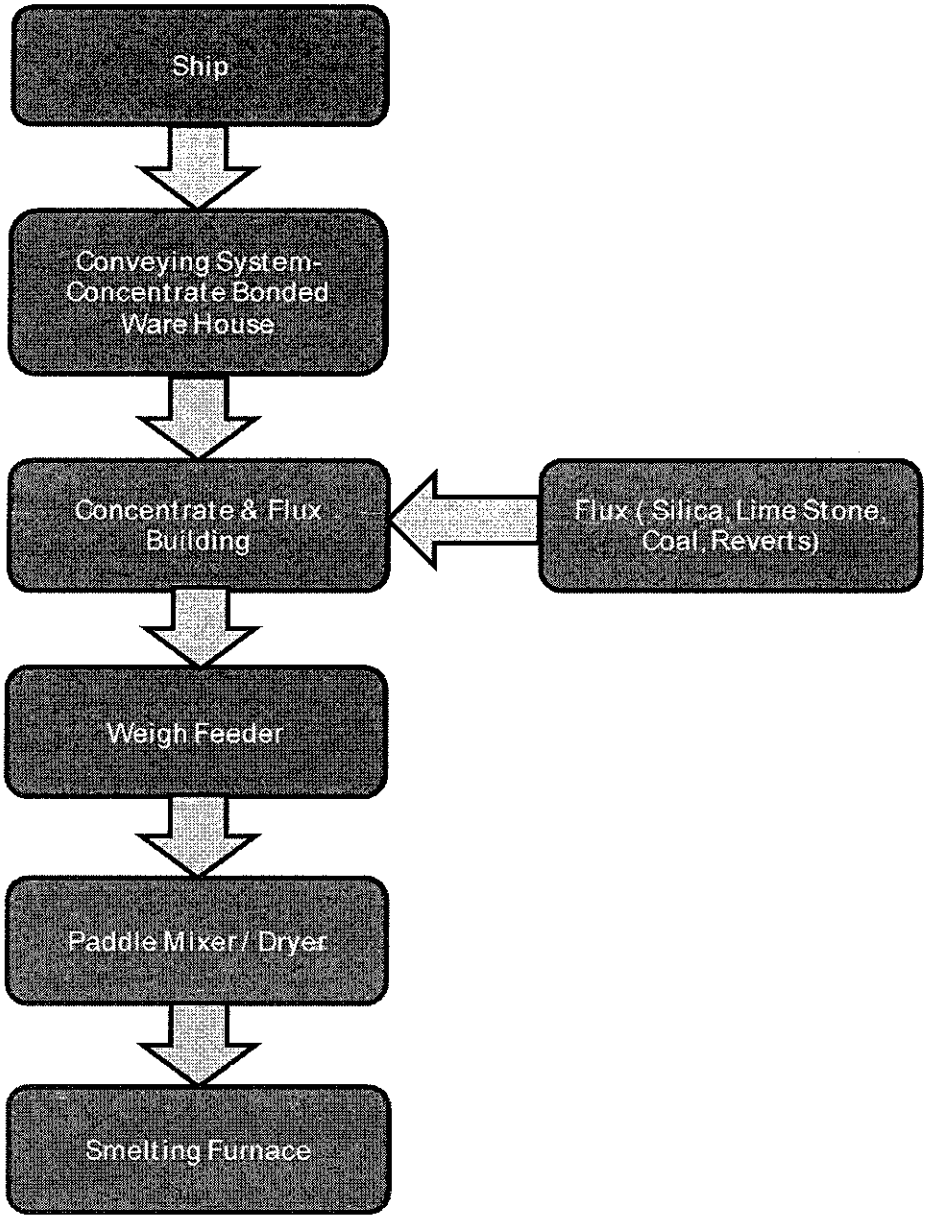


FIGURE-2.7
CONCENTRATE AND FLUX MATERIAL HANDLING PROCESS FLOW CHART

2.3.2 Smelting Furnace

The proposed smelting furnace is for production of 9,00,000 TPA of copper anode production. The copper concentrate blend mixed with flux material is fed to the smelting furnace, where enriched air added with oxygen is fed to furnace. The smelting reaction takes place at furnace temperature around 1200^0C. Furnace produces copper matte (~60% Cu); copper slag (~1% Cu) and sulphur di-oxide gas (SO_2). Both copper matte (~60% Cu) and copper slag (~1% Cu) is tapped to settling furnace and sulphur di-oxide gas (SO_2) is transferred to sulphuric acid plant through a closed pipeline. The smelting furnace will be provided with a waste heat recovery boiler to recover the heat from the off gas of the process.

$$CuFeS_2 + O_2 + SiO_2 \longrightarrow \underset{\text{Matte}}{Cu\text{-}Fe\text{-}S} + \underset{\text{Slag}}{FeO.SiO_2} + \underset{\text{Gas}}{SO_2}$$

The purpose is to utilise heat of the gases within the process and also conservation of water. The furnace will be attached with a state of the art, electrostatic precipitator and a high capacity induced draft fan to transfer the gases to sulphuric acid plant. The secondary off gas will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO_2 before it is discharged to the atmosphere. The process flow diagram of smelter furnace is shown in **Figure-2.8.**

2.3.2.1 Settling Furnace

Settling furnace will be provided for matte and ferro sand (copper slag also called as iron silicate) separation.

The copper matte & ferro sand from smelting furnace will be periodically tapped from the tap hole which will be provided with water cooled copper block in the smelting furnace. The tap hole will be opened with a tap gunning machine. The ferro sand/ matte together will flow by gravity to the settling furnace for ferro sand and matte settling and separation. Separation will take place on the basis of the density difference. The temperature around 1250°C will be maintained. The off-gases from the furnace operation will be taken smelting furnace scrubbing system.

Ferro sand settled in the settling furnace will be granulated and will be collected in the collection pond. Ferro sand granulation clear water will overflow into a clear water pond and it is pumped to spray pond for cooling and then recycled back.

The granulated ferro sand from settling pond will be collected and discharged in a steel bunker. From the steel bunkers ferro sand will be transported to the designed ferro sand dump area and further sale/disposal. The process flow diagram of settling furnace is shown in **Figure-2.9.**

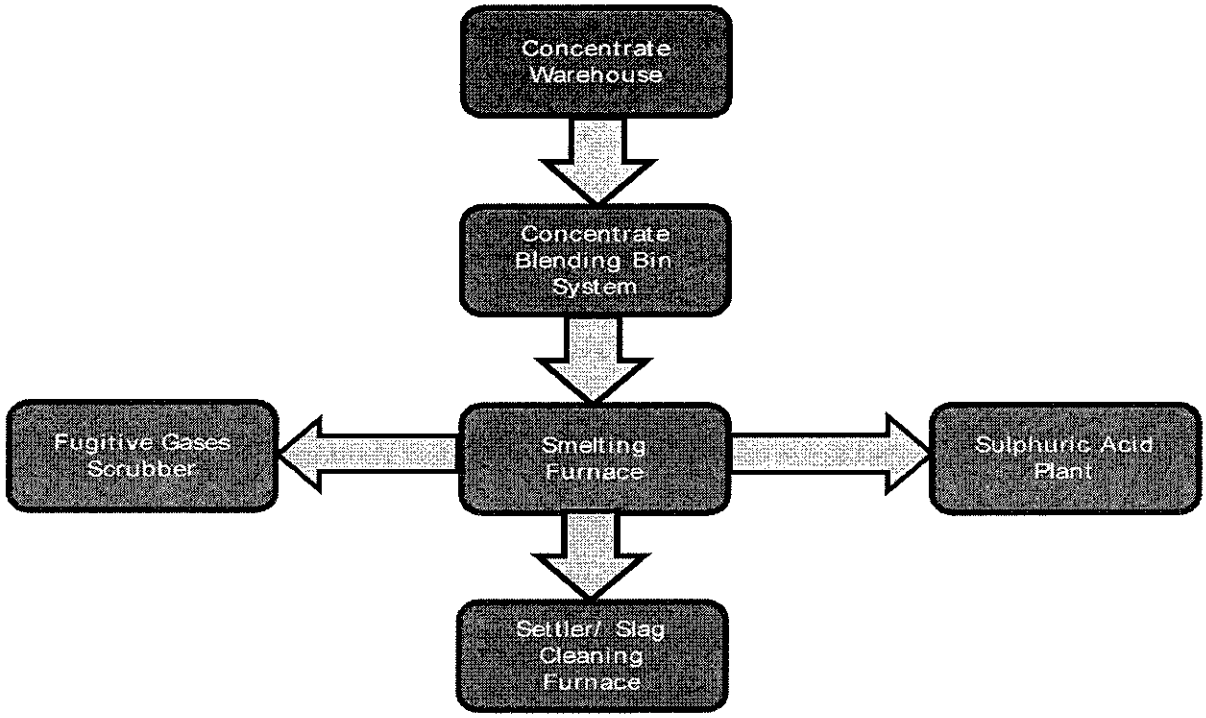


FIGURE-2.8
PROCESS FLOW DIAGRAM OF SMELTER FURNACE

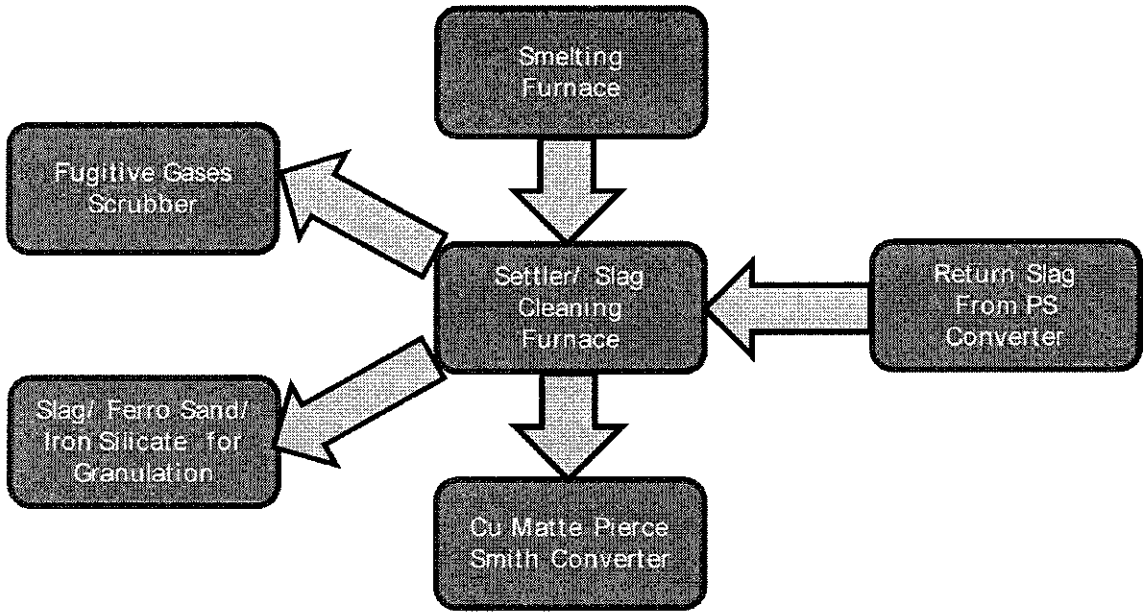


FIGURE-2.9
PROCESS FLOW DIAGRAM OF SETTLING FURNACE

2.3.3 Pierce Smith Converter

Pierce Smith Converters (PSC) will be used to convert copper matte to blister copper (~98% Cu). Converting is oxidation of molten Cu-Fe-S matte to form molten 'blister' copper (~ 98 % Cu). It entails oxidizing Fe and S from the matte with oxygen-enriched air or air 'blast'. It is mostly done in the Peirce Smith converter, which blows the blast into molten matte through submerged tuyeres.

The main raw material for converting is molten Cu-Fe-S matte from smelting. Other raw materials include silica flux, air and industrial oxygen. Several Cu bearing materials are recycled to the converter mainly solidified Cu-bearing reverts and copper scrap.

The products of converting are:

(a) Molten blister copper which is sent to fire- and electrorefining;
(b) Molten iron-silicate slag which is sent to Cu recovery, then discard; and
(c) SO_2-bearing off gas which is sent to cooling, dust removal and & H_2SO_4 manufacture.

The heat for converting is supplied entirely by Fe and S oxidation; i.e. the process is auto thermal. The overall converting process may be described by the schematic reaction:

Cu-Fe-S	+ O_2	+ SiO_2	⟶	Cu^0_l +	{2FeO:SiO_2 :Fe_3O_4}	+ SO_2
Molten matte	in air oxygen	and in flux			molten slag with some solid Fe_3O_4	Gas

Primary gases from these furnaces will be routed to sulphuric acid plant. The furnace will be attached with a state of the art, electrostatic precipitator and a high capacity induced draft fan to transfer the gases to sulphuric acid plant. Proper water cooled double hood arrangement and gas cooling system, etc. will be installed to collect the secondary fugitive emission. The secondary off gases will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO_2. This will enable continuous operation of three converters with one converter on periodical maintenance. The process flow diagram of pierce smith converter is shown in **Figure-2.10.**

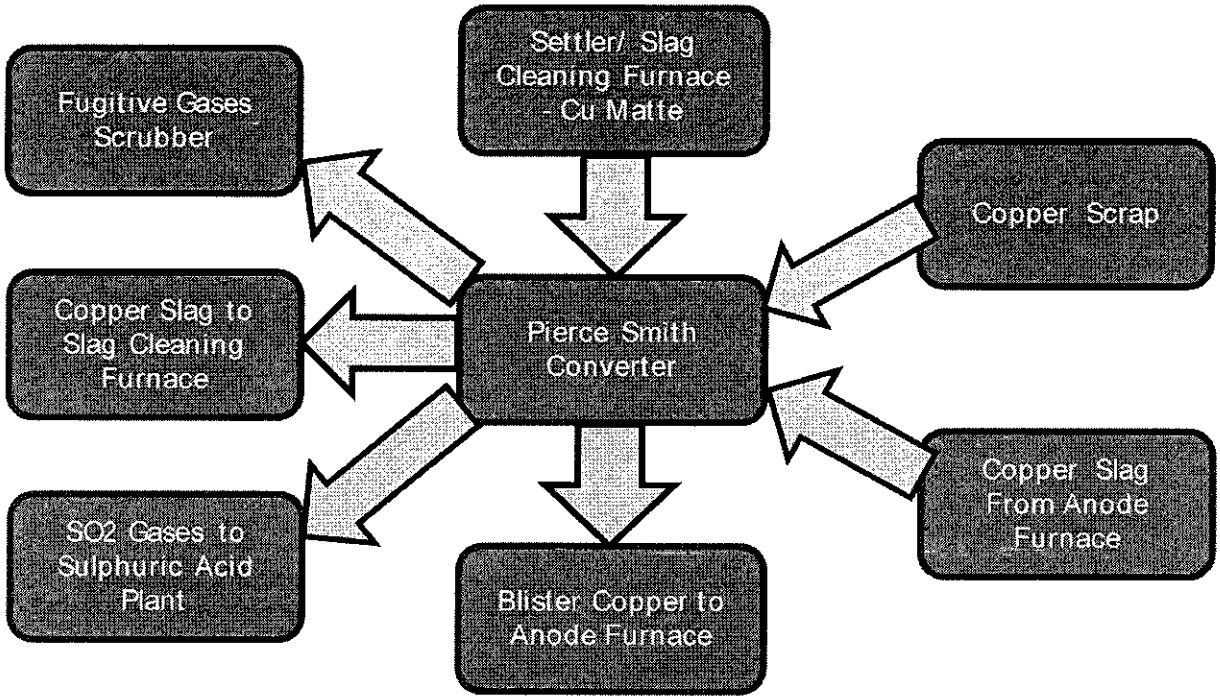


FIGURE-2.10
PROCESS FLOW DIAGRAM OF PIERCE SMITH CONVERTER

2.3.4 Ferro Sand Cleaning Furnace (FSCF)

The ferro sand (copper slag) from converter will be processed in the ferro sand cleaning furnace. Slag-cleaning furnaces process of smelting furnace slag as well as slag from Pierce Smith Converters. A reducing agent is often required to reduce Cu oxide in the slag to Cu metal or Cu sulfide. Coal or metallurgical coke is often added for this reduction.

$$C + Cu_2O \longrightarrow CO + 2Cu^0$$

Carbon additions also reduce solid magnetite in the slag to liquid FeO:

$$C + Fe_3O_4(s) \longrightarrow CO + 3FeO$$

This decreases slag viscosity and improves settling rates.

The copper slag is also called as iron silicate as well as ferro sand. Ferro sand from cleaning furnace will be granulated and will be collected in the collection pond. Ferro sand granulation clear water will overflow into a clear water pond and it is pumped to spray pond for cooling and then recycled back. The granulated ferro sand from settling pond will be collected and discharged in a steel bunker. From the steel bunkers ferro sand will be transported to the designed ferro sand dump area and further sale/disposal. The process flow diagram of slag cleaning furnace flow sheet is shown in **Figure-2.11.**

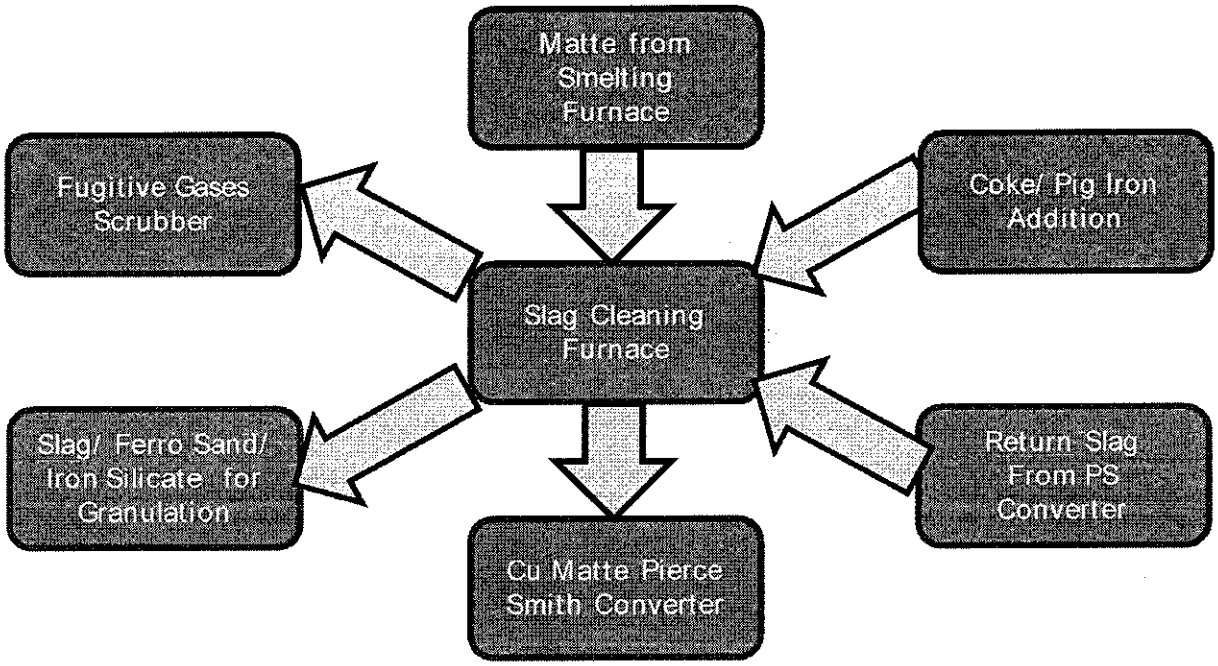


FIGURE-2.11
PROCESS FLOW DIAGRAM OF SLAG CLEANING FURNACE

2.3.5 Copper Scrap Melting System

Considering the availability of the copper scrap & electronic scrap getting generated within the country as well as in house (applicable for copper scrap) getting generated within the country as well as in house; a dedicated copper scrap melting system will be designed to have a sustainable solution for the country. This will help the various copper scrap producer a sustainable outlet to treat the copper scrap and produce LME Grade 'A' copper cathode. System is also designed to handle utilization of the imported copper scrap as feed stock as well. A state of art technology will be used for the same. Such facilities are available in various developed countries. The process flow diagram of copper scrap melting furnace flow sheet is shown in **Figure-2.12**.

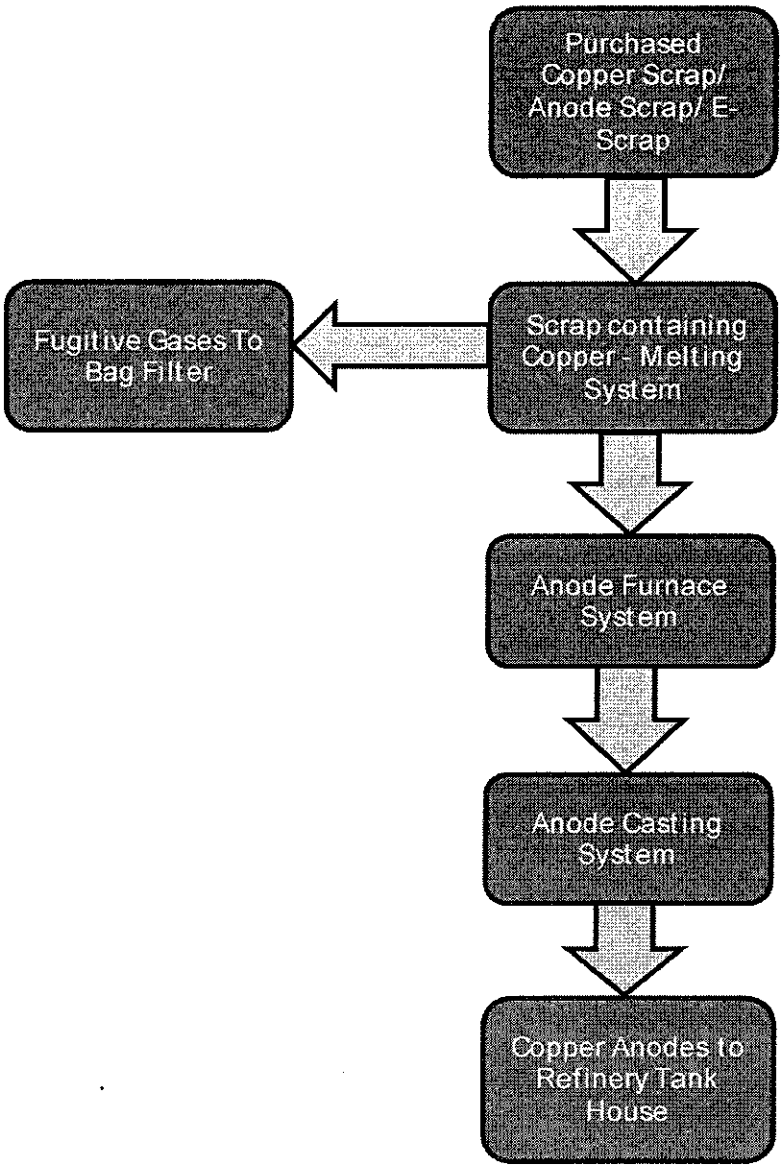


FIGURE-2.12
PROCESS FLOW DIAGRAM OF COPPER SCRAP MELTING FURNACE

2.3.6 Anode Furnace & Anode Casting Wheel

Anode furnaces will be used to make anode copper (~99.5% Cu) from blister received from Pierce Smith Converters. The molten blister copper from Peirce-Smith converting contains -0.01% S and -0.5% O_2. At these levels, the dissolved sulfur and oxygen would combine during solidification to form bubbles ('blisters') of SO_2 in newly cast anodes – making them weak and bumpy.

Fire refining removes sulfur and oxygen from liquid blister copper by:

a) Air-oxidation removal of sulfur as SO_2 to -0.002% S then; and
b) Hydrocarbon-reduction removal of oxygen as CO and H_2O (g) to -0.15% liquefied petroleum gas or natural gas is used for doing fire refining.

The secondary off gases will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO_2. The final product of fire refining is molten copper, -0.002% S, 0.15% O, 1180- 1200^{0}C, ready for casting as anodes. Most copper anodes are cast in open anode-shaped impressions on the top of flat copper moulds. Newly developed latest designed double casting wheel system will be installed with casting rate of ~100 TPH. The newly poured anodes are cooled by spraying water on the tops and bottoms of the moulds while the wheel rotates. They are stripped from their moulds (usually by an automatic raising pin and lifting machine) after a half rotation. The empty moulds are then sprayed with a barite-water wash to prevent sticking of the next anode. The most important aspect of anode casting, besides flat surfaces, is uniformity of thickness. This uniformity ensures that all the anodes in an electro refining cell reach the end of their useful life at the same time. Automatic control of the mass of each pour of copper (Le. the mass and thickness of each anode) will be used. Anode mass is normally 375-425 kg. Anode-to-anode mass variation in a smelter or refinery is +2 to 5 kg with automatic weight control.

Recent anode designs have incorporated:

(i) Knife-edged lugs which make the anode hang vertically in the electrolytic cell; and
(ii) Thin tops where the anode is not submerged (i.e. where it isn't dissolved during refining).

The latter feature decreases the amount of un-dissolved 'anode scrap' which must be recycled at the end of an anode's life. Suitable capacity twin casting wheel arrangement will be provided to produce copper anode. The copper anode will be transferred to copper refinery for further processing. The process flow diagram of copper anode furnace & anode casting wheel flow sheet is shown in **Figure-2.13.**

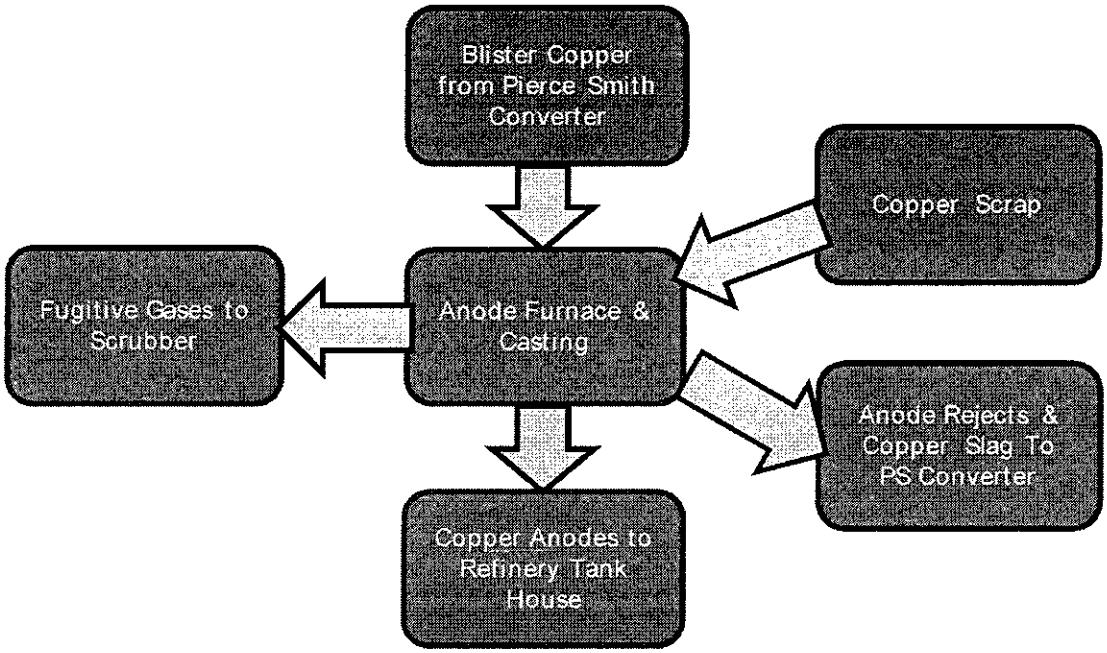


FIGURE-2.13
PROCESS FLOW DIAGRAM OF COPPER ANODE FURNACE & ANODE CASTING WHEEL

2.3.7 Off Gas Handling

a. It is proposed to install a Waste Heat Recovery Boiler (WHRB) to recover the entire off gas heat from the smelting furnace before reaching to sulphuric acid plant for production of sulphuric acid through suitable ESP, ID fan, ducting and a gas-mixing chamber;
b. A suitable dust conveying system for WHRB & ESP will be installed and will be consumed within the process;
c. The secondary collection system with scrubbing system will be ensured to have sufficient capacity to handle all the secondary gas; and
d. Gases will be discharged through required size stack to atmosphere after scrubbing and meeting standards prescribed authorities.

2.3.8 Sulphuric Acid Plant (SAP)

Sulphuric Acid Plant (SAP) having capacity of 30 LTPA will be provided to handle the gases from copper smelter with required capacity of gas cleaning plant to treat the incoming gases. State of art environment friendly technology of double contact double absorption will be used for sulfuric acid plant. Effluent generated from sulphuric acid plant will be treated in state of the art effluent treatment facility.

The sulphurous gases generated during the sulphidic copper concentrate smelting and matte converting operation in a copper smelter plant are treated in sulphuric acid plant for the production of monohydrate sulphuric acid as a by-product.

The process of production of sulphuric acid consists of three principal steps, namely:

i. Cleaning of the sulphur dioxide gas from the smelting furnace and PS converters.
ii. Catalytic conversion of the sulphur dioxide (SO_2) gas to sulphur trioxide (SO_3) gas according to the chemical reaction:

$$SO_2 + ½\ O_2 = SO_3$$

iii. Absorption of the sulphur trioxide (SO_3) gas by combining with water (H_2O) to form a solution of sulphuric acid (H_2SO_4) according to the chemical reaction:

$$SO_3 + H_2O = H_2SO_4$$

The conversion of SO_2 to SO_3 is an exothermic, reversible and adiabatic reaction and with increase in temperature the equilibrium constants become more unfavourable with respect to SO_3 formations. The other factors, which favour equilibrium conversions, are increase in oxygen concentration in the gases or high pressures but the relative gains are rather small. In contrast to the unfavourable effect of high temperature on equilibrium it is found that the rate of reaction increases rapidly with rising temperature. Consequently optimum performance requires a balance between the opposing effects of reaction rate and equilibrium. Thus the gases entering the V_2O_5 catalyst normally are maintained between 400 - 450°C. Therefore, in order to achieve over-all high conversion efficiencies between 99.8% - 99.9%, it is imperative that the converter gases need to be cooled between stages to the above temperature range and also removing the partially converted sulphur trioxide formed normally after 2nd/3rd beds, before returning them to subsequent stages. This process is commonly known as Double Conversion and Double Absorption (DCDA).

2.3.9 Gas Cleaning Systems

Waste gases from the metallurgical process must be treated to reduce the sulphur dioxide emissions to the atmosphere. To achieve this the sulphur dioxide in the gas is converted to sulphur trioxide for the production of sulphuric acid in the sulphuric acid plant. The metallurgical off-gases must be cleaned prior to entering the contact section of the acid plant to enable the plant to produce a product acid of acceptable quality for use and sale.

As well, clean gas is required to prevent plugging of catalyst beds and other detrimental effects on equipment such as corrosion and erosion.

2.3.9.1 Gas Cleaning Systems

There are four main duties to be performed by the gas cleaning system of a metallurgical sulphuric acid plant:

1. Saturation of the gases and elimination of the coarse and fine particulate matter;
2. Cooling of the gases, condensation of the metallic fumes and reduction of the moisture content;

3. Removal of the very fine particulate matter as well as the bulk of the acid mist by electrostatic precipitation to produce an optically clear gas which is fed to the acid plant downstream; and

4. Specialty processes for removal of specific impurities in the gas (i.e. mercury removal, halogens).

- **Saturation –** Adiabatic cooling and saturation of the gas is done in an open spray tower, low or high pressure drop venturi. Some removal of course particulate is achieved.

- **Elimination** – The nature (type, concentration, size) of the impurity/dust determines the type of cleaning device required. Typically, high pressure drop venturi (fixed or variable throat), reverse jet scrubber (DynaWave), radial flow scrubber, etc. is required if dust loadings are high or particle size is small.

- **Cooling and Condensation** – Removal of water from the gas is required to achieve the plant water balance. Direct contact devices (packed towers, tray scrubbers) or indirect cooling (star coolers, shell and tube condensers) are used to cool the gas and provide some removal of gaseous impurities.

- **Electrostatic Precipitation** – Usually the last stage of gas cleaning before the drying tower. Removes the finest dust particles and acid mist.

- **Special Process** – These include mercury removal (Boliden-Norzink), fluoride scrubbers, sodium silicate systems, etc.

a. Mercury Removal

Three primary technologies which have since been further developed over the years:

- Mercury Removal Process – utilizes a chloride scrubber;
- Mercury Removal Process – utilizes a selenium filter; and
- Mercury Removal Process – utilizes sodium thiosulfate.

Chloride scrubber process has essentially become industry standard process providing these benefits:

- Insensitivity to high incoming values of mercury;
- Cost-effectiveness; moderate investment costs and low operating costs, which are practically independent of the mercury level;
- Applicability to almost any gases including ones containing SO_2;
- Proven technology: approx. 40 reference plants; and

- Option for an additional step involving a specially designed electro-winning cell, in which the calomel produced can be converted to high purity metallic mercury.

➢ **Process Equipment**

- Reactor tower and other special vessels;
- Chlorination system;
- Electrowinning cell for metallic mercury production from calomel; and
- Process control.

b) Fluoride Removal Process

Hydrogen fluoride in the SO_2 gas can cause damage to the sulfuric acid plant and therefore requires removal from the gas. This can be achieved by adding sodium silicate solution to the packed gas cooling tower. The hydrogen fluoride is absorbed in the gas cooling tower, reacts with the sodium silicate forming a reaction product with low vapor pressure and is finally bled to the wastewater treatment plant.

c) Arsenic Removal Process

To avoid contamination to the sulfuric acid, it is necessary to remove as much arsenic in the SO_2 gas as possible. Particulate arsenic has already been removed during the hot gas cleaning process. High-efficiency scrubbers with a variable throat for efficient continuous scrubbing for removing most of the arsenic content to wet electrostatic precipitators for the final cleaning of the gas will be used. Gaseous arsenic condenses in the quench section where the SO_2 gas is cooled down to the saturation temperature. Solid arsenic forms here and is ready to be scrubbed out of the gas in the wet gas cleaning plant. The solved arsenic is then transferred to the wastewater treatment plant with the weak acid bleed, where the arsenic has to be separated from the bleed.

Alternatively, some of the arsenic can be precipitated out of the weak acid as early as in the wet gas cleaning plant assuming the acid concentration in the quench liquid is high enough. This will allow for the solid arsenic to be separated from the weak acid before it is transferred to the wastewater treatment plant.

The process flow diagram of gas cleaning plant flow sheet is shown in **Figure-2.14**.

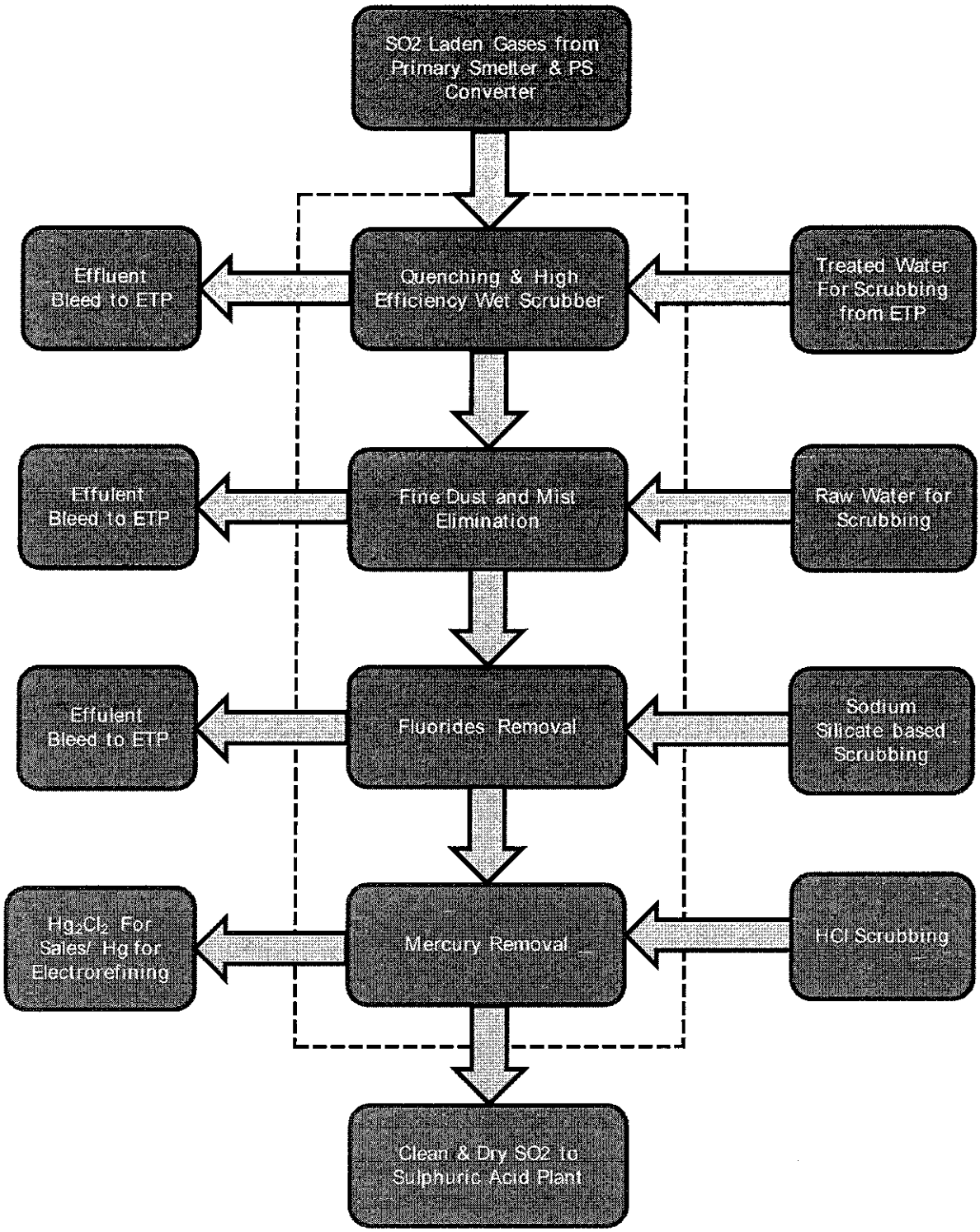


FIGURE-2.14
PROCESS FLOW DIAGRAM OF GAS CLEANING PLANT

2.3.9.2 Conversion of SO_2 to SO_3

Double Absorption

- Also known as Double Contact/Double Absorption; and
- Characterized by two SO_3 absorption towers.

Double Absorption Plant Arrangements

- **2/1 Arrangement** - 2 catalyst beds before intermediate absorber followed by 1 catalyst bed. Will not meet current emission regulations.

- **2/2 Arrangement** - 2 catalyst beds before intermediate absorber followed by 2 catalyst beds. Used by Lurgi in many plants around the world.

- **3/1 Arrangement** - 3 catalyst beds before intermediate absorber followed by 1 catalyst bed. Standard arrangement for the modern contact sulphuric acid plant for obtaining SO_2 emissions of 4 lb/ST (2 kg/MT) or 99.7% conversion.

- **3/2 Arrangement** - 3 catalyst beds before intermediate absorber followed by 2 catalyst beds. Used when high overall conversions (>99.9%)/low SO_2 emissions are required.

Plants with 3/2 arrangements are required to ensure low SO_2 emissions and are considered Best Available Technology (BAT).

The optically cleaned SO_2 rich gases along with dilution air to the extent required for maintaining the requisite O_2 / SO_2 ratio are dried in a drying tower with 96% concentrated sulphuric acid in counter current circulation. The dried gases after heating to 400 - 450 ^oC passed through converter with cesium promoted vanadium pent oxide catalyst. The converted SO_3 gases are absorbed in two absorption towers where 98% concentrated sulphuric acid is circulated to produce 98.5% strength sulphuric acid product. During the start-up and other abnormal operations such as when SO_2 content is less than auto thermal point, gases are heated before conversion in converter which helps in low SO_2 content in vent gases. The process flow diagram of double absorption plant is shown in **Figure-2.15.**

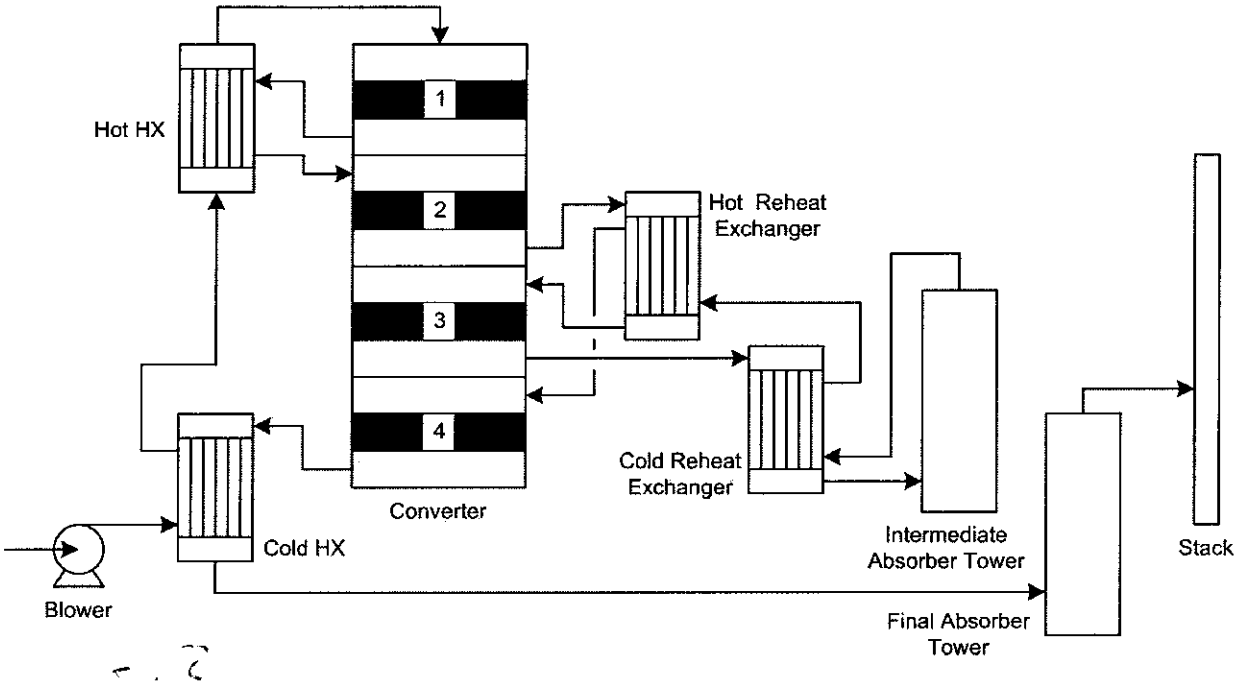


FIGURE-2.15
PROCESS FLOW DIAGRAM OF DOUBLE ABSORPTION PLANT

2.3.9.3 Acid Section

Acid produced during the absorption process is given bleed at >98%. This acid is at a high temperature and need to be brought to the room temperature level say ~< 40 Deg C. Acid coolers are used for the same. Acid coolers are either plate heat exchangers or shell & tube heat changer with anodic protection to protect the cooler. Cooling of the acid is down either by using water or air or combination of both depending upon the application. Cooled product acid is stored in the storage tanks and supplied for further use in the market as well as in house consumption to produce phosphoric acid. The process flow diagram of sulphuric acid plant is shown in **Figure-2.16.**

2.3.10 Oxygen Plant

Oxygen plant with capacity of 96,000 TPM with purity ranging from 95% - 99.6% will be provided for copper smelter plant requirement, Totaling 3,200 TPD production of oxygen will be set up. Exact configuration will be frozen after detailed engineering is completed.

2.3.11 Refinery Unit

The anodes produced from the smelter will be refined through electrolysis process to remove the impurities present. A refinery unit capable of handling the smelter capacity will be built. State of art electro refining technology will be used to produce copper cathode of LME Grade 'A' from copper anodes produced in the copper smelter. Refinery will have state of art technology to produce value added products from the impurities include Bi, Te, Ni, etc. Copper anode slime generated during copper electro refining process will have precious metals such as Au, Ag, Pt, Pd, etc. Effluent generated from copper refinery will be treated in state of art effluent treatment facility. The process flow diagram of copper anode furnace & casting is shown in **Figure-2.17.**

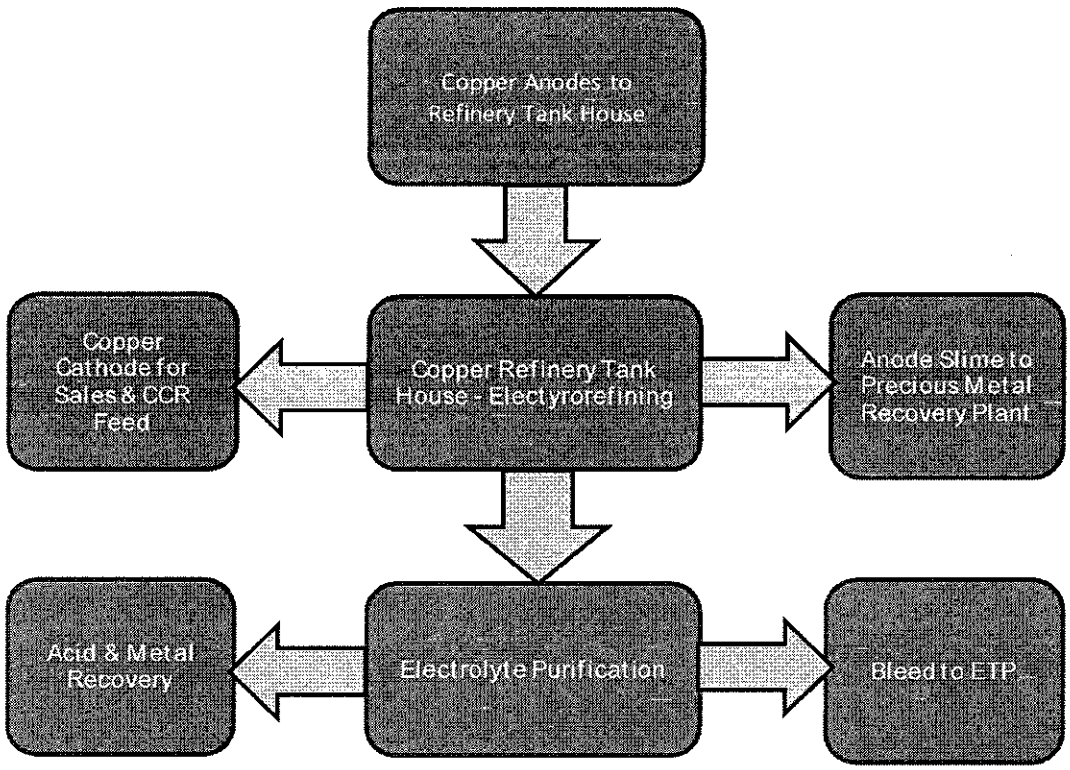


FIGURE-2.17
PROCESS FLOW DIAGRAM OF COPPER REFINERY TANKHOUSE

- *Electrorefining Entails:*

a. Electrochemically dissolving copper from impure copper anodes into $CuSO_4 - H_2SO_4 - H_2O$ Electrolyte; and
b. Selectively electroplating pure copper from this electrolyte *without the anode impurities.*

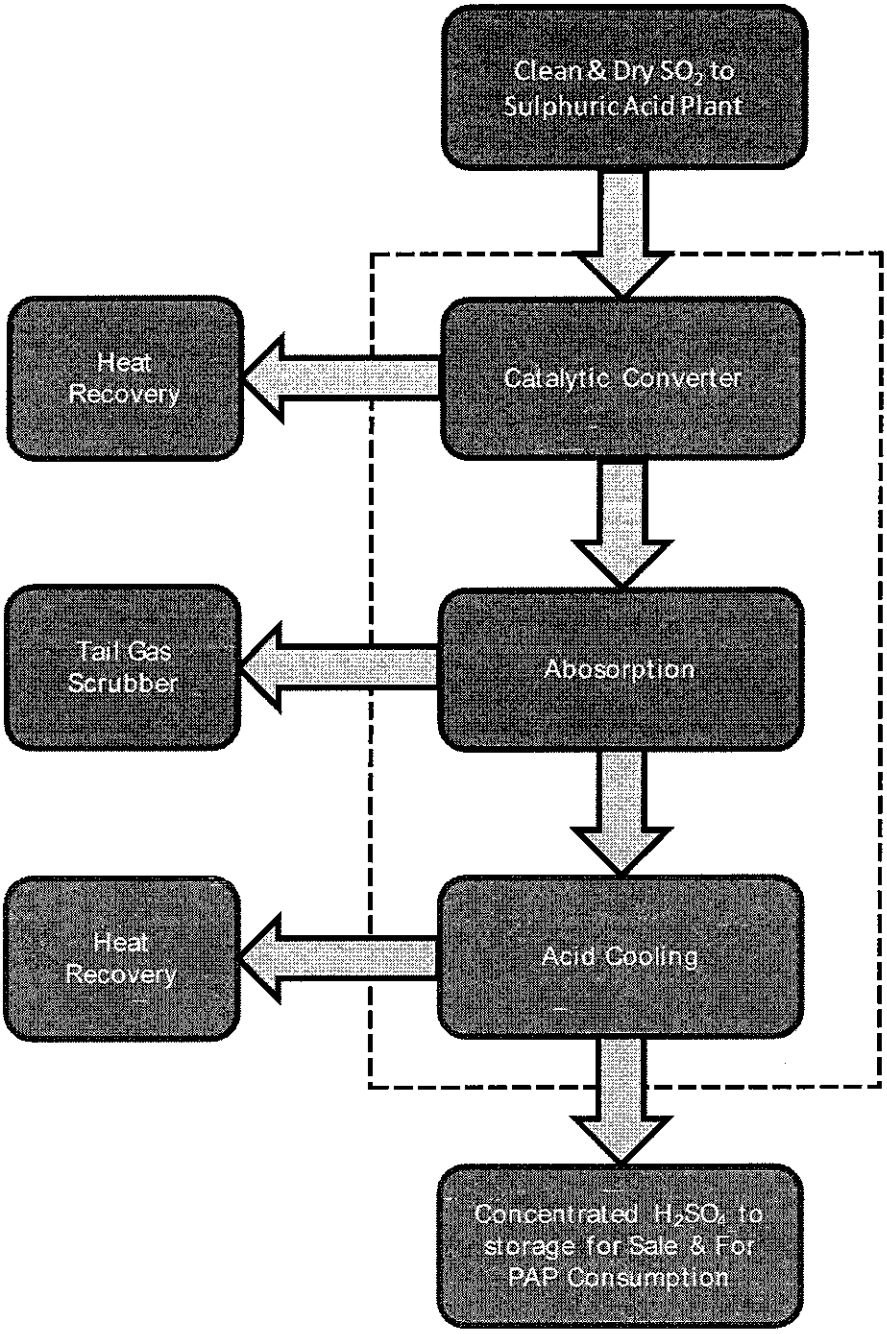


FIGURE-2.16
PROCESS FLOW DIAGRAM OF SULPHURIC ACID PLANT

It serves two purposes:

a. It produces copper essentially free of harmful impurities; and
b. It separates valuable impurities (e.g. gold and silver) from copper for recovery as by-products.

Application of an electrical potential between a copper anode and a metal cathode in $CuSO_4$ –H_2SO_4 – H_2O Electrolyte causes the following:

a. Copper is electrochemically dissolved from the anode into the electrolyte producing copper cations plus electrons:

$$Cu^0_{anode} \longrightarrow Cu^{++} + 2e^-$$

b. The electrons produced by above reaction are conducted towards the cathode through the external circuit and power supply.
c. The Cu^{++} cations in the electrolyte migrate to the cathode by convection and diffusion.
d. The electrons and Cu^{++} ions recombine at the cathode surface to form copper metal (without the anode impurities), i.e.:

$$Cu^{++} + 2e^- \; Cu^0_{Cathode} \longrightarrow$$

Overall copper electrorefining is the sum of Reactions

$$Cu^0_{impure} \; Cu^0_{pure} \longrightarrow$$

2.3.12 Precious Metal Recovery Plant (PMRP)- A typical process

Copper anode slime generated in copper electro refining process undergo smelting process in Kaldo Furnace to recover Precious Metals and selenium. The process flow diagram of precious metal recovery plant is shown in **Figure-2.18.**

2.3.12.1 Kaldo Furnace Treatment

The leached anode slime will be dried, mixed with fluxes and charged to the Kaldo furnace together with other recycled materials. After heating, smelting and slag reduction the smelt slag is tapped. This is recycled to the copper smelter.

During converting, high velocity air is blown on the bullion surface through a water cooled steel lance and elements like Pb, Te, Bi, Sb, and Se will be oxidized and separated from the metal phase. The Kaldo furnace is rotating during all operations. After final refining the Doré metal is casted into anodes and sent to the silver refinery.

2.3.12.2 Gas Cleaning and Selenium Recovery

The horizontal venturi scrubber has three stages, a quencher stage (cooling stage), venturi stage and a cyclone stage. In the first stage, the gas is cooled to saturation temperature by vaporization of water in a vertical quencher. Water is introduced tangentially ahead of the throat, which gives a so-called "wet approach" (no nozzles are needed). This design prevents a wet-dry line.

The high gas velocity in the throat atomizes the water into fine water droplets, which are evaporated. The excess water together with the collected material is continuously drained from the quencher to a circulation tank. Slurry in the bottom part of the gas turning chamber is collected and emptied after every kaldo cycle. The pressure drop across the quencher is monitored.

The gases proceeds, via a gas duct, to the second stage, the venturi, where the gas is further cleaned from particulates. The venturi is a horizontal "gas duct" in which water is introduced from one side, then distributed out into the gas by nozzles. The gas is accelerated into a very high velocity by the inner adjustable throttle. The high gas velocity atomizes the water into very fine droplets. The dust particles collide and impact with the liquid droplets. In the diverging section behind the venturi throat, part of the static pressure is regained as the velocity of the gas stream is reduced. The pressure drop across the venturi is monitored.

After the venturi the gas passes horizontally through a gas duct before it reaches the cyclone stage (droplet separator). The gas enters the droplet separator tangentially at the bottom of the cylindrical portion. This creates a centrifugal force, which together with gravity, separates the droplets from the gas. The clean gas continues upward in the separator while the liquid with entrapped particulates drains to the cone bottom of the cyclone and is continuously drained to circulation tanks. The cleaning efficiency of the horizontal venturi scrubber is in excess of 90% and can reach up to 99%.

The process gas is transported using two-stage venturi scrubber fans. The two fans are needed to maintain the high pressure drop across the scrubber. Process water is fed to the scrubber using centrifugal pumps.

Copper anode slime generated in copper electro refining process undergo roasting process to recover Selenium. Selenium is of a commercial grade with purity of 99.5%.

2.3.12.3 Silver Electrolysis Tankhouse

Dore anode is consisting of Ag, Au, Pt, Pd, etc. Dore anode further undergoes electrolysis process to recover the precious metals. The heart of the silver refining plant process is the silver electrolysis tankhouse, which consists of electro-refining cells, circulation tanks and pumps, sieve tanks, a cooling system, and a pH control and adjustment system. A sophisticated control system monitors and controls the process, making it both easy to operate and highly efficient. With HCD (High Current Density) silver electro-refining cells, current densities exceeding 1000 A/m^2 are possible, depending on the composition of the silver Dore anodes being processed.

The electro-refining process is continuous except when new silver Dore anodes are loaded in the cells and silver anode slime and anode scrap is discharged from the cells at the end of the electrolysis cycle. The anodes continuously dissolve, depositing refined silver on the cathodes. The cell is equipped with an automatic scraper system that removes the deposits – the silver crystals scraped off the cathodes are collected at the bottom of the cells. At the end of the electrolysis

cycle, a slurry containing crystals of cathode silver and electrolyte is discharged into a sieve tank. The quality of the silver crystals produced in the electrolytic refining process is ensured by electrolyte circulation.

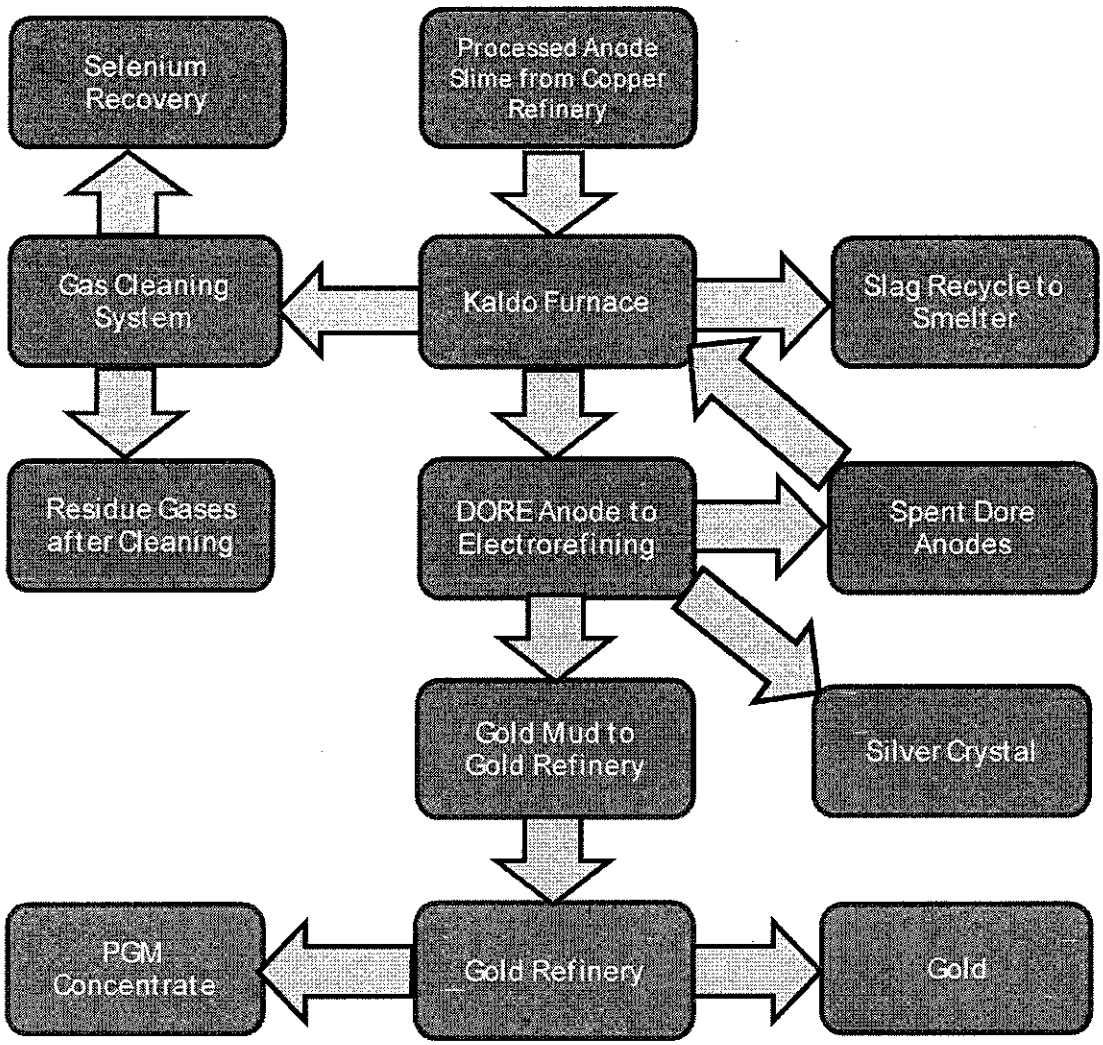


FIGURE-2.18
PRECIOUS METAL RECOVERY PLANT

All this helps increase the efficiency of the process, decrease manual work, and increase the amount of silver recovered. The modular design makes it easy to scale the solution for your desired capacity. Silver anode slime containing valuable impurities such as gold and platinum-group metals (PGMs) is also formed during the electrolysis process. The slime is collected inside anode bags surrounding silver Doré anodes and can be further processed using the Gold Refining process for recovery of gold and PGMs.

The non-dissolved anodes remaining after electrolysis are recycled for smelting and casting of new silver Doré anodes. Spent electrolyte withdrawn from circulation is replaced with fresh silver nitrate electrolyte in order to keep the silver content at a constant level.

Some of the silver crystals produced in the silver electrorefining cell are processed in the silver electrolyte preparation system, where they are dissolved to produce pure silver nitrate solution. The process and equipment design avoids the formation of toxic NOx gases, which improves the safety of the working environment. The system is also available as standalone equipment with its own control system.

Drying of Silver Crystals

The final product can be either silver bars or silver granules. In both cases the silver crystals are dried using the fully automated Silver Dryer, which consists of a fan, a heater, and a sieve tank for the silver crystals. The dried silver crystals are then melted using an induction furnace.

Casting and Bar Processing

Casting of silver bars is performed using a silver bar casting wheel for 1000 troy ounce (approximately 31 kg) ingots. The bars are then cooled in a water bath. Further operations, such as polishing, weighing, marking, and stacking can be performed by the Silver PWMS Robot. The equipment produces silver bars that meet the requirements of the London Bullion Market Association's Good Delivery standards.

Granulation and Packing

Silver granulation equipment consists of an induction furnace, granulation equipment and a receiving tank. Granules are dried in the silver dryer and packed using a material-handling system that produces ready-to-ship bags that are sealed and marked.

2.3.12.4 Gold Leaching & Recovery

A new environmentally friendly developed chloride leaching process for gold ores and concentrates. The new process combines effective gold leaching with a new type of gold solvent extraction process. Process flow chart for gold recovery is shown in **Figure-2.19.**

Highly oxidizing power in gold leaching provides very fast leaching kinetics and excellent gold recovery. Gold can be extracted from pregnant leach solutions using a patented solvent extractant. Pure gold product is precipitated directly from the stripping solution. Solvent extraction technology enables also direct silver recovery.

Effluent generated during the process is treated in state of art effluent treatment facility.

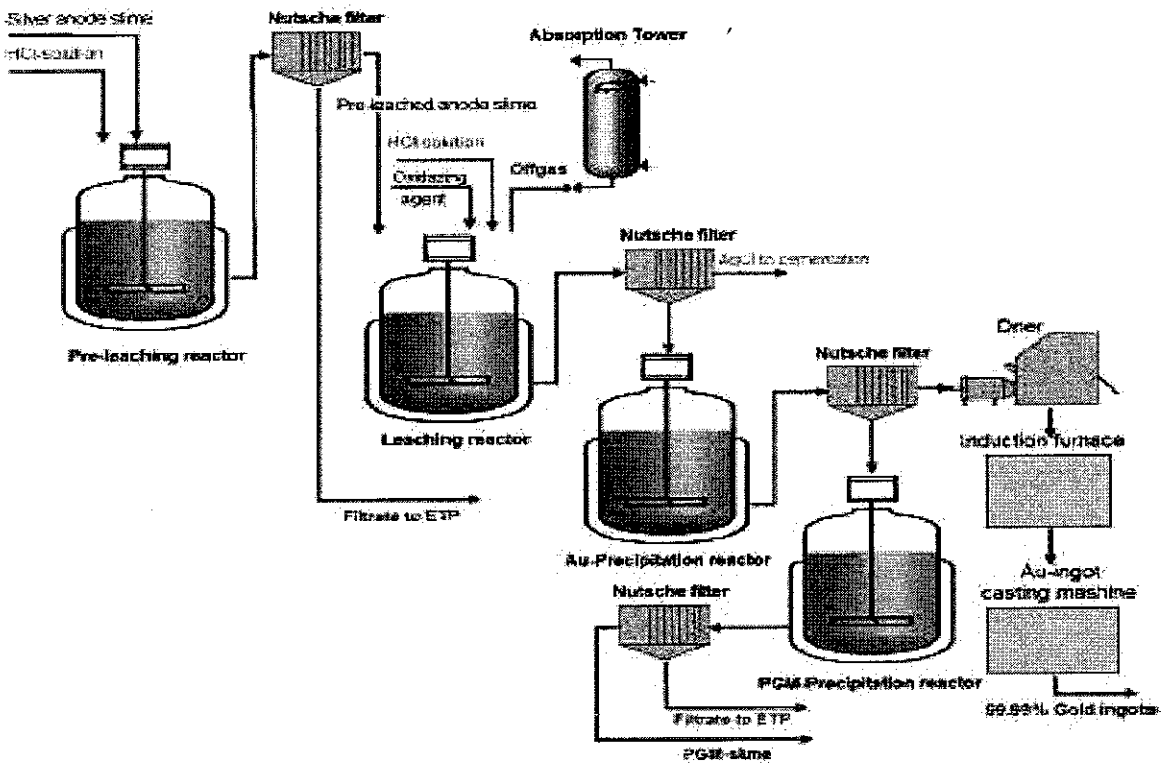


FIGURE-2.19
GOLD RECOVERY PLANT

2.3.13 Continuous Cast Copper Wire Rod Plant (CCR)

Copper cathode produced from copper refinery will be melted in a vertical shaft furnace with the help of gaseous fuel like LNG/LPG/ etc. and drawn in the form of Copper wire rod on continuous basis from a continuous casting and rolling machine. Rod will be of various sizes as per market requirement such as 8 mm to 25 mm.

The copper rod is manufactured by the modern continuous casting and rolling technology CONTIROD/ South Wire/ Properzi using the machinery supplied by Asarco (USA) – shaft furnace, Hazelett (USA) – twin belt caster/ South wire/

Continuous Properzi Caster, SMS-MEER (Germany)/ Morgan (USA)/ Continuous Properzi (Italy) – rolling mill.

The process of copper rod manufacturing consists of the following main stages:

1. Charging copper cathodes into the shaft furnace by the skip hoist and melting of the metal with gaseous fuel;
2. Preparation of metal for casting in the holding furnace;
3. Continuous casting rectangular/ Trapezoidal shape copper bar on the caster;
4. Rolling of continuously cast in the rolling mill;
5. Cooling and brightening of copper rod;
6. Coating the copper rod with anti-corrosion wax layer;
7. Coiling of the copper rod into coils; and
8. Weighing, packing, warehousing, and shipping of the finished product.

The process flow diagram of continuous cast copper wire rod plant is shown in **Figure-2.20.**

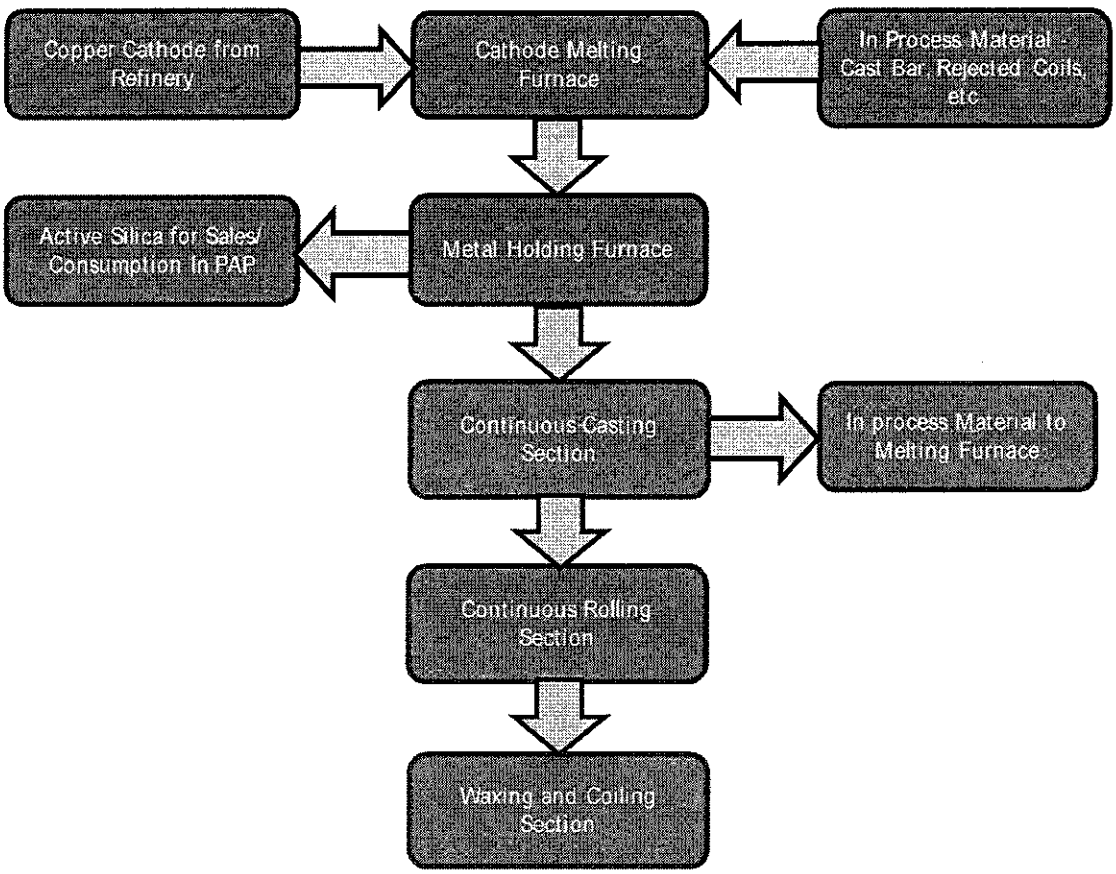


FIGURE-2.20
CONTINUOUS CAST COPPER WIRE ROD PLANT

2.3.14 Phosphoric Acid Plant

Phosphoric acid plant of 5 LTPA capacity (100% P_2O_5) will be set up. This will be value addition to proposed copper smelter project as well as Indian Fertilizer industries. This will be sold to fertilizer companies. Phosphogypsum produced during the process will be sold to cement industries as well as fertilizer and rest will be stock piled. Hydro fluro silicic acid generated as a byproduct will be converted as aluminum fluoride as well as sold in the market.

The rock phosphate received by pipe conveying system from port and stored in rock phosphate storage area. The rock phosphate will be taken to reactor (R1) by conveyor and hopper where it is mixed with recycled slurry, which contains mainly P_2O_5, CaO, SO_3 and H_2O received from reactor (R2). Slurry prepared in the reactor (R1) series will be sent to flash column to cool the slurry and maintain the required temperature in the reactor compartment. The slurry separated out from flash column will be fed to reactor (R2) to react with sulphuric acid and form the slurry which will be sent to filter. Phosphoric acid of 26-27% to 42-43% (Weak Phosphoric Acid) will be recovered based on the process of phosphoric acid is selected. A series of washes has been introduced to recover the P_2O_5 from the filtered cake, before it is sent gypsum pond. The process flow diagram of phosphoric acid plant is shown in **Figure-2.21.**

Filtered acid is then sent to clarification section to trap the solids passed through the filter cloth. Clarified acid is then fed through evaporation section to enhance the concentration to 48-54% P_2O_5 (strong phosphoric acid) suitable for fertilizer manufacturer.

During evaporation of the weak acid to strong phosphoric acid, Hydro fluro silicic acid of 18 -20% concentration is generated. This acid is then partially consumed in house for aluminum fluoride manufacturing and rest is sold in the market.

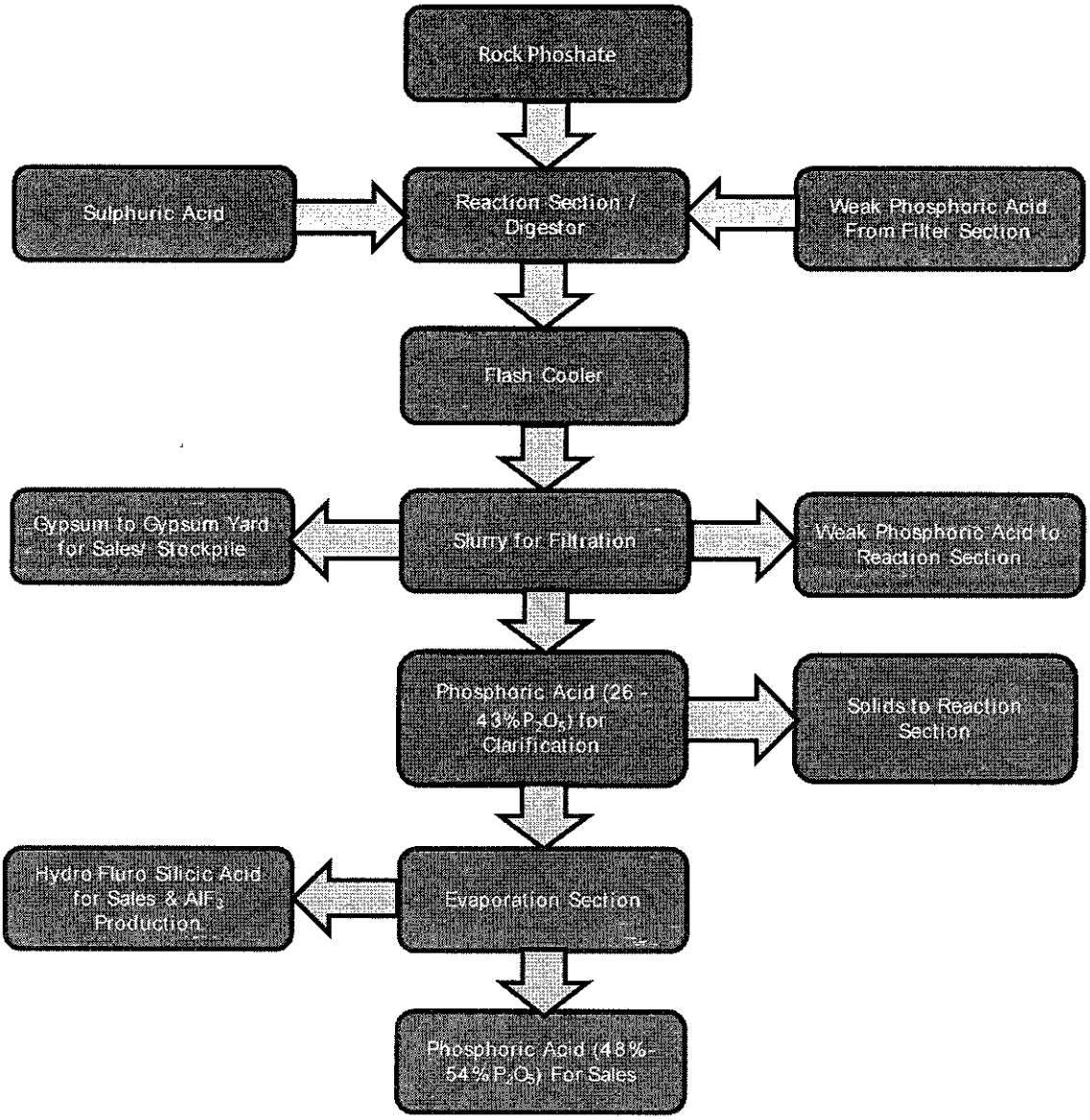


FIGURE-2.21
PHOSPHORIC ACID PLANT

2.3.15 Aluminum Fluoride Plant

Hydro fluro silicic acid generated from phosphoric acid plant will be converted in value added aluminum fluoride. Aluminum fluoride plant of 30,000 TPA capacity will be set up. Aluminum fluoride produced will be sold to aluminum manufacturing companies.

Aluminum hydrate will be sourced from local market. Aluminum hydrate will be digested with hydro fluro silicic acid to make aluminum fluoride in liquid form and silica part will be separated by filtration. Liquid aluminum fluoride will then

undergo crystallization process and then aluminum fluoride will be filtered and dried with gaseous fuel before sending it to packaging section. Cyclonic separator and bag filters will be installed to recover the aluminum fluoride, which may get escaped during the drying process. The process flow diagram of aluminum fluoride plant is shown in **Figure-2.22.**

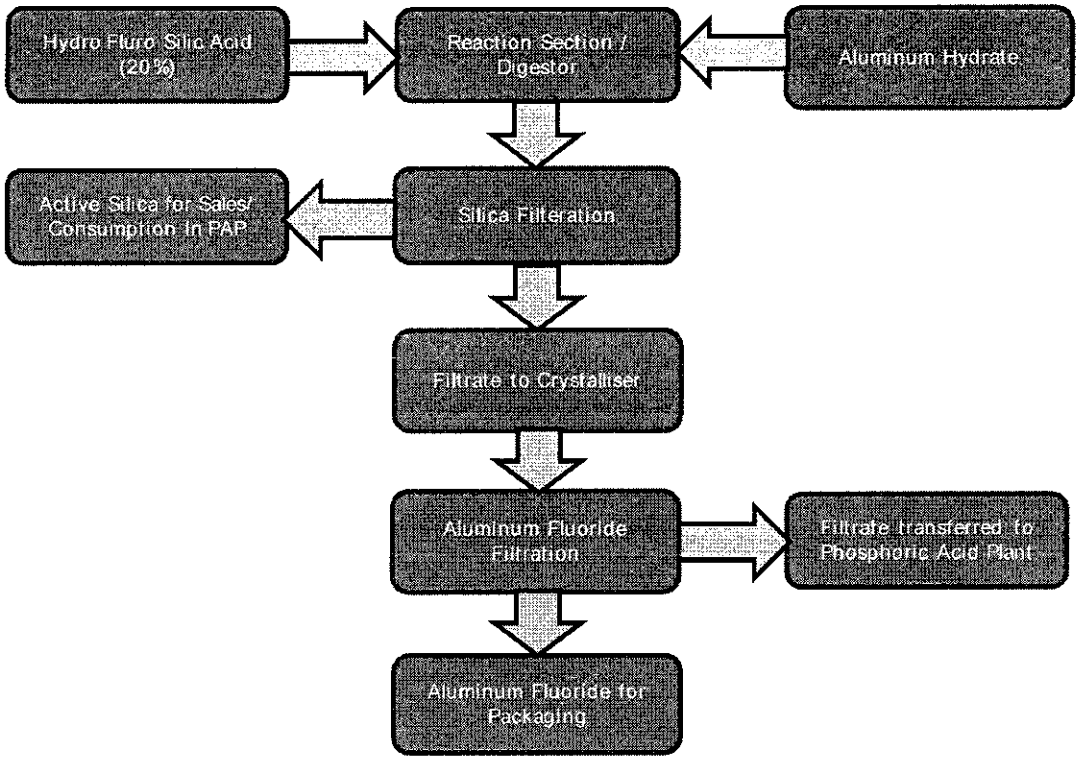


FIGURE-2.22
ALUMINUM FLUORIDE PLANT

2.4 Sources of Pollution and Mitigation Measures

The various types of pollution from the proposed project are categorized under the following types:

- Air pollution;
- Water pollution;
- Pollution emanating due to solid waste; and
- Noise pollution.

2.4.1 Air Emissions

The main pollutants discharged from the units will be particulate matter and sulphur dioxide emissions. Gas cleaning plant, ESP and scrubber will be installed to reduce dust emissions. The anticipated stack emission details are given in **Table-2.7.**

TABLE-2.7
DETAILS OF STACK EMISSIONS- PROPOSED PLANT

Sr. No.	Stacks Attached to	Height m	Dia m	Temp °C	Velocity m/s	Volume Nm^3/hr	SO_2 ppm	PM mg/Nm^3	NOx ppm
	Unit –I								
	Flue Emission Through Stack attached to Boiler/Furnace/Heater								
1	Waste Heat Recovery Super heater - I	70	1.0	150	25	70,000	150	50	50
2	Sulphuric Acid Pre Heater-I (Only for startup)**	30	1.2	250	25	60,000	150	50	50
3	Sulphuric Acid Pre Heater-II (Only for startup)**	30	1.2	250	25	60,000	150	50	50
4	DG Set – I (4 MVA Standby)**	30	Only Standby Facilities						
5	DG Set – II (4 MVA Standby)**	30	Only Standby Facilities						
6	Boiler – I (operational only when steam is not available from smelter)**	70	1.0	150	25	70,000	150	50	50
7	Shaft Furnace of CCR Plant-I	36	1.0	200	18	37000	25	50	50
	Process Emission through various Stacks/Vent of Reactors, Process, Vessel								
8	Anode Casting – I**	20	0.5	100	18	21000	-	50	15
9	Anode Casting – II**	20	0.5	100	18	21000	-	50	15
10	Main Stack Secondary Gas Scrubber- I & II (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)	100	2.0	60	22	2,50,000	150	50	-
			1.6	60	22	1,50,000			-
11	Electric Furnace and Secondary gases from Smelting – I (Bi Flue)	70	1.6	150	22	1,50,000	150	50	-
			2.0	150	22	2,25,000			-
12	Main Stack Sulphuric Acid Plant-I & II (Bi flue)	100	1.6	75	22	1,50,760	1 kg/t of 100 % H_2SO_4	-	-
			1.6	75	22	1,50,760			-
13	Cathode Stripping M C – I	30	0.5	50	2.2	1500	-	50	-
14	Cathode Stripping M C – I	30	0.5	50	2.2	1500	-	50	-
15	Anode Scrap Washing MC– I	30	0.5	40	2.2	1500	-	50	-
16	Electro winning Stack – I	45	0.5	40	6.5	4500	100	-	-
17	Slag Granulation – I	30	1.0	100	25	80,000	25	50	-
18	Steam Dryer for Copper concentrate – I	60	1.0	120	25	100,000	25	50	-
19	Smelting Furnace Area (Emergency Vent-I only during process tripping)**	45	1.0	300	25	86,000	150	50	-

Sr. No.	Stacks Attached to	Height m	Dia m	Temp °C	Velocity m/s	Volume Nm^3/hr	SO_2 ppm	PM mg/Nm^3	NOx ppm
20	PS Convertor Area (Emergency Vent – I (only during process tripping)**	45	1.0	300	25	86,000	150	50	-
21	Dust Extraction – I (Rock Phosphate Handling Area)	30	0.5	40	21	15,000	-	50	-
22	Precious Metal Recovery Plant – I	45	0.5	60	7.5	5,000	100	50	15
	Unit-II								
	Flue Emission Through Stack attached to Boiler/Furnace/Heater								
23	Waste Heat Recovery Super heater – II	70	1.0	150	25	70,000	150	50	50
24	Sulphuric Acid Pre Heater-III (Only for Plant startup)**	30	1.2	250	25	60,000	150	50	50
25	Sulphuric Acid Pre Heater-IV (Only for Plant startup)**	30	1.2	250	25	60,000	150	50	50
26	DG Set - III (4 MVA Standby)**	30	Only Standby Facilities						
27	DG Set – IV (4 MVA Standby)**	30	Only Standby Facilities						
28	Boiler – II**	70	1.0	150	25	70,000	150	50	50
29	Shaft Furnace of CCR Plant-II	36	1.0	200	18	37000	25	50	50
	Process Emission through various Stacks/Vent of Reactors, Process, Vessel								
30	Anode Casting – III**	20	0.5	100	18	21000	-	50	15
31	Anode Casting – IV**	20	0.5	100	18	21000	-	50	15
32	Main Stack Secondary Gas Scrubber- III & IV (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)	100	2.0	60	22	2,50,000	150	150	-
			1.6	60	22	1,50,000			-
33	Electric Furnace and Secondary gases from Smelting – II (Bi Flue)	70	1.6	150	22	1,50,000	150	150	-
			2.0	150	22	2,25,000			-
34	Main Stack Sulphuric Acid Plant-III & IV (Bi-flue)	100	1.6	75	22	1,50,760	1 kg/t of 100 % H_2SO_4	-	-
			1.6	75	22	1,50,760			-
35	Cathode Stripping M C – III	30	0.5	50	2.2	1500	-	50	-
36	Cathode Stripping M C – IV	30	0.5	50	2.2	1500	-	50	-
37	Anode Scrap Washing MC-II	30	0.5	40	2.2	1500	-	50	-
38	Electro winning Stack – II	45	0.5	40	6.5	4500	100	-	-
39	Slag Granulation – II	30	1.0	100	25	80,000	25	50	-
40	Steam Dryer for Copper concentrate – II	60	1.0	120	25	100,000	25	50	-
41	Smelting Furnace Area (Emergency Vent-II)**	45	1.0	300	25	86,000	150	50	-

Sr. No.	Stacks Attached to	Height m	Dia m	Temp °C	Velocity m/s	Volume Nm^3/hr	SO_2 ppm	PM mg/Nm^3	NOx ppm
42	PS Convertor Area (Emergency Vent - II)**	45	1.0	300	25	86,000	150	50	-
43	Dust Extraction – II (Rock Phosphate Handling Area)	30	0.5	40	21	15,000	-	50	-
44	Precious Metal Recovery Plant – II	45	0.5	60	7.5	5,000	100	50	-
	Phosphoric Acid Plant*						**HF mg/m^3**	**PM mg/Nm^3**	-
45	Phosphoric Acid Plant – I	90	1.2	50	25	1,00,000	20	50	-
46	Phosphoric Acid Plant – II	90	1.2	50	25	1,00,000	20	50	-

***stacks not considered for modeling*

2.4.2 Wastewater Generation and its Management

The total fresh water requirement for the entire project (phase-I & phase-II) will be about 32,800 KLD. About 5,432 KLD of wastewater will be generated from various facilities which will be treated and recycled into the process. The total water requirement and wastewater generation details are given in **Table-2.8.**

TABLE-2.8
WATER REQUIREMENT AND WASTEWATER GENERATION

All values are given in KLD

Sr. No.	Purpose	Raw (Fresh) Water	Wastewater Generation	Treated/ Recycled Water
1	Phosphoric Acid Plant	8,000	-	-
2	Sulphuric Acid Plant	15,020	1944	1440
3	Copper Smelter Plant + Scrap Melting Furnace	7,200	1872	1440
4	Copper Refinery & PMR	1,530	1200	-
5	CCR Plant	640	16	-
6	Domestic	400	400	-
7	Greenbelt/Green Cover	-	-	396
8	Lime slurry preparation	-	-	1440
9	Reverse Osmosis Plant & Multi Effect Evaporator	-	-	712
Total		**32,790**	**5,432**	**5,428**

Source: Feasibility Report

The liquid wastewater generated from SAP, refinery section and precious metal recovery plant will contain mainly inorganic contaminants viz., heavy metals, sulphate, etc., which needs to be reduced to within the acceptable levels for reuse in the plant.

The other wastewater generated from phosphoric acid plant, continuous copper rod plant, cooling towers, boiler blow down and WWTP raw water will not require any treatment for re-use/recycle. Similarly, the scrubbers bleed off, which will be in slurry form and to be filtered for solids only.

Effluent Treatment Plant (ETP)

Wastewater generated from copper smelter, sulphuric acid plant and copper refinery will be treated in state of art effluent treatment facility.

The ferric arsenate process is a solution for managing toxic arsenic in process and effluent streams. The process consists of a ferric arsenate precipitation stage followed by neutralization using lime milk. The process is based on easy, robust and understandable precipitation. The treatment of toxic arsenic requires a high level process reliability. This can be guaranteed using the cost-effective ferric arsenate process.

After the ferric arsenate process the treated water has a low arsenic concentration, typically containing 1-3 mg/l arsenic. A polishing step with enhanced arsenic removal will be included. The process comprises the neutralization of acidic streams and the advanced removal of metal impurities. The final product of the ferric arsenate treatment process are ferric arsenate cake and treated water. Ferric arsenate cake will be stored in environment friendly secured land fill, which will be designed as per Central Pollution Control Board (CPCB) guidelines. The selection of the arsenic treatment process is governed by residual stability. The residue of the ferric arsenate process is a stable solid precipitate.

Treated effluent will be recycled back for process use as well as sent to Reverse Osmosis (RO) plant for efficient and effective use. Rejects from RO plant will be sent to Multi Effect Evaporator (MEE). Solids generated from Multi Effect Evaporator (MEE) will be sent to Secured Land Fill (SLF).

Schematic flow diagram of ETP is given in in **Figure-2.23.**

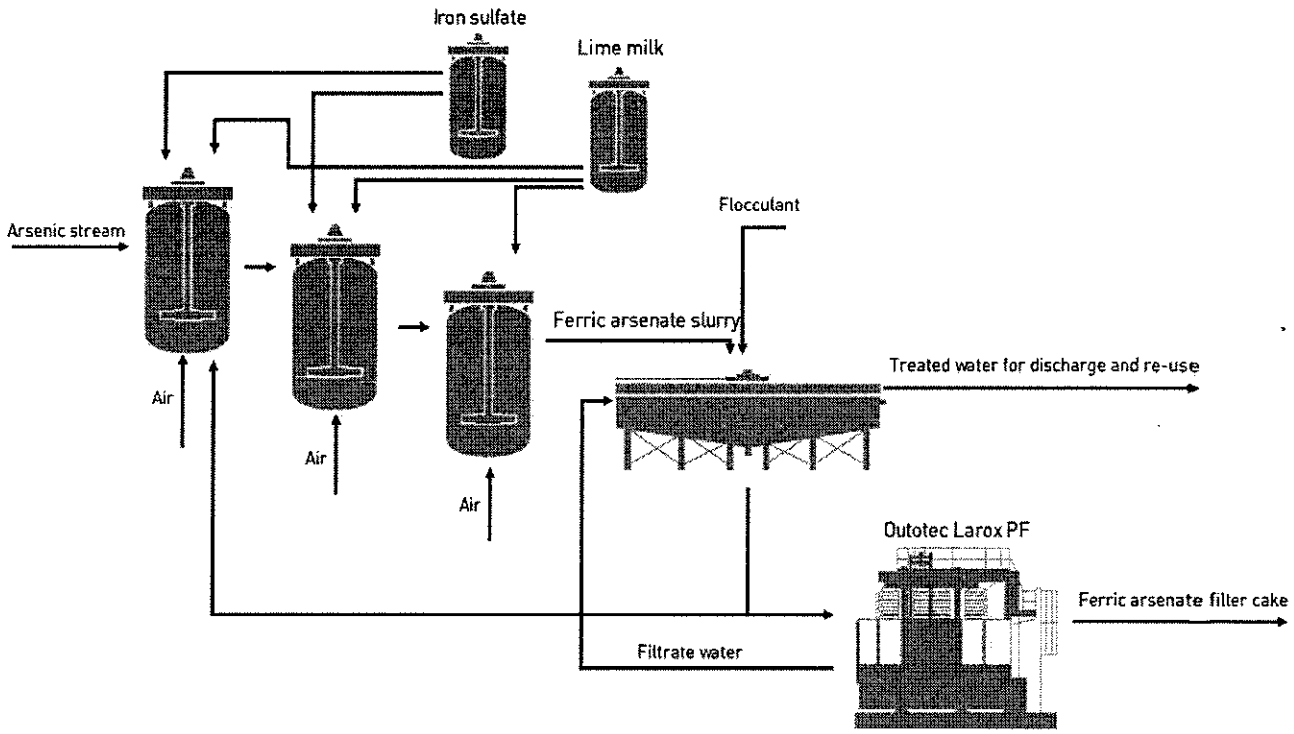


FIGURE-2.23
EFFLUENT TREATMENT PLANT

2.4.3 Solid & Hazardous Waste Generation

The details of solid and hazardous waste generation are given in **Table-2.9.**

TABLE-2.9
SOLID AND HAZARDOUS WASTE GENERATION

Sr. No.	Waste	Units	Waste Generation Quantity			Mode of Disposal	Mode of Transport	Distance from Plant Site (km)
			Phase-I	Phase-II	Total Quantity			
1	ETP waste sludge & scrubber waste	TPM	9,000 (1,08,000 TPA)	9,000 (1,08,000 TPA)	18,000 (2,16,000 TPA)	SLF	Road	Within Plant site
2	Nickel sludge	TPM	265 (3,180 TPA)	265 (3,180 TPA)	530 (6,360 TPA)	SLF/Authorized recyclers	Road	Within Plant site
3	Arsenic bearing sludge (As-Cu precipitate)	TPM	111 (1,332 TPA)	111 (1,332 TPA)	222 (2,664 TPA)	Recycling within the Plant/ Authorized recyclers	Road	Within Plant site
4	Used Oil	KL/Yr	100	100	200	Recycling within the Plant/ Authorized recyclers	Road	Within Plant site
5	Oil Sludge	TPA	25	25	50	Authorized recyclers	Road	60
6	Spent catalyst	KL/Yr	200	200	400	SLF	Road	Within Plant site
7	Spent resins from DM, RO & refinery plant	KL/Yr	10	10	20	SLF	Road	Within Plant site

Source: Feasibility Report

Waste Characteristics (Typical)

The chemical characteristics of scrubber cake and ETP cake are given in **Table-2.10** and **Table-2.11** respectively.

TABLE-2.10
CHEMICAL CHARACTERISTICS OF SCRUBBER CAKE

Sr. No.	Parameter	UOM	Value
1	Iron	%	0.05 – 0.07
2	Copper	ppm	10 - 20
3	Zinc	ppm	1.0 - 2.0
4	CaO	%	30 - 32
5	Sulphate	%	40 – 45
6	Silica	%	< 0.5%
7	Moisture	%	45

Source: Feasibility Report

TABLE-2.11
CHEMICAL CHARACTERISTICS OF ETP CAKE

Sr. No.	Parameter	UOM	Value
1	Iron	%	4.5 – 6.2
2	Arsenic	%	0.8 – 1.5
3	Copper	mg/l	1300 – 2100
4	Bismuth	mg/l	65 – 185
5	Cadmium	mg/l	< 15
6	Chromium	mg/l	< 15
7	Cobalt	mg/l	< 20
8	Nickel	mg/l	< 15
9	Lead	mg/l	20 – 50
10	Antimony	mg/l	< 20
11	Selenium	mg/l	20 – 40
12	Zinc	mg/l	1100 – 2500
13	CaO	%	28 – 30
14	Sulphate as SO_3^-	%	38 – 42
15	Silica	%	< 0.5%
16	Moisture	%	35

Source: Feasibility Report

Secured Land Fill (SLF) is proposed over 13.35 ha within the project premises for disposal of ETP waste sludge and spent catalyst. Other Hazardous waste will be disposed through the approved recyclers.

2.4.4 Noise Levels

All equipment in the proposed project is designed for 90-95 dB(A) at 1 m from the equipment. Oxygen plant will be provided with double wall building and compressor will be provided with acoustic enclosures to attenuate noise levels. The operators will be provided with protective devices. The major noise generating sources from different the facilities are listed in **Table-2.12.**

TABLE-2.12
NOISE LEVELS FROM THE PROPOSED PLANT

Sr. No.	Sources	Noise Levels in dB(A)
1	Converter process air blower	90-95
2	Oxygen plant air compressor	85-90
3	Air compressor	90-95
4	Sulphuric acid plant suction blower	90-95
5	Waste heat recovery steam turbine generator	90-95
6	Pump House Operation	85-90
7	Blower	90-95

Chapter-3
Description of the Environment

3.0 DESCRIPTION OF THE ENVIRONMENT

3.1 Introduction

Baseline data generation forms a part of the Environmental Impact Assessment study, which helps to evaluate the predicted impacts on the various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies. This further helps in preparing an Environment Management Plan (EMP) outlining the measures for improving the environmental quality and scope for future improvements for environmentally sustainable development. The baseline environmental study also helps to identify the critical environmental attributes, which are required to be monitored after implementation of the project.

This chapter illustrates the description of the existing environmental status of the study area with reference to the prominent environmental attributes. The existing environmental setting is considered to adjudge the baseline conditions which are described with respect to climate, hydro-geological aspects, atmospheric conditions, water quality, soil quality, vegetation pattern, ecology, socio-economic profile, landuse, places of archaeological importance etc.

The primary baseline monitoring data includes meteorology, ambient air quality, noise levels, water quality, soil quality and ecology (aquatic and terrestrial). Land use, geology, hydrogeology, demography are based on the secondary & previous data collected from various Government and Semi-Government organizations. This EIA report incorporates the baseline data generated for post-monsoon and part winter season (October to December) of 2016. The monitoring stations and sampling photographs are enclosed in **Annexure-VIII**.

3.2 Physiography, Drainage, Geology & Hydrogeology

3.2.1 Physiography

Physiographically, the Kutch district can be divided into four parts, namely:

a) Central High land and the Upland in the Rann Area;
b) Central Plain in the southern part;
c) Little and Great Rann areas; and
d) Banni plains.

The mainland of Kutch is an undulating country with rugged broken ground and broad plains and is marked by hill ranges and isolated peaks. There are three hill ranges in the main land namely Dhinodhar, Jura and Vavar, which rise to 387 m and 274 m above mean sea level (amsl). The other uplands in the main land area are in Wagad area in the east forming part of Bhachau and Rapar Talukas. The Pachham, Khadir and Bela islands in the Great Rann in the north also form highlands with maximum elevation of 458 m amsl. All the hill ranges follow a general east-west trend.

Kutch district has about 350 km long coastline and its coastal plain is about 35-45 km wide and attains the elevation up to 80 m amsl. The coast is generally flat and broken by small and big creeks, viz., Kori, Boacha and Godia.

The Rann forms a unique and conspicuous landform and has been divided into the Great Rann in the north and Little Rann in the east. The Rann mainly comprises marshy land, salt/mud flats and is devoid of vegetation and habitation and has a very hostile environment. The total area of Rann is about 25000 sq.km.

The extensive low lying area south west of Pachchham Island resembles Rann except for some patches of scanty vegetation. It is known as Banni plain and covers an area of about 2000 sq. km. About 777 sq. km of Banni plain is reported to be superior grassland.

Drainage pattern of the Kutch district is mainly by Bharud, Kali, Suri, Khari, Mithi, Rukmavati and BhukhiLuni, Rupen, Kankawati and Malwan rivers and its tributaries.

Physiographycally, the study area is fairly flat with growth of prosopis juliflora. Due to gentle gradient towards the sea (Gulf of Kutch) most of the water flows in the sea within short span of time.

3.2.2 Drainage

Drainage pattern of the study area and project site are drained by several rivers and small tributaries, which are of dendritic pattern which remains dry in almost all the season. The Dhaneswari river (Danesri Nadi) a seasonal river (rain fed) flows in the western part of the project site. The water bodies flows through study area are Kotri creek (0.5 km, S), Khari Nadi (1.9 km, W), Gulf of Kutch (3.9 km, S), Nagavanti Nadi (4.7 km, E) and Phot Nadi (8.7 km, ENE) from the project site.

Natural drainage passing through the site will be suitably trained and maintained. There will not be any diversion. Further, conveyer for copper concentrate and rock phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required.

3.2.3 Geology

The Pre-Cambrian granite and Aravalli rocks are reported to be exposed in a tiny hillock i.e. "Meruda Takkar" in the northern part of great Rann.

The sedimentary rocks of marine and non-marine origin formed under different environmental conditions during middle Jurassic to Recent period occur in the district besides volcanic and intrusive rocks (Deccan Trap) of middle Cretaceous to lower Eocene.

Geologically, the study area and the project site are underlain by Quaternary sediments consisting of a succession of clay, silty clay, sand and sand mixed with gravel.

3.2.4 Hydrogeology

The hydrogeological studies to understand the local geology, geomorphic features, drainage network, aquifer characteristics and yield of water. Accordingly, various components controlling the hydrogeological regime.

- Occurrence of Ground Water

The formations forming aquifer or hydrogeological units can be grouped as:

a) Mesozoic formations;
b) Deccan trap (hard rock) as aquifer;
c) Tertiary formations; and
d) Quaternary sediments.

The ground water conditions, its occurrence and movement, hydraulic characteristics and chemical quality aspects vary in each hydrogeologic group. The pre-cambrian granite and Aravalli rocks are reported to be exposed in a tiny hillock i.e. "Meruda Takkar" in the northern part of great Rann.

➢ *Mesozoic Formations*

The sediments belonging to Mesozoic period include both marine and non-marine sedimentary formation and occupy almost 60% of the district. Patcham, Chari and Katrol series belong to Jurassic period where as Umia or Bhuj represent lower Cretaceous.

➢ *Patcham Series*

The rocks of this series consist of yellow and greyish coloured sandstone, shale, and fossiliferous. Limestone represent marine sedimentary sequence. It occupies largely the island belt of Patcham, Khadir and Bela and small area in northern part in main land of Kutch. The ground water occurs under water table and confined conditions in the sandstone/shale sequence belonging to this group. The semi-consolidated sandstone exposed in the lower reaches forms phreatic aquifer and is being developed locally for domestic and irrigation purposes. The dug wells tapping this aquifer ranges in depth from 10 m to 24 m below ground level (bgl), whereas the depth to water level during summer varies from 15 m to 20 m. Their yield varies from 50 to 175 m^3/day. The quality of ground water is potable to slightly brackish and near Rann and lower reaches while the deeper ground water is saline. In Khadir Island, the springs have been observed at Hadibadang and Kakindiya bet. They had about ½ lps discharges and quality of ground water was fresh at Hadibadang and saline at Kakindiya. Exploratory borehole in this formation indicated presence of alternating layers of shale and sandstone with minor bands of limestone down to 150 m depth. Ground water at deeper levels is under confined conditions and quality is saline, Electrical Coductivity up to 9000 µs/cm. Only, shallow aquifer down to 30-35 m constituted by feldspathic sandstone exposed in the mid-reaches hold some promise for potable ground water in this formation.

➢ *Chari Series*

The formations belonging to this series are hard oolitic limestone, sand stone and shale representing marine facie. This formation occurs mostly as inlier in the core of anticlines and constitutes hilly topography. There is no ground water development in formations belonging to Chari series because of marine nature of sediments and its physiographic settings. Not much information is available about occurrence and movement of ground water.

➢ *Katrol Series*

The rocks belonging to this series occupy the Wagad up land and northern and central parts of main land. It is represented by shale and sand stone sequence with minor bands of limestone. The sandstone is generally made up of hard indurated blocks, except in Wagad area where it is feldspathic and soft/friable at places. Ground water development in these formations is confined to only the Wagad area falling in parts of Bhachau and Rapar Talukas.

Exploratory drilling in Wagad area has revealed presence of alternate bands of sandstone and shale. The sandstone at shallow depth is generally soft and friable and forms aquifer locally. The ground water in this formation occurs under phreatic to confined conditions. The ground water development is generally through dug wells which, range in depth from less than 10 m to about 25 m. At places, the dug-cum-bored wells are also observed with depth of bores ranging between 25 m and 60 m. Depth to water level ranges from 10 m to 30 m bgl. Yield of dug wells and dug-cum-bored wells range from 60 m to 660 m^3/day. Though, the formation is hard and compact at deeper levels, at places the ground water may occur in fractures in localized areas. Few tube wells, ranging in depth from 40 m to 140 m are observed in Wagad area tapping the fractured part of the aquifer. The discharge of such tube wells range from 400 lpm to 1000 lpm at drawdowns ranging from 3 m to 9 m.

In rest of the district, the formations belonging to Katrol Series do not from aquifer due to hard and compact nature and geomorphological setting.

➢ *Bhuj Series*

The formations belonging to the Bhuj (Umia) series form the most prolific aquifer system in the district. This aquifer is extensively developed in central part of the district in a belt that extends from Gadhuli-Dayapar-Lakhpat area in the west to Bhachau in the east. Lithologically, the Bhuj sandstone comprises of fine to coarse grained sandstone interbedded with siltstone and shale. The sandstone, which mainly forms the aquifer is soft, friable and highly porous/permeable.

The quality of ground water in general is fresh with EC <3000 µS/cm, excepting in the western Kutch where it is mostly saline with EC >5000 µS/cm. Besides this, the quality of the formation water is known to deteriorate with depth in underlying lower Bhuj formations.

Ground water occurs both under phreatic and confined conditions. The unconfined of the phreatic aquifers system in this formation extends down to a depth ranging

from 20 m to about 100 m depending on the presence of aquitards/ confining layers. The ground water in central parts occur mainly in unconfined to semi-confined conditions whereas in the western part, the deeper horizons within this system are under confined conditions and free flow/auto flow conditions are also observed at places. The ground water in phreatic system is generally developed through dug wells, dug-cum-bored wells and shallow tube wells. However, due to excessive development and deepening of water levels, most of the dug wells have gone dry, particularly in Bhachu-Dudhai, Anjar-Khedoi-Vidi, Kera-Sisagadh and Deshalpur-Nakhatrana-Netra areas. In these areas, the ground water is mainly developed through deep and medium depth tube wells ranging in depth from 80 to 250 m. These tube wells tap aquifer zones in the depth range of 40 to 220 m with aggregate thickness of granular zones ranging from 30 to 100 m. The discharge of tube wells range between 40 and 360 m^3/hr for drawdowns ranging between 3 and 12 m. The piezometeric levels/water levels in Bhuj Sandstone ranges from 30 to 70 m bgl.

- *Deccan Trap*

Deccan trap occurs as almost one continuous belt from Anjar to Lakhpat Taluka with a lateral dislocation near the injunctions of Nakhatrana, Abdasa & Mandvi talukas. It mainly comprises of light to dark grey basalt & dolerite as moderately extensive flows.

In the areas underlain by Deccan trap, ground water occurs in the weathered mantle and along the interflow zones, joints and fissures. In this formation, very limited groundwater development is observed due to poor water bearing characteristics and highly saline ground water particularly in the central and western part. At places this formation has limited thickness and acts only as a capping to underlying formations.

Ground water development is meagre in Deccan traps. It occurs in the weathered portions & joints. Dug wells are 11 to 15 m deep with depth to water 5 to 9 m below ground level (bgl).

- *Tertiary Formations*

The tertiary sediments belonging to Eocene to Miocene period are of marine origin & are largely argillaceous and calcareous in nature and do not contain arenaceous members and thus mostly have inferior quality of formation water. However, the grey and mottled sandstone and calcareous grits of the Manchhar series (Pliocene) form moderate aquifer in the coastal areas between Mandvi-Mundra and parts of Abdasa talukas, where ground water quality is moderate. However, occurrence of fluoride more than permissible limits in the coastal tracts of Abdasa taluka in general is indicative of non-acceptable quality of ground water. The recent alluvium in the district in the coastal areas contain variable quality of ground water.

Formations of Ranikot Series occur in parts of Mandvi taluka, fringing the southern margin of the Deccan traps. They comprise of soft argillaceous, aluminous and variegated shale, laterite and bauxite. There is very little ground water development in this formation.

Supra Trappeans occur as about 9 m thick ferruginous laterite (iron cap) and aluminous ferruginous laterite derived in situ from Deccan Trap flows in Anjar-Khedoi Region. They locally yield very meager supplies of brackish to saline water to wells. However, generally this formation occurs above the zone of saturation.

In Bhachau region they are as much as 76 m thick at places and locally yields small supplies of brackish water to shallow wells.

Supra Trappeans comprising laterite, aluminous shale and lateritic clays also occur as narrow belts overlying Bhuj Series in central parts of district. There is no ground water development in the areas underlain by this formation.

- *Laki Series (Eocene)*

Laki Series occurs in parts of Abdasa & Lakhpat Talukas. The formations comprise of up to 160 m thick red & mottled clays gypsiferous, pyritiferous & carbonaceous shale with thin seams of lignite & pockets of unconsolidated fine grained sand beds at the bottom of the series.

The formations of this series yield very little quantities of brackish to saline water to dug wells. Ground water occurs in confined conditions also. The confined aquifer is capable of yielding large quantities of highly saline water.

- *Kirthar Series (Eocene)*

Formations of Kirthar Series occur in parts of Abdasa & Lakhpat Talukas. They comprise about 325 m thick mainly composed of Nummulitic limestone with occasional thin beds of calcareous shale.

These formations yield very little quantities of poor quality water in wells located in low grounds.

- *Nari & Gaj Series (Miocene-Oligocene)*

The formations of these series occur in parts of Abdasa & Lakhpat Talukas. They comprise of up to 640 m thick, mostly argillaceous formations composed of mottled clays and variegated shale with thin beds of fine grained clayey sandstone and Shelly limestone.

These formations yield very little quantities of brackish to saline water to wells. Quality is potable in wells located near the stream courses or in the vicinity of surface water bodies.

The sediments of Gaj Series unconformabily overlie the Bhuj Series and comprise of grey and yellowish gypseous shale inter-bedded with fossiliferous marls. Due to poor permeability, only limited ground water development has been possible.

- *Manchhar Series (Pliocene)*

This formation occurs in about 259 sq.km area lying between Faradi and Bhadreshwar, overlying the Bhuj Series unconformably and comprises of buff light grey, yellowish clay, mottled sandstone and sandy clays with gypsum.

The mottled sandstone forms productive aquifer at places. Wells range from 7 m to 24 m in depth with depth to water 3 m to 15 m bgl.

In Mundra taluka, some scope of ground water development exists. In Eastern Kutch, (Wagad Area), there is no ground water development in this formation.

In parts of Bhachau taluka, this formation occurs as up to 60 m thick undifferentiated massive reddish brown gypseous clay, shale, some laminated silt stone, lenses of laterite & trap gravel, mottled sandstone and occasionally some limestone. This formation yields meagre supplies of brackish to salty water to wells.

In Anjar-Khedoi area, the sediments of Manchar Series occur as 185 m or more thick semi-consolidated clayey sandstone and conglomeratic sandstone. Fossiliferous sandstone with silt stone & conglomerate. Clay shale, lime cemented conglomerate. They yield meagre to small supplies of brackish water to wells. Locally, the water is saline.

In parts of Abdasa and Lakhpat talukas, up to 550 m thick, semi-consolidated fine to medium grained current bedded sandstone, conglomerate, mottled clay, pink & yellow limestone occur. They yield moderate to large quantities of potable to brackish water. Water is highly brackish/saline near the coast.

In parts of Mandvi & Abdasa talukas, these sediments are generally extensive and have permitted moderate of ground water development by means of dug and dug-cum-bored wells. Ground water occurs under water table conditions down to 25 m and under confined conditions further below down to 180 m.

Chemically, the ground water has fluoride content exceeding the permissible limits of ICMR standards at many places, i.e., around Naliya. DTW ranges from 2 m to 29 m bgl with depth of wells ranging from 8 m to 90 m.

Tube wells yield about 1.5 m^3/minute for drawdowns of 12 m to 21 m. Trasmisivity ranges from 14 m^2/day to 173 m^2/day. Sp. Capacity ranges between 30 lpm/day & 110 lpm/day.

- *Quaternary Sediments*

Milliolite limestone, which is white to dull grey, medium-grained limestone comprising Milliolite Foraminifer, occurs along hill slopes and faulted plains, e.g., near Sukhpur on the northern slopes of Khatrod range west of Adhoi, near Ler, etc. There is no ground water development in this formation.

Alluvium occurs in channels of large ephemeral streams, & coastal tracts spread over almost whole district. The alluvium comprises of brown loamy, kankary, silt, clays, sand, gravel, loam & kankar with a thickness of about 6 m most of the district. However, in southern parts of the district, i.e., in Mandvi & Mundra as well as Bhachau & Anjar talukas, the thickness may be considerable.

The alluvium yields small quantities of brackish water to shallow wells in Bhachau taluka. Coarse facies may yield small to moderate supplies of brackish water to

wells in Anjar-Khedoi region. In parts of Abdasa and Lakhpat talukas, the water table is generally below the formation. In Mandvi & Mundra talukas, the ground water development is extensive.

There is no possibility of further ground water development east and southeast of Lakadiya by means of deep tube wells because exploratory boreholes drilled at Lakadiya & Kumbhariya down to 450 m and 305 m bgl respectively have not met with any promising granular zones. Between Bidada and Bhadreshwar in about 450 sq.km area dug wells are 4 m to 22 m deep with depth to water 3 m to 16 m bgl. The tube wells tap aquifers down to 129 m depth. The value of T is 27.327 m^2/day.

Between Hand and Kanmer in about 500 sq.km area, dug wells are 7 m to 22 m deep with depth to water ranging front 3 m to 15 m bgl. They yield 48 m^3/day to 75 m^3/day.

- Depth to Water Levels

As per the Central Ground Water Board report (2013) of Kutch district, the depth to water levels during pre-monsoon (May-2012) lies within a range of 5 m to 10 m below ground level (bgl), where as in some part of central and south east the water level is within a range of 2 m to 5 m bgl. In north west, and some isolated patches water level is between 10 m to 20 m bgl and 20 m to 40 m bgl. The depth to water level map of pre-monsoon-2012 of the Kutch district is given in **Figure-3.2.1.**

The depth to water levels during post monsoon (November-2012) is less than 20 m bgl in most of the district, however the water level is more than 20 m bgl in north east part of the district. The depth to water level map of post-monsoon-2012 of the Kutch district is given in **Figure-3.2.2.**

In major part of district, there is fall in water level after rainfall but in South West part there is rise in water level.

From **Figure-3.2.1** and **Figure-3.2.2** the depth to water levels at Mundra taluka, where the project site is located ranges from <2 m to 10 m bgl and also 10 m to 20 m bgl in pre-monsoon season-2012 and the depth to water levels in post monsoon-2012 ranges from <2 m to 20 m bgl.

3.2.6 Ground Water Resources

- *Ground Water Recharge*

The main source of ground water recharge is by the rainfall by direct percolation to the zone of saturation. A significant part of the rainfall is lost as runoff from area while a limited percentage of rainfall therefore reaches zone of saturation and becomes the part of ground water storage after meeting the evaporation and evapo-transpiration losses. There is also ground water recharge from the return flow of irrigation water from dug wells and tube wells operated by the cultivators and from canals.

The dynamic groundwater resources of Kutch district has been estimated jointly by CGWB and SWID, Govt of Gujarat, following the norms laid down by GEC-1997 methodology and projected as on 31.03.2011. The ground water resources of the Kutch district are given in **Table-3.2.1** and the dynamic ground water resources of Mundra taluka as on 31.03.2011 is given in **Table-3.2.2.**

TABLE-3.2.1
THE DYNAMIC GROUNDWATER RESOURCES OF KUTCH DISTRICT AS ON 31.03.2011

Sr. No	Particulars	Quantity (HAM)
1	Total Annual Replenishable Ground Water Resources	83811
2	Natural Discharge during Non-Monsoon Period	4191
3	Net Annual Ground Water Availability	79621
4	Total Annual Ground Water Draft	63170
5	Projected demand for Domestic and Industrial uses upto 2025	5694
6	Net Ground Water Availability for Future Irrigation use	15855
7	Stage of Ground Water Development (%)	79 **("Semi-Critical")**

Source: Dynamic Ground Water Resources of India-July 2014

TABLE-3.2.2
THE DYNAMIC GROUNDWATER RESOURCES OF MUNDRA TALUKA AS ON 31.03.2011

Sr. No	Particulars	Quantity (MCM/Year)
1	Annual Ground Water Recharge	79.30
2	Existing Annual Ground Water Draft for all uses	47.68
3	Stage of Ground Water Development (%)	63.28 **("Safe")**

Source: CGWB Report of Kutch District-2013

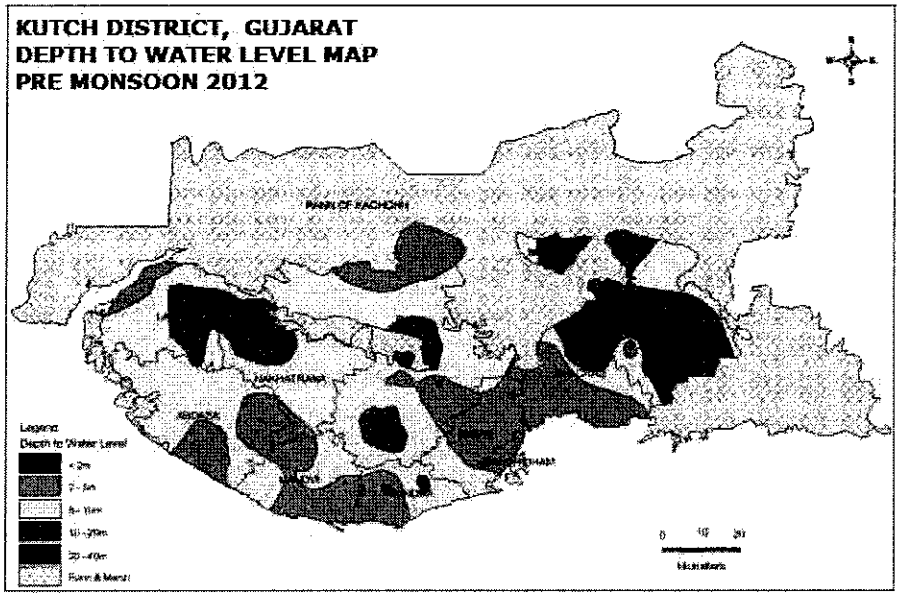


FIGURE-3.2.1
DEPTH TO WATER LEVEL MAP OF PRE-MONSOON-2012, KUTCH DISTRICT

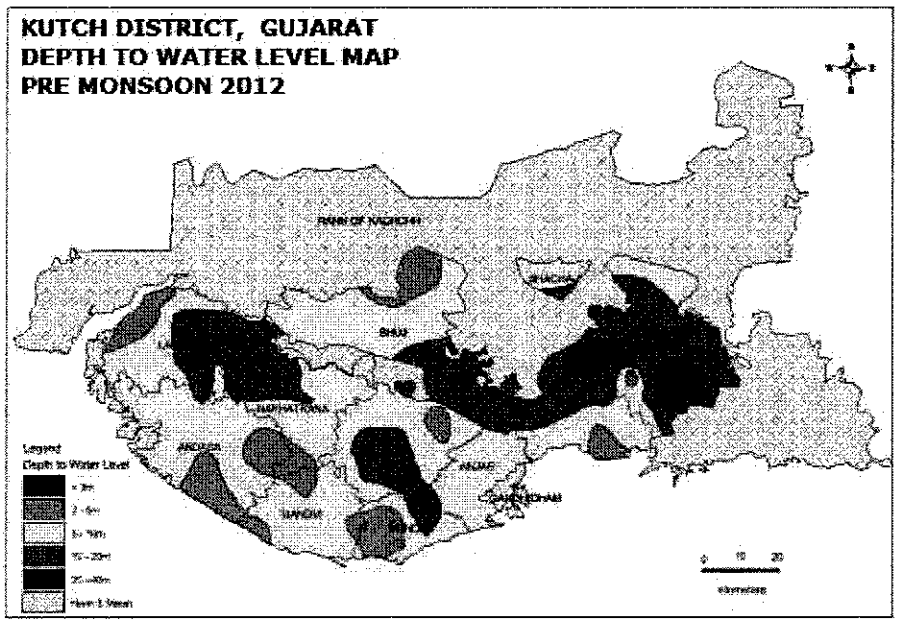


FIGURE-3.2.2
DEPTH TO WATER LEVEL MAP OF POST-MONSOON-2012, KUTCH DISTRICT

3.3 Land Use Studies

Studies on land use aspects of eco-system play an important role for identifying sensitive issues, if any, and taking appropriate actions for maintaining the ecological balance in the development of the region.

3.3.1 Objectives

The objectives of land use studies are:

- To determine the present land use pattern;
- To analyze the impacts on land use due to plant activities in the study area; and
- To give recommendations for optimizing the future land use pattern vis-a-vis growth of plant activities in the study area and its associated impacts.

3.3.2 Methodology

For the study of land use, literature review of various secondary sources such as district census handbooks, regional maps regarding topography, zoning settlement, industry, forest etc., were taken. The data was collected from various sources like district census handbook, revenue records, state and central government offices and survey of india (SOI) topo sheets and also through primary field surveys.

3.3.3 Land use Pattern Based on Remote Sensing Data

Remote sensing satellite imageries were collected and interpreted for the 10 km radius study area for analyzing the land use pattern of the study area. Based on the satellite data, land use/land cover maps have been prepared.

The land use pattern of the study area (10 km radius around the proposed project site) has been estimated by interpreting the recent IRS Resourcesat-2 of 5 m resolution (L4FMX) for the year 2016.

3.3.3.1 Land use/Land Cover Classification System

The present land use / land cover maps were prepared based on the classification system of national standards. For explanation for each of the land use category the details as given in **Table-3.3.1** were considered.

TABLE-3.3.1
LAND USE/LAND COVER CLASSIFICATION SYSTEM

Sr. No.	Level I	Level II
1	**Built-up Land**	Settlements
		Industry/Institutional Land
		New Development/Layout
2	**Forest**	Deciduous/Tropical Forest
		Degraded Scrub
		Forest Blank

Sr. No.	Level I	Level II
		Forest Plantation - In/Outside Forest
3	**Agricultural Land**	Plantation
		Double Crop/Irrigated Land
		Other Agriculture Land
		Fallow Land
4	**Waste Land**	Land with Scrub
		Land without Scrub
		Rocky/Stony/Barren Land
		Quarry/Mining Land/Dumps
5	**Water Body**	Stream/River/Tank/Reservoir/Pond/Lake
		Creek
		Bay (Gulf of Kuchchh)
6	**Wetland**	Mudflat/tidal flat
		Mangrove
7	**Others**	Reclaimed/Level Raised Land
		Salt Pans
		Salt Pans (Abandoned)
		Sandy Area

3.3.3.2 Data Requirements

IRS Resourcesat-2 of 5 m resolution (L4FMX) multispectral satellite data of 21st January/14th February 2016 was used for the mapping and interpretation. Besides, other collateral data as available in the form of maps, charts, census records, other reports and especially topographical survey of India maps are used. In addition to this, ground truth survey was also conducted to verify and confirm the ground features.

3.3.3.3 Methodology

The methodology adopted for preparation of landuse/land cover thematic maps is as follows:

- Digital interpretation of IRS Resourcesat-2 L4FMX Digital Data using ERDAS software programme; and
- Field observations.

The methodology adopted for preparation of land use/ land cover thematic map is monoscopic visual interpretation of geocoded scenes of IRS-Resourcesat-2 satellite and field observations are taken. The various steps involved in the study are preparatory field work, field survey and post field work.

3.3.3.4 Pre-field Interpretation of Satellite Data

The False Color Composite (FCC) of IRS-Resourcesat-2; satellite data is used for pre-field interpretation work. Taking the help of topo-sheets, geology, geo-morphology and by using the image elements the features are identified and delineated the boundaries roughly. Each feature is identified on image by their image elements like tone, texture, colour, shape, size, pattern and association. A tentative legend in terms of land cover and land use, physiography and erosion was formulated. The sample areas for field check were selected covering all the

physiography landuse/land cover features cum image characteristics to ascertain the ambiguous features.

- ***Ground Truth Collection***

Both toposheets and imagery were taken for field verification and a transverse plan using existing road network was made to cover as many representative sample areas as possible to observe the broad land use features and to adjust the sample areas according to field conditions. Detailed field observations and investigations were carried out and noted the land use features on the imagery.

- ***Post Field Work***

The base maps of the study area were prepared, with the help of Survey of India topo-sheets. Preliminary interpreted land use and the land cover features boundaries from IRS-Resourcesat-2 false colour composite were modified in light of field information and the final thematic details were transferred onto the base maps. The final interpreted and classified thematic map was catrographed. The cartographic map was colored with standard colour coding and detailed description of feature with standard symbols. All the classes noted and marked by the standard legend on the map.

3.3.3.5 Final Output

The final output would be the land use/land cover map numerals were given different colour code for each category as shown in map. Area estimation of all features of land use/land cover categories was noted. The following are the main interpreted land use/land cover classes of the study area and their respective areas are given in hectares in **Table-3.3.2** for the year 2016**.** The thematic map of study area and land use pattern within 10 km radius based on IRS Resourcesat-2 for the year 2016 are shown in **Figure-3.3.1** and **Figure-3.3.2** respectively. Layout map superimposed on CRZ map is shown in **Figure-3.3.3.**

TABLE-3.3.2
LANDUSE BREAKUP DETAILS IN 10 KM RADIUS

Sr. No.	Level I	Level II	Area (Hectares)	Area (%)
1.0	**Built-up Land**		**2,103.27**	**5.08**
1.1		Settlements	593.00	1.43
1.2		Industry/Institutional Land	1,417.96	3.43
1.3		New Development/Layout	92.31	0.22
2.0	**Forest**		**837.62**	**2.02**
2.1		Deciduous/Tropical Forest	378.40	0.91
2.2		Degraded Scrub	29.98	0.07
2.3		Forest Blank	402.24	0.97
2.4		Forest Plantation - In/Outside Forest	27.00	0.07
3.0	**Agricultural Land**		**15,484.69**	**37.41**
3.1		Plantation	1,505.14	3.64
3.2		Double Crop/Irrigated Land	4,059.16	9.81
3.3		Other Agriculture Land	7,634.76	18.44
3.4		Fallow Land	2,285.63	5.52

Sr. No.	Level I	Level II	Area (Hectares)	Area (%)
4.0	**Waste Land**		**5,620.36**	**13.58**
4.1		Land with Scrub	4,719.45	11.40
4.2		Land without Scrub	728.80	1.76
4.3		Rocky/Stony/Barren Land	91.72	0.22
4.4		Quarry/Mining Land/Dumps	80.39	0.19
5.0	**Water Body**		**9,366.30**	**22.63**
5.1		Stream/River/Tank/Reservoir/Pond/Lake	1,156.92	2.79
5.3		Creek	466.62	1.13
5.4		Bay (Gulf of Kuchchh)	7,742.76	18.71
6.0	**Wetland**		**4,469.36**	**10.80**
6.1		Mudflat/tidal flat	3,217.62	7.78
6.2		Mangrove	1,251.74	3.02
7.0	**Others**		**3,512.17**	**8.48**
7.1		Reclaimed/Level Raised Land	2,870.68	6.94
7.3		Salt Pans	266.27	0.64
7.4		Salt Pans (Abandoned)	105.15	0.25
7.5		Sandy Area	270.07	0.65
Total			**41,393.77**	**100.00**

Source: Satellite Imagery

3.3.3.6 Observations

The land use pattern of the study area indicates that 37.41 % of the study area is under agricultural land followed by water bodies of about 22.63 %. Percentage of Built-up area and forest land is about 5.08 % and 2.02 % respectively. Waste lands and wetlands in about 13.58 % and 10.80 % of the study area. Reclaimed land, salt pans and sandy area is about 8.48 % of study area.

550



69°30'

69°35'

69°40'

D

- Project Site

N

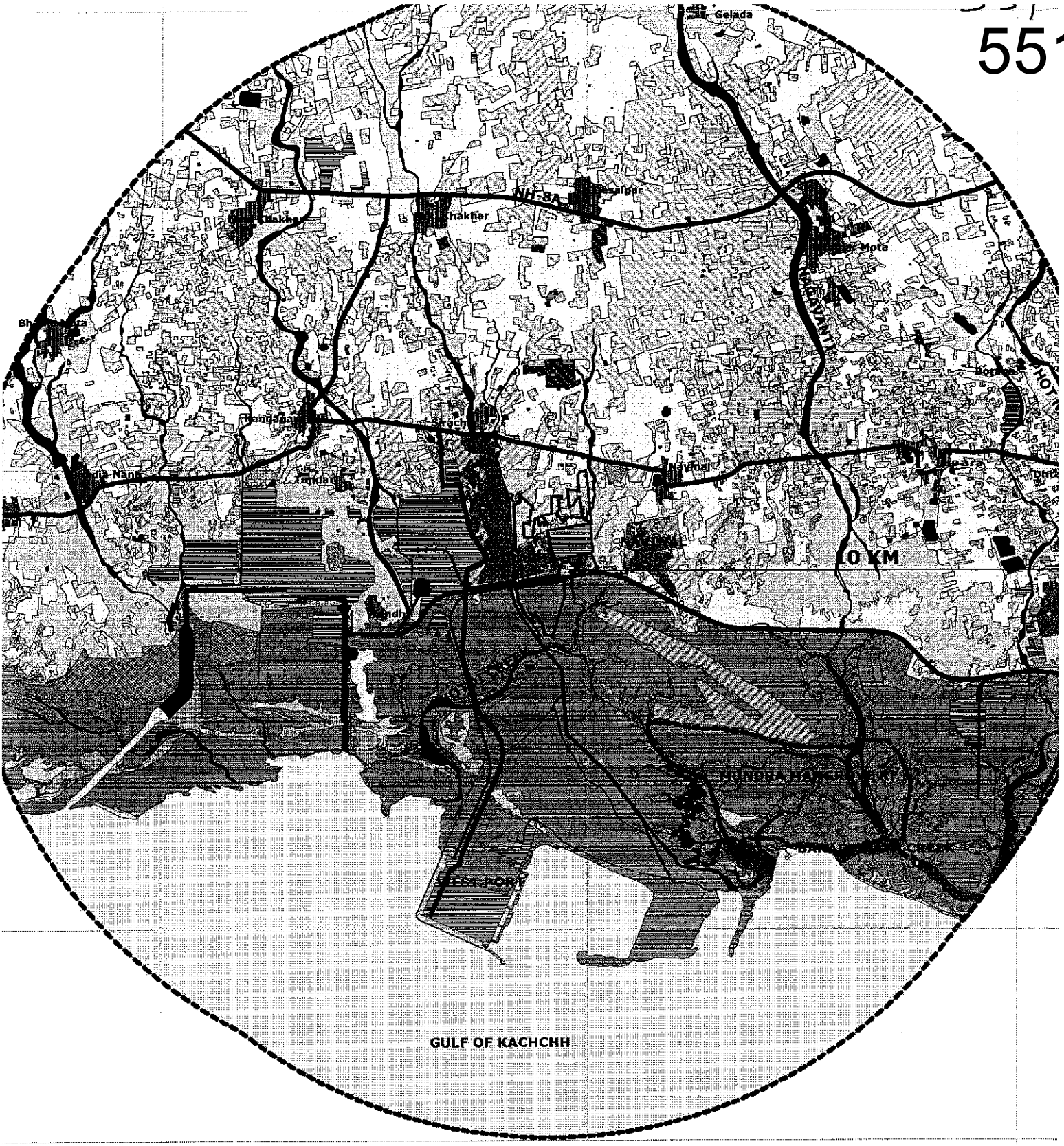
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Data Source: IRS Resourcesat 2



ject Site
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and

tlements
ustry/Institutional Land
out/New Development

Agriculture Land
- Plantation
- Irrigated/Double Crop
- Other Agriculture Land
- Fallow Land

Waste Land
- Land with Scrub
- Land without Scrub
- Stony/rocky/Barren Land
- Quary/Mining Land

Water Body
- Water Body
- Creek

Others
- Reclaimed/Level Raised Land
- Salt Pans
- Salt Pans - Abandoned
- Sandy Area

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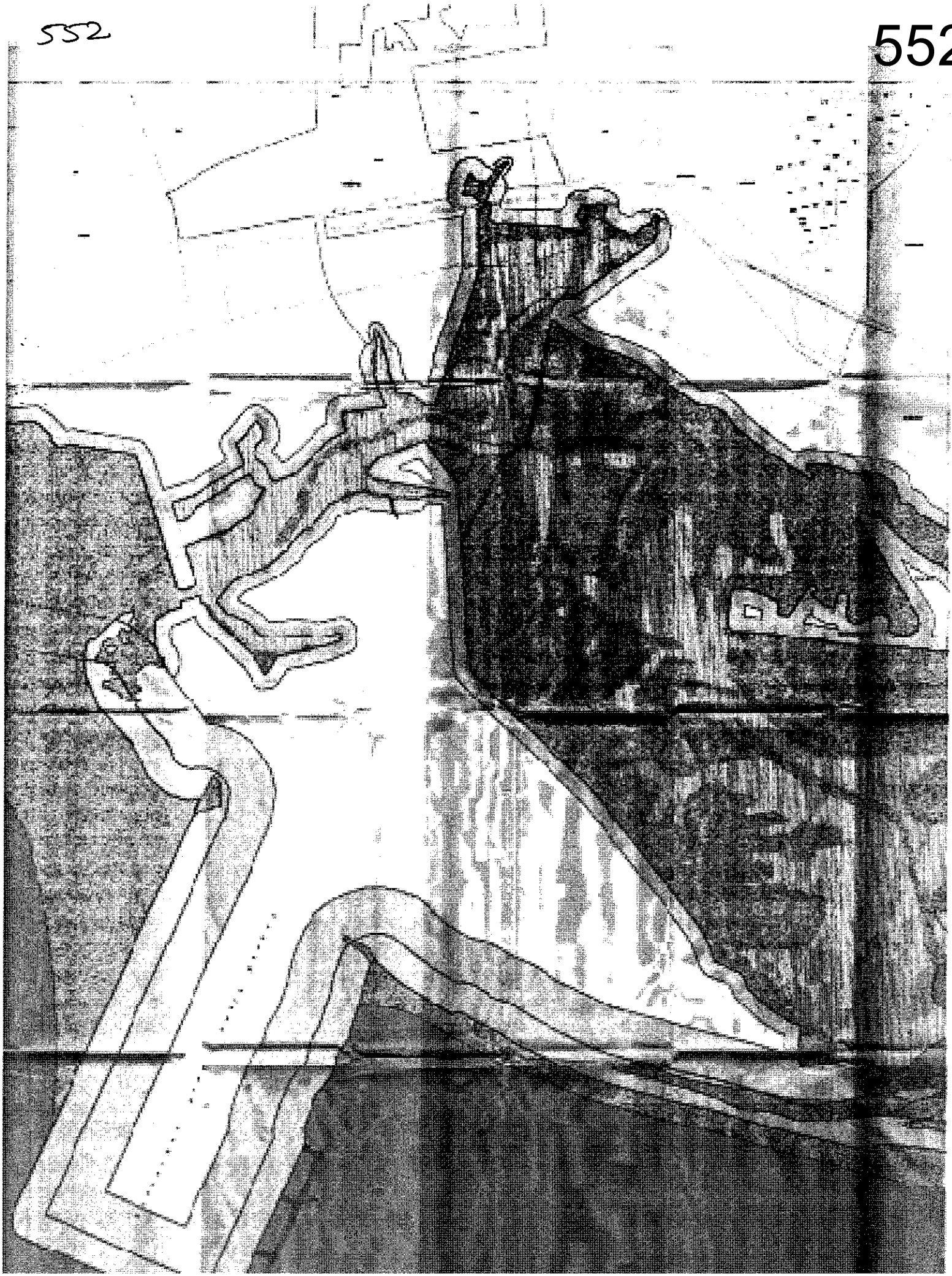
SCALE:

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DATA SOURCE:

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552



3.4 Soil Characteristics

It is essential to determine the potentials of soil in the area to identify the current status of soil quality and also to predict the impacts that may arise due to the project. Accordingly, a study for assessment of the baseline soil quality has been carried out in the region.

3.4.1 Data Generation

Eight locations in and around the proposed project boundary were selected for soil sampling. At each location, soil samples were collected from surface 0 to 90 cm depth and are homogenized and collected after quartering. This is in line with IS: 2720 and Methods of Soil Analysis, Part-1, 2nd edition, 1986 of (American Society for Agronomy and Soil Science Society of America). The homogenized samples were analyzed for physical and chemical characteristics. The soil samples were collected during post-monsoon season.

The samples have been analyzed as per the established scientific methods for physico-chemical parameters. The methodology adopted for each parameter is described in **Table-3.4.1**.

TABLE-3.4.1
ANALYTICAL TECHNIQUES FOR SOIL ANALYSIS

Parameter	Method (ASTM Number)
Grain size distribution	Sieve analysis (D 422 – 63)
Textural classification	Chart developed by Public Roads Administration
Bulk density	Sand replacement, core cutter
Sodium absorption ratio	Flame photometric (D 1428-82)
pH	pH meter (D 1293-84)
Electrical conductivity	Conductivity meter (D 1125-82)
Nitrogen	Kjeldahl distillation (D 3590-84)
Phosphorus	Molybdenum blue, colourimetric (D 515-82)
Potassium	Flame photometric (D 1428-82)
Iron	AAS (D 1068-84)
Zinc	AAS (D 1691-84)
Boron	Surcumin, colourimetric (D 3082-79)
Chlorides	Argentometric (D 512-81 Rev 85)

3.4.2 Soil Sampling and Analysis

A total of eight samples within 10 km radius of the project site were collected for the assessment of soil quality. The details of sampling locations are given in **Table-3.4.2** and are shown in **Figure-3.4.1.** The samples were collected by ramming an auger into the soil up to a depth of 90-cm. The homogenized samples were analyzed as per standard methods in laboratory. The standard classification of soil is given in **Table-3.4.3.**

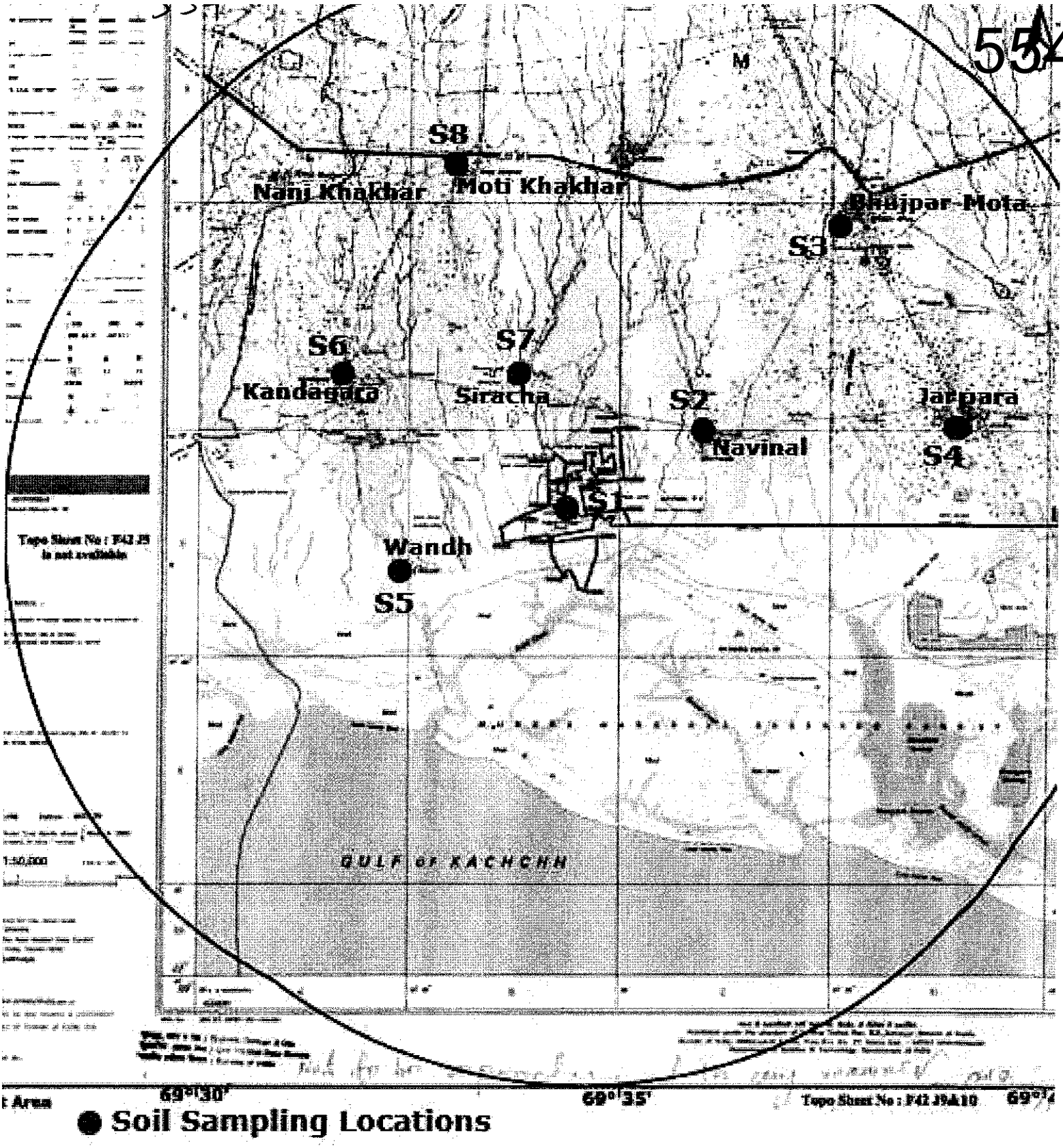

S8
Nanj Khakhar
Moti Khakhar
Bhujpar Mota
S3
S6
S7
Kandagara
Siracha
S2
Navinal
Jarpara
S4
S1
Wandh
S5
GULF OF KACHCHH
Topo Sheet No : F42 J9
is not available
69°30'
69°35'
Topo Sheet No : F42 J9&10
Soil Sampling Locations

TABLE-3.4.2
DETAILS OF SAMPLING LOCATIONS

Code	Location	Distance from Project Site (km)	Direction w.r.t Project Site
S1	Project Site	-	-
S2	Navinal	1.7	ENE
S3	Bhujpar Mota	6.2	NE
S4	Japara	6.8	ENE
S5	Wandh	1.8	SW
S6	Kandagara	4.4	NW
S7	Siracha	1.7	NNW
S8	Moti Khakhar	5.9	NNW

TABLE-3.4.3
STANDARD SOIL CLASSIFICATION

Sr. No.	Soil Test	Classification
1	pH	<4.5 Extremely acidic 4.51- 5.00 Very strongly acidic 5.01-6.00 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 Neutral 7.31-7.80 slightly alkaline 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline >9.01 very strongly alkaline
2	Salinity Electrical Conductivity (µS/cm) (1ppm = 640 µS/cm)	Upto 1.00 Average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)
3	Organic Carbon (%)	Upto 0.2: very less 0.21-0.4: less 0.41-0.5 medium, 0.51-0.8: on an average sufficient 0.81-1.00: sufficient >1.0 more than sufficient
4	Nitrogen (kg/ha)	Upto 50 very less 51-100 less 101-150 good 151-300 Better >300 sufficient
5	Phosphorus (kg/ha)	Upto 15 very less 16-30 less 31-50 medium, 51-65 on an average sufficient 66-80 sufficient >80 more than sufficient
6	Potassium (kg/ha)	0 -120 very less 120-180 less 181-240 medium 241-300 average 301-360 better >360 more than sufficient

Source: Hand Book of Agriculture, ICAR, New Delhi

3.4.2.1 Description and Justification of Sampling Locations

The soil samples were collected from surface 0 to 90 cm depth at eight sampling location to know the classification and any contamination of soil. A brief description and justification for selecting the sampling locations are presented hereunder:

Project Site (S1): The soil sample was collected in barren land (though in classified under industrial land use category), which is located in latitude 22°48'53.1"N and longitude 69°35'19.0"E within the proposed project area. The main objective to select this location is to assess the classification and any contamination of soil within proposed project site premises.

Navinal Village (S2): The soil sample was collected in agriculture land, which is located in latitude 22°50'41.0"N and longitude 69°35'46.2"E at a distance of about 1.7 km in ENE direction of the proposed project site. The objective for selection of this location is to assess the classification and any contamination of soil.

Bhujpor Mota Village (S3): The soil sample was collected near settlement area, which is located in latitude 22°52'52.8"N and longitude 69°38'54.3"E at a distance of about 6.2 km in NE direction of the proposed project site. The objective for selection of this location is to assess the classification and any contamination of soil.

Jarpara Village (S4): The soil sample was collected in agriculture land, which is located in latitude 22°50'13.2"N and longitude 69°39'32.3"E at a distance of about 6.8 km in ENE (cross wind) direction of the proposed project site. The objective for selection of this location is to assess the classification and any contamination of soil.

Wandh Village (S5): The soil sample was collected in barren land and close to the shore (sandy soil), which is located in latitude 22°48'19.4"N and longitude 69°32'35.0"E at a distance of about 1.8 km in SW direction of the proposed project site. The objective for selection of this location is to assess the classification and any contamination of soil.

Kandagara Village (S6): The soil sample was collected in agriculture land, which is located in latitude 22°51'29.7"N and longitude 69°32'12.6"E at a distance of about 4.4 km in NW direction of the proposed project site. The objective for selection of this location is to assess the classification and any contamination of soil.

Siracha Village (S7): The soil sample was collected in agriculture land, which is located in latitude 22°51'04.8"N and longitude 69°34'10.5"E at a distance of about 1.7 km in NNW direction of the proposed project site. The objective for selection of this location is to assess the classification and any contamination of soil.

Moti Khakhar Village (S8): The soil sample was collected in dry agriculture land, which is located in latitude 22°53'33.2"N and longitude 69°33'17.7"E at a distance of 5.9 km NNW direction of the proposed project site. The objective for selecting this location is to assess the classification and any contamination of soil.

3.4.2.2 Baseline Soil Status

The results of soil samples collected at all locations within the study area are given in **Table-3.4.4** and are compared with the standard classification of soil (**Table-3.4.3**).

TABLE-3.4.4
SOIL ANALYSIS RESULTS

Sr. No.	Parameters	U.O.M	S1 Project Site	S2 Navinal	S3 Bhujpar	S4 Japara	S5 Wandh	S6 Kandagara	S7 Siracha	S8 Moti Khakhar	Min	Max
A	**Physical properties**											
1	Texture		Clay loam	Sandy Clay Loam	Sandy Clay Loam	Sandy Clay	Sandy Clay	Sandy Clay loam	Sandy Clay Loam	Sandy Clay Loam	**Clay Laom**	**Sandy Clay Loam**
a	Sand	%	45	59	62	49	51	43	68	61	**43**	**68**
b	Silt	%	16	12	13	14	11	13	10	15	**10**	**16**
c	Clay	%	39	29	25	37	38	29	22	24	**22**	**39**
2	Textural Class		-	-	-	-	-	-	-	-	**0**	**0**
3	Bulk Density	g/cc	1.1	1.2	1.0	1.2	1.1	1.1	1.2	1.0	**1.0**	**1.2**
4	Permeability	Cm/hr	Slow	Mod slow	Mod slow	Mod slow	Mod slow	Mod slow	Mod slow	Mod slow	**Slow**	**Mod slow**
5	Water holding capacity(WHC)	%	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	**Moderate**	**Moderate**
6	Porosity	%	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	**Moderate**	**Moderate**
B	**Chemical Properties**											
7	pH (1:5 Aq.Extraction		8.3	7.7	8.4	7.9	7.8	8.4	8.1	7.9	**7.7**	**8.4**
8	Conductivity (1:5 Aq.Extraction	µS/cm	403	192	582	138	6300	1508	151	137	**137**	**6300**
9	Cation Exchange Capacity	meq/100 gm	55.2	29.8	73.2	58.5	137.7	56.9	42.7	40.2	**29.8**	**137.7**
10	Exchangeable Calcium	meq/100 gm	33.0	15.5	49.0	38.0	51.0	30.5	31.4	23.0	**15.5**	**51**
11	Exchangeable Magnesium	meq/100 gm	13.16	13.49	8.09	18.22	61.72	12.14	10.1	16.17	**8.09**	**61.72**
12	Exchangeable Potassium	meq/100 gm	0.83	0.25	1.26	1.28	1.21	1.69	0.62	0.37	**0.25**	**1.69**
13	Exchangeable Sodium	meq/100 gm	8.26	0.55	14.88	0.99	23.84	12.56	0.57	0.73	**0.55**	**23.84**
14	Sodium Absorption Ratio (SAR)	----	2.44	0.20	3.95	0.27	4.52	3.86	0.18	0.23	**0.18**	**4.52**
15	Available Nitrogen	Kg/ha	13.2	8.3	4.8	20.1	23.8	15.8	19.7	7.0	**4.8**	**23.8**

Sr. No.	Parameters	U.O.M	S1 Project Site	S2 Navinal	S3 Bhujpar	S4 Japara	S5 Wandh	S6 Kandagara	S7 Siracha	S8 Moti Khakhar	Min	Max
	as N											
16	Available Phosphorous as P	Kg/ha	74.9	109.6	42.2	154.4	68.4	74.8	117.7	86.2	**42.2**	**154.4**
17	Available Potassium as K	Kg/ha	552.4	178.2	759.5	930.0	801.4	1125.3	450.1	224.8	**178.2**	**1125.3**
18	Organic Carbon	%	0.07	0.04	0.03	0.10	0.13	0.09	0.10	0.04	**0.03**	**0.13**
19	Organic Matter	%	0.12	0.07	0.05	0.17	0.22	0.15	0.17	0.07	**0.05**	**0.22**
20	Water Soluble Chlorides as Cl	mg/kg	779.6	354.4	1701.2	496.2	12400.9	4608.2	567.0	425.3	**354.4**	**12400.9**
21	Water Soluble Sulphates as SO_4	mg/kg	485.1	196.7	748.2	203.7	1644.3	1090.5	240.5	212.4	**196.7**	**1644.3**
C	**Metals**											
22	Aluminium	%	0.53	0.42	1.10	0.87	1.18	0.93	0.29	0.57	**0.29**	**1.18**
23	Total Iron	%	1.14	1.10	1.35	1.88	2.17	1.62	1.34	1.27	**1.10**	**2.17**
24	Manganese	mg/kg or ppm	215.7	234.7	308.6	397.6	412.3	316.8	245.3	231.9	**215.7**	**412.3**
25	Boron	mg/kg or ppm	18.9	21.5	16.4	20.5	25.7	19.7	21.3	36.7	**16.4**	**36.7**
26	Zinc	mg/kg or ppm	33.2	28.6	19.7	31.4	41.6	32.3	17.4	21.8	**17.4**	**41.6**
27	Total Chromium as Cr	mg/kg or ppm	10.5	9.8	16.7	12.4	11.8	13.5	10.9	12.7	**9.8**	**16.7**
28	Lead as Pb	mg/kg or ppm	4.5	2.1	6.3	3.7	8.9	4.7	3.2	5.9	**2.1**	**8.9**
29	Nickel as Ni	mg/kg or ppm	6.7	2.4	4.7	2.3	7.3	2.8	1.9	2.5	**1.9**	**7.3**
30	Arsenic as As	mg/kg or ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**<0.1**	**<0.1**
31	Mercury as Hg	mg/kg or ppm	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**	**<0.01**
32	Cadmium as Cd	mg/kg or ppm	1.2	1.4	1.1	1.3	2.1	1.8	1.5	1.6	**1.1**	**2.1**

3.4.3 Inference

The evaluation of initial soil quality based on the above characters is done and presented as below:

3.4.3.1 Physical Characters

The physical characters include bulk density, grain size distribution (textural analysis).

Grain Size Distribution: Texture indicates relative proportion of various sizes of primary soil particles such as sand, silt and clay present in the soil. Based on their quantities present in the soil sample and using the textural classification diagram.

The textural classes of eight soil samples are sandy clay loam to clay loam (mod fine texture).

Bulk Density: In case of bulk density total soil space (space occupied by solid and pore spaces combined) are taken in to consideration. Thus bulk density is defined as the mass (weight) of a unit volume of a dry soil. This volume would, off course include both solids and pores. Soil texture, soil structure and organic matter content are the factors influencing the bulk density of a soil. Bulk density, besides being an interesting and significant physical characteristic, is very important as a basis for certain computations. The bulk density of the eight soil sample under consideration ranges between 1.0 to 1.2 gm/cc, and confirms the mod fine texture of the soils of the area under study.

Porosity: The pore space of a soil is the space occupied by air and water and is expressed as percent pore space. The amount of this pore space is determined by structural conditions, that is by inter- related influence of texture, compactness and aggregation. Porosity is also related to aeration and retention and movement of water in the soil. The porosity of eight soil samples was inferred from textural analysis and is moderate in accordance to the texture of soil, and considered good for air and water movement in the soil for crops.

Permeability: Permeability is the entry of fluid from one medium to another. In soil – water relationship, it means entry of water from air in to soil. Permeability rate is defined as maximum rate at which a soil in a given condition can absorb rain or irrigation water as it comes at soil surface, permeability rate is the rate of water entry in to the soil when flow is non-divergent. It is a surface and subsurface character and is expressed as mm/sec or cm/hr. Permeability of eight samples under study was inferred from textural analysis and classified as moderately slow to slow for agriculture and conservation, indicating good availability of moisture to after rain or irrigation.

Water Holding Capacity (WHC): Water holding capacity of soil is the maximum amount of moisture, a dry soil is capable of holding, under given standard condition. If the moisture content is increased further percolation result WHC is of great value to practical agriculture, since it provides a simple means to determine moisture content. WHC required for good crop growth is 35 to 70%. The WHC of

the eight soil samples was inferred from textural analysis and is moderate indicating somewhat frequent water application for growing crops.

3.4.3.2 Chemical Characters

The parameters considered for chemical analysis are: soil reaction (pH), electrical conductivity (EC), cation exchange capacity (CEC) cations, like calcium, magnesium, sodium and potassium, water soluble sulphates and chlorides, sodium adsorption ratio (SAR). Macro nutrients like available nitrogen, total organic carbon, organic matter available phosphorus, available potassium micro nutrients like iron zinc, manganese and boron. Heavy metals like, chromium (Cr), lead (Pb), nickel (Ni), arsenic (As), mercury (Hg) and cadmium (Cd).

Soil Reaction (pH): The nutritional importance of pH is illustrated, thus hydrogen ion concentration has influence not only on, solubility of nutrients, but also upon facility with which these nutrients are absorbed by plants, even already in soil solution for e.g. Fe, Mn and Zn become less available as pH rises from 4.5 to 7.0. At pH 6.5 to 7.0 utilization of nitrate and ammonia nitrogen becomes more available. In case of phosphorus it becomes less available to plant as pH increases above 8.5, due to its fixation in exchange complex of soil. For the eight soil sample under consideration the pH ranges between 7.7 to 8.4 indicating soils are slight to moderately alkaline.

Electrical Conductivity (EC): The salt content of the soils are estimated by EC measurements, and is useful to designate soils as normal or sodic (saline). Electrical conductivity is expressed as µmhos/cm at 25◦C, µsmhos/ cm or mmhos /cm or sm/cm. The EC of eight soil samples is between 137 to 582 µs/cm and are below the limits to be called as saline and hence the soils are normal for crop growth. In samples S5 (6300 micro mhos) and 1508 micro mhos in S6 and strongly saline.

Organic Carbon / Organic Matter (%): Although accounting for only a small part of the total soil mass in mineral soils, organic matter influences physical, chemical, and biological activities in the soil. Organic matter in the soil is plant and animal residue which serves as a reserve for many essential nutrients, especially nitrogen. Determination of organic matter helps to estimate the nitrogen which will be released by bacterial activity for the next season depending on the conditions, soil aeration, pH, type of organic material, and other factors. The eight soil samples under consideration contain 0.05 to 0.22% organic matter, OM is calculated from organic carbon estimation. As per crop requirements the soils are very less to less in organic matter content. Requires addition of organic matter, by way of compost application.

Available Nitrogen (N) Nitrogen is a part of all living cells and is a necessary part of all proteins, enzymes and metabolic processes involved in the synthesis and transfer of energy. Nitrogen is a part of chlorophyll, the green pigment of the plant that is responsible for photosynthesis. Helps plants with rapid growth, increasing seed and fruit production and improving the quality of leaf and forage crops. The available nitrogen in the eight samples in question, as per analysis ranges between 4.8 to 23.8 kg/ha showing very low to good nitrogen content for crop growth.

Available Phosphorus (P): Like nitrogen, phosphorus (P) is an essential part of the process of photosynthesis. Involved in the formation of all oils, sugars, starches, etc, helps with the transformation of solar energy into chemical energy; proper plant maturation; withstanding stress, effects rapid growth, encourages blooming and root growth. The phosphorus content of soil of eight samples ranges between 42.2 to 154.4 kg/ha and falls under low medium, good to more than sufficient category for crop growth.

Available Potassium (K): Potassium is absorbed by plants in larger amounts than any other mineral element except nitrogen and, in some cases, calcium. Helps in the building of protein, photosynthesis, fruit quality and reduction of diseases. The potassium content of eight soil samples ranges between 178.2 to 1125.3 kg/ha and is very less to more than sufficient for crop growth.

Cation Exchange Capacity (CEC): The total amount of exchangeable cations that a soil can retain is designated as cation exchange capacity (CEC) and usually expressed as me/100gm of soil. Determination of amount of cations present in soil is useful, because CEC influences the availability of adsorbed cations to both higher plants and soil microorganisms. Thus CEC is directly related to fertility of soils. The CEC of the eight samples ranges between 29.8 to 73.2 meq/ 100 gm soil except in sample S5 where it is unusually high may be estimation error. A soil with low CEC indicates low fertility and soils with high CEC indicates high fertility. Eight soil samples are moderately fine textured having high percentage of clay, showing medium to high CEC, in turn fertility is also moderate to high.

Exchangeable Calcium (Ca++): Calcium, an essential part of plant cell wall structure, provides for normal transport and retention of other elements as well as strength in the plant. It is also thought to counteract the effect of alkali salts and organic acids within a plant and soil acidity. The exchangeable calcium content of eight soil samples ranges between 15.5 to 51.0 meq/100 gm soil, and having moderate to high base saturation percentage. (ranging from 52% to 67%). For normal crop growth a base saturation percent of soils more than 50% is required.

Exchangeable Magnesium (Mg++): Magnesium is part of the chlorophyll in all green plants and essential for photosynthesis. It also helps activate many plant enzymes needed for growth. The magnesium content of the eight soil samples ranges between 8.09 to 61.72 m e /100 gm soil, which is further adding to base saturation.

Exchangeable Sodium (Na+): Though sodium is not an essential plant nutrient, but it has some role in potassium nutrition. Sodium also has a role in affecting the pH of soils; Sodium present above a certain limit makes soil alkaline which affect soil physical condition, and fixing of available phosphorus. Out of the eight samples sodium ranges between 0.55 to 0.99 meq/100gm soil, which is below the content (i.e. ESP is below 15%) at which soil show, saline alkali or alkaline properties, hence no adverse effect on soils. But in samples S1 ,S3, S5 & S6 ,ESP values are more than 15%,EC is more than 2 mmhos /cm and pH is above 8.2 and according to criteria of salt affected soils these samples are saline –alkali to alkaline.

Sodium Adsorption Ratio (SAR): Sodium adsorption ratio is ratio of Na+ to under root of Ca++, Mg++ by 2. SAR values of soil solution along with EC and pH helps in diagnosing soils as normal, saline, saline-alkali or alkali. The eight soil samples show SAR values between 0.18 to 4.52 and indicate that samples S1, S3, S5 & S6 are salt affected and remaining samples are normal.

Iron (Fe): Iron is essential for crop and other plants for chlorophyll formation Iron deficiency likely occurs in soils with high pH, poor aeration, excessive phosphorus, or low organic matter. It may be produced also by an imbalance of Mo, Cu, and Mn. In plants, the deficiency shows up as a pale green leaf color (chlorosis) with sharp distinction between green veins and yellow inter-venial tissues. The iron content of eight samples ranges between 1.10 to 2.17% and is very low. Thus may cause problem of iron deficiency.

Aluminum (Al): Exchangeable Aluminum (Al) is not present in a plant available form in soils with a pH above 5.5 and therefore tests for extractable aluminum need only be done on distinctly acid soils. In soils with a pH range of 4.5 - 5.5 are those most likely to be affected by aluminum toxicity. In the eight samples the total aluminum ranges between 0.29 to 1.18 % which is very low.

Manganese (Mn): Is an important plant micro nutrient and is required by plants in second greater quantity compared to iron, like any other element, it can have limiting factor on plant growth, if it is deficient or toxic in plant tissue.

Manganese is used in plants as major contribution to various biological systems, including photo synthesis, respiration and nitrogen assimilation. Mn content in the eight samples ranges between 215.7 to 412.3 mg/kg and is very high and may cause toxicity to plants.

Zinc (Zn): Zn deficiency most often is present in sandy soils with neutral or alkaline pH, or with low organic matter. Total zinc may be high but the availability depends on other factors. In the present eight samples Zinc content ranges between 17.4 to 41.6 mg/kg or ppm and are high, considered sufficient for crop growth.

Boron (B): There is a very narrow range between deficiency and toxicity in boron. Deficiencies are more often when organic matter is low and dry weather slows the decomposition. Uptake of boron is reduced at pH level higher than 7.0 plant toxicity symptoms manifest as leaf tip and marginal chlorosis. Boron toxicity occurs in dry areas and is generally associated with irrigation water. In the eight samples of the project the boron content ranges between 16.4 to 36.7 mg/kg and is low in some samples may cause deficiency to some crops. In other samples content is normal.

Water-Soluble Sulphates as SO_4: This test measures readily available sulphur in the form of dissolved plus absorbed sulphate. Sulphur testing is important where low sulphur or sulphur-free fertilizers are used, such as high analysis NPK fertilizers. Retention of sulphate sulphur by the soil is related to its phosphate retention, with high leaching losses of sulphate being associated with low phosphate retention soils. This should also be taken into account when

considering sulphur fertilizer options. In the eight samples the water soluble sulphate as SO4 ranges between 196.7 to 1644 mg/kg and very high.

Water Soluble Chlorides as Cl: The Cl^-anion does not form complexes readily, and shows little affinity (or specificity) in its adsorption to soil components. Thus, Cl^- movement within the soil is largely determined by water flows. Chlorine is an essential micronutrient for higher plants. It is present mainly as Cl^-. Chloride is a major osmotically active solute in the vacuole and is involved in both turgor- and osmo regulation. In the cytoplasm it may regulate the activities of key enzymes. In addition, Cl^-also acts as a counter anion and Cl^- fluxes are implicated in the stabilization of membrane potential, regulation of intracellular pH gradients and electrical excitability. In the eight samples the water soluble chloride ranges between 354.4 to 12400.9 mg/kg and is high. Particularly in samples S1, S3, S5 & S6 they are very high due to proximity to Gulf of Kutch.

3.4.3.3 Heavy Metals

Soils may become contaminated by the accumulation of heavy metals and metalloids through emissions from the rapidly expanding industrial areas, disposal of high metal wastes, leaded gasoline and paints, land application of fertilizers, animal manures, sewage sludge, pesticides, wastewater irrigation, coal combustion residues, spillage of petrochemicals, and atmospheric deposition. Heavy metals constitute an ill-defined group of inorganic chemical hazards, and those most commonly found at contaminated sites are lead (Pb), chromium (Cr), arsenic (As), zinc (Zn), cadmium (Cd)), mercury (Hg) and nickel (Ni). Soils are the major sink for heavy metals released into the environment by aforementioned anthropogenic activities and unlike organic contaminants which are oxidized to carbon (IV) oxide by microbial action, most metals do not undergo microbial or chemical degradation and their total concentration in soils persists for a long time after their introduction changes in their chemical forms (speciation) and bioavailability are, however, possible.

The presence of toxic metals in soil can severely inhibit the biodegradation of organic contaminants [heavy metal contamination of soil may pose risks and hazards to humans and the ecosystem through: direct ingestion or contact with contaminated soil, the food chain (soil-plant-human or soil-plant-animal-human), drinking of contaminated ground water, reduction in food quality (safety and marketability) via phyto-toxicity, reduction in land usability for agricultural production causing food insecurity, and land tenure problems. Standards for metals and heavy metals in soil are still evolving. United States Environmental Protection Agency (US EPA) has set limits for concentration of metals in soil called soil screening levels (SSL), when values exceed these concentrations, the site needs cleanup efforts. New York State Department of Environmental Conservation (NYS DEC) has also set limits for metal concentration in soil with an objective of removing risks on human health. (Ref:https://webcache.googleusercontent.com/search?q=cache:AgJTpGB_n4wJ:https://www.researchgate.net/file.PostFileLoader.html%3Fid%3D575ee11e217e2079c875d156%26assetKey%3DAS%253A372556528930816%2540146583580608 7+&cd=1&hl=en&ct=clnk&gl=in).

Chromium (Cr): Chromium mobility depends on sorption characteristics of the soil, including clay content, iron oxide content, and the amount of organic matter present. Chromium can be transported by surface runoff to surface waters in its soluble or precipitated form. Soluble and un-adsorbed chromium complexes can leach from soil into groundwater. The leachability of Cr (VI) increases as soil pH increases. Most of Cr released into natural waters is particle associated, however, and is ultimately deposited into the sediment. In the eight samples the chromium ranges between 9.8 to 13.5 mg/kg. As per New York State Department of Environmental Conservation (NYS DEC), the safety limit for Chromium (VI) concentration in soil is 22 mg/kg and as per the US EPA standard for concentration of Chromium (VI) in soil for initiating cleanup efforts is 230 mg/kg as research paper referred above.

Lead (Pb): Typical mean Pb concentration for surface soils worldwide averages 32 $mg\,kg^{-1}$ and ranges from 10 to 67 $mg\,kg^{-1}$. The most serious source of exposure to soil lead is through direct ingestion of contaminated soil or dust. In general, plants do not absorb or accumulate lead. However, in soils testing high in lead, it is possible for some lead to be taken up. Studies have shown that lead does not readily accumulate in the fruiting parts of vegetable and fruit crops (e.g., corn, beans, squash, tomatoes, strawberries, and apples).

Higher concentrations are more likely to be found in leafy vegetables (e.g., lettuce) and on the surface of root crops (e.g., carrots). Since plants do not take up large quantities of soil lead, the lead levels in soil considered safe for plants will be much higher than soil lead levels where eating of soil is a concern (pica). In the eight samples the Lead ranges between 2.1 to 8.9 mg/kg. In the research paper on "Potentially toxic metal contamination and enzyme activities in soil around chromite mines at Sukinda Ultramafic Complex" authored by Pattnaik et.al published in the Journal of Geochemical exploration, the safety range for lead content in soil is given as 250-500 mg/kg (Ref: https://www.sciencedirect.com/science/article/pii/S037567421630139X). The US EPA standard for concentration of lead in soil for initiating cleanup efforts is 400 mg/kg.

Nickel (Ni): Nickel is an element that occurs in the environment only at very low levels and is essential in small doses, but it can be dangerous when the maximum tolerable amounts are exceeded. It usually takes a long time for nickel to be removed from air. The larger part of all Ni compounds that are released to the environment will adsorb to sediment or soil particles and become immobile as a result. In acidic soils, however, Ni becomes more mobile and often leaches down to the adjacent groundwater. In the eight soil samples, the nickel content is ranging from 1.9 to 7.3 mg/kg In the research paper on "Potentially toxic metal contamination and enzyme activities in soil around chromite mines at Sukinda Ultramafic Complex" authored by Pattnaik et.al published in the Journal of Geochemical exploration, the safety limit for Nickel content in soil is given as 75-150 mg/kgas research paper referred aboveAs per the US EPA standard for concentration of Nickel in soil for initiating cleanup efforts is 1600 mg/kg as per the research paper referred above.

Arsenic (As): Arsenate can adsorb or co precipitates with metal sulfides and has a high affinity for other sulfur compounds. Elemental arsenic and arsine, AsH_3,

may be present under extreme reducing conditions. Biotransformation (via methylation) of arsenic creates methylated derivatives of arsine. As compounds adsorb strongly to soils and are therefore transported only over short distances in groundwater and surface water. In the eight samples the arsenic values are <0.1 mg/kg. As per the US EPA standard for concentration of Arsenic in soil for initiating cleanup efforts is 0.4 mg/kg as per the research paper referred above.

Mercury (Hg): Sorption to soils, sediments, and humic materials is an important mechanism for the removal of Hg from solution. Sorption is pH dependent and increases as pH increases. Mercury may also be removed from solution by co-precipitation with sulphides. Under anaerobic conditions, both organic and inorganic forms of Hg may be converted to alkylated forms by microbial activity, such as by sulfur-reducing bacteria. Elemental mercury may also be formed under anaerobic conditions by demethylation of methyl mercury, or by reduction of Hg (II). Acidic conditions (pH < 4) also favor the formation of methyl mercury, whereas higher pH values favor precipitation of HgS(s). In the eight samples the mercury content is < 0.1 mg/kg.

Cadmium (Cd): The application of agricultural inputs such as fertilizers, pesticides, and biosolids (sewage sludge), the disposal of industrial wastes or the deposition of atmospheric contaminants increases the total concentration of Cd in soils, and the bioavailability of this Cd determines whether plant Cd uptake occurs to a significant degree. Cadmium is very bio -persistent but has few toxicological properties and, once absorbed by an organism, remains resident for many years. The eight samples contain cadmium between 1.1 to 2.1 mg/kg. As per the US EPA standard for concentration of Cadmium in soil for initiating cleanup efforts is 70 mg/kg as per the research paper referred above

3.4.3.4 Conclusions

From the interpretation of field data, physical and chemical data it can be concluded that:

As per the physical data soils are moderately fine texture, having low bulk density, imperatively moderately water holding capacity, and moderately slow permeability. As per physical characters, soils are rated as poor to moderate for agriculture.

As per chemical characters, soil reaction (pH) soils are slight to moderately alkaline and electrical conductivity (EC) is non saline (normal) to saline. Organic matter is very less to less. Macro nutrient like nitrogen is very low and phosphorus is medium, to more than sufficient, potassium is sufficient, calcium, magnesium are medium to good and base saturation is moderate to good Sodium is below the limit to make soil saline or sodic or alkali, except in samples S1, S2, S5 & S6.

Micro-nutrients, Mn (very high may cause toxicity), Zn (normal) and B (Normal), Fe (very low), Al (low to very low), SO_4 and Cl are high to very high.

Cation Exchange capacity is high indicating moderate to good fertility. Exchangeable Ca is medium to good with medium to good base saturation, Ex K

is low, Ex Na is also low in four samples not indicating any alkalinity, and in samples S1, S3, S5 & S6 they are saline alkali to alkaline. Sodium adsorption ratio indicates the soils are normal.

For 4 samples and salt affected for above mentioned samples as observed during field visit of 10 km buffer area from boundary of proposed project.

The 10 km buffer from geomorphologic point of view, the area consists of slightly undulating plain topography with elevation ranging from 3 to7 m AMSL. The main geomorphic units are: Central high land and upland in Rann area, part of little Ran.

The thickness of the soil cover is more than 2 m. In general, area is characterized by slightly undulating and flat terrain. Thus as per analysis of soils data and field observation the land represented by samples by S2, S4, S7 & S8 can be classified as class III land i.e. moderate soils on plain to gentle slopes subject to water erosion, as per land capability classification (USDA) i.e. moderate land for sustained agriculture. Land represented by sample S1, S3, S5 & S6 are class IV land with limitation of soil and are not suitable for agriculture but may be used for pasture and afforestation.

3.5 Meteorology

The meteorological data recorded during the study period is very useful for proper interpretation of the baseline information as well as for input to air quality impact prediction model. Historical data on meteorological parameters will also play an important role in identifying the general meteorological regime of the region.

The year may broadly be divided into four seasons:

- Winter season : December to February
- Pre-monsoon season : March to May
- Monsoon season : June to September
- Post-monsoon season : October to November

3.5.1 Methodology

The methodology adopted for monitoring surface observations is as per the standard norms laid down by Bureau of Indian Standards (IS : 8829) and India Meteorological Department (IMD). On-site monitoring was undertaken for various meteorological variables in order to generate the site-specific data.

3.5.1.1Methodology of Data Generation

The Central Monitoring Station (CMS) equipped with continuous weather monitoring equipment was installed on top of a building near to the project site at a height of 10 m above ground level to record wind speed, direction, relative humidity and temperature. The meteorological monitoring station was located in such a way that it is free from any obstructions and cloud cover was recorded by visual observation. Rainfall was monitored by rain gauge.

3.5.1.2 Sources of Information

Secondary information on meteorological conditions has been collected from the nearest IMD station at new Kandla. The available meteorological data of IMD, new Kandla has been collected for the period 1971-2000 and analysed. The monthly maximum, minimum and average values are collected for all the parameters except wind speed and direction. All these parameters are recorded twice a day viz at 0830 and 1730 hours. The climatological data from IMD, new Kandla is shown in **Table-3.5.1.**

TABLE-3.5.1
CLIMATOLOGICAL DATA-STATION: IMD NEW KANDLA
YEAR (1971-2000)

Month	Atmospheric Pressure (mb)		Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	0830	1730	Mean Max	Mean Min	0830	1730	
January	1015.5	1012.6	29.2	10.6	60	40	0.8
February	1013.8	1010.8	32.6	12.4	62	36	2.1
March	1011.6	1008.3	36.8	16.0	65	38	0.9
April	1008.3	1004.9	39.3	20.5	72	46	0.0
May	1005.2	1001.9	39.8	23.6	76	56	3.7
June	1000.7	997.8	38.4	25.3	78	62	67.6
July	999.7	997.5	35.6	24.6	81	68	152.4
August	1001.8	999.5	34.2	23.9	83	69	95.8
September	1006.3	1003.3	36.3	23.7	80	60	39.2
October	1010.3	1007.0	37.6	21.1	70	45	24.4
November	1013.6	1010.5	34.8	16.2	64	41	10.2
December	1015.7	1012.7	30.3	11.9	60	41	0.3
Range	**997.5 - 1015.7**		**10.6 - 39.8**		**36 - 83**		**397.4 (Total)**

Source: Climatological Normals 1971-2000 by IMD Pune-5

3.5.2 Observations of Secondary Data

The data are presented in **Table-3.5.1** and are described below for IMD station, new Kandla. Wind direction and speed are presented in **Figure-3.5.1.**

- ***Temperature***

During winter season, mean maximum temperature is observed at 32.6°C in the month of February and the mean minimum temperature at 10.6°C is observed in the month of January. Both the day and night temperatures increase rapidly during the onset of summer season from March to May. During pre-monsoon the mean maximum temperature is observed at 39.8°C (May) with the mean minimum temperature at 16.0°C (March). The mean maximum temperature during monsoon season is observed in the month of June at 38.4°C and mean minimum temperature is observed in the month of September at 23.7°C. The mean maximum temperature during post-monsoon season is observed in the month of October at 37.6°C and mean minimum temperature is observed in the month of November at 16.2°C. The monthly mean values are presented in **Table-3.5.1.**

- ***Relative Humidity***

The relative humidity values at 0830-hr and 1730-hr are ranging from 36%-83%. The monthly mean values are presented in **Table-3.5.1**.

- ***Atmospheric Pressure***

It can be seen from the data that is slight variations are observed in the average atmospheric pressure levels. The pressure levels during the range from 997.5 - 1015.7 (mb). The monthly mean values are presented in **Table-3.5.1**.

- ***Rainfall***

The annual mean rainfall observed based on the 30 years IMD data is 397.4 mm. Mostly in the monsoon rains are also observed in the region. The monthly mean values are presented in **Table-3.5.1**.

- ***Wind Speed/Direction***

The seasonal and annual wind rose pattern (predominant wind direction and speed) as per the IMD new Kandla data is presented in **Table-3.5.2**.

TABLE-3.5.2
PREDOMINANT WIND PATTERN

Sr. No.	8.30 hrs		17.30 hrs	
	Wind Direction	Wind Speed Frequency (%)	Wind Direction	Wind Speed Frequency (%)
1	Pre Monsoon Season			
	WSW	37.6	SSW	29.9
	NNW	19.2	SW	26.7
2	Monsoon Season			
	WSW	44.9	WSW	47.6
	SW	16.7	SSW	29.1
3	Post Monsoon Season			
	NNW	31.5	SSW	21.0
	WNW	11.0	NNE	11.5
4	Winter Season			
	NNW	45.5	NNE	23.2
	NNE	13.2	NNW	18.2
5	Annual			
	WSW	24.7	SSW	24.0
	NNW	23.3	WSW	21.1

3.5.2.1 Observations On Primary Data - October to December, 2016

The site specific data is presented in **Table-3.5.3** and is discussed below:

TABLE-3.5.3
SUMMARY OF THE METEOROLOGICAL DATA GENERATED AT SITE

Month	Temperature (°C)		Relative Humidity (%)		Total Rainfall (mm)
	Min	Max	Min	Max	
October, 2016	17.9	40.6	47	96	0.0
November, 2016	13.1	37.1	53	98	0.0
December, 2016	9.2	36.3	50	94	0.0
Range	**9.2 – 40.6**		**47 - 98**		**0.0**

1) Temperature

The maximum temperature was observed to be 40.6°C during October 2016 and minimum temperature was observed to be 9.2°C during December 2016.

2) Relative Humidity

The relative humidity was observed to be a maximum of 98% for the month of November 2016 and a minimum of 47% for the month of October 2016.

3) Rainfall

There was no rainfall recorded during the study period.

4) Wind Speed/Direction

The predominant winds along with wind speeds during the study period are represented as windrose in **Figure-3.5.2** and are discussed below. A review of the wind rose diagram shows that predominant winds are mostly from SSW followed by SW.

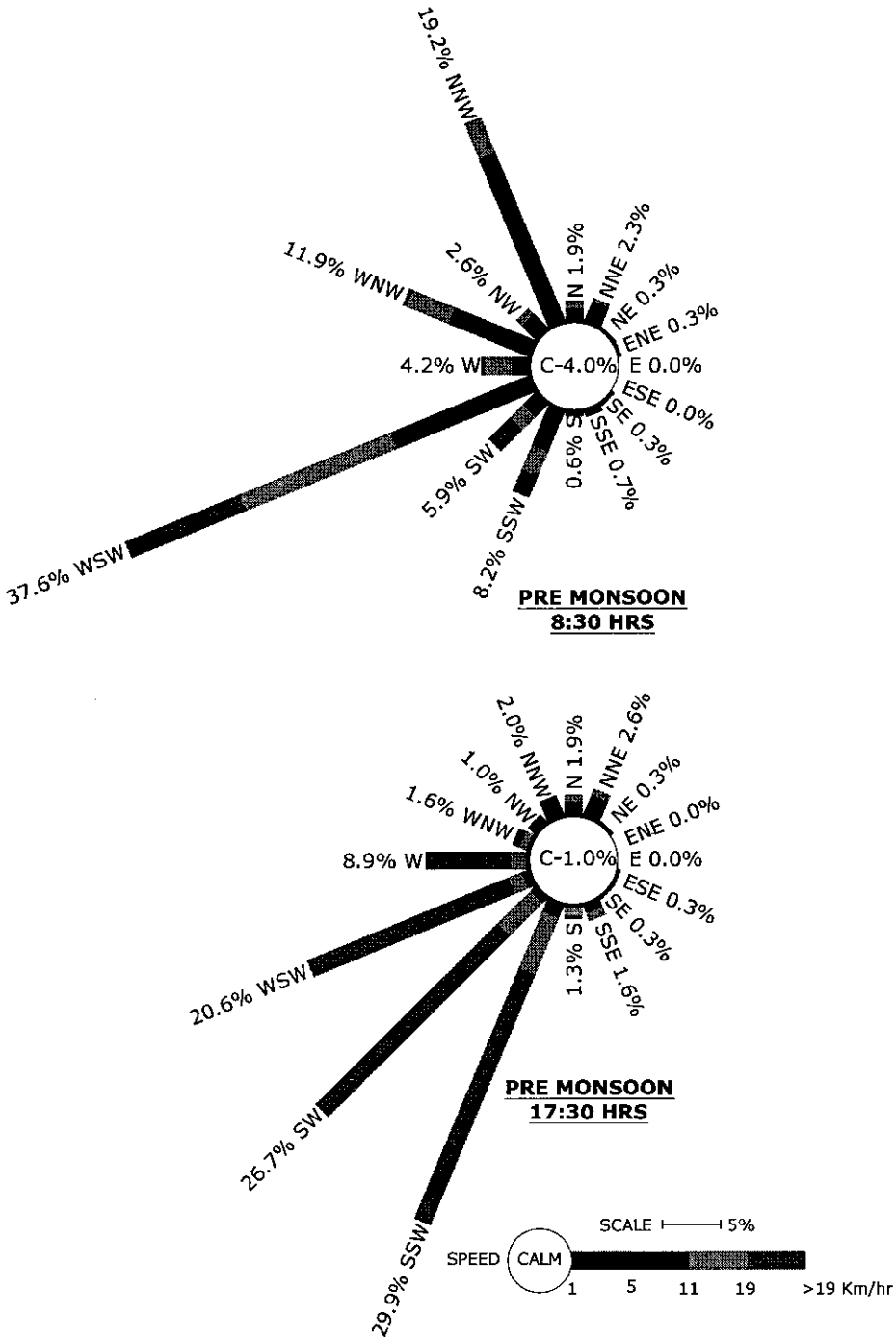


FIGURE-3.5.1(A)
PRE-MONSOON - IMD NEW KANDLA

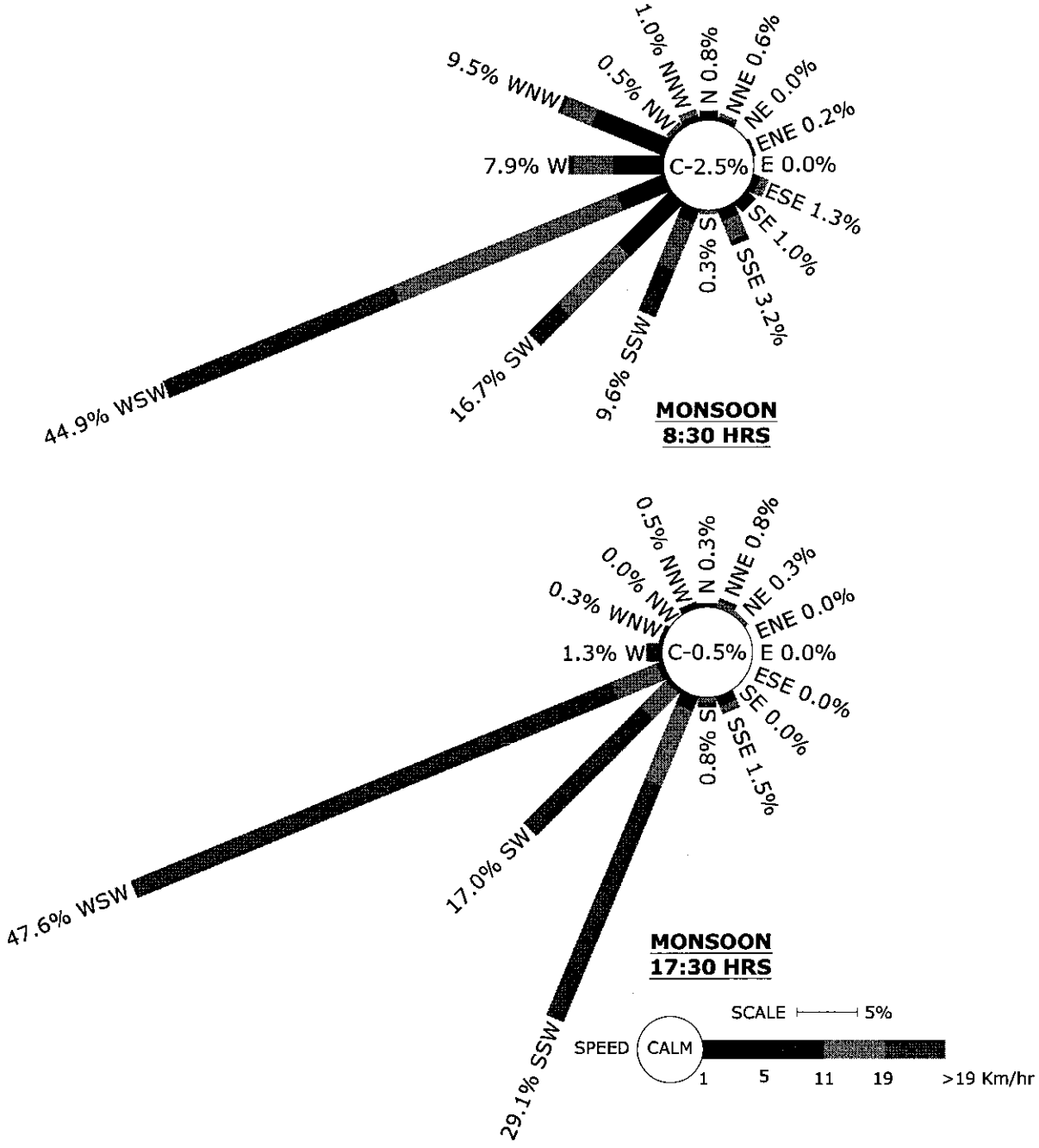


FIGURE-3.5.1(B)
MONSOON WINDROSE - IMD NEW KANDLA

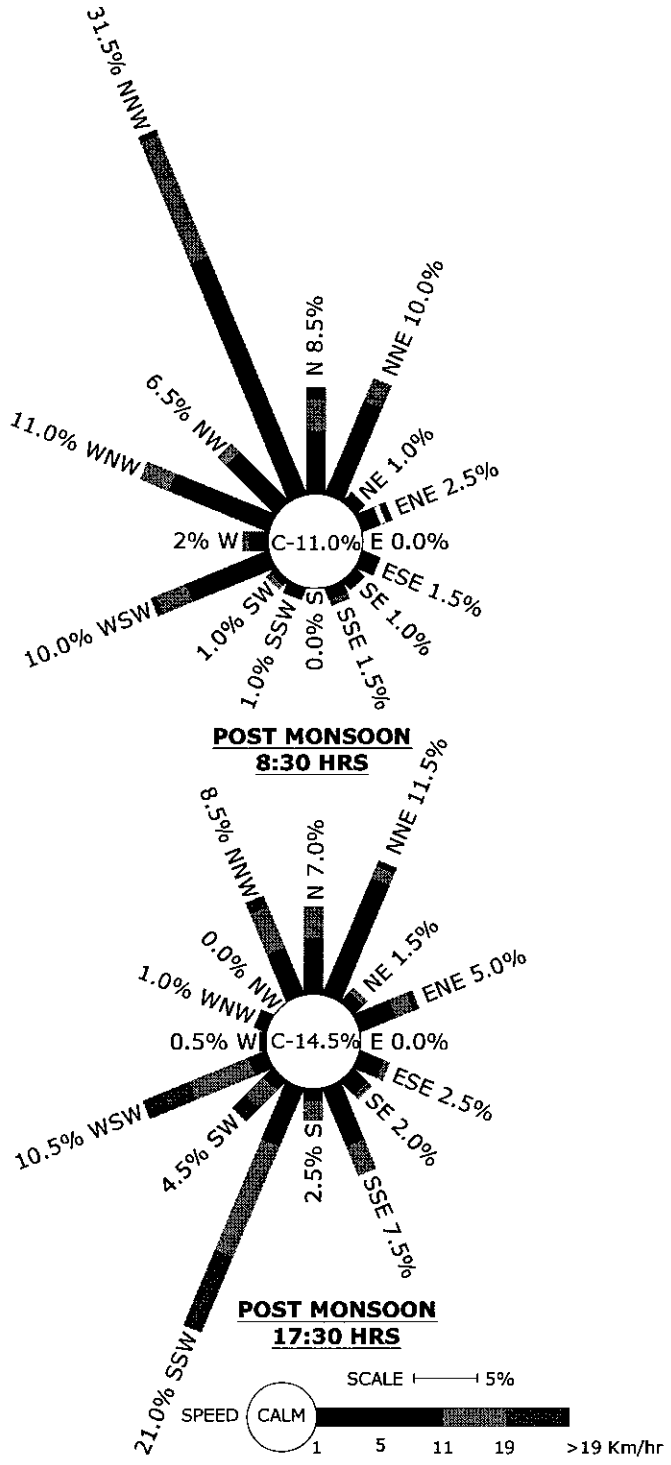


FIGURE-3.5.1(C)
POST-MONSOON - IMD NEW KANDLA

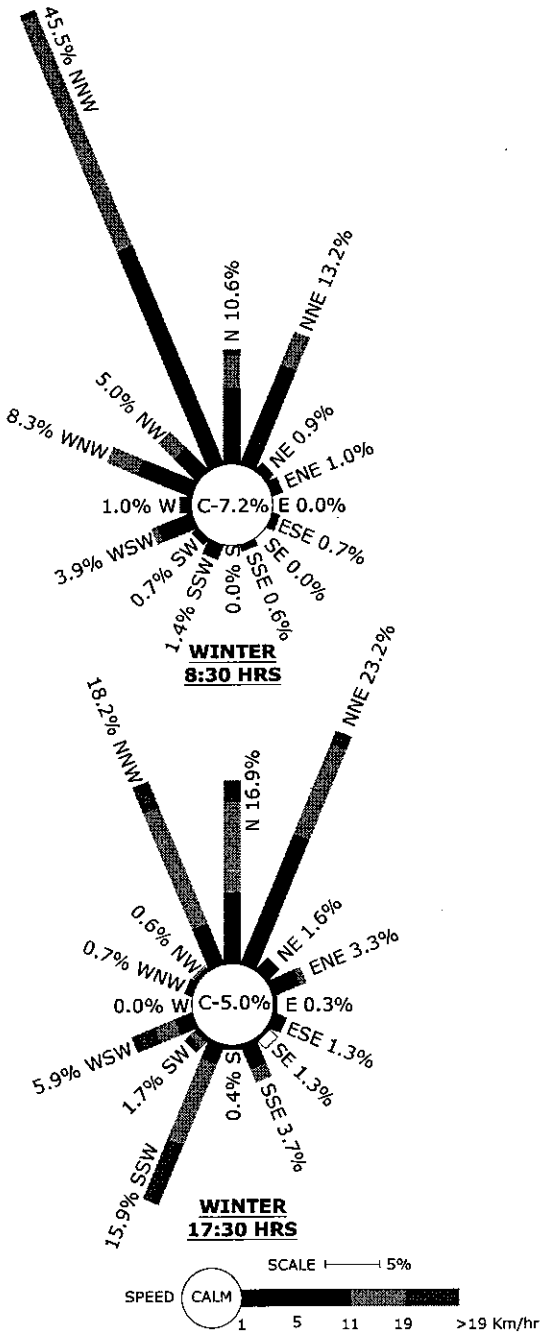


FIGURE-3.5.1(D)
WINTER WINDROSE - IMD NEW KANDLA

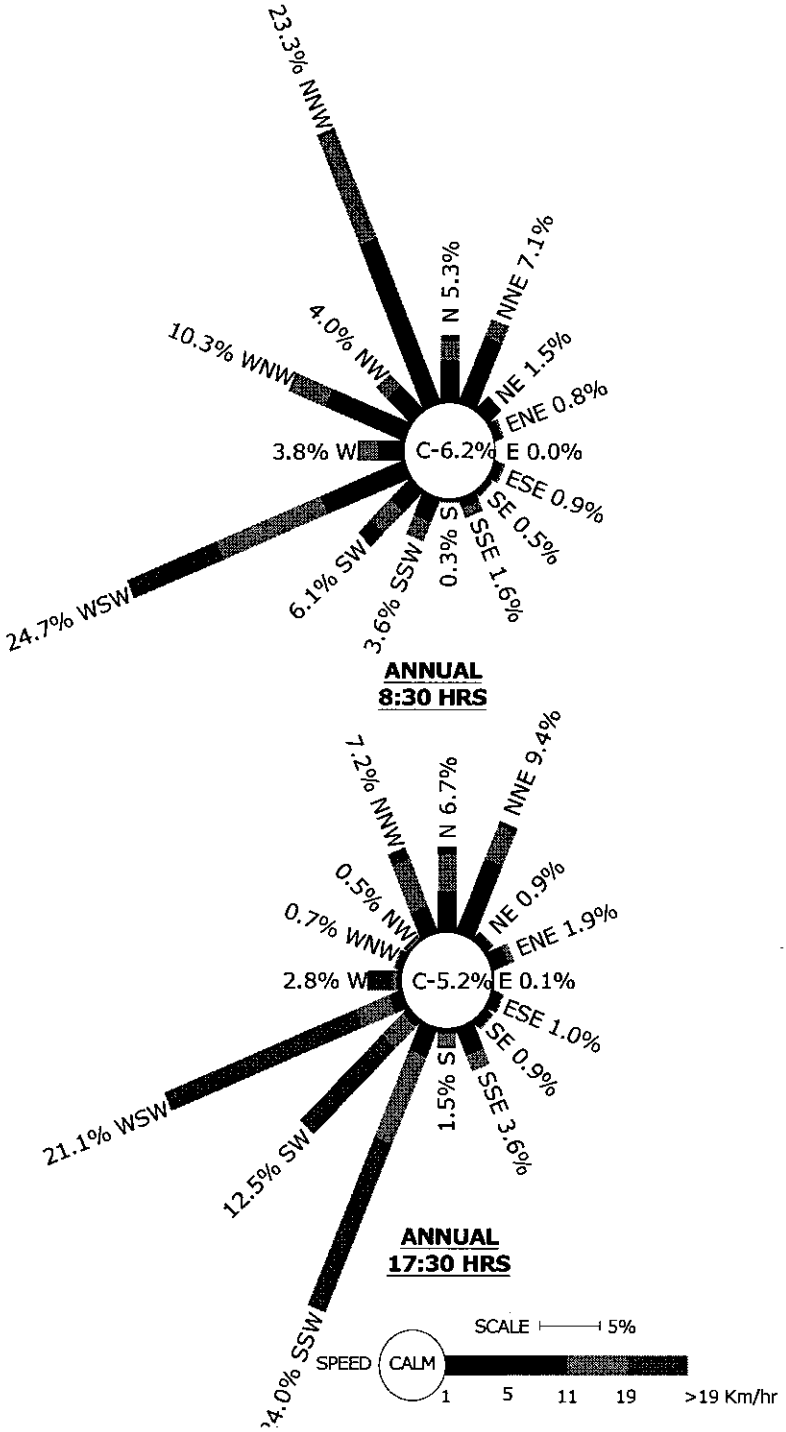


FIGURE-3.5.1(E)
ANNUAL WINDROSE - IMD NEW KANDLA

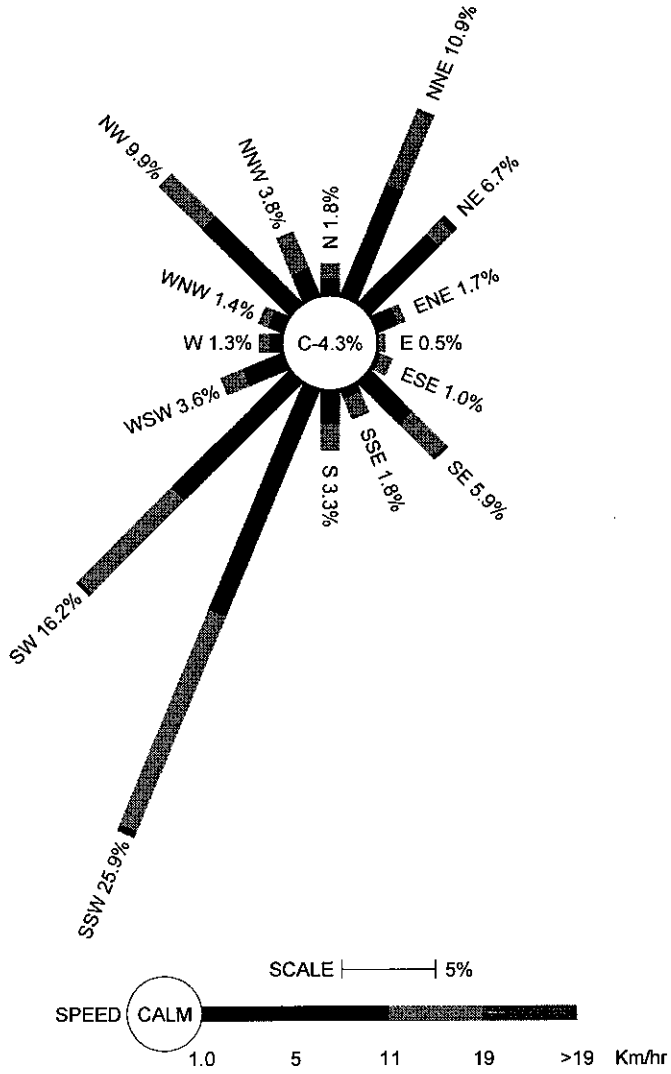


FIGURE-3.5.2
SITE SPECIFIC WINDROSE (OCTOBER 2016 TO DECEMBER 2016)

3.6 Ambient Air Quality

The ambient air quality with respect to the study zone of 10 km distance around the proposed project boundary forms the baseline information. The prime objective of the baseline air quality study was to assess the existing air quality of the area. This will also be useful for assessing the conformity to standards of the ambient air quality during the project operations.

This section describes the selection of sampling locations, methodology adopted for sampling, analytical techniques and frequency of sampling. The ambient air quality was monitored at locations in and around the proposed project site. The air quality monitoring was conducted as per revised NAAQ standards 2009.

3.6.1 Methodology adopted for Air Quality Survey

The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality monitoring network. The design of monitoring network in the air quality surveillance program has been based on the following considerations:

- Meteorological conditions on synoptic scale;
- The methodology for conducting the baseline environmental survey and selection of sampling locations considered the guidelines given in the EIA manual of the MoEF&CC;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status; and
- Representatives of likely impact areas.

3.6.2 Sampling and Analytical Techniques

The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB), IS:5184 and American Public Health Association (APHA).

3.6.2.1 Frequency and Parameters for Sampling

Ambient air quality monitoring was carried out at a frequency of two days per week at each location during the study period. The baseline data of air environment was generated for the following parameters:

- Particulate Matter (PM_{10});
- Particulate Matter ($PM_{2.5}$);
- Sulphur dioxide (SO_2);
- Nitrogen dioxide (NO_2);
- Carbon Monoxide (CO);
- Ozone (O_3);
- Ammonia (NH_3);
- Nickel (Ni);
- Benzene(C_6H_6);
- Arsenic (As);
- Lead (Pb); and
- Benzo Pyrene (BAP).

3.6.2.2 Duration of Sampling

The sampling duration for PM_{10}, $PM_{2.5}$, SO_2, NO_2, NH_3, C_6H_6, BaP, Pb, As, Ni and as was twenty-four hourly continuous samples per day and CO and O_3 was sampled for 8 hrs continuous thrice a day. This is to allow a comparison with the present revised standards mentioned in the latest Gazette notification of the Central Pollution Control Board (CPCB) (November 16, 2009).

Ambient air quality monitoring (AAQM) stations were set up at eight locations with due consideration to the above mentioned points. **Table-3.6.1** gives the details of environmental setting around each monitoring station and shown in **Figure-3.6.1**.

TABLE-3.6.1
DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS

Station Code	Location	Distance from Centre of Project Site (km)	Direction w.r.t. Centre of Project Site
AAQ1	Project Site	-	-
AAQ2	Navinal	1.7	ENE
AAQ3	Bhujpar Mota	6.2	NE
AAQ4	Jarpara	6.8	ENE
AAQ5	Wandh	1.8	SW
AAQ6	Kandagara	4.4	NW
AAQ7	Siracha	1.7	NNW
AAQ8	Moti Khakhar	5.9	NNW

3.6.2.3 Description and Justification of Sampling Locations

A brief description and justification for selecting the sampling locations are presented hereunder:

Project Site (AAQ1): This sampling station was placed in this location of latitude 22°48'49.8"N and longitude 69°34'28.7" E, located within the project site. The main objective for selecting this location is to assess the concentration of pollutants within proposed project site premises. This will also be useful for assessing the conformity to standards of the ambient air quality during the proposed project operation. The site is barren and falls under industrial land use category.

Navinal Village (AAQ2): This sampling station was placed in this location of latitude 22°50'0.17"N and longitude 69°35'51.2"E at a distance of about 1.7 km in ENE direction of the project site. The objective for selection of this location is to assess the concentration of pollutants in downwind direction of the proposed project site, which is in the rural residential area.

Bhujpor Mota Village (AAQ3): This sampling station was placed in this location of latitude 22°52'33.4"N and longitude 69°37'58.9"E at a distance of about 6.2 km in NE direction of the proposed project site. The objective for selection of this location is to assess the concentration of pollutants in downwind direction of the proposed project site, which is in the populated and commercial area.

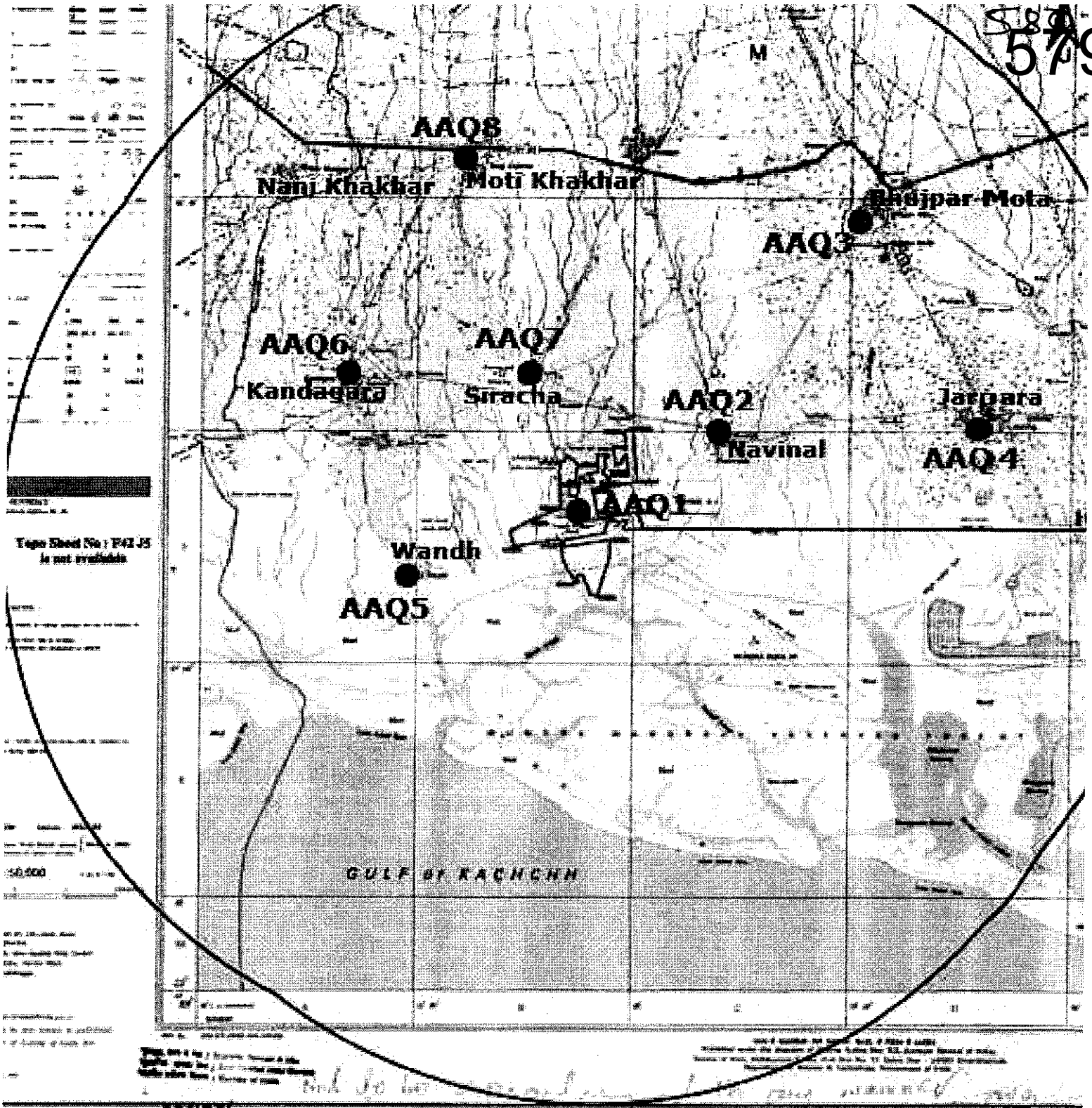
Jarpara Village (AAQ4): This sampling station was placed in this location of latitude 22°50'09.1"N and longitude 69°37'30.7"E at a distance of about 6.8 km in ENE (cross wind) direction of the proposed project site. The objective for selection of this location is to assess the concentration of pollutants in crosswind direction of the proposed project site, which is in the densely populated residential area.

Wandh Village (AAQ5): This sampling station was placed in this location of latitude 22°48'37.6"N and longitude 69°32'23.5"E at a distance of about 1.8 km in SW direction of the proposed project site. The objective for selection of this location is to assess the concentration of pollutants in upwind direction of the proposed project site, which is nearest village from the proposed project site and other existing plants like Tata Power Plant of 4000 MW capacity-(1.3 km, NW) & Adani Power Plant of 4620 MW–(1.8 km, NE) are located close to this sampling location.

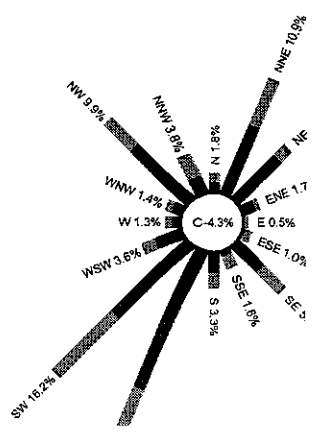
Kandagara Village (AAQ6): This sampling station was placed in this location of latitude 22°50'34.7"N and longitude 69°31'47.5"E at a distance of about 4.4 km in NW direction of the proposed project site. The objective for selection of this location is to assess the concentration of pollutants in crosswind direction, which is located in the commercial area and nearby SH-6 (0.3 km, East direction of the sampling location). This location is also close to the Tata Power Plant.

Siracha Village (AAQ7): This sampling station was placed in this location of latitude 22°50'36.5"N and longitude 69°33'47.8"E at a distance of about 1.7 km in NNW direction of the proposed project site. The objective for selection of this location is to assess the concentration of pollutants in crosswind direction, which is located in the rural residential area.

Moti Khakhar Village (AAQ8): This sampling station was placed in this location of latitude 22°52'43.2"N and longitude 69°33'07.5"E at a distance of 5.9 km NNW direction of the proposed project site. The objective for selecting this location is to assess the concentration of pollutants in crosswind direction, which is located in the commercial area and nearby NH-8A (0.5 km, North direction of the sampling location).



● Ambient Air Quality Monitoring Locations



3.6.3 Presentation of Primary Data - Baseline Air Quality

The 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations. The summary of these results for each location during the Study period (October to December, 2016) are presented in **Table-3.6.2**. The detail AAQ monitoring results are presented in **Annexure-IX.**

- **Summary of Observations**

The results of the monitored data indicate that the ambient air quality of the region in general is in conformity with respect to industrial, commercial and rural/residential norms of the National Ambient Air Quality Standards of CPCB, with present level of activities.

$PM_{2.5}$: The minimum value for $PM_{2.5}$ is observed at Bhujpar Mota (AAQ3), as 19.2 $\mu g/m^3$ with the maximum value observed at Moti Khakhar (AAQ8), as 43.9 $\mu g/m^3$ during the study period.

PM_{10}: The minimum value for PM_{10} is observed at Japara (AAQ4), as 35.2 $\mu g/m^3$ with the maximum value observed at Moti Khakhar (AAQ8), as 84.2 $\mu g/m^3$ during the study period.

SO_2: The minimum value for SO_2 is observed at Japara (AAQ4), 14.8 $\mu g/m^3$ as with the maximum value observed at Moti Khakhar (AAQ8), as 42.6 $\mu g/m^3$ respectively during the study period.

NO_2: The minimum value for NO_2 is observed at Project Site (AAQ1), as 13.1 $\mu g/m^3$ with the maximum value observed at Moti Khakhar (AAQ8), as 32.8 $\mu g/m^3$ during the study period.

CO: The minimum value for CO is observed at Bhujpar Mota (AAQ3), as 262 $\mu g/m^3$ with the maximum value observed at Wandh (AAQ5), as 412 $\mu g/m^3$ $\mu g/m^3$ during the study period.

O_3: The minimum value for O_3 is observed at Moti Khakhar (AAQ8), as 2.4 $\mu g/m^3$ with the maximum value observed at Wandh (AAQ5), as 6.9 $\mu g/m^3$ during the study period.

Ammonia (NH_3): Ammonia concentration observed in all the locations is <20.0 $\mu g/m^3$.

Benzo(a) Pyrene (BaP): BaP values observed in all the locations are <1.0 ng/m^3.

Benzene (C_6H_6): Benzene concentration was observed in all the locations are <1.0 ng/m^3.

Heavy Metals: All heavy metals were observed to be below detectable limits.

- **Conclusion:**

From the above analysis of the data, it infers that the baseline concentrations in the study area are within the permissible limits. However, the high concentrations can be attributed to the presence of the two major power plants and dusty open terrain and industrial traffic in the study area.

TABLE-3.6.2
SUMMARY OF AMBIENT AIR QUALITY RESULTS (OCTOBER-DECEMBER, 2016)

Station Code	Locations	$PM_{2.5}$ (µg/m³)				PM_{10} (µg/m³)				SO_2 (µg/m³)				NO_2 (µg/m³)			
		Min	Max	Avg	98th %ile	Min	Max	Avg	98th %ile	Min	Max	Avg	98th %ile	Min	Max	Avg	98th %ile
AAQ1	Project Site	24.7	31.5	27.7	30.8	37.1	54.2	46.3	54.2	17.5	24.9	21.7	24.6	13.1	18.2	15.9	17.9
AAQ2	Navinal	23.0	41.3	32.7	40.4	41.1	62.5	50.6	60.6	17.2	32.1	28.0	32.1	13.5	23.7	18.4	23.1
AAQ3	Bhujpar Mota	19.2	37.5	28.5	37.3	39.6	75.2	51.3	74.1	16.3	30.9	26.7	30.7	17.4	28.7	25.1	28.5
AAQ4	Jarpara	25.6	37.8	32.2	37.4	35.2	64.8	50.8	63.7	14.8	21.5	16.5	20.4	14.3	27.7	20.7	27.5
AAQ5	Wandh	25.4	40.8	33.4	40.1	37.6	77.1	60.1	76.6	15.4	30.1	26.4	29.8	16.8	27.8	21.6	27.7
AAQ6	Kandagara	20.1	42.7	33.0	42.7	51.6	82.5	67.8	82.2	17.9	31.7	23.5	30.6	15.9	27.4	21.5	27.3
AAQ7	Siracha	23.2	39.8	33.0	39.6	38.7	64.9	52.9	64.8	17.5	31.6	22.3	30.8	18.2	28.7	24.9	28.5
AAQ8	Moti Khakhar	30.5	43.9	39.0	43.9	46.7	84.2	68.8	84.1	26.8	42.6	34.0	42.0	22.1	32.8	27.5	31.7
Range		**19.2 – 43.9**				**35.2 – 84.2**				**14.8 – 42.6**				**13.1 – 32.8**			
NAAQ Standards		**60**				**100**				**80**				**80**			

Station Code	Locations	CO (µg/m³)				O_3 (µg/m³)				NH_3 (µg/m³)	C_6H_6 (ng/m³)	BaP (ng/m³)	As (ng/m³)	Ni (ng/m³)	Pb (ng/m³)
		Min	Max	Avg	98th %ile	Min	Max	Avg	98th %ile						
AAQ1	Project Site	264	370	310	358	4.3	6.4	5.3	6.3	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
AAQ2	Navinal	316	400	359	384	3.8	6.7	5.2	6.7	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
AAQ3	Bhujpar Mota	262	366	328	366	3.1	6.5	4.7	6.4	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
AAQ4	Jarpara	296	398	355	393	3.3	6.6	4.4	6.0	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
AAQ5	Wandh	292	412	351	407	2.5	6.9	4.4	5.9	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
AAQ6	Kandagara	280	409	342	404	2.7	6.5	4.3	5.9	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
AAQ7	Siracha	291	390	336	387	2.8	6.8	5.5	6.7	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
AAQ8	Moti Khakhar	305	349	333	349	2.4	5.3	4	5.3	<20.0	<1.0	<1.0	<0.2	<0.1	<0.05
Range		**262 - 412**				**2.4 - 6.9**				**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**	**<0.05**
NAAQ Standards		**2000**				**100**				**400**	**5**	**1**	-	-	-

3.7 Water Quality

Selected water quality parameters of surface and ground water resources within 10 km radius of the study area has been studied for assessing the water environment and evaluate anticipated impact of the project. Understanding the water quality is essential in preparation of environmental impact assessment and to identify critical issues with a view to suggest appropriate mitigation measures for implementation.

The purpose of this study is to:

- Assess the water quality characteristics for critical parameters;
- Evaluate the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity; and
- Predict impact on water quality by this project and related activities.

The information required has been collected through primary surveys and secondary sources.

3.7.1 Methodology

Reconnaissance survey was undertaken and monitoring locations were finalized based on:

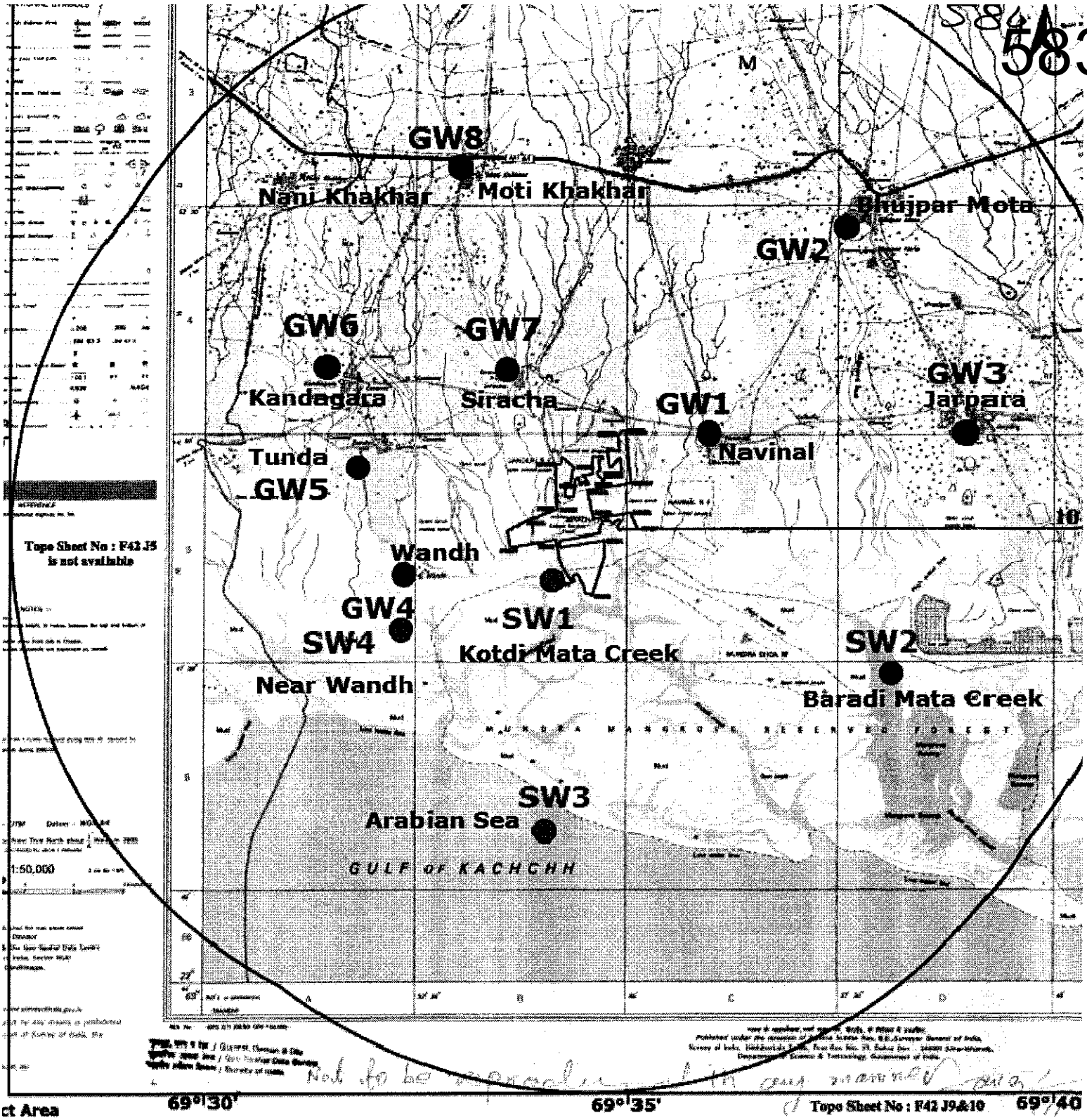
- Drainage pattern and surface water bodies;
- Location of residential areas representing different activities/likely impact areas; and
- Likely areas, which can represent baseline conditions.

The ground water and surface water sources covering 10 km radial distance were examined for physico-chemical, heavy metals and bacteriological parameters in order to assess the effect of industrial and other activities on surface and ground water. The samples were analyzed as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA).

Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO_3. Samples for bacteriological analysis were collected in sterilized glass bottles. Selected physico-chemical and bacteriological parameters have been analyzed for projecting the existing water quality status in the study area.

3.7.2 Water Sampling Locations

Eight ground water samples and four surface water sample was collected from the study area during the monitoring period. These samples were taken as grab samples and were analyzed for various parameters to compare with the standards for drinking water as per IS: 10500 "Specifications for Drinking Water". The water sampling locations are identified in **Table-3.7.1** and shown in **Figure-3.7.1.**



ct Area

● Ground Water Sampling Locations

● Surface Water Sampling Locations

TABLE-3.7.1
WATER SAMPLING LOCATIONS

Location Code	Location Name	Distance-Km	Direction
Surface Water			
SW1	Kotdi Creek	4.5	SSW
SW2	Baradi Mata Creek	6.4	ESE
SW3	Arabian Sea water In take	5.0	S
SW4	Creek at Wandh village	2.0	SW
Ground Water			
GW1	Navinal	1.7	ENE
GW2	Bhujpar Mota	6.2	NE
GW3	Jarpara	6.8	ENE
GW4	Wandh	1.8	SW
GW5	Tunda	3.4	NW
GW6	Kandagara	4.4	NW
GW7	Siracha	1.7	NNW
GW8	Moti Khakhar	5.9	NNW

3.7.2.1 Description and Justification of Sampling Locations

Four surface water and eight ground water samples were collected at sampling locations to know the water quality and any contamination of water. A brief description and justification of selecting the sampling locations is presented hereunder:

- **Ground Water Sampling Locations**

Navinal Village (GW1): The ground water sample was collected in location of latitude 22^{0}49'51.3"N and longitude 69^{0}35'54.0"E at a distance of about 1.7 km in ENE direction of the project site. The objective for selection of this location is to assess the water quality and any contamination of water in rural residential area.

Bhujpor Mota Village (GW2): The ground water sample was collected in location of latitude 22^{0}53'00.9"N and longitude 69^{0}37'36.5"E at a distance of about 6.2 km in NE direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in the densely populated and commercial area.

Jarpara Village (GW3): The ground water sample was collected in location of latitude 22^{0}50'09.1"N and longitude 69^{0}37'30.7"E at a distance of about 6.8 km in ENE (cross wind) direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in the populated residential area.

Wandh Village (GW4): The ground water sample was collected in location of latitude 22^{0}48'34.7"N and longitude 69^{0}32'34.1"E at a distance of about 1.8 km in SW direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in the nearest Wandh village located to the project site and other existing plants (Coastal Gujarat Power

Limited-1.3 km in NW direction and Adani Power Limited -1.8 km NE direction) of sampling location.

Tunda Village (GW5): The ground water sample was collected in location latitude 22°49'54.1"N and longitude 69°32'28.7" E at a distance of about 3.4 km in NW direction of the proposed project site. The main objective to select this location is to assess the water quality and any contamination of water in the residential area.

Kandagara Village (GW6): The ground water sample was collected in location of latitude 22°50'34.7"N and longitude 69°31'47.5"E at a distance of about 4.4 km in NW direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in the commercial area and nearby SH-6 (0.3 km, East direction of the sampling location).

Siracha Village (GW7): The ground water sample was collected in location of latitude 22°50'36.5"N and longitude 69°33'47.8"E at a distance of about 1.7 km in NNW direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in the rural residential area.

Moti Khakhar Village (GW8): The ground water sample was collected in location of latitude 22°52'46.2"N and longitude 69°33'15.3"E at a distance of 5.9 km NNW direction of the proposed project site. The objective for selecting this location is to assess the water quality and any contamination of water in the commercial area and nearby NH-8A (0.5 km, North direction of the sampling location).

- **Surface Water Sampling Locations**

Kodit Creek (SW1): The surface water sample was collected in location of latitude 22°48'18.6"N and longitude 69°34'18.4"E at a distance of about 4.5 km in SSW direction of the project site. The objective for selection of this location is to assess the water quality and any contamination of water in creak due to nearby industries.

Baradi Mata Creek (SW2): The surface water sample was collected in location of latitude 22°46'38.3"N and longitude 69°38'06.4"E at a distance of about 6.4 km in ESE direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in creak due to nearby industries.

Arabian Sea Water intake (SW3): The surface water sample was collected in location of latitude 22°43'18.4"N and longitude 69°33'55.2"E at a distance of about 5.0 km in S (cross wind) direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in sea due to nearby industries.

Creek at Wandh Village (SW4): The surface water sample was collected in location of latitude 22°48'14.7"N and longitude 69°32'36.9"E at a distance of about 2.0 km in SW direction of the proposed project site. The objective for selection of this location is to assess the water quality and any contamination of water in creek due to nearby industries.

3.7.3 Presentation of Results

The results of the water quality monitored during the study period are given in **Table-3.7.2** and **Table-3.7.3**.

3.7.3.1 Surface Water Quality

The analysis results indicate that pH is found to be 7.2 to 8.0, which is well within the specified standard 6.5-8.5. The TDS was observed to be 41645 to 43572 mg/l. Dissolved oxygen was observed to be 5.6 to 5.9 mg/l. The chlorides and sulphates were found to be 16078.9 to 20915.5 mg/l and 2139.1 to 2734.0 mg/l respectively. Bacteriological studies reveal the 5 MPN/100ML. The surface water is observed to be brackish in nature. This can be attributed due to presence of Arabian sea inclose proximity.

3.7.3.2 Ground Water Quality

The analysis results indicate that the pH ranges in between 7.3 to 7.8, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 125 to 392 mg/l.

Chlorides at all the locations were ranging in between 282.6 to 978.4 mg/l. Fluorides were observed to be ranging in between 0.9 to 1.5 mg/l and are found to be within the permissible limit. Nitrates are found to be in range of 8.2 to 22.0 mg/l. Bacteriological studies reveal that no coliform bacteria are present in the samples. The heavy metal contents were observed to be in well within the limits except few parameters. It can be observed that the ground water quality is influenced by sea water quality possibly due to sea water ingression.

TABLE-3.7.2
SURFACE WATER QUALITY

Sr. No.	Parameters	UOM	SW1 Kotdi Creek	SW2 Baradi Mata Creek	SW3 Arabian Sea water In take	SW4 Creek at Wandh Village	Max	Min	Classification of Water Inland Body (as per IS: 2296)
1	pH	-	8.0	7.2	8.0	7.5	**8.0**	**7.2**	**D**
2	Temperature	°C	26.2	25.9	25.7	25.6	**26.2**	**25.6**	**D**
3	Conductivity	µs/cm	57900	52785	59800	58421	**59800**	**52785**	**D**
4	Salinity	gm/kg	29.6	29.0	37.7	32.3	**37.7**	**29**	**D**
5	Density	Kg/m^3	1018	1018	1024	1021	**1024**	**1018**	**D**
6	Dissolved oxygen	mg/l	5.6	5.8	5.7	5.9	**5.9**	**5.6**	**D**
7	Biochemical Oxygen Demand (BOD)	mg/l	<3*	<3*	<3*	<3*	**<3***	**<3***	**D**
8	Chemical Oxygen Demand (BOD)	mg/l	75	60	80	65	**60**	**80**	**D**
9	Total Dissolved Solids	mg/l	42784	41645	43056	43572	**43572**	**41645**	**D**
10	Total Hardness	mg/l	6800	6962	7243	7637	**7637**	**6800**	**D**
11	Oil and Grease	mg/l	<1.0*	<1.0*	<1.0*	<1.0*	**<1.0***	**<1.0***	**D**
12	Sodium	mg/l	9640	9684	10120	10633	**10633**	**9640**	**D**
13	Potassium	mg/l	354	332	492	383	**492**	**332**	**D**
14	Nitrates	mg/l	2.1	3.5	1.4	2.7	**3.5**	**1.4**	**D**
15	Nitrites	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***	**D**
16	Chlorides	mg/l	16421.7	16078.9	20915.5	17926.3	**20915.5**	**16078.9**	**D**
17	Sulphates	mg/l	2582.3	2543.5	2139.1	2734.0	**2734**	**2139.1**	**D**
18	Ammonia	mg/l	<0.1*	<0.1*	<0.1*	<0.1*	**<0.1***	**<0.1***	**D**
19	Phosphates	mg/l	<0.1*	<0.1*	<0.1*	<0.1*	**<0.1***	**<0.1***	**D**
20	Silicates	mg/l	<0.1*	<0.1*	<0.1*	<0.1*	**<0.1***	**<0.1***	**D**
21	Reactive Silica	mg/l	<0.1*	<0.1*	<0.1*	<0.1*	**<0.1***	**<0.1***	**D**
22	Total Phosphorous	mg/l	<0.1*	<0.1*	<0.1*	<0.1*	**<0.1***	**<0.1***	**D**
23	Total Nitrogen	mg/l	<0.2*	<0.2*	<0.2*	<0.2*	**<0.2***	**<0.2***	**D**
24	Lead as Pb	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***	**D**
25	Cadmium as Cd	mg/l	<0.001*	<0.001*	<0.001*	<0.001*	**<0.001***	**<0.001***	**D**
26	Zinc as Zn	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***	**D**
27	Copper as Cu	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***	**D**
28	Coli forms	MPN/100 ml	Absent	Absent	Absent	Absent	**Absent**	**Absent**	**D**
29	Fecal Coli forms	Per 100 ml	<2*	<2*	<2*	<2*	**<2***	**<2***	**D**

* Below detection Limit of Instrument

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TABLE-3.7.3
GROUND WATER QUALITY

Sr. No.	Parameter	IS:10500 Limits (Desirable/ Permissible)	Units	GW1 Navinal	GW2 Bhojpur Mota	GW3 Jarpara	GW4 Vandh	GW5 Tunda	GW6 Kondagara	GW7 Siracha	GW8 Moti Khakhar	Max	Min
1	pH	6.5 – 8.5 (NR)	-	7.5	7.3	7.5	7.4	7.8	7.5	7.7	7.8	**7.8**	**7.3**
2	Colour (Hazen units)	5(15)	Hazen	2	1	2	1	3	3	2	2	**3**	**1**
3	Taste	Agreeable	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Agreeable**	**Agreeable**
4	Odour	Agreeable	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Agreeable**	**Agreeable**
5	Conductivity	$	uS/cm	2690	3160	2762	4260	3819	2875	2130	2810	**4260**	**2130**
6	Turbidity (NTU)	1(5)	NTU	3	3	2	4	3	4	3	2	**4**	**2**
7	Total Dissolve solids	500(2000)	mg/l	1810	2085	1785	2930	2480	1855	1372	1875	**2930**	**1372**
8	Total Suspended Solids	-	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**	**<1.0**
9	Total Hardness as CaCO3	200(600)	mg/l	160	171	189	392	207	206	125	181	**392**	**125**
10	Total Alkalinity	200(600)	mg/l	490	560	851	590	1342	883	625	520	**1342**	**490**
11	Calcium as Ca	75(200)	mg/l	28.4	35.8	75.6	67.3	82.2	82.2	49.8	33.7	**82.2**	**28.4**
12	Magnesium as Mg	30(100)	mg/l	21.6	19.8	54.6	54.4	63.4	72.3	30.2	23.4	**72.3**	**19.8**
13	Residual Chlorine	0.2(1.0)	mg/l	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	**<0.2***	**<0.2***
14	Boron	0.5(1.0)	mg/l	0.86	0.97	0.48	0.85	0.65	0.42	0.28	0.65	**0.97**	**0.28**
15	Chloride as Cl	250(1000)	mg/l	553.0	645.2	325.0	978.4	352.0	348.4	282.6	581.4	**978.4**	**282.6**
16	Sulphate as SO4	200(400)	mg/l	32.3	63.8	35.2	115.4	44.0	38.2	27.8	39.0	**115.4**	**27.8**
17	Fluorides as F-	1.0(1.5)	mg/l	1.5	1.4	0.9	1.0	1.2	1.3	1.0	1.1	**1.5**	**0.9**
18	Nitrates as NO3	45(NR)	mg/l	10.9	11.3	17.2	18.0	22.0	18.4	12.4	8.2	**22**	**8.2**
19	Sodium as Na	$	mg/l	541.2	642.5	425.7	788.2	645.3	425.8	373.9	559.3	**788.2**	**373.9**
20	Potassium as K	$	mg/l	4.1	3.8	6.5	5.4	8.2	6.2	5.2	3.0	**8.2**	**3**
21	Phenolic Compounds	0.001 (0.002)	mg/l	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	**<0.001***	**<0.001***
22	Cyanides	0.05 (NR)	mg/l	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	<0.02*	**<0.02***	**<0.02***

Sr. No.	Parameter	IS:10500 Limits (Desirable/ Permissible)	Units	GW1 Navinal	GW2 Bhojpur Mota	GW3 Jarpara	GW4 Vandh	GW5 Tunda	GW6 Kondagara	GW7 Siracha	GW8 Moti Khakhar	Max	Min
23	Anionic Detergents	0.2 (1.0)	mg/l	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	**<0.2***	**<0.2***
24	Mineral Oil	0.5(NR)	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***
25	Cadmium as Cd	0.003(NR)	mg/l	<0.001*	<0.003*	<0.003*	<0.003*	<0.003*	<0.003*	<0.003*	<0.003*	**<0.003***	**<0.003***
26	Arsenic as As	0.01(0.05)	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***
27	Copper as Cu	0.05(1.5)	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***
28	Lead as Pb	0.01(NR)	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***
29	Manganese as Mn	0.1(0.3)	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***
30	Iron as Fe	0.3(NR)	mg/l	<0.01*	<0.01*	0.02	<0.01*	0.04	0.04	<0.01*	<0.01*	**0.04**	**<0.01***
31	Chromium as Cr6+	0.05(NR)	mg/l	<0.05*	<0.05*	<0.05*	<0.05*	<0.05*	<0.05*	<0.05*	<0.05*	**<0.05***	**<0.05***
32	Selenium as Se	0.01(NR)	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***
33	Zinc as Zn	5(15)	mg/l	0.08	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**0.08**	**<0.01***
34	Aluminium as Al	0.03(0.2)	mg/l	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	<0.01*	**<0.01***	**<0.01***
35	Mercury as Hg	0.001(NR)	mg/l	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	**<0.001***	**<0.001***
36	Pesticides	Absent	mg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**	**Absent**
37	E-coli(Nos/100 ml)	Absent	-	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**	**Absent**
38	Coliform Organisms	10	MPN/100 ml	<2*	<2*	<2*	<2*	<2*	<2*	<2*	<2*	**<2***	**<2***

$ Limits not specified as per IS code: 10500, NR-No Relaxation,
* Below detection Limit of Instrument

3.8 Noise Level Survey

The main objective of noise monitoring in the study area is to establish the baseline noise levels and assess the impact of the total noise expected to be generated by the construction and operation of the proposed project.

3.8.1 Identification of Sampling Locations

A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the area. Noise at different noise generating sources has been identified based on the residential, commercial and industrial activities in the area. The monitoring locations are given in **Table-3.8.1** and shown in **Figure-3.8.1.**

TABLE-3.8.1
DETAILS OF NOISE MONITORING LOCATIONS

Location code	Locations	Distance w.r.t. Project Site (km)	Direction w.r.t. Project Site
N1	Project Site	-	-
N2	Navinal	1.7	ENE
N3	Bhujpar Mota	6.2	NE
N4	Jarpara	6.8	ENE
N5	Wandh	1.8	SW
N6	Kandagara	4.4	NW
N7	Siracha	1.7	NNW
N8	Moti Khakhar	5.9	NNW

3.8.1.1 Description and Justification of Sampling Locations

The integrated sound meter was used to measure the nosie levels at eight sampling locations to monitor the noise level. A brief description and justification for selecting the sampling locations is presented hereunder:

Project Site (N1): The noise levels are recorded in location latitude 22^{0}48'49.8"N and longitude 69^{0}34'28.7" E within the proposed project area. The main objective for selecting this location is to assess the noise levels within proposed project site premises.

Navinal Village (N2): The noise levels are recorded in location of latitude 22^{0}52'43.2"N and longitude 69^{0}33'07.5"E at a distance of about 1.7 km in ENE direction of the project site. The objective for selection of this location is to assess the noise levels in rural residential area.

Bhujpor Mota Village (N3): The noise levels are recorded in location of latitude 22^{0}52'33.4"N and longitude 69^{0}37'58.9"E at a distance of about 6.2 km in NE direction of the proposed project site. The objective for selection of this location is to assess the noise levels of the densely populated and commercial zone.

Jarpara Village (N4): The noise levels are recorded in location of latitude 22°50'09.1"N and longitude 69°37'30.7"E at a distance of about 6.8 km in ENE (cross wind) direction of the proposed project site. The objective for selection of this location is to assess the noise levels of the densely populated residential area.

Wandh Village (N5): The noise levels are recorded in location of latitude 22°48'37.6"N and longitude 69°32'23.5"E at a distance of about 1.8 km in SW direction of the proposed project site. The objective for selection of this location is to assess the noise levels of the nearest village located to the project site and other existing plants (Tata Power Plant -1.3 km in NW direction and Adani Power Plant – 1.8 km NE direction) of sampling location.

Kandagara Village (N6): The noise levels are recorded in location of latitude 22°50'34.7"N and longitude 69°31'47.5"E at a distance of about 4.4 km in NW direction of the proposed project site. The objective for selection of this location is to assess the noise levels of the commercial area and nearby SH-6 (0.3 km, East direction of the sampling location).

Siracha Village (N7): The noise levels are recorded in location of latitude 22°50'36.5"N and longitude 69°33'47.8"E at a distance of about 1.7 km in NNW direction of the proposed project site. The objective for selection of this location is to assess the noise levels of the rural residential area.

Moti Khakhar Village (N8): The noise levels are recorded in location of latitude 22°52'43.2"N and longitude 69°33'07.5"E at a distance of 5.9 km NNW direction of the proposed project site. The objective for selecting this location is to assess the noise levels of the commercial area and nearby NH-8A (0.5 km, North direction of the sampling location).

3.8.2 Methodology of Data Generation

Sound Pressure Level (SPL) measurements were measured at all locations. The readings were taken for every hour for 24 hours. The day noise levels have been monitored during 6 am to 10 pm and night levels during 10 pm to 6 am.

Noise levels were measured using integrated sound level meter manufactured by Quest Technologies, USA (Model No.2900). The integrating sound level meter is an integrating/ logging type with Octave filter attachment (model OB-100) with frequency range of 31.5 to 16000 Hz. This instrument is capable of measuring the Sound Pressure Level (SPL), L_{eq} and octave band frequency analysis.

The noise levels were monitored on working days only and Saturdays, Sundays and public holidays were not monitored. During each hour L_{eq} was directly computed by the instrument based on the sound pressure levels.

Lday (Ld), Lnight (Ln) and Ldn values were computed using corresponding hourly Leq of day and night respectively. Monitoring was carried out at 'A' response and fast mode.

- ***Parameters Measured During Monitoring***

For noise levels measured over a given period of time interval, it is possible to describe important features of noise using statistical quantities. This is calculated using the percent of the time certain noise levels exceeds the time interval. The notation for the statistical quantities of noise levels is described below:

L_{10} is the noise level exceeded 10 percent of the time;
L_{50} is the noise level exceeded 50 percent of the time; and
L_{90} is the noise level exceeded 90 percent of the time.

The ambient noise standards levels as per CPCB guidelines are given in **Table-3.8.2**.

TABLE-3.8.2
AMBIENT NOISE STANDARDS

Area Code	Ambient Noise Standards		
	Category of Area	Noise Levels (dB (A) Leq (Limits)	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Source : Ambient Noise Standards of CPCB

3.8.3 Presentation of Results

The statistical analysis is done for measured noise levels at eight locations. The parameters are analyzed for L_{10}, L_{50}, L_{90}, L_{eq}, L_{day}, L_{night}, and L_{dn}. The statistical analysis results monitored during the study period (i.e. October to December, 2016) are given in **Table-3.8.3**.

3.8.4 Observations

Day time Noise Levels (L_{day})

The day time noise levels were ranged in between 48.5 dB (A) to 56.6 dB (A). The maximum value 56.6 dB (A) was recorded at Siracha (N7), and the minimum value 48.5 dB (A) was recorded at Moti Khakhar (N8).

Night time Noise Levels (L_{night})

The night time noise levels were ranged in between 42.3 dB (A) to 48.8 dB (A). The maximum value 48.8 dB (A) was recorded at Siracha (N7), and the minimum value 42.3 dB (A) was recorded at Moti Khakhar (N8).

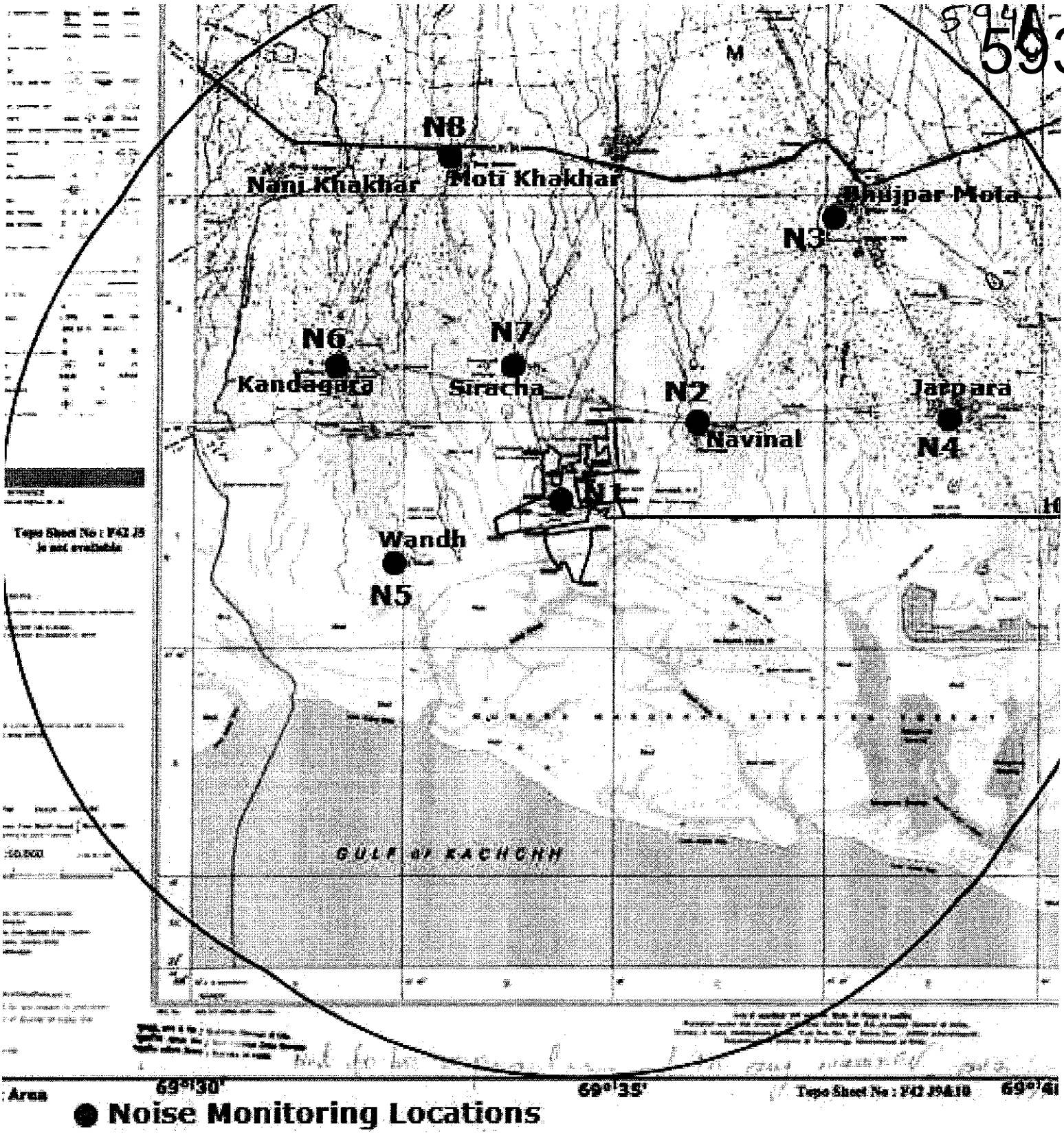

N8
Nani Khakhar
Moti Khakhar
Bhujpar Mota
N3
N6
Kandagara
N7
Siracha
N2
Navinal
Jarpara
N4
N1
Wandh
N5
GULF OF KACHCHH
69°30'
69°35'
Noise Monitoring Locations

TABLE-3.8.3
NOISE LEVELS IN THE STUDY AREA

Code	Location	Average Noise Levels in dB(A)						
		L10	L50	L90	Leq	Ld	Ln	Ldn
N1	Project Site	52.7	49.9	46.1	50.8	51.6	46.1	53.8
N2	Navinal	57.7	52.9	48.5	54.1	56.2	46.9	58.3
N3	Bhujpar Mota	51.3	46.3	42.6	47.3	48.9	43.7	52.1
N4	Jarpara	55.9	49.4	45.1	50.5	54.7	45.4	56.0
N5	Wandh	54.9	50.3	45.9	51.5	54.4	44.8	55.4
N6	Kandagara	55.8	50.2	45.8	51.2	55.0	48.4	56.8
N7	Siracha	57.9	54.5	49.9	55.7	56.6	48.8	57.8
N8	Moti Khakhar	49.6	43.8	40.3	44.7	48.5	42.3	50.1
Maximum		**57.9**	**54.5**	**49.9**	**55.7**	**56.6**	**48.8**	**58.3**
Minimum		**49.6**	**43.8**	**40.3**	**44.7**	**48.5**	**42.3**	**50.1**

3.9 Ecology and Biodiversity

3.9.1 Habitats in the Study Area

Ecological evaluation aims at developing and applying methodologies to assess the relevance of an area for nature conservation. As such, it is to support the assessment of the impact of a proposed development by providing guidance on how to describe the ecological features within the area affected, how to value them, and how to predict the value losses caused by the development. The evaluation of the ecological significance of an area can be undertaken from different perspectives and consequently with different objectives. One of such perspectives focuses on the conservation of the biological diversity or biodiversity.

Most of the background data needs to be acquired from the governmental agencies or the scientific literature. This information is typically complemented by field visit, site surveys and sample collection. The description of the actual ecological assessment provided by the ecological baseline study serves to set a reference for the subsequent impact analysis. Moreover, it helps decision makers and EIA reviewers to become familiar with the environmental features and the needs of the study area (10 km radius).

3.9.2 Objectives of the Study

The present study was undertaken with the following objectives to assess both terrestrial and aquatic habitats of the study area:

- To assess the nature and distribution of vegetation in and around the project site;
- To assess the flora and fauna of the study area;
- To understand the ecology of the marine habitat;
- To ascertain the migratory routes of fauna, presence of breeding grounds and sensitive habitats in the study area, if any;
- To assess the presence of protected areas in the study area;
- To review the information from secondary sources and discuss the issues of concern with the relevant authority and stakeholders; and

- Impact prediction based on primary and secondary data sources to formulate mitigation measures.

3.9.3 Methodology

To achieve the above objectives, a detailed study of the area was undertaken with the project site as its center. The different techniques used for the survey are given below:

- Generation of primary data by undertaking systematic ecological studies in the study area;
- Primary data collection for flora through random sampling method for trees, shrubs and herbs from the selected locations to know the vegetation cover qualitatively;
- To spot the fauna in the study area and also to identify the fauna by secondary indicators such as pugmarks, scats, fecal pallets, calls and other signs;
- For ecological information, the secondary sources such as local officials, villagers and other stakeholders were interviewed; and
- Sourcing secondary data with respect to the study area from published literature.

The list of terrestrial and aquatic sampling locations in the study area is presented in **Table-3.9.1** and shown in **Figure-3.9.1.**

TABLE-3.9.1
LIST OF TERRESTRIAL SAMPLING LOCATIONS

Code	Name of the Locations	Distance from Project Site (Km)	Direction w.r.t. Proposed Project Site
Terrestrial Locations			
TE-1	Project Site	-	-
TE-2	Navinal	1.7	ENE
TE-3	Bhujpar Mota	6.2	NE
TE-4	Wandh	1.8	SW
TE-5	Moti Khakhar	5.9	NNW
Aquatic Ecological Locations			
AE1	Nagavanti River	0.3	ENE
AE2	Kotdi Creek	4.5	SSW

3.9.4 Terrestrial Ecology- Analysis of the Primary Survey and the Secondary Data

The biological environment described includes the description of forests areas and protected areas from secondary sources like working plan and management plans. Apart from this floral and faunal composition present in the open areas (for each taluka) as information collected through primary data collection described.

Entire coastal zone of the Gulf of Kutch falls in semi-arid zone (Biotic province-4B: Gujarat-Rajwada). Over a dozen vegetation communities are found in the coastal zone of the gulf. The major vegetation communities or the forest subtypes, as per the Champion and Seth Classification 1968, and natural ecosystems occurring in the coastal talukas of the Gulf of Kutch are as follows:

- 4B – Tidalor swamp forests-mangroves;
- 5/E8– Saline/alkaline scrub Savannah;
- 5/E3 – Babool (*Acacia nilotica*) forests;
- 6B/C1 – Desert thorn forests;
- 6B/DSI – Zizyphus scrub;
- 6B/DS2 – Tropical *Euphorbia;*
- 6E1–*Euphorbia*scrubs;
- 6E2 – *Acacia senegal* forests;
- 6E4 – *Salvadora* scrubs;
- 6/DS1 – Cassia *auriculata;*
- *Prosopis* scrubs- a major vegetation type developed during the last four to five decades; and
- *Sueda* sp. covered saline lands.

The main dominant tree and woody species in the coast of the gulf are-*Acacia nilotica* (deshibabool), *A. Senegal* (gorad), *A. leucophloea* (hermo), *Zizyphus* sp.(bordi), *Salvadora persica* (kharapiloo), *Salvadora oleonoides* (mithapiloo), *Commiphora wightii* (gugal), *Balanite aegyptiaca* (ingoriyo), *Capparis* sp, (kerdo), *Euphorbia* sp. and *Prosopis chilensis, Azadirachta indica* -Neem, *Cocos nucifera-, Mangifera indica*-Mango, (*Terminalia catappa*),Badam, *Ficus bengalensis* (Vad), Pipado- (*Ficus religiosa*) are normally grown in the villages.

Source: *GES, FES, MIR- Ecological Profile of Coastal Talukas of Kacchh September -2014* & Botanical Survey of India publication, dated 1997.

3.9.4.1 Core Zone – Flora and Fauna

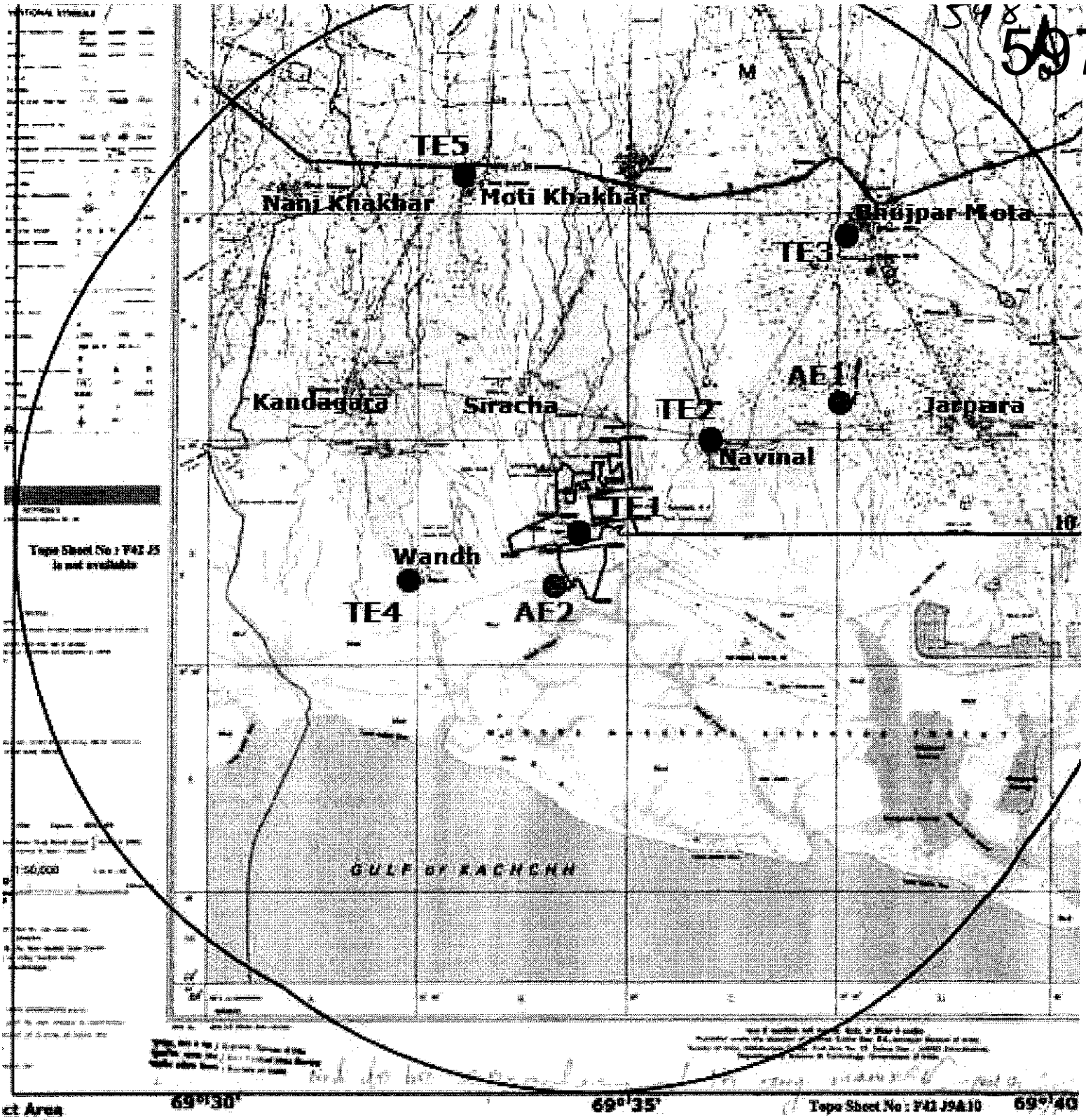
The core area is very arid and vegetation is represented by the presence of *Prosposis juliflora* (Vilayati babul). The following of the species are listed in the **Table-3.9.2**.

TABLE-3.9.2
FLORA OF CORE ZONE (PROJECT SITE)

Sr. No	Scientific Name	Common Name	Family
Trees			
1	*Prosopis juliflora*	Vilayati Babul	Mimosaceae
Shurbs			
1	*Cassia auriculata*	Tanner's Cassia	Caesalpinaceae
2	*Lantana camara*	Lantana	Verbanaceae
Grasses			
1	*Cyonodon dactylon*	Nut Grass, Dharbha	Poaceae
2	*Heteropogon contortus*	Khad Grass	Poaceae

3.9.4.2Fauna of the Core Area (Project Site)

The species observed in the core zone were of common occurrence, mostly common birds such as common crow, common sparrow and egrets. The commonly observed mammals were mongoose, and squirrels. The list of animal species recorded in core area is presented in **Table-3.9.3**.



● Terrestrial Ecological Sampling Locations
● Aquatic Ecological Sampling Locations

TABLE-3.9.3
FAUNA OF THE CORE ZONE (PROJECT SITE)

Sr. No.	Scientific Name	Common Name	Conservation as per WPA (1972)
Avian Fauna			
1	*Acridotheres tristis*	Common myna	Sch-IV
2	*Bubulcus ibis*	Cattle egret	Sch-IV
3	*Egretta garzetta*	Little egret	Sch-IV
4	*Corvus splendens*	House crow/ Kowa	Sch-V
5	*Passer domesticus*	House Sparrow	Sch-IV
Amphibians & Reptiles			
1	*Bufo melanosticus*	Common frog	Sch-IV
2	*Calotes versicolor*	Common garden lizard	Sch-IV
Mammals			
1	*Bandicota indica*	Greater Bandicoot	Sch-V
2	*Funambulus palmarum*	Three Striped Palm Squirrel	Sch-V

3.9.4.3 Buffer Area

The fertility of the coastal soil is affected by salinity. The vegetation is characterized by arid–semi-arid and mainly consist of trees, shrubs under shrubs and climbers with stunted growth with admixture of xerophytes & thorny species the dominant floral species are *prosopis juliflora*, *Phoenix sylvestris*, *Acacia Senegal*, and *Acacia nilotica*. The list of plant species recorded is presented in the **Table-3.9.4.**

TABLE-3.9.4
LIST OF FLORA RECORDED IN THE BUFFER AREA

Sr. No.	Scientific Name	Common Name	Family
1	*Acacia jacqemontii*	Kikar	Fabaceae
2	*Acacia Senegal*	Gum Arabic	Fabaceae
3	*Azadiractha indica*	Neem	Meliaceae
4	*Leucaena leucocephala*	Subabul	Fabaceae
5	*Phoenix sylvestris*	Date palm	Arecaceae
6	*Prosopis cineraria*	Khejri	Fabaceae
7	*Salvadora oleoides*	Mithi jar	Salvadoraceae
8	*Prosopis juliflora*	Vilayati Babul	Mimosaceae
9	*Salvadora persica*	Khari jaar	Salvadoraceae
10	*Zizyphus mauritiana*	Jharber/Ber	Rhamnaceae
11	*Commiphora wightii*	Guggul	Burseraceae
Herbs & Shrubs			
1	*Aloe barbadensis*	Indian Aloe	Lilaceae
2	*Aerva javanica*	Kapok	Amarantheaceae
3	*Leptadenia pyrotechnica*	Khimp	Ascelpidiaceae
4	*Cassia auriculata*	Tarwar	Caesalpinaceae
5	*Corchorus fascicularis*	Jute sp	Tiliaceae
6	*Cressa cretica*	Rudravanti	Cyperaceae
7	*Capparis decidua*	Kair	Capparaceae
8	*Calotropis procera*	Milk weed/Arkha	Asclepidaceae
9	*Euphorbia triucalli*	Indian tree spurge	Euphorbiaceae

Sr. No.	Scientific Name	Common Name	Family
10	*Gomphrena celosiodes*	Bachelors button	Amaranthaceae
11	*Cuscuta reflexa*	Amar bel	Convolvulaceae
12	*Indigofera oblongifolia*	Jhiladi	Fabaceae
Grasses			
1	Chloris barbata	Swollen finger grass	Poaceae
2	*Cenchrus cillaris*	Buffel grass	Poaceae
3	*Desmostachya bipinnata*	Daabh	Poaceae
4	*Eragrostis tenella*	Lovegrass	Poaceae
Mangroves			
1	*Avicennia marina*	Grey Mangrove/White Mangrove /Tavariyan -Gujarati	Acanthaceae
2	*Rhizophora mucronata*	Karod- Gujarati True Mangrove/Asiatic Mangrove	Rhizophoraceae
3	*Ceriops tagal*	Spurred Mangrove	Rhizophoraceae
4	*Bruguiera gymnorhiza*	Large Leafed Orange Mangrove	Rhizophoraceae

3.9.5 Mangroves

Mangroves are situated about 4.5 km near Kotri creek area/ SSW direction, distributed along the networks of creek system. Mangroves are predominantly composed of *Avicenna marina*, Species known for its high tolerance of salinity and other environmental stresses.

3.9.6 Endemic Flora Species and Threatened Flora of Navinal Area

Important threatened plant species reported from the region are *Dipcadi erythraeum, Helichrysum cutchicum, Heliotropium rariflorum, Pavonia ceratocarpa, Convolvulus stocksii, Commiphora wightii.*

Gujarat State Biodiversity Board earlier proposed to declare the area as biodiversity heritage site. However the proposed development of the "Biodiversity Park at Navinal village, Mundra Taluk" has been shelved by Gujarat State Biodiversity Board, though initially proposed. Hence, it is given to understand that the earlier proposed biodiversity park will not be further developed in the study area.

3.9.7 Reserve Forests

The following reserve forests are found in the 10 km radius areas which are Mundra Dhoa reserve forest, Dhanderi reserve forest, Navinal Reserve forest, Mundra mangrove reserve forest, Japava reserve forests in the study area. Part of the project site falls in Dhanderi reserve forest area, for which stage-I clearance has been obtained.

There are no wildlife sanctuaries, notified wetlands or national parks within the study area. Avifauna reported in the study area is listed in the following **Table-3.9.5.**

TABLE-3.9.5
LIST OF FAUNA RECORDED IN THE BUFFER AREA

Sr. No	Scientific Name	Common Name	Conservation Status as per WPA (1972)
Aves			
1	*Tringa nebularia*	Common Green shank	Sch-IV
2	*Actitis hypoleucos*	Common Sandpiper	Sch-IV
3	*Himantopus himantopus*	Black Winged Stilt	Sch-IV
4	*Vanellus indicus*	Red-Wattled lapwing	Sch-IV
5	*Vanellus malabaricus*	Yellow Wattled lapwing	Sch-IV
6	*Chroicocephalus ridibundus*	Common black headed gull	Sch-IV
7	*Gelochelidon nilotica*	Gull-billed tern	Sch-IV
8	*Sternula albifrons*	Little tern	Sch-IV
9	*Egretta gularis*	Western reef heron	Sch-IV
10	*Passer domesticus*	House sparrow	Sch-IV
11	*Corvus splendens*	Common crow	Sch-V
12	*Hirundo rustica*	Barn swallow	Sch-IV
13	*Alcedo atthis*	Common kingfisher	Sch-IV
14	*Limosa lapponica*	Bar –tailed Godwit	Sch-IV
15	*Pseudibis papillosa*	Indian Black ibis	Sch-IV
16	*Streptopelia tranquebarica*	Red collared dove	Sch-IV
17	*Aythya ferina*	Common Pochard	Sch-IV
18	*Charadrius mongolus*	Lesser Sand plover	Sch-IV
19	*Charadrius leschenaultii*	Greater Sand plover	Sch-IV
20	*Acridotheres ginginianus*	Bank Myna	Sch-IV
21	*Tachybaptus ruficollis*	Little Grebe	Sch-IV
22	*Numenius arquata*	Eurasian Curlew	Sch-IV
23	*Columba livia*	Blue Rock Pigeon	Sch-V
24	*Egretta garzetta*	Little Egret	Sch-IV
25	*Ardeola grayii*	Indian pond Heron	Sch-IV
26	*Coracias bengalensis*	Indian roller	Sch-IV
27	*Dicrurus macrocerus*	Black drongo	Sch-IV
28	*Numenius arquata*	Eurasian curlew	Sch-IV
29	*Limosa limosa*	Black tailed godwit	Sch-IV
30	*Ephippiorhynchus asiaticus*	Black necked stork	Sch-IV
31	*Thraskiornis melanocephalus*	Black headed ibis	Sch-IV
32	*Mycteria leucocephala*	Painted stork	Sch-IV
33	*Pelicanus crispus*	Dalmation pelican	Sch-IV
34	*Phoenicopterus roseus*	Greater Flamingo	Sch-IV
35	*Pavo cristatus*	Peacock	Sch-I
Reptiles			
1	*Ptyas mucosus*	Dhaman	Sch-II
2	*Sitana porticeriana*	Fan throated lizard	Sch-IV
3	*Acanthodactylus cantoris*	Indian fringe toed lizard	Sch-IV
4	Echis carinatus	Saw scaled viper	Sch-II
5	*Daboia russelii*	Russells viper	Sch-II

Sr. No	Scientific Name	Common Name	Conservation Status as per WPA (1972)
6	*Varanus spp.*	Monitor lizard	Sch-II
7	*Ptyas mucosus*	Indian rat snake	Sch-II
Mammals			
1	*Herpestis edwardsii*	Common mongoose	Sch-II
2	*Lepus nigricollis*	Indian Hare	Sch-IV
3	*Canis aureus*	Jackal	Sch-II
4	*Funambulus palmarus*	Three striped palm squirrel	Sch-IV
5	*Boselaphus tragocamelus*	Nilgai	Sch-III
6	*Sus scrofa*	Wild Boar	Sch-III
Amphibians			
1	*Euphlyctis cyanophlyctis*	Indian Skipping Frog	Sch-IV
2	*Hoplobatrachus tigerinus*	Indian bullfrog	Sch-IV

3.9.8 Species Richness and Diversity indices

Species diversity is calculated for the communities using the formula

Shannon-Wiener Index is defined and given by the following function:

$H=\sum [(pi)\times ln(pi)]$

Where –

- *pi*= proportion of total sample represented by species *i*
- Divide no. of individuals of species i by total number of samples.
- *S* = number of species, = species richness
- *Hmax=ln(S)*

  = Maximum diversity possible

E= Evenness = *H Hmax*

Name of the Species	Number of Individuals	*pi*	*ln(pi)*	*pi×ln(pi*
Prosopis juliflora	60	0.60	-0.51	0.31
Acacia senegal	10	0.10	-2.30	-0.23
Salvadora persica	25	0.25	-1.39	-0.35
Commiphora wightii	1	0.01	- 4.61	-0.05
Prosopis cineraria	4	0.04	-3.22	-0.13
S=5	100			Sum=-1.07

S = 5 Sum = 100 Sum = -1.07

H=1.07*Hmax=ln(S)* =*ln* (5) =1.61*E*=1.071.61=0.66*Shannon diversity index* (*H*) =1.07 *Evenness*=0.66

3.9.8.1 Phytoplankton

List of Phytoplankton observed in sampling locations is presented in **Table-3.9.6.** Samples were collected from Nagavanti river and Kotri creek. 11 species were collected at the sampling locations.

TABLE-3.9.6
LIST OF PHYTOPLANKTON OBSERVED FROM THE STUDY AREA

Sr.No	Phytoplankton Species
1	*Biddulphia regia*
2	*Chaetoceros affinis*
3	*Leptoculindrus danicus*
4	*Nitzschia sigma*
5	*Rhizosolenia crassispina*
6	*Ditylum brighwellii*
7	*Synedra utrimohili*
8	*Thalassiosira pseudonona*
9	*Protopteridinium mite*
10	*Triceratium reticulatum*
11	*Planktoniella corinatum*

3.9.8.2 Zooplankton

A total of 18 zooplankton taxa collected from Nagavanti river and Kotri creek. List of zooplankton species recorded are presented in **Table-3.9.7**.

TABLE-3.9.7
LIST OF ZOOPLANKTON OBSERVED FROM THE STUDY AREA

Sr.No	Zooplankton Species
1	*Oithona rigida*
2	*Centropages furcatus*
3	*Temora discaudata*
4	*Euphasid nauplius*
5	*Lucifer larvae*
6	*Paracalamus parvus*
7	*Gastropod veliger*
8	*Sabellarid cornutus*
9	*Sagitta bmbayensis*
10	*Spioniid larvae*
11	*Acrocalanus longicornis*
12	*Acarita erythraea*
13	*Eucalanus nauplius*
14	*Euchaeta concinna*
15	*Rhincalanus cornutus*
16	*Penaeid nauplius*
17	*Balanus cypris*
18	*Brachyuran larvae*

3.9.8.3 Marine Fishes

The list of marine fishes in the study area is given in **Table-3.9.8.**

TABLE-3.9.8
LIST OF MARINE FISHES IN THE STUDY AREA

Sr.No	Scientific Name of the Marine Fishes in the Study Area	Common Name
1	*Therapon jarbaa*	Target Patch
2	*Epinephalus maculatus*	Spotted Grouper
3	*Mugil cephalus*	Mullet
4	*Harpodon nehereus*	Bombay Duck
5	*Scatophagus argus*	Seat/Vaga
6	*Tachysurus* sp	Cat fish
7	*Boleophthalmus* sp	Mudskippers
8	*Megalope cyprinoides*	Big eye
9	*Pampus argentus*	Pomfret
10	*Muraenosox* sp	Eel
11	*Trichirus* sp	Ribbon Fish

3.9.9 Conservation Plan

Conservation Plan for the Indian Peafowl which is found in the buffer zone of the Adani copper refinery project at Mundra is discussed below:

3.9.9.1 Peafowl –Conservation (Peacock)



INDIAN PEAFOWL

3.9.9.2 Description

The Indian Peafowl is the largest pheasant occurring in the subcontinent. The species was first named and described by Linnaeus in 1758 and the name *Pavo cristatus* is still in use now. The male peacock is predominantly blue with a fan-like crest of spatula-tipped wire-like feathers and is best known for the long train made up of elongated upper-tail covert feathers which bear colorful eye spots. These stiff and elongated feathers are raised into a fan and quivered in a display during courtship. The female lacks the train, has a greenish lower neck and a duller brown plumage. The Indian Peafowl is found mainly on the ground in open forest or on land under cultivation where they forage for berries, grains but will also prey on snakes, lizards and small rodents. The scientific classification of this species is given below with its distribution in India.

3.9.9.3 Identification Features of Indian Peafowl

Peafowl has a splendid glossy green long tail feathers that may be more than 60 percent of the birds total body length. These features have blue, golden green and copper coloured ocelli (eyes). The long tail feathers are used for courtship displays. The feathers are arched into magnificent fan shaped form across the back of the bird and almost touching the ground on both sides. Females do have graceful tail feathers. They have fan like crest with whitish face and throat, chestnut brown crown and hind neck, metallic green upper breast and mantle, white belly and brown back rump and tail. Their primaries feathers are dark brown.

3.9.9.4 Importance of the Species

The peafowl is prominent in the mythology and folklore of the Indian people. The Hindus consider the bird to be sacred because of its association with Lord Krishna who used to wear its feather as crown (*Mor Mokut*). It is also associated with the God *Kartikeya*, son of the Lord *Shiva* and *Parvati* and brother of Lord *Ganesha*. It is the *Vaahan"* (transport) of Lord *Kartikeya*. This long and close association with humans has proven the peafowl's adaptability to human altered landscapes. In villages where it is protected it becomes quite tame, but is very shy and secretive where hunted. In the buffer area of mine site peacock is generally protected by the local people.

3.9.9.5 Ecology and Behavior

Peafowl forages on the ground in small groups, known as musters that usually have a cock and 3 to 5 hens. After the breeding season, the flock tends to be made up only of females and young. They are found in the open early in the mornings and tend to stay in cover during the heat of the day. They are fond of dust-bathing and at dusk, groups walk in single file to a waterhole to drink. When disturbed, they usually escape by running and rarely take to flight.

Peafowl produces loud calls, especially in the breeding season. They may call at night when alarmed and neighboring birds may call in a relay like series. Nearly seven different call variants have been identified in the peacocks apart from six alarm calls that are commonly produced by both sexes. Peafowl roosts in groups during the night on tall trees but sometimes make use of rocks, buildings or pylons. Birds arrive at dusk and call frequently taking their position on the roost

trees. Due to this habit of congregating at the roost, many population studies are made at these sites.

3.9.9.6 Threats

The peafowl is under threat from various quarters that include the demand for feathers and wild meat, conflict with farmers during cropping season, increased use of chemical fertilizers and pesticides coupled with habitat degradation. An adult peacock has about 200 tail feathers, which it sheds from August onwards; fully developed new feathers appear in February. The fallen feathers are collected and sold in local markets and the birds are also reportedly killed to increase the revenue returns. Other threats include habitat loss due to encroachment for agriculture, developmental activities, poisoning for countering crop damage, egg consumption and fat usage for medicinal purpose and direct killing for meat.

3.9.9.7 Conservation and Present Status

The Indian Peafowl is listed as least concern species in the red list of the International Union for Conservation of Nature (IUCN), as assessed by the Bird Life International in the year 2012, owing to its widespread distribution, occurrence of locally abundant populations and protection from the people on religious grounds.

In India, it is given highest protection by including it in the Schedule-I of the Wildlife (Protection) Act, 1972. Although the train feathers of the Indian Peafowl are traded for various reasons, it is not included on any Appendix of the Convention on International Trade of Endangered Species perhaps on the claim that their feathers are naturally fallen ones during annual molt of the males.

3.9.9.8 Objectives of the Peacock Conservation Plan (PCP)

- Develop dense tree plantation of highly branching canopy that provide roosting habitat for the peacocks; Captive shelter belts and water holes with appropriate check dams to conserve moisture during blistering heat of summer climes when temperature will be around 40°C.

- Providing the floral habitat that is conducive for foraging species of Peafowl like insects and reptiles which Peafowl feed on; ample grass land habitat should be promoted as "Peafowl "mostly forages on insects, apart from fruits.

- Reduce the habitat loss, promoting captive shelter belt of green belt especially will provide ample roosting space for the birds and shade, apart from forage;

- Also restricting the use of pesticides and fertilizers in the buffer zone will be helpful for the conservation of peafowl; promoting organic means of agricultural practices in the buffer zone will be beneficial for the "Peafowl" which will be much safe devoid of chemical fertilizers and pesticides.

- Sufficient water troughs and large saucer like pans are ideal for water conservation measures in summer months.

- Promoting awareness among Adani copper refinery plant group employees and adjoining villages, populace about the 'Peacock Conservation' in the area, will aid in improving the conservation initiatives.
- Conducting *Vanyaprani Saptah*- week celebrations to promote awareness about "Peafowl" conservation in the study area in Mundra and near Navinal.
- The glaring lights should be avoided in during the night in the vicinity of the "Peafowl"
- Appropriate "Captive Shelterbelt reduces impacts on habitat loss; especially loss of the roosting habitat and also provides foraging habit and habitat for the "Peafowl".
- To envisage to reduce the mortality of the birds and loss of eggs and chicks to direct and in-direct impacts; and
- The nesting and roosting sites should be protected from feral animals like dogs, cats which prey on the birds and eggs and the juvenile chicks as the gestation of the Indian Peafowl varies from 28 days to 30 days.
- Promotion of the organic farming is beneficial for Indian Peafowl conservation
- Indian Peafowl is protected across pan India as it is listed in Schedule-I of the Wildlife (Protection) Act, 1972.

3.9.9.9 Tentative Budget

The tentative budget for peacock conservation is given in **Table-3.9.9.**

TABLE-3.9.9
TENTATIVE BUDGET FOR PEACOCK CONSERVATION

Sr. No.	Item	Estimated Expenditure (Rs.in Lakhs)
Conservation of Soil and Water		
1	Watershed improvement & Improvement of existing water resources	5.00
Improvement of Pasture Development		
2	Pasture development	5.00
3	Control of grazing	5.00
4	Weed control	5.00
5	Creation of conservation awareness	5.00
6	Planting of trees for Indian Peafowl Roosting	5.00
7	Fire protection and mitigation and control of forest fires in Mundra creek and Navinal Area	5.00
8	Improvement of Watch Towers	5.00
Grand Total		**40.00**

Conclusion

Flora and fauna studies were conducted during the study period to assess the existing floristic and faunal components in study area. Floral species are mainly dominated by *Prosopis juliflora and Acacia Senegal.* Primary survey and literature survey reveals that there are no wildlife sanctuaries, national parks and biospheres and no migratory paths of birds and animals in 10 km radius study area. The faunal species were categorized as per conservation status of Wildlife Protection Act, 1972 reveals peacock is the only Sch-I species in the study area. However, as per International Union for Conservation of Nature IUCN, Peacock falls under Least Concern Category. Mangroves are predominantly composed of *Avicenna marina*, Species known for its high tolerance of salinity and other environmental stresses.

3.10 Demography and Socio-Economics

In this section, the prevailing socio-economic aspects of people in the study area around the proposed project boundary, which would form the basis for the making the planning efforts for the social-economic development people in the study area have been described.

3.10.1 Methodology Adopted for the Study

The methodology adopted for the study mainly includes review of published secondary data; the district Census Statistics of 2011, parameters of demography, occupational structure of the local people within the study area of 10 km radial distance from the boundary of the proposed greenfield copper refinery project at Siracha and Navinal villages of Mundra block Kutch district of Gujarat state.

3.10.2 Review of Demographic and Socio-Economic Profile-2011

The village wise demographic data for the census year 2011 is given in **Annexure-X.** The salient feature of the demographic and socio-economic details are described in the following sections.

3.10.3 Demography

All the villages in the study area are experiencing rapid growth of population, which may be due to the process of urbanization and industrialization in connection with globalization.

- **Distribution of Population**

As per 2011 census of India the study area (10 km radius) consisted to the tune of 60,525 person's inhabited, out of the total population male constitute 65.16% (39,438) and the total population of females constitute 34.84% (21,087) and the child community from 0 to 6 years constitute 11.50% (6,959) of the total

population within the 10 km radius. The distribution of population in the study area is shown in **Table-3.10.1**.

TABLE-3.10.1
DISTRIBUTION OF POPULATION

Sr. No.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1	Total no of Households	4,165	3,640	5,388	13,193
2	Total Male Population	14,838	9,158	15,442	39,438
3	Total Female Population	2,612	7,776	10,699	21,087
4	Total Population	17,450	16,934	26,141	60,525
5	Male Population from 0 to 6 Years	469	1,285	1,790	3,544
6	Female Population from 0 to 6 years	434	1,280	1,701	3,415
7	0 to 6 Years Total Population	903	2,565	3,491	6,959
8	% of 0 to 6 Years Population in Project area	5.17	63.34	13.35	11.50
9	Average Household Size in Project Area	4.19	19.02	4.85	4.59
10	% of Males to the Total Population	85.03	54.08	59.07	65.16
11	% of Females to the Total Population	14.97	45.92	40.93	34.84
12	Sex Ratio (No of Females per 1000 Males)	176.03	849.09	692.85	534.69
13	Density per Kilometer	5,816.67	4,233.50	8,713.67	6,052.50

Source: Census of India 2011

- **Average Household Size:** The study area has a family size of 4.59 persons as per Census of India 2011.

- **Population and its Density:** The density of the population reveals that, the study area has an overall density of 6,052.50 per Sqkm (Population per Square Kilometer) as per Census of India 2011.

  The males and females constitute to 51.37% and 48.63% respectively of the study area population.

- **Sex Ratio:** The configuration of male and female indicates that, the males constitute to about 65.16% and the females to 34.84% of the total population as per the Census of India 2011 records. The sex ratio i.e. the number of females 535 per every 1000 males. The project area villages of Shiracha and Navinal female population is 1,402 and male population is 3,577. The study area female population is 21,087 and male population is 39,438. The main reason for low sex ratio in the study area is due to industrial area, more male migrants have reached in this area for employment. Infant mortality among female children, single person family structure, a resultant of migration of industrial workers from other parts of the country. As it is an industrial belt, male migration from outside area is also the major factor for this in sex ratio.

3.10.4 Social Structure

In the study area, as per 2011 India Census, 9.72% of the population belongs to Schedule Castes (SC's) and 1.29% of the population belongs to Schedule Tribes (ST's). Both SC's and ST's put together constitute 11.01% of the total population in the study area. The detailed distribution of population by social structure is shown in **Table-3.10.2.**

TABLE-3.10.2
DISTRIBUTION OF POPULATION BY SOCIAL STRUCTURE

Sr. No.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1	SC Population	693	2,245	2,945	5,883
2	% of SC's to the Total Population	3.97	13.26	11.27	9.72
3	ST Population	18	342	419	779
4	% of ST's to the Total Population	0.10	2.02	1.60	1.29
5	Total SC & ST's Population	711	2,587	3,364	6,662
6	% of SC's & ST's to the Total Population	4.07	15.28	12.87	11.01
7	Total Population	17,450	16,934	26,141	60,525

Source: District Census Hand Book -2011

3.10.5 Literacy Levels

The study area experiences a literacy rate of 67.62% as per 2011 Census of India, which is +7.77% better than the total literacy rate of the Kutch district i.e. 59.85% and +4.55% better than the national average literacy 63.07%. It is a good indicator that, the study area literacy rate is more than the India's literacy rate. However, the study area literacy rate is little -0.37 (67.99%) lesser than the Gujarat state literacy rate.

The distribution of literate and literacy rate in the study area given in **Table-3.10.3**. The male literacy rate is higher than the Kutch district, Gujarat state and the national male literacy rate respectively by 14.39%, 16.29%, 16.49%. However, the female literacy rate is much lesser than the Kutch district, Gujarat state and the national female literacy rate respectively by -14.39%, -16.29%, -16.49% and the comparison details given in **Table-3.10.3.**

TABLE-3.10.3
DISTRIBUTION OF LITERATE AND LITERACY RATES

Sr. No.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1	Male Population	14,838	9,158	15,442	39,438
2	Female Population	2,612	7,776	10,699	21,087
3	Total Population	17,450	16,934	26,141	60,525
4	Male :Population 0 to 6 years	469	1,285	1,790	3,544
5	Female Population 0 to 6 years	434	1,280	1,701	3,415
6	Total Population 0 to 6 years	903	2,565	3,491	6,959
7	Male literates	12,532	6,722	10,794	30,048
8	Female Literates	1,288	4,359	5,231	10,878
9	Total literates	13,820	11,081	16,025	40,926
10	% of Male Literacy Rate	83.29	60.66	67.36	73.42
11	% of Female Literacy rate	16.71	39.34	32.64	26.58
12	Average Male Literacy to the total Population (%)	63.60	39.70	41.29	49.65
13	Average female Literacy to the total	12.18	25.74	20.01	17.97

	Population (%)				
14	Total Literacy Rate (%)	75.78	65.44	61.30	67.62

Source: District Census Hand Book –2011

3.10.6 Occupational Structure

The occupational structure of the residents of work participation (rate) in the project area has been studied with reference to main workers, marginal workers and non-workers. The main workers include 10 categories of workers defined by the Census of department consisting of:

1. Cultivators;
2. Agricultural laborers;
3. Persons engaged in live-stock;
4. Forestry;
5. Fishing;
6. Mining;
7. Quarrying: manufacturing and process;
8. Persons engaged in repairs in household industry;
9. Other than household industry such as construction, trade and commerce; and
10. Transport, communication, and other services.

The marginal workers are those workers engaged in some work for a period of less than six months during the reference year prior to the census survey. The non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beggars and vagrants, institutional inmates or all other non-workers who do not fall under the above categories.
The total work participation in the project study areas is 56.36% as against the Kutch district work participation rate 37.10% which is +19.26% higher than the district work participation rate. Gujarat State overall work participation rate is 40.98%, which is +15.38% higher than the state work participation rate. The overall India's work participation rate is 39.79%, which is +16.57% higher than the countries work participation rate. With this statistics, it is evident that there is atmosphere for the employment promotion in Mundra and surrounding areas. In addition, with the establishment of Adani greenfield copper refinery project at Shiracha and Navinal villages of Mundra block, there will be a boost to generate more employment to needy people.

The non-workers constitute 43.64% of the total population in study area. The distribution of workers by occupation indicates that the non-workers are the marginal population than the working population.

The Kutch district non-workers rate is 62.90%, Gujarat state level workers participation rate 59.02% and the countries workers participation rate 60.21%. However, the study areas non-workers rate is lesser than those are the dist, state and national as -19.26%, -15.38% and -16.57% respectively. It is evident that the study areas non-workers are much lesser than the District, State and National non-workers rate to the total population. It is a positive indicator that, the non-workers are gradually coming down in the study area and the new copper refinery positively contributes to increase the workers participation rate.

The main workers to the total workers of the study area are 90.57%, Kutch district main workers to the total workers are 88.50%, Gujarat state's main workers to the total workers are 82.23% and countries main workers to the total workers are 75.24%. However, the study areas percentage of main workers to the total workers are higher than those are the dist, state and national main workers rate by +2.07%, +8.34% and +15.33% respectively.

The percentage of marginal workers of the study area constitute to 9.43% and the Kutch district percentage of marginal workers are 11.50%, Gujarat state's percentage of marginal workers are 17.77% and the National percentage of marginal workers are 24.76%. However, the study areas percentage of marginal workers is better than that of District, State and National by -2.07%, -8.34% and -15.33% respectively. The occupational structure of the study area shown in **Table-3.10.4**.

TABLE-3.10.4
OCCUPATIONAL STRUCTURE

Sr. No.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1	Total Population	17,450	16,934	26,141	60,525
2	Total Workers	14,094	6,790	13,228	34,112
3	Work Participation Rate (%)	80.77	40.10	50.60	56.36
4	Total Main Workers	13,173	6,228	11,494	30,895
5	% of Main Workers to Total Workers	93.47	91.72	86.89	90.57
6	Marginal Workers	921	562	1734	3,217
7	% of Marginal Workers to Total Workers	6.53	8.28	13.11	9.43
8	Non-Workers	3,356	10,144	12,913	26,413
9	% of Non-Workers to Total Population	19.23	59.90	49.40	43.64

Source: District Census Hand Book-2011

3.10.6.1 Occupational Issues

Fishing operations in Mundra: Wagher's, belonging to Muslim community are the fishing communities in coast of Mundra, who are associated with deep sea fishing activity. The Kohlis, Mundra bander, Pagadiya communities are also associated with fishing in Mundra taluka.

The following are the exclusive study findings by Gujarat Ecology Society. Name of the Study: Ecological Profile for Coastal Talukas of Gulf of Kutch, sponsored by Gujarat Ecological commission Government of Gujarat. September 2014.

The fishing families, total fishermen population and active fishermen details in Mundra taluka are given in **Table-3.10.5**.

TABLE-3.10.5
FISHING FAMILIES, TOTAL FISHERMEN POPULATION AND ACTIVE FISHERMEN

Taluka	Families			Total Population			Active Population		
	1997	2003	2007	1997	2003	2007	1997	2003	2007
Mundra	501	705	930	3079	3979	4725	1423	2411	2392

Source: Gujarat Ecology Society (Ecological Profile for Coastal Talukas of Gulf of Kutch, sponsored by Gujarat Ecological commission September 2014)

The study also suggested the conservation plan to safeguard the fishermen community and coastal development as well and presented in **Table-3.10.6** Hence, the conservation plan may be taken forward in the study area and promote the fishermen community.

TABLE-3.10.6
ISSUES AND CONSERVATION PLAN

Issues	Conservation Plan
1. Ground Water Salinity in some villages. 2. Decline in open fallow land (by 100 ha) and increase in grazing pressure(Grazing land per livestock reduced from 0.12 ha (1997) to 0.08 ha (2007)) 3. Increase in salt pans (doubled since 1997) 4. Decline in mangrove area 5. No significant growth in fishery 6. Increased port activity (11 Million MT in 2005 to 100 Million MT in 2014) 7. Alteration in coastal morphology	1. Conservation and management of wetlands/water bodies for effective ground water recharge 2. Promotion of Stall feeding 3. Developing skills of the fishermen in sector of office maintenance through training 4. Coastal development be expanded and reviewed periodically (every 3 years) for changes taking place in the coastal ecology and morphology 5. Disaster management cell should be given priority

3.11 Traffic Density Survey

Traffic studies have been conducted to know the prevailing traffic volumes on the roads in the study area. It is essential to consider these details for assessing the anticipated future traffic volumes as a part of overall impact assessment for the project.

The variations of traffic densities depend upon the working days and time as there would be variations in day and night times. In order to assess the prevailing traffic volumes on the roads, the survey was conducted during normal working days of the week by avoiding local holidays or abnormal situations to reflect the true picture of the traffic densities.

3.11.1 Methodology

3.11.1.1 Vehicular Count

The vehicles plying in both the directions were counted continuously for 24 hours at entrance of APSEZ. The vehicles were counted every hour and recorded under respective category. The maximum traffic count in an hour is termed as peak hour traffic. The vehicles were categorized under various heads like bikes, four-wheelers, buses/trucks and heavy vehicles.

3.11.1.2 Categorization of Traffic

The engine driven vehicles were categorized into various heads viz. as two wheelers (scooters, motor cycles etc.), three wheelers (auto rickshaws, 3-wheel tempo etc.), Light motor vehicles (cars, jeeps), Buses/trucks; Heavy Motor Vehicles such as tractors, dumpers etc.

3.11.2 Results and Discussion

The summary of daily traffic count for the location was monitored during the study period is summarized in **Table-3.11.1.**

The present level of traffic has been converted to Passenger Car Units (PCU) at the locations as per the conversion factors stipulated by Indian Road Congress (IRC). The Passenger Car Unit (PCU) recorded at the selected traffic location is 1026 PCU. It was observed that the four-wheelers and trucks/buses form the major volume of the traffic. The total traffic PCU of this road is minimal.

TABLE-3.11.1
TRAFFIC DENSITY (VEHICLES/DAY)

Code	Location	2/3 wheelers	LMV	Bus/ Trucks	HMV	Total Vehicles	Total PCUs
T1	West port to SEZ Mundra	12	80	139	16	247	551
	SEZ to Westport	10	71	124	9	214	475

Note: PCU rating: (2/3 wheelers: 0.5, Car/Jeep: 1.0, Tractor: 3.0, Buses: 3.0, Trucks/HMV: 3.0)

Chapter-4

Anticipated Environmental Impacts & Mitigation Measures

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

This chapter presents identification and appraisal of various impacts from the proposed project. The environmental impacts can be categorized as either primary or secondary. Primary impacts are those, which are attributed directly to the project and secondary impacts are those, which are indirectly induced and typically include the associated changed pattern of social and economic activities of surrounding community.

The proposed project would create impact on the environment in two distinct phases:

- During the construction phase which may be regarded as temporary or short term; and
- During the operation phase which would have long term effects.

The construction and operation phases of the proposed project comprises of various activities, each of which will have some impact on one or more environmental parameters. Various impacts during the functional phase of the project have been studied to estimate the impact on the environment and are discussed briefly in the subsequent sections.

4.1 Impacts during Construction Phase

This includes the activities related to leveling of site, construction of additional units, other related structures and installation of equipment.

4.1.1 Impact on Land Use

The area earmarked for proposed copper refinery project is about 256.58 ha (634 acres). Out of which, 158.19 ha (381 acres) belongs to the APSEZ (Adani Group Company) and is already designated for industrial purpose as per the local land use plan. MoU for this land has been signed between AEL and APSEZ for the development of project. The remaining 102.39 ha (253 acres) is a terrestrial forest land which will be converted for industrial use. The project site is located outside the CRZ area, there is no reclaimed land, mudflats, mangroves and sand dunes in the project site.

There is no significant vegetation in the project site. However, some shrubs/ weeds (mainly prosopis juliflora) present at the site shall be cleared. Permanent change in land cover and topography will occur due to construction of the proposed industry. There will not be any diversion of nallahs. However, existing nallahs, which passes through the project site will be suitably trained. There will also be positive development with implementation of 33% of greenbelt and green cover.

4.1.2 Impact on Soil

During construction phase, there shall be import of construction material like bricks, cement, murrum, sand etc. Use of these materials will change the

characteristics of the soil in the plant construction area. Further, usage of diesel oil and lubricating oils for vehicles and equipments, municipal wastes due to construction workers, domestic sewage and sullage from construction labour canteen and office at project site etc., may have certain impact on soil, if not handled properly.

Various mitigation measures proposed are:

- Top soil at construction site shall be stored separately, conserved and shall be used for greenbelt/ green cover development at later stage;
- The construction material & diesel/oil to be used for various construction activities shall be stored in designated storage yards to reduce the spills into unwarranted areas. Segregation, collection, storage and disposal of waste material generated during construction phase to minimise its impact on soil quality; and
- Use an identified area for undertaking any repair and maintenance of vehicles/equipment.

4.1.3 Impact on Air Quality

During construction phase, particulate matter will be the main pollutant, which would be generated from the site development activities and vehicular movement on the road. Further, concentration of NO_x and CO may also slightly increase due to increased vehicular traffic movement. However, the increase in ambient concentrations of air quality will be negligible. The increment in concentration can be expected to be about 2-3% and this will be local in nature and will be contained to construction site only. As most of the construction equipment will be mobile, the emissions are likely to be fugitive. The dust generated will also be fugitive in nature, which can be controlled by suitable mitigation measures like sprinkling of water and development of green cover.

The impacts will be localized in nature and the areas outside the proposed project site premises are not likely to have any major adverse impact with respect to ambient air quality.

Following mitigation measures are proposed to reduce the impacts:

- Enforce deployment of good condition vehicles with speed restrictions inside the project boundary;
- Deploy mobile water tankers to moist the vehicle movement paths to suppress dust; and
- Enforce no use of firewood for cooking and also no open air burning of any kind of wastes.

4.1.4 Impact on Water Resources and Quality

APSEZ Ltd has considered the project requirement and assured for supplying 2,000 m^3/day of water required during the construction phase. No ground water will be abstracted for construction purpose.

The wastewater generation during the construction period will be from the sanitary units provided for the construction workers. This wastewater will be treated in septic tanks and discharged into soak pits. Wastewater from vehicle maintenance & labour working areas may have certain impacts.

Following mitigation measures are proposed to reduce such impacts:

- A dedicated area for repair and maintenance of construction equipment with adequate spill prevention systems;
- Proper sanitation facility for construction workers during work at site;
- Proper storm water drainage system to the construction site; and
- The existing natural will not be disturbed during construction activities and the proper required maintaince will be adopted.

The overall impact on water environment during construction phase due to proposed project is likely to be short term, local and insignificant.

4.1.5 Impact on Noise Levels

The major sources of noise during the construction phase are vehicular traffic, construction equipment like dozers, scrapers, concrete mixers, cranes, pumps, compressors, pneumatic tools, saws and vibrators etc. The operation of these equipments will generate noise ranging between 85-95dB(A) near the source. These noise levels will be contained within the project boundary and will be transient in nature.

Following mitigation measures are proposed to reduce the noise impacts:

- All noise generating equipments shall be provided with noise attenuation arrangements like silencers, mufflers, insulators etc., to reduce the noise levels below 85 dB(A) as far as technically feasible;
- All machineries and moving equipments will be periodically tested for their physical stability to ensure minimum noise during operation;
- Awareness will be imparted to labours employed in the project and shall be encouraged to commute through mass/public transport to reduce traffic and minimum use of horns while travel; and
- All the construction labour will be made to wear the personal protection equipment such as helmets, ear muffs etc.

4.1.6 Impact on Ecology

Ecological studies reveal that there is no presence of significant flora and fauna in the project site. Though forest land is involved in the proposed project, entire forest is dominated by *Prosopis juliflora,* bushes and shrubs. This clearance of

vegetation will create loss of habitat for Nilgai (commonly found fauna in the study area) within the project site and would migrate to nearby areas.

Further, the constructional activities lead to inward migration of labour force in the area and thus there would be pressure on trees in the area due to increase in fuel demand. Care shall be taken that the labours do not cut small trees or branches as fuel wood, for their requirement in cooking and other purposes.

4.1.7 Demography and Socio-Economics

As per the 2011 census data, non-workers constitute about 43.64% of the total population in 10 km radius study area. Some of them will be available for employment in the proposed project during construction activities. As the labours are generally un-skilled, the locals would get opportunities for employment during construction activities. The peak labour force required during the construction period is estimated to be about 2000 - 3000 persons per day and preference will be given to locals based on skill set & eglibility requirement as per the job and the vacancies available.

In addition to the opportunity of getting employment as construction labours, the local population would also have employment opportunities in related service activities like petty commercial establishments, small contracts/sub-contracts and supply of construction materials for buildings and ancillary infrastructures etc. Consequently, this will contribute to economic up-liftment of the area.

There will be no damage to fishing activities and fisherman due to the proposed project. The roads used by fisherman will not be disturbed due to the proposed project.

4.2 Impacts during Operational Phase

For the purpose of impact assessment during the operational phase, the following components have been separately considered:

- Soil quality;
- Air quality;
- Traffic density;
- Water resources and quality;
- Noise levels;
- Terrestrial and aquatic ecology;
- Demography and socio-economics; and
- Infrastructural facilities.

4.2.1 Impact on Soil Quality

The main sources of pollution that are likely to cause impact on soil quality are:

- Particulate matter emission from the stacks provided to the process equipment;
- Fugitive emissions from handling of material and vehicular movement during transportation; and

- Leaks and spills from the plant including process effluents, used and waste oils, contaminated rainwater runoff.

Following mitigation measures are proposed to reduce the impact on soil during operation phase:

- All stack emission sources will be provided with appropriate high efficiency air pollution control equipment like bag filter, scrubber etc.;
- Dust suppression arrangement at raw material storage yard;
- Closed container collection, storage and transportation of all hazardous wastes within the plant and outside;
- Regular road sweeping for recovery of dust from the spilled areas within the plant boundary; and
- The top soil will be suitably collected, stacked separetly and used for greenbelt/green cover during subsequent stages.

With the proposed mitigation measures, the impact on soil quality outside the project boundary will be mitigated.

4.2.2 Impact on Air Quality

Sulphur dioxide (SO_2) and particulate matter (PM) emissions are the main pollutants in the copper refinery plant and there will be no major source of NOx emissions. The incremental ground level concentrations due to proposed project have been predicted by dispersion modeling is given in **Table-4.4**

Incremental ground level concentration (GLC) for the copper project along with cement grinding plant proposed by other company within 10 km radius has also been predicted is given in **Table-4.5**. By the time of completion of this EIA, there was no other industry proposal found with projected emission load within 10 km area of proposed copper project.

➢ ***Details of Mathematical Modelling***

For prediction of maximum Ground Level Concentrations (GLC's), the air dispersion modeling software (AERMOD version 7.1.0) was used. AERMOD is steady state advanced Gaussian plume model that simulates air quality and deposition fields upto 50 km radius. AERMOD is approved by USEPA and is widely used software. It is an advanced version of Industrial Source Complex (ISCST3) model, utilizes similar input and output structure to ISCST3 sharing many of the same features, as well as offering additional features. The model is applicable to rural and urban areas, flat and complex terrain, surface and elevated releases and multiple sources including point, area, flare, line and volume sources. Dispersion modeling using AERMOD requires hourly meteorological data. Site specific data recorded at site is used for executing modeling studies. The site specific meteorological data is processed using AERMET processor.

➢ ***Model Set-up***

The model set-up details are presented in **Table-4.1** below:

TABLE-4.1
MODEL SET-UP

Sr. No.	Parameter	Details
1	Model Name	AERMOD (Version 7.1.0)
2	Model Type	Steady state Gaussian Plume Air Dispersion model
3	Topography	Rural, Flat
4	Averaging Time	24 hours
5	Source Type	Point Source
6	Boundary Limits	10 km X 10 km
7	Co-ordinate System	Uniform Polar Grid
8	Receptor Height	0
9	Anemometer	10 m
10	Surface meteorological data	Site Specific data processed by AERMET
11	Upper air Data	Upper air Estimator using AERMET processor

- **Atmospheric Inversion Level and Mixing Height Study**

The atmospheric inversion studies have been carried out at the project site for estimating the site specific mixing height based on variable weather conditions. Same has been used in modeling. Detailed report of upper air study is enclosed as **Annexure-XI.**

- ***Model Input Data***

The details of stack emissions of proposed Adani copper refinery project and proposed project of other company are given in **Table-4.2** and **Table-4.3.**

TABLE-4.2
DETAILS OF STACK EMISSIONS FOR PROPOSED COPPER REFINERY PROJECT

Sr. No.	Stacks Attached to	Height	Dia	Temp	Velocity	Volume	SO_2	PM	NOx	Emission Rates (g/s)		
		m	m	° C	m/s	Nm^3/hr	ppm	mg/Nm^3	ppm	SO_2	PM	NOx
	Unit –I											
	Flue Emission Through Stack attached to Boiler/Furnace/Heater											
1	Waste Heat Recovery Super heater - I	70	1.0	150	25	70,000	150	50	50	7.6	1.0	1.8
2	Sulphuric Acid Pre Heater-I (Only for startup)**	30	1.2	250	25	60,000	150	50	50	9.8	1.3	2.4
3	Sulphuric Acid Pre Heater-II (Only for startup)**	30	1.2	250	25	60,000	150	50	50	9.8	1.3	2.4
4	DG Set – I (4 MVA Standby)**	30	Only standby facility for emergency									
5	DG Set – II (4 MVA Standby)**	30	Only standby facility for emergency									
6	Boiler – I (operational only when steam is not available from smelter)**	70	1.0	150	25	70,000	150	50	50	7.6	1.0	1.8
7	Shaft Furnace of CCR Plant-I*	36	1.0	200	18	37,000	25	50	50	0.7	0.5	1.0
	Process Emission through various Stacks/Vent of Reactors, Process, Vessel											
8	Anode Casting – I**	20	0.5	100	18	21,000	-	50	15	-	0.3	0.16
9	Anode Casting – II**	20	0.5	100	18	21,000	-	50	15	-	0.3	0.16
10	Main Stack Secondary Gas Scrubber- I & II (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)	100	2.0	60	22	2,50,000	150	50	-	27.3	3.5	-
			1.6	60	22	1,50,000			-	16.4	2.1	-
11	Electric Furnace and Secondary gases from Smelting – I (Bi Flue)	70	1.6	150	22	1,50,000	150	50	-	16.4	2.1	-
			2.0	150	22	2,25,000			-	24.5	3.2	-
12	Main Stack Sulphuric Acid Plant-I & II (Bi flue)	100	1.6	75	22	1,50,760	1 kg/t of 100 % H_2SO_4	-	-	26	-	-
			1.6	75	22	1,50,760			-	26	-	-
13	Cathode Stripping M C – I	30	0.5	50	2.2	1500	-	50	-	-	0.02	-
14	Cathode Stripping M C – II	30	0.5	50	2.2	1500	-	50	-	-	0.02	-
15	Anode Scrap Washing MC– I	30	0.5	40	2.2	1500	-	50	-	-	0.02	-

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Sr. No.	Stacks Attached to	Height	Dia	Temp	Velocity	Volume	SO_2	PM	NOx	Emission Rates (g/s)		
		m	m	°C	m/s	Nm^3/hr	ppm	mg/Nm^3	ppm	SO_2	PM	NOx
16	Electro winning Stack – I	45	0.5	40	6.5	4500	100	-	-	0.3	-	-
17	Slag Granulation – I	30	1.0	100	25	80,000	25	50	-	1.4	1.1	-
18	Steam Dryer for Copper concentrate – I	60	1.0	120	25	100,000	25	50	-	1.8	1.4	-
19	Smelting Furnace Area (Emergency Vent-I only during process tripping)**	45	1.0	300	25	86,000	150	50	-	9.4	1.2	-
20	PS Convertor Area (Emergency Vent – I (only during process tripping)**	45	1.0	300	25	86,000	150	50	-	9.4	1.2	-
21	Dust Extraction – I (Rock Phosphate Handling Area)	30	0.5	40	21	15,000	-	50	-	-	0.2	-
22	Precious Metal Recovery Plant – I	45	0.5	60	7.5	5,000	100	50	15	0.4	0.07	-
	Unit-II											
	Flue Emission Through Stack attached to Boiler/Furnace/Heater											
23	Waste Heat Recovery Super heater – II	70	1.0	150	25	70,000	150	50	50	7.6	1.0	1.8
24	Sulphuric Acid Pre Heater-III (Only for plant startup)**	30	1.2	250	25	60,000	150	50	50	9.8	1.3	2.4
25	Sulphuric Acid Pre Heater-IV (Only for plant startup)**	30	1.2	250	25	60,000	150	50	50	9.8	1.3	2.4
26	DG Set - III (4 MVA Standby)**	30	Standby arrangement only for emergency									
27	DG Set – IV (4 MVA Standby)**	30	Standby arrangement only for emergency									
28	Boiler – II**	70	1.0	150	25	70,000	150	50	50	7.6	1.0	1.8
29	Shaft Furnace of CCR Plant-II	36	1.0	200	18	37,000	25	50	50	0.7	0.5	1.0
	Process Emission through various Stacks/Vent of Reactors, Process, Vessel											
30	Anode Casting – III**	20	0.5	100	18	21,000	-	50	15	-	0.3	0.16
31	Anode Casting – IV**	20	0.5	100	18	21,000	-	50	15	-	0.3	0.16
32	Main Stack Secondary Gas Scrubber- III & IV (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)	100	2.0	60	22	2,50,000	150	150	-	27.3	3.5	-
			1.6	60	22	1,50,000			-	16.4	2.1	-
33	Electric Furnace and Secondary gases from Smelting – II (Bi Flue)	70	1.6	150	22	1,50,000	150	150	-	16.4	2.1	-
			2.0	150	22	2,25,000			-	24.5	3.2	-
34	Main Stack Sulphuric Acid Plant-III & IV	100	1.6	75	22	1,50,760	1 kg/t of	-	-	26		

Sr. No.	Stacks Attached to	Height	Dia	Temp	Velocity	Volume	SO_2	PM	NOx	Emission Rates (g/s)		
		m	m	° C	m/s	Nm^3/hr	ppm	mg/Nm^3	ppm	SO_2	PM	NOx
	(Bi-flue)		1.6	75	22	1,50,760	100 % H_2SO_4		-	26		
35	Cathode Stripping M C – III	30	0.5	50	2.2	1500	-	50	-	-	0.02	-
36	Cathode Stripping M C – IV	30	0.5	50	2.2	1500	-	50	-	-	0.02	-
37	Anode Scrap Washing MC-II	30	0.5	40	2.2	1500	-	50	-	-	0.02	-
38	Electro winning Stack – II	45	0.5	40	6.5	4500	100	-	-	0.3	-	-
39	Slag Granulation – II	30	1.0	100	25	80,000	25	50	-	1.4	1.1	-
40	Steam Dryer for Copper concentrate – II	60	1.0	120	25	100,000	25	50	-	1.8	1.4	-
41	Smelting Furnace Area (Emergency Vent-II -only during process tripping)**	45	1.0	300	25	86,000	150	50	-	9.4	1.2	-
42	PS Convertor Area (Emergency Vent – II- only during process tripping)**	45	1.0	300	25	86,000	150	50	-	9.4	1.2	-
43	Dust Extraction – II (Rock Phosphate Handling Area)	30	0.5	40	21	15,000	-	50	-	-	0.2	-
44	Precious Metal Recovery Plant – II	45	0.5	60	7.5	5,000	100	50	-	0.4	0.07	-
	Phosphoric Acid Plant						**HF mg/m^3**	**PM mg/Nm^3**	-	**HF**	**PM**	**-**
45	Phosphoric Acid Plant – I	90	1.2	50	25	1,00,000	20	50	-	0.6	1.4	-
46	Phosphoric Acid Plant – II	90	1.2	50	25	1,00,000	20	50	-	0.6	1.4	-

***denotes stacks not considered for modeling*

TABLE-4.3
DETAILS OF STACKS OF PROPOSED PROJECTS BY OTHER COMPANIES IN STUDY AREA

Sr. No.	Stack of Cement Grinding Unit by M/s. ACL	Cement Mill-1	Cement Mill-2
1	Capacity	1 Million Ton	1 Million Ton
2	Height of Stack	30	30
3	Temperature of flue gas (K)	353	353
4	Internal Dia of Stack (m)	1	1
5	Velocity of Flue gas (M/sec)	15	15
6	PM Emission(g/s)	0.65	0.65
7	Co-ordinates	22^0 49' 30" N 69^0 32'35" E	22^0 49' 30" N 69^0 32'40" E

The simulations have been carried out to evaluate PM, SO_2 and even for NO_2 likely to be contributed by the proposed project. For the short-term simulations, the concentrations were estimated to obtain an optimum description of variations in concentrations over the site in 10 km radius covering 16 directions. The predicted results for PM_{10}, $PM_{2.5}$, SO_2, NO_2 are presented in **Table-4.4 & Table-4.5** and isopleths showing the incremental concentrations are shown in **Figure-4.1** to **Figure-4.6** respectively.

TABLE-4.4
PREDICTED SHORT-TERM MODELLING RESULTS (24 HOURLY) FOR COPPER PROJECT

Pollutants	Maximum Incremental Levels (µg/m³)	Distance (km)	Direction
Particulate Matter (PM_{10})	1.27	2.2	NE
Particulate Matter ($PM_{2.5}$)	0.52	2.2	NE
Sulphur dioxide	10.37	2.2	NE
Nitrogen dioxide	0.23	2.2	NE
Hydrogen floride	0.06	2.2	NE

TABLE-4.5
PREDICTED SHORT-TERM MODELLING RESULTS (24 HOURLY) FOR COPPER AND CEMENT GRINDING PROJECT

Pollutants	Maximum Incremental Levels (µg/m³)	Distance (km)	Direction
Particulate Matter (PM_{10})	1.32	2.2	NE
Particulate Matter ($PM_{2.5}$)	0.54	2.2	NE
Sulphur dioxide	10.37	2.2	NE
Nitrogen dioxide	0.23	2.2	NE
Hydrogen floride	0.06	2.2	NE

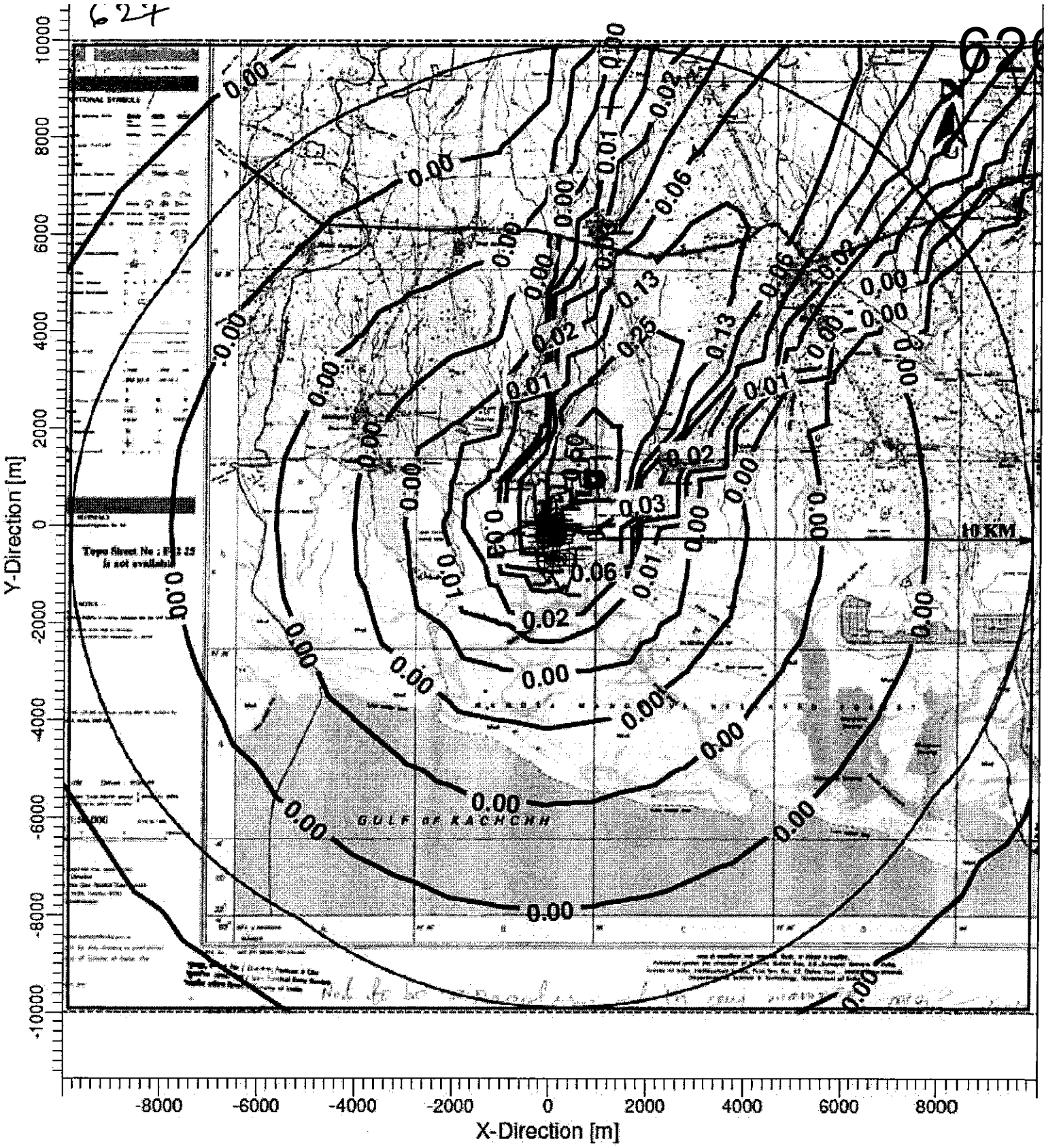
- ***Resultant Concentrations after Implementation of Project***

The resultant concentrations after the implementation of the proposed project are given in **Table-4.6**.

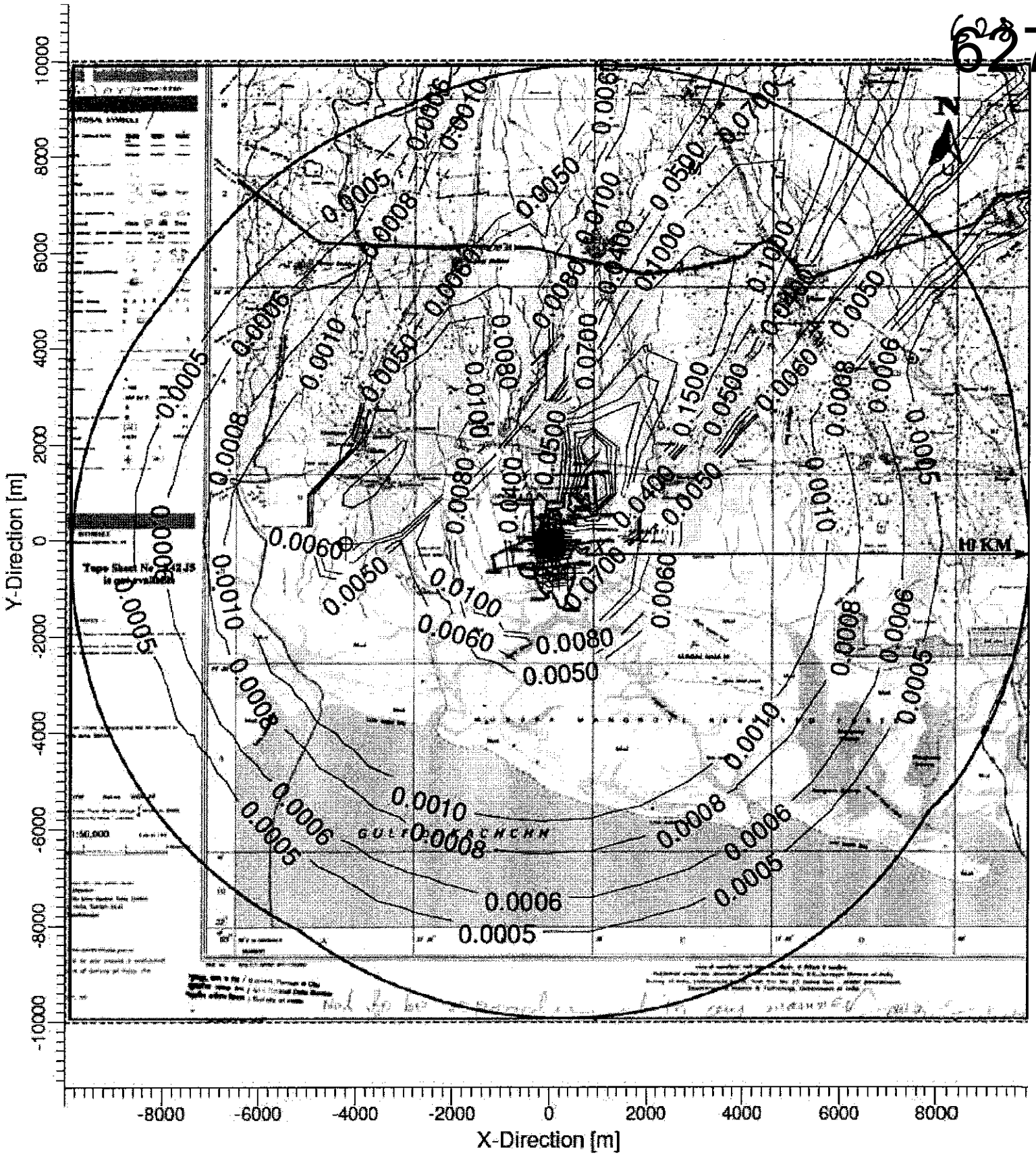
TABLE-4.6
RESULTANT CUMULATIVE GROUND LEVEL CONCENTRATIONS (24 HOURLY)

Pollutant	Concentrations (µg/m³)			
	Baseline	Incremental Concentration due to Copper and Cement Grinding	Resultant Cumulative Concentration	NAAQS Limits
Coper Project + Cement Grinding Unit				
PM_{10}	84.2	1.32	85.52	100
$PM_{2.5}$	43.9	0.54	44.44	60
SO_2	42.6	10.37	52.97	80
NO_2	32.8	0.23	33.03	80

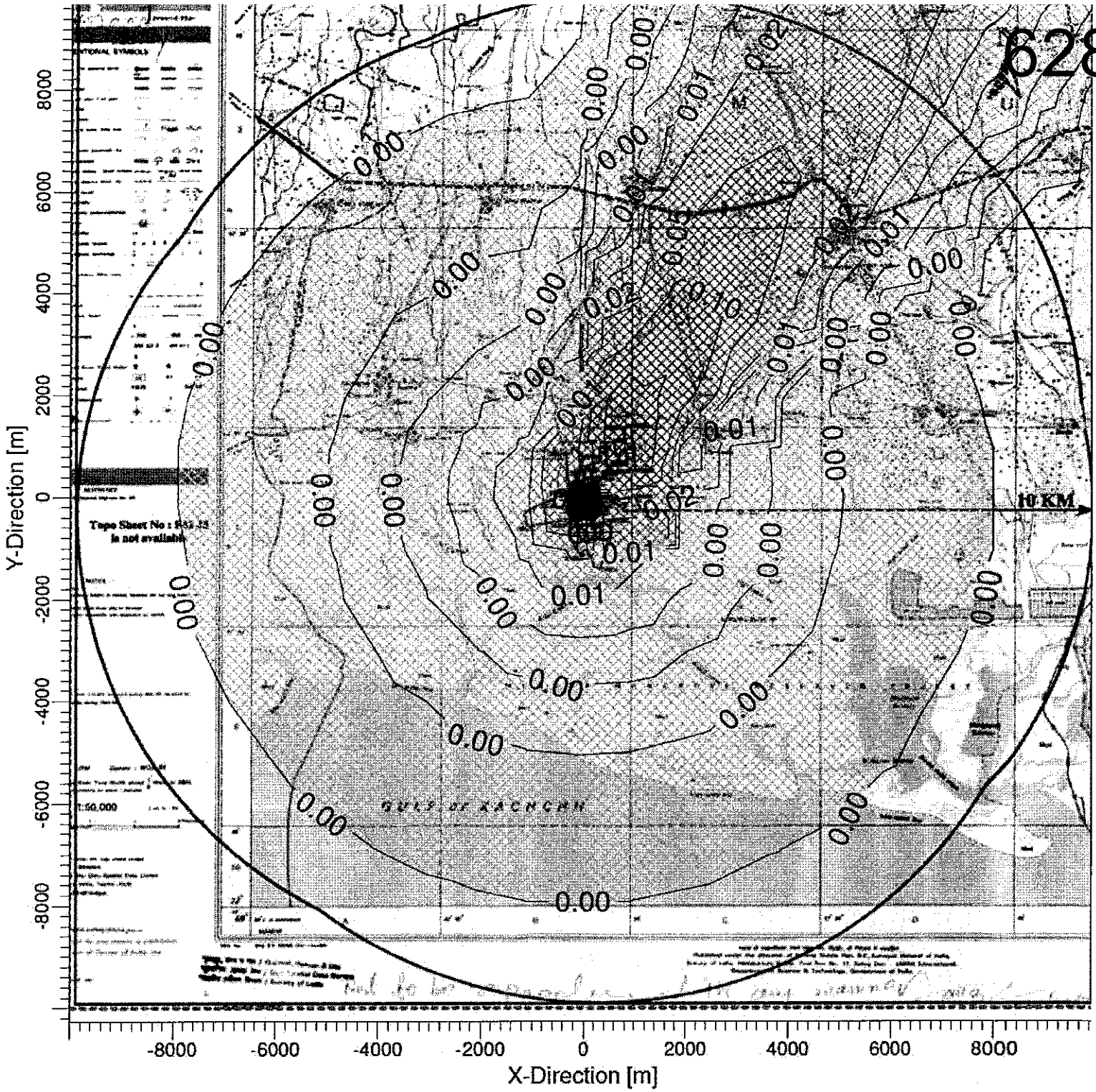
The incremental concentrations when superimposed over the existing baseline concentrations, the resultant concentrations are observed to be within the permissible levels for residential/rural conditions.



COMMENTS:	SOURCES: 34	COMPANY NAME: Vimta Labs Limited
	RECEPTORS: 441	MODELER: Dr.Chandra Shekar Bh.Durga Bhavani
	OUTPUT TYPE: Concentration	SCALE: 1:129,297 0 5 km



COMMENTS:	SOURCES:	COMPANY NAME:
ILCs - PM10	36	Vimta Labs Limited
	RECEPTORS:	MODELER:
	882	M.Janardhan Bh.Durga Bhavani
	OUTPUT TYPE:	SCALE: 1:129,297
	Concentration	0 5 km

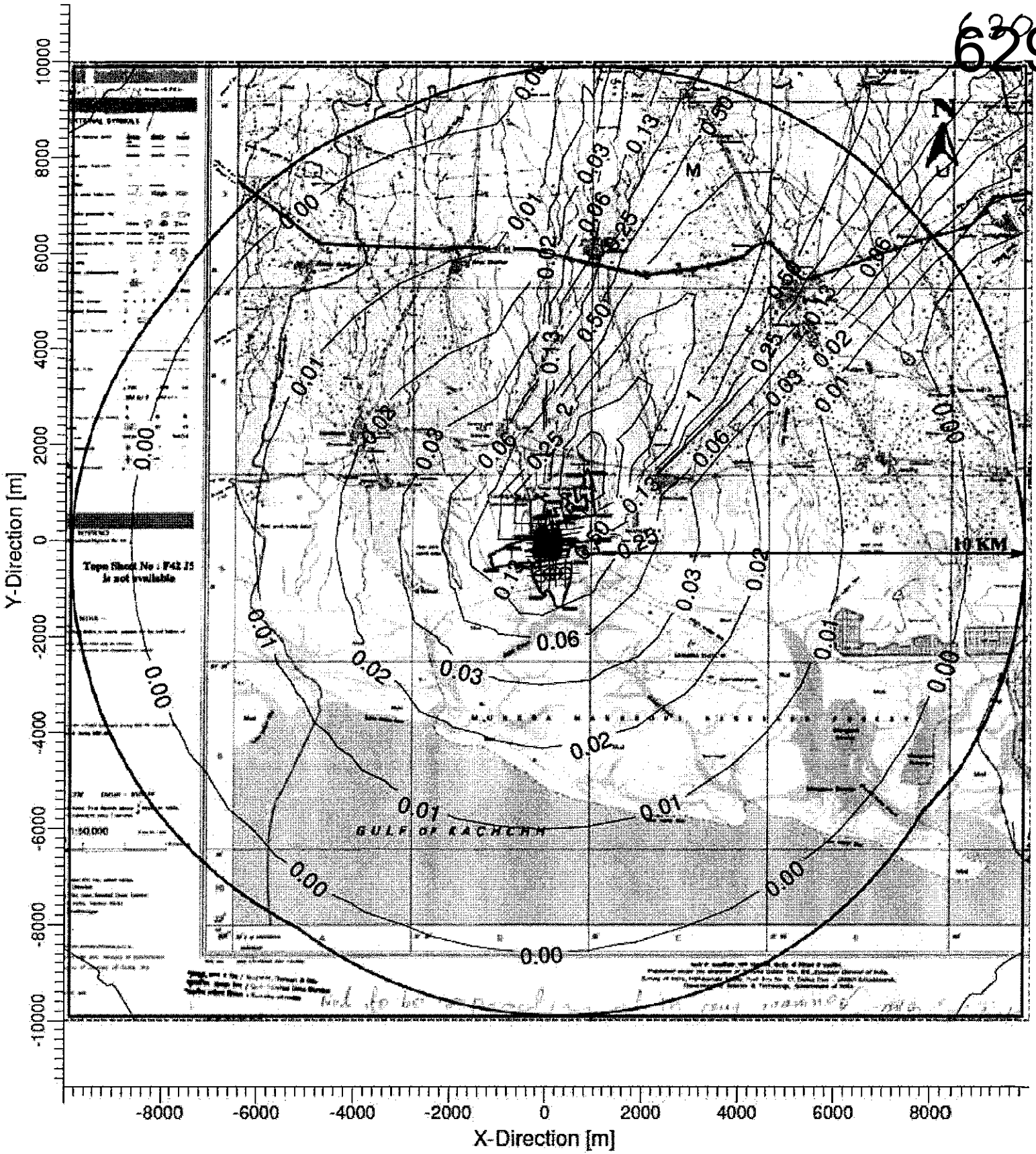


PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

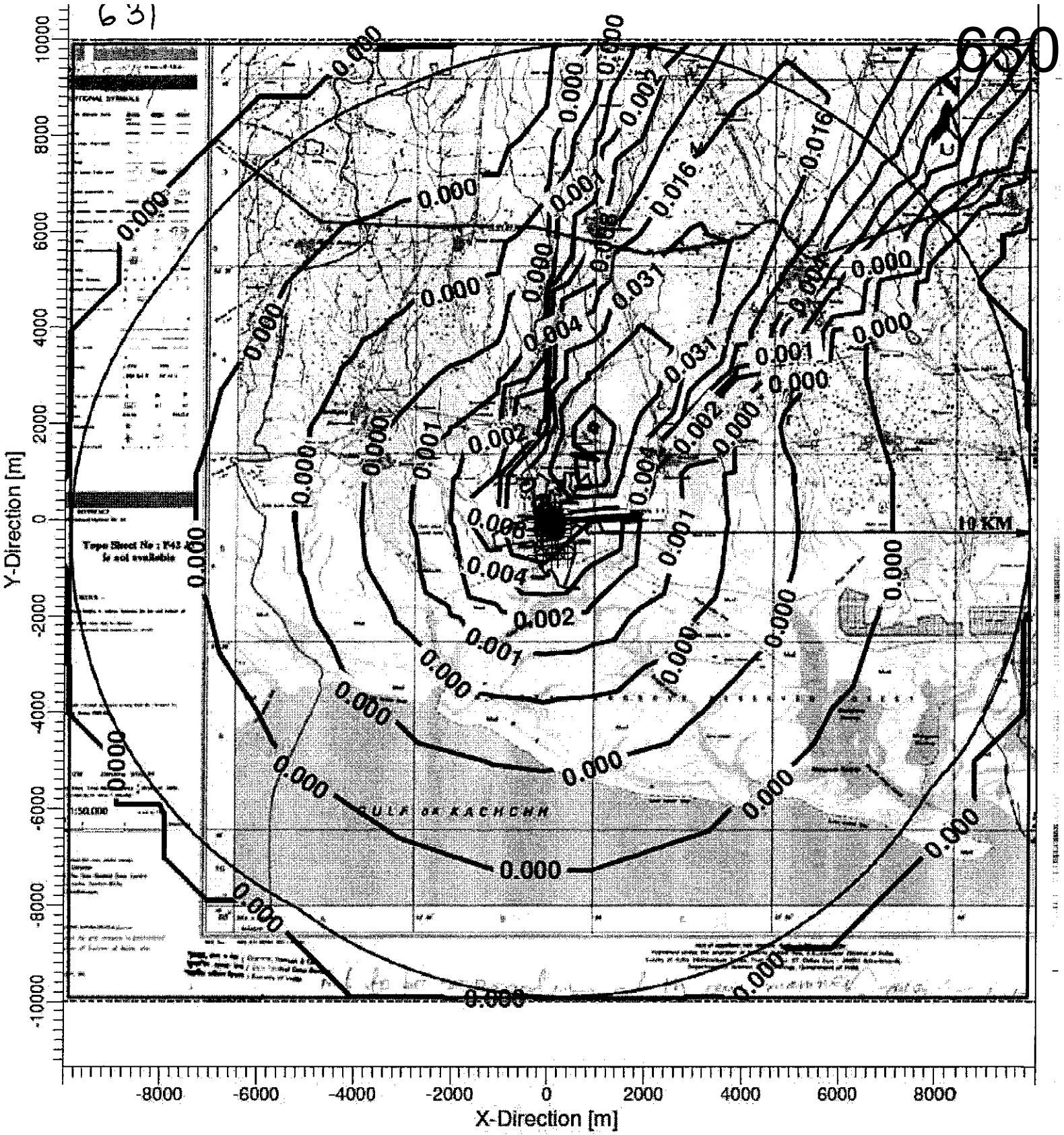
ug/m^3

.000 0.001 0.001 0.002 0.005 0.010 0.020 0.050 0.100 0.200 0.500 0.518

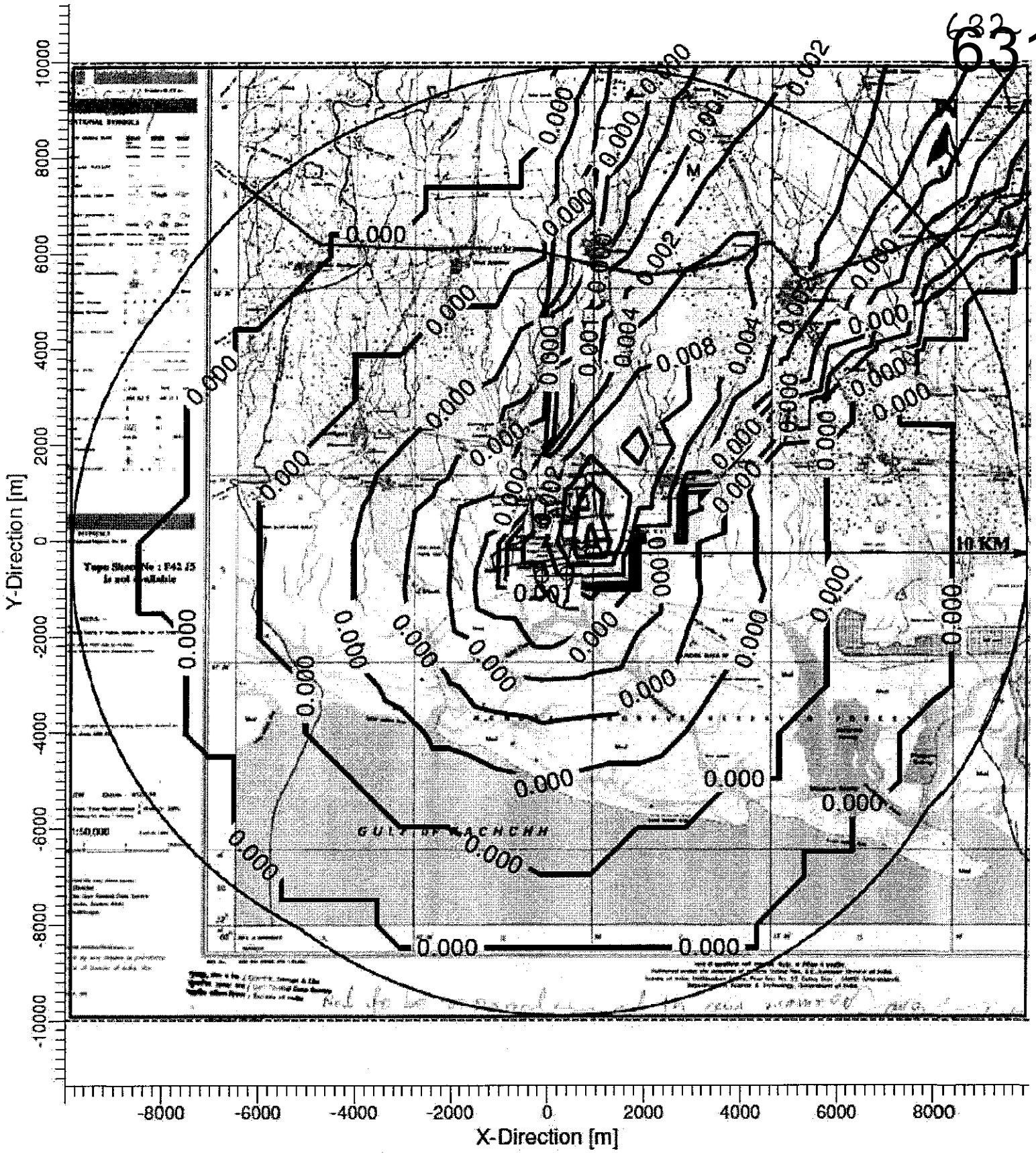
OMMENTS:	SOURCES:	COMPANY NAME:
GLCs - PM2.5	34	Vimta Labs Limited
	RECEPTORS:	MODELER:
	441	M.Janardhan Bh.Durga Bhavani
	OUTPUT TYPE:	SCALE: 1:129,297
	Concentration	0 5 km



MMENTS: .Cs - SO2	SOURCES: 34	COMPANY NAME: Vimta Labs Limited
	RECEPTORS: 882	MODELER: M.Janardhan Bh.Durga Bhavani
	OUTPUT TYPE: Concentration	SCALE: 1:129,304 0 5 km



MMENTS:	SOURCES: 34	COMPANY NAME: Vimta Labs Limited
	RECEPTORS: 441	MODELER: Dr.Chandra Shekar Bh.Durga Bhavani
	OUTPUT TYPE: Concentration	SCALE: 1:129,297 0 5 km



MMENTS:	SOURCES: 2	COMPANY NAME: Vimta Labs Limited	
	RECEPTORS: 441	MODELER: Dr.Chandra Shekar Bh.Durga Bhavani	
	OUTPUT TYPE: Concentration	SCALE: 1:129,297 0 5 km	

➢ ***Contribution of Existing Industries in Baseline Concentrations***

Within 10 km radius study area, Adani Power Plant (Adjacent) and Tata Mundra Power Plant (2.0 km) are located in western direction from the proposed project.

The stack emissions from the existing power plants are given in **Table-4.7**.

TABLE-4.7
STACK EMISSIONS FROM EXISTING POWER PLANT

Parameters	Units	Adani Power Limited				Tata Power (CGPL)	
Total Capacity	MW	4620				4000	
Capacity	MW	2x330	2x330	2x660	3x660 (With Sea Water FGD)	2x800	3x800
Coordinate		22°49'20"N 69°32'59"E	22°49'20"N 69°33'06"E	22°49'20"N 69°33'15"E	22°49'20"N 69°33'23"E	22°48'59"N 69°32'46"E	22°48'59"N 69°31'46"E
Stack Height	m	220	275	275	275	275	275
Stacks	Nos	1	1	1	1	1	1
Flue/Stack	Nos	2	2	2	3	2	3
Internal Flue Diameter	m	5.4	5.4	7.3	7.3	7.5	7.5
Flue gas velocity/ flue	m/sec	23-25	23-25	23-25	23-25	23-25	23-25
Flue Gas Temperature/ flue	K	408	408	408	368	407.5	407.5
Volumetric Flow Rate	Nm^3/sec/ unit	350	350	600	600	1150.6	1150.6
Flow rate from Stack	Nm^3/sec	700	700	1200	1800	2301.2	3451.8
SOx Emission Concentration at Limit	Mg/Nm^3	200	200	200	200	200	200
SOx Emission Rate from Stack	g/s	140	140	240	360	460.24	690.36
NOx Emission Concentration at Limit	Mg/Nm^3	300	300	300	300	300	300
NOx Emission Rate from Stack	g/s	210	210	360	540	690.36	1035.54
PM Emission Concentration at Limit	Mg/Nm^3	50	50	50	50	50	50
PM Emission Rate from Stack	g/s	35	35	60	90	115.06	172.60

The concentrations from the existing industries has already been captured in the baseline ambient air quality. Hence, it can be concluded that during operation phase of the proposed project, the resultant ground level concentrations after the proposed project, with adequate control measures will be within the permissible limits as given in **Table-4.6**.

To see the contribution due to existing operating industries in ambient air quality baseline, modeling has also been done using AERMOD. The modeling results are tabulated below in **Table-4.8** and the isopleths showing the concentrations are given in **Figure-4.7, Figure-4.8** and **Figure-4.9**.

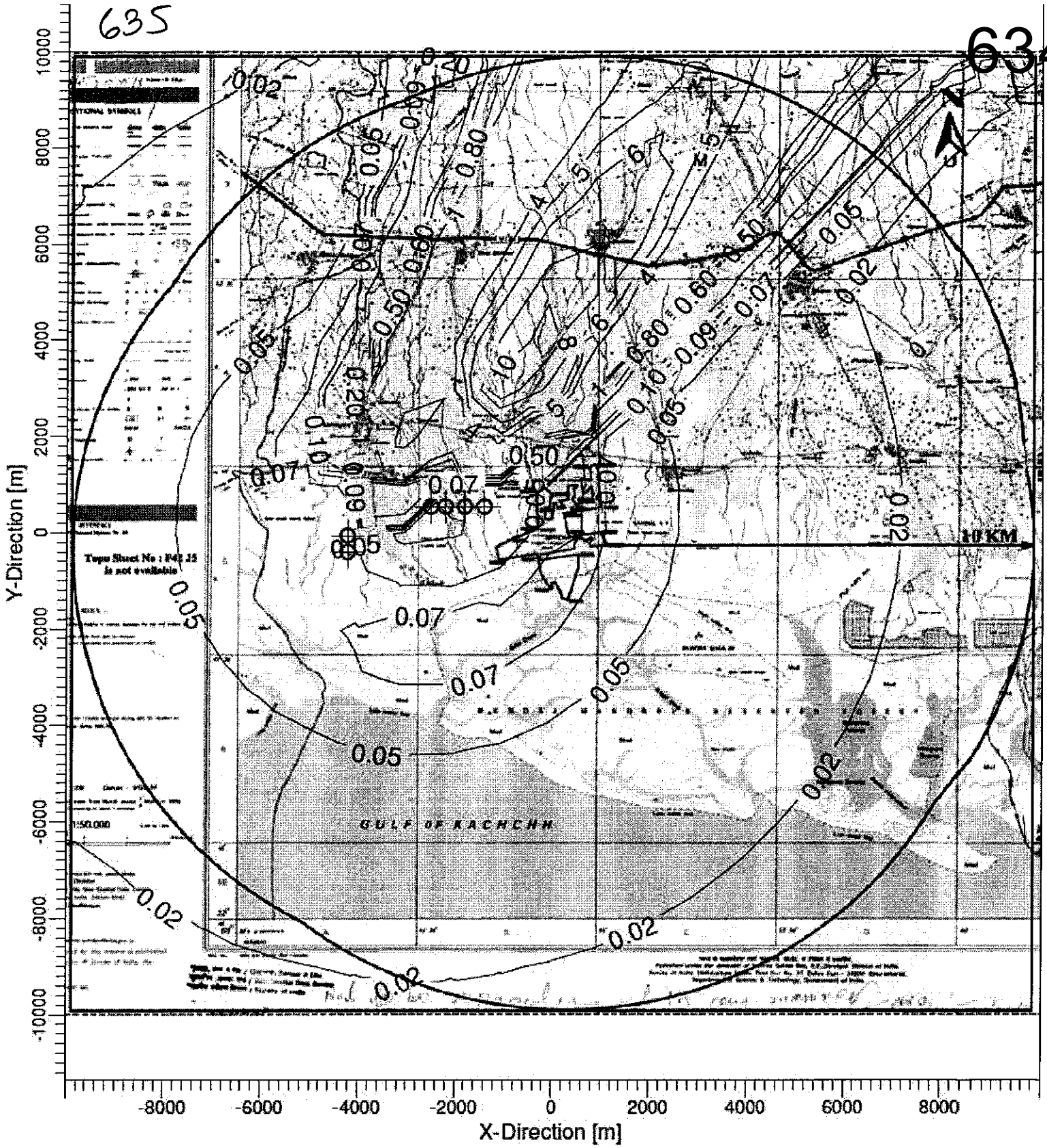
TABLE-4.8
CONTRIBUTION BY NEARBY EXISTING INDUSTRIES (APL 4620 MW TTP and CGPL 4000 MW TPP) IN BASELINE (24 HOURLY CONCENTRATION)

Pollutant	Concentration (µg/m^3)	Distance (km)	Direction
PM_{10}	11.67	4.2	NE
SO_2	36.92	4.2	NE
NO_2	28.74	4.2	NE

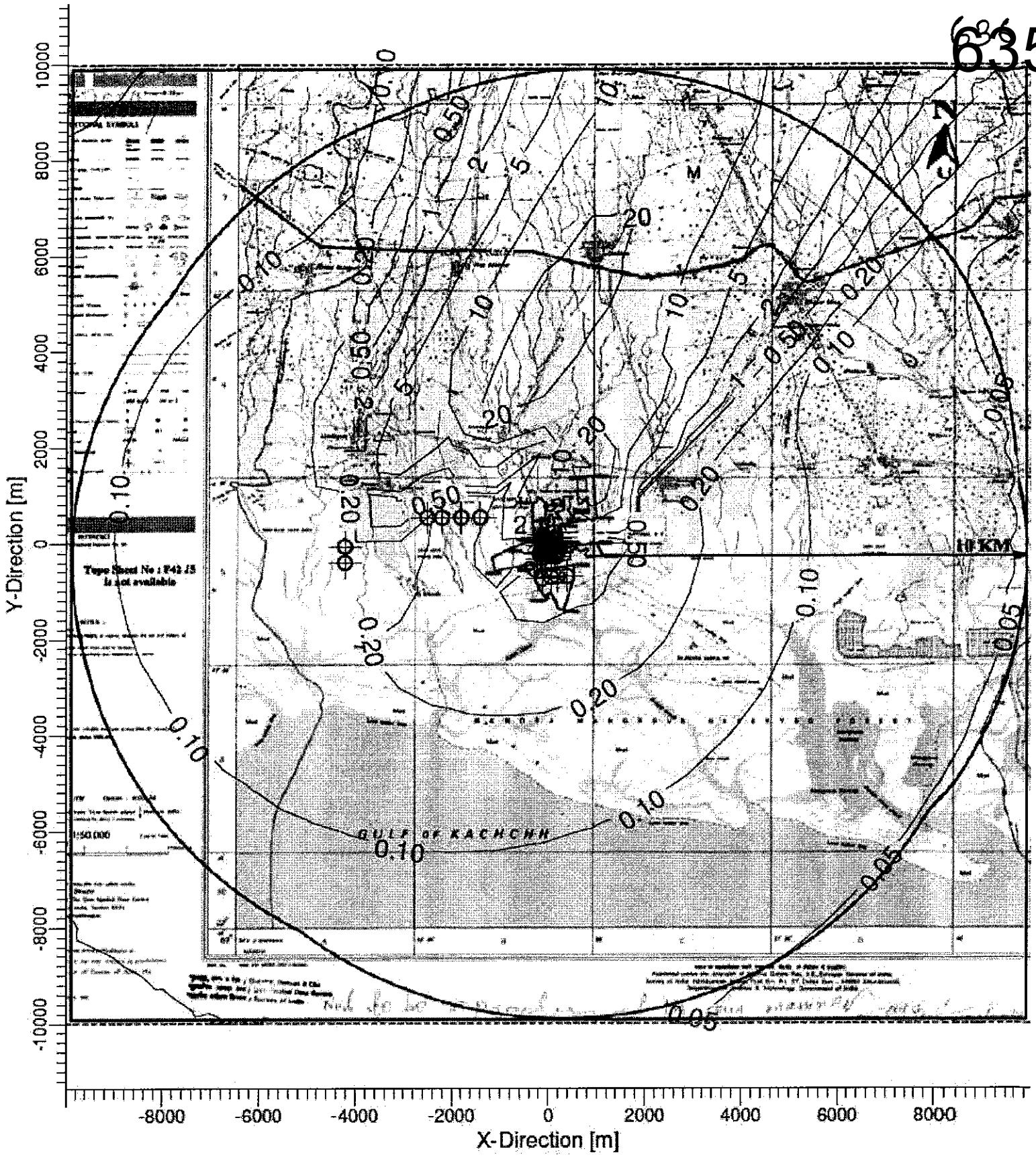
A perusal of the above table clearly reveals that the cumulative contribution due to the existing and proposed industries are well within the prescribed limits specified by CPCB.

635

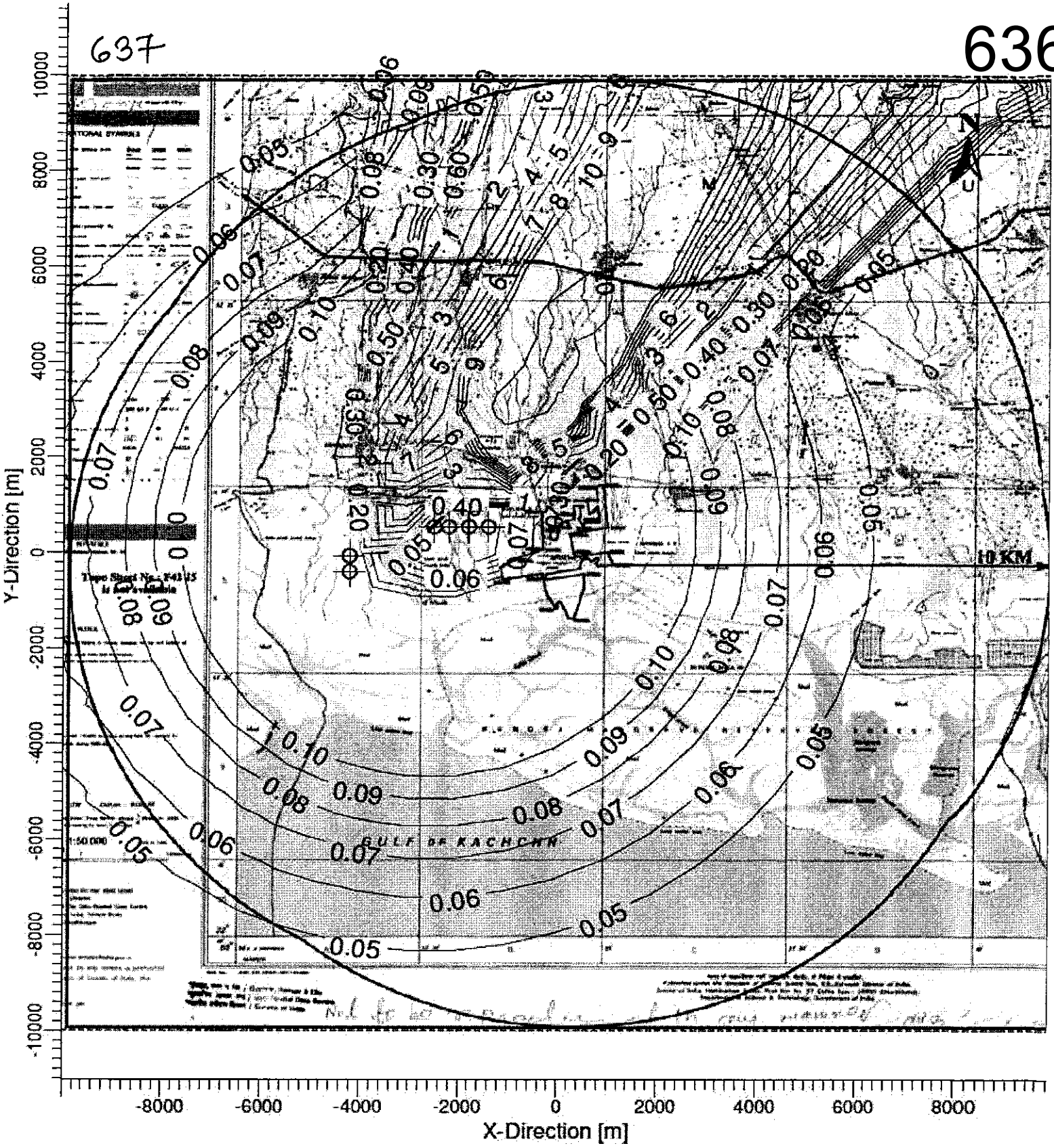
634



MMENTS:	SOURCES:	COMPANY NAME:	
Cs - PM10	13	Vimta Labs Limited	
	RECEPTORS:	MODELER:	
	882	M.Janardhan Bh.Durga Bhavani	
	OUTPUT TYPE:	SCALE: 1:129,297	
	Concentration	0 5 km	



COMMENTS:	SOURCES:	COMPANY NAME:
_Cs - SO2	48	Vimta Labs Limited
	RECEPTORS:	MODELER:
	882	M.Janardhan Bh.Durga Bhavani
	OUTPUT TYPE:	SCALE: 1:129,297
	Concentration	5 km



MENTS:	SOURCES:	COMPANY NAME:
Cs - NOx	14	Vimta Labs Limited
	RECEPTORS:	MODELER:
	882	M.Janardhan Bh.Durga Bhavani
	OUTPUT TYPE:	SCALE: 1:129,297
	Concentration	0 5 km

4.2.2.1 Fugitive Emissions

The fugitive emissions will be generated from raw material handling area, matte and ferro sand tapping area from smelting furnace, settling furnace, slag cleaning furnace and matte transfer points. The fugitive emissions cannot be quantifiable and will be controlled by the following measures:

- Tube and closed conveyor will be provided at raw material handling area;
- Hygiene ventilation system with bag filter, scrubber and stack arrangement to handle smelting furnace/SF/converter/anode furnace secondary gas emissions; and
- Hood system at converter to capture secondary gases while transferring.

4.2.2.2 Air Pollution Control Schemes

Following air pollution control schemes and techniques are suggested which shall be used to minimize and control the emission of air pollutants as well as their effective dispersion into the atmosphere.

- ***Abatement Technologies***

➢ Sulphur Dioxide (SO_2): High efficiency collection and scrubbing system with lime and caustic;

➢ Fluorine (F): High efficiency collection and scrubbing system with water to produce hydro fluro silicic acid, which will be input to aluminum fluoride plant;

➢ Particulate Matter: Wet scrubbers, cyclones, electrostatic precipitators, bag filters, vacuum trucks, road vacuum sweepers, etc.; based on the application; and

➢ The final gaseous emissions from the copper refinery project would be well within the permissible limits as prescribed by GPCB/CPCB/MoEF&CC.

- ***Control Measures at the Design Stage***

➢ Hygiene ventilation system with scrubber and stack arrangement will be provided for treating secondary sulphur dioxide off gases generated from smelting furnace, settling furnace, slag cleaning furnance, converter furnace and anode furnace;

➢ Sulphur dioxide laden gases released during the primary smelting operations from smelting furnace will be sent to electrostatic precipitators for dust removal;

➢ The fugitive emissions from and tapping port of smelting furnace will be connected to the smelting furnace stack via scrubber;

- In the converter/anode furnace, scrubber will be provided with venturi scrubbers and fugitive emission will be scrubbed in the secondary gas handling system (SGHS) before vented through stack;

- Online SO_2 analyzer for stack emission and adequate stack height of 100 m will be provided;

- Tail gas scrubber will be provided with adequate stack height of 100 m for sulfuric acid plant; and

- In the phosphoric acid plant, five stage scrubber will be provided with adequate stack height of 90 m.

Apart from above measures, the following measures will be taken to improve the air quality within the plant premises:

- Improved scrubber performance by online cleaning & mist eliminator;
- To monitor the work environment by online automatic SO_2 electro chemical sensors;
- Provision of trips and interlocks for all processes with online analyzers for all process stacks to meet the emission of SO_2 to less than 1 Kg/tonne of H_2SO_4 produced;
- Good housekeeping shall be maintained in the plant premises; road sweeping machine shall be used to clean road;
- The trucks and other vehicles shall be maintained and serviced regularly to reduce air emissions; and
- Usage of respiratory protective equipment by all employees shall be ensured.

4.2.2.3 Details of Episodal SO_2 Stack Emissions

Copper Smelter Plant:

- The SO_2 gas from the primary gas handling system (containing 14% to 18% SO_2) will be processed in sulphuric acid plant (SAP) to produce sulphuric acid; and

- The lean SO_2 gases (fugitive gases) generated from various furnaces will be conveyed to hygiene ventilation system/ secondary gas scrubber for scrubbing of SO_2 before vented through stack.

Sulphuric Acid Plant:

- Sulphuric acid plant (SAP) has been installed with highly efficient (Double Conversion Double Absorption) DCDA process to control the SO_2 emission to less than 1 kg/t of sulphuic acid produced; and

- Tail gas scrubber (TGS) also provided to treat the gases and mists before venting to the atmosphere through the stack even during plant start-up and other emergency operations.

In addition, the following monitoring and controlling mechanism has also been provided to make a fool-proof system:

- Provision of online SO_2 analyzer with process trip & interlock system for all the process stacks;
- Periodic online calibration of SO_2 stack analyser will be carried out at 90 % of the analyzer range with prior intimation to state pollution control board; and
- Online stack SO_2 analysers will be connected with state pollution control board for real time monitoring of SO_2 emission.

Further, SO_2 generation is a continuous process during smelting activity. Primary gas stream will be routed to SAP plant and the secondary gas stream will be routed through scrubber. Futher, there is no provision in the plant/process for storage of SO_2 gases and will be processed immediately to produce sulphuric acid.

In view of aforesaid, there is no likelihood of any episodal SO_2 stack emission from the plant operations.

4.2.3 Impact of Traffic on Air Quality

After implementation of proposed project, there will be an increase in traffic flow due to movement of trucks carrying raw material and finished products. The extent of these impacts, at any given time, depends upon (i) the rate of vehicular emission within a given stretch of the road and (ii) the prevailing meteorological conditions. The impacts have strong temporal dependence as both of these factors vary with time. The temporal dependence would have diurnal, seasonal as well as long term components.

The air quality predictions have been carried out by using the air quality model CALINE-4 developed by California Department of Transportation. The model is based on Gaussian diffusion equation and uses a mixing zone concept to characterize pollutant dispersion over the roadway. The model has been extensively tested for its predictive capability for traffic related air quality impacts. Given the source strength, meteorology, site geometry and site characteristics, the model can reliably predict pollutant concentrations for receptors located within 150 m of the roadway, the most important region for estimating the impacts due to the low elevation emissions.

The traffic due to the project mainly includes trucks, which are used to transport products. Hence, only heavy traffic is considered in assessing the impact of traffic. It is estimated that the number of additional trucks due to the proposed project is about 700 trucks per day.

4.2.3.1 Emission Factors

The emission standards for Indian vehicles as proposed by the Indian Institute of Petroleum (IIP) have been used to provide the emission factors for the different

vehicle types. Emission factors after accounting for the vehicle speeds are as specified in **Table-4.9.**

TABLE-4.9
EMISSION FACTORS FOR TRUCKS

*All values are in gm/km/vehicle**

Pollutant	CO	NOx
Emission Factor	10.67	18.97

*Note: *: To be multiplied by 1.6 for converting into gm/mile for use in CALINE4.*

4.2.3.2 Results and Discussions for Traffic Impact

The estimated concentrations of CO and NOx for the additional traffic are presented in **Table-4.10**.

TABLE-4.10
PEAK HOURLY PREDICTION RESULTS

Distance from the edge of the Road (m)	Incremental Concentrations for CO (µg/m³)	Incremental concentrations for NOx (µg/m³)
20	21.0	17.2
40	12.3	9.8
60	4.9	3.3
80	1.3	0.9

The general observation from above table reveals that the maximum concentration occurs at 20 m from the edge of the road, and the concentration is about 21.0 µg/m³ for CO and 17.2 µg/m³ for NOx, which are well within the permissible limit.

4.2.3.3 Adequacy of the Existing Road Network

The estimated traffic for the proposed project is calculated by superimposing traffic of the project with baseline traffic data. The traffic details have been converted to Passenger Car Units (PCU) at all the locations as per the conversion factors stipulated by Indian Road Congress (IRC). Existing and additional traffic is given in **Table-4.11.**

TABLE-4.11
EXISTING AND ADDITIONAL TRAFFIC

Traffic	No. of Vehicles per Day	PCU per Day
Existing Traffic	461	1026
Traffic due to Proposed Project		
Trucks & Heavy Motor Vehicles	700	2100
Total	**1161**	**3126**

(PCU Factors: Cars/Light Duty Vehicles=1.0, Trucks/Buses/Tractors=3.0, 2/3 Wheelers=0.5)

The increase in traffic due to the proposed project, adequacy of road/highway during operational phase has been estimated by comparing with the

recommendations stipulated by Indian Road Congress (IRC) for highways. The IRC recommendations on traffic capacity are presented in **Table-4.12.**

TABLE-4.12
RECOMMENDATIONS ON TRAFFIC CAPACITY - IRC

Sr. No.	Category of Road	Maximum PCU/day
1	Two lane roads (7 m) with earthen shoulders	15,000
2	4-lane highway with earthen shoulders	35,000

The existing highway has a width of 7 m carriage way. On comparison with the above standards, as the existing road is two lane road, it can take a maximum load of 15000 PCU/day. Whereas, the projected traffic load is only 3126 PCU per day. Hence, the existing road is adequate to take the additional traffic generated by the project. Futher, the road will be widened and strenghtned suitably to take the additional load.

4.2.4 Impact on Water Resources and Water Quality

4.2.4.1 Impact on Water Resources

The total water requirement for the project is about 32,800 m^3/day which will be sourced from desalination plant of APSEZ Ltd. No ground water will be abstracted during the operation phase, thus there is no impact envisaged on groundwater resources. There will not be any adverse impact on the fresh water sources as the primary water source for this project is sea water after desalination.

Dhaneshwari river is a seasonal river, which flows in the western part of the proposed site. The river will not be diverted but suitably trained along the boundary.

4.2.4.2 Impact on Water Quality

The water balance and wastewater streams along with the details of wastewater treatment plant have been described in *Chapter-2*. The total wastewater generation from the proposed plant will be about 5,432 m^3/day. This will be treated in the effluent treatment plant and the treated wastewater will be fully utilized within the plant for process, cooling and other purposes. No wastewater will be discharged outside the plant. Hence, there will be no impact on the water regime due to the wastewater generated from the plant complex. The proposed project will operate on zero liquid discharge concept.

4.2.4.3 Water Pollution Management and Water Conservation

- Maximum recycling of treated wastewater into process;
- Provision of appropriate treatment facility to treat domestic sewage from plant;
- Utilization of treated domestic wastewater in greenbelt development and dust suppression;

- Provision of separate storm water system to collect and store run-off water during rainy season and utilization of the same in the process;
- Treatment of storm water to remove contaminants, if any before discharging into water streams;
- The existing natural drainage will not be disturbed during operation stage of project and the proper required maintaince will be adopted;
- No ground water shall be used in this project;
- The waste that comes out of the project shall be recycled;
- The liquid type waste shall be treated in side the plant and reused/disposed as per standars;
- The chemicals that damage the environment and the waste which is hazardous to the environment shall be disposed off in such a manner that there will be no resion effect on the environment; and
- There will be no discharge of any effuents, chemical, wastes (solid & liquid) and hazardous waste into the back waters and marine water.

Treated sewage will conform to the standards for land application. Regular monitoring of ground water and surface water as part of the post-project monitoring shall be carried out.

4.2.4.4 Rainwater Harvesting System

Rainwater harvesting structures will be provided to recharge the groundwater resources in the region. The run-off water from the roof of the structures and paved areas shall be collected through storm water drainage system and led to rain water harvesting structure. The typical rainwater harvesting structure is shown in **Figure-4.10**.

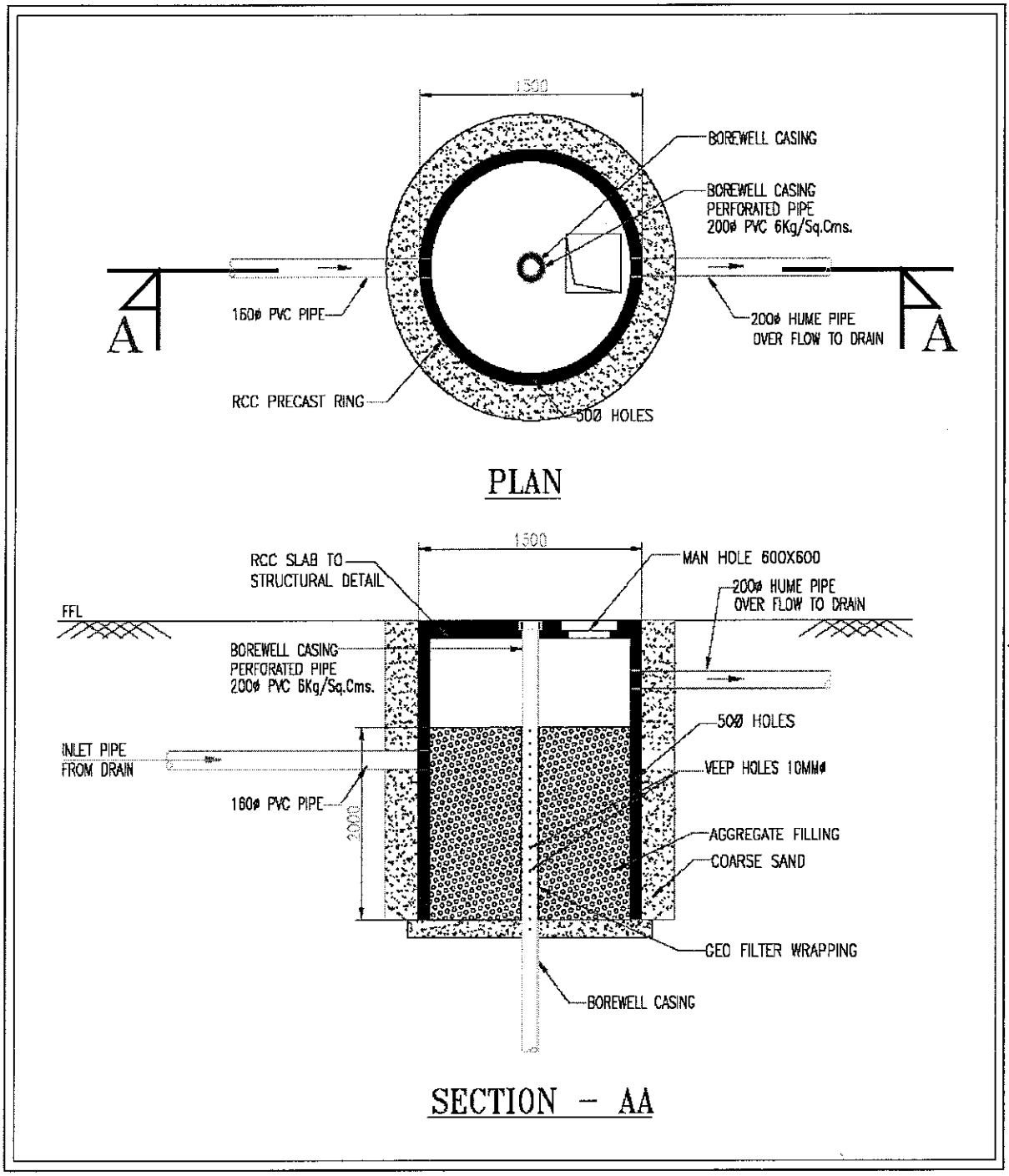


FIGURE-4.10
TYPICAL PLAN AND SECTION OF DEEP WELL RECHARGE PITS

4.2.5 Impact of Solid Wastes

The details of hazardous and non-hazardous waste generation with waste quantities and composition are given in *Chapter-2*. The main solid waste generated from the proposed plant are:

- Copper slag from copper smelter plant;
- Phosphogypsum from phosphoric acid plant;
- Hazardous cake produced from effluent treatment plant; and
- Scrubber cake from fugitive gas handling scrubbers.

Options would be explored to maximize the utilization of copper slag in the following areas:

- Road/ embankment making;
- Sea shore embankment;
- Land development;
- Shot blasting; and
- Cement manufacturing.

Options would be explored to maximize the utilization of phosphogypsum in the following areas:

- Cement manufacturing;
- Soil rectification; and
- Land development.

Hazardous cake and scrubber cake will be stabilized and stored in secured land fill as per guidelines of MoEF&CC/ CPCB/ GPCB. An area of around 13.35 ha is identified and allocated. For the initial years of copper refinery plant operation till sustained utilization/management of copper slag and phosphogypsum; in the above application areas are developed, as well as for emergency purpose, copper slag storage area and gypsum pond of around 39.25 ha would be identified and made available for intermediate/emergency storage of the same. Provision would be made to reclaim the disposed copper slag and phosphogypsum from gypsum pond at a later stage for various utilization ventures.

4.2.5.1 Solid Waste Management

Hazardous Wastes Generation, Handling and Management Plan

ETP Waste and Scrubber Waste

- **Source and Quantity**

ETP cake is the solid waste generated from the Gas Cleaning Plant (GCP) of sulphuric acid plant, wastewater treatment process. It is mainly made up of $CaSO_4$ and hazardous in nature as per Schedule-1 of Hazardous Waste Rules-2008. Hence, ETP cake will be stored in secured land fill designed as per CPCB guidelines.

The scrubber cake is a solid waste generated during the scrubbing of the secondary gases / tail gases before dispatching into the stack.

The generation of ETP waste sludge and scrubber waste will be about 18,000 TPM.

- **Handling, Storage & Management Plan**

The ETP cake, because of its hazardous nature, will be stored in a secured landfill. The secured landfill will be constructed as per CPCB guidelines. The secured land fill will have impervious layers of clay liner and HDPE liner. This will ensure that the ground water will not be impacted by the storage of the ETP cake. The SLF facility will be provided with monitoring piezometric bore wells around it and the samples will be collected periodically to have a check on the sub soil water quality.

Spent Catalyst

- **Source and Quantity**

V_2O_5 will be used as a catalyst in the catalytic converter of the sulphuric acid plant to convert SO_2 to SO_3. To maintain the conversion efficiency, the catalysts will be replaced during major turn-around shutdown. About 400 KL/yr of spent catalyst will be generated. These spent catalysts will be hazardous in nature and hence will be disposed in secured land fill facility.

- **Handling, Storage & Management Plan**

The spent catalyst will be collected in HDPE bags and stuffed in transportation drums, which will be sent back to the supplier for regeneration (or) the entire quantity will be dumped in secured landfill facility.

Used Oil and Oil Sludge

- **Source and Quantity**

The lubricating oil used during the maintenance processes generate used oil / spent oil. These are all categorized as hazardous waste and will be given to the authorized recyclers.

The oil sludge generated from oil storage facilities Viz. furnace oil storage tanks will be collected from the storage tank during cleaning operation.

- **Handling, Storage & Management Plan**

The spent oil will be collected in the drums and stored in concrete area as oil waste at scrap yard. This will be sold to the authorized recyclers as and when generated.

Spent Resins from DM and RO Plant

Hazardous waste will be generated from the DM and RO plant to the tune of about 20 KL/year.

- **Handling, Storage & Management Plan**

Spent resins DM and RO plant will be stored in secured land fill. RO plant rejects will be sent to multi effect evaporator (MEE) and solids generated from MEE will be stored in secured land fill.

Nickel and Arsenic bearing Sludge

The nickel sludge and arsenic bearing sludge (As-Cu precipitate) will be given to authorized recycler.

4.2.6 Impact on Noise Levels

The main noise generating sources in the plant will be blowers and compressors of acid plant, utility air, converters and furnace; waste heat recovery boiler and pump house. The noise levels at the source for these units will be in the range of 85-90 dB(A). The major noise generating sources from the proposed plant are listed in **Table-4.13.**

TABLE-4.13
NOISE LEVELS FROM THE PROPOSED PLANT

Sr. No.	Sources	Typical Noise Levels dB(A)
1	Air Compressor	90 - 95
2	Converter Blowers	85 - 90
3	Sulphuric Acid Plant Blower	90 - 95
4	Waste Heat Recovery Turbine Generator	90 - 95
5	Pump House Area	80 - 85
6	ISA Blower	85- 90
7	Proposed Air Compressors	90 - 95
8	Proposed Converter Blowers	85 - 90
9	Proposed Sulphuric Acid Plant Blowers	90 - 95
10	ISA Blowers of the Proposed Project	85 - 90

The predicted noise levels at the plant boundaries are estimated through computer based mathematical model. The predicted noise levels at the boundary due to various activities are found ranging in between 40 to 46 dB(A). It is seen from the simulation results that the incremental noise levels will be well within the CPCB standards. The incremental noise levels due to plant operation are shown in **Figure-4.11**.

➢ ***Impact on Work Zone***

The impacts on the working personnel are not expected to be significant on account of the high level of automation of these noisy equipments, which means

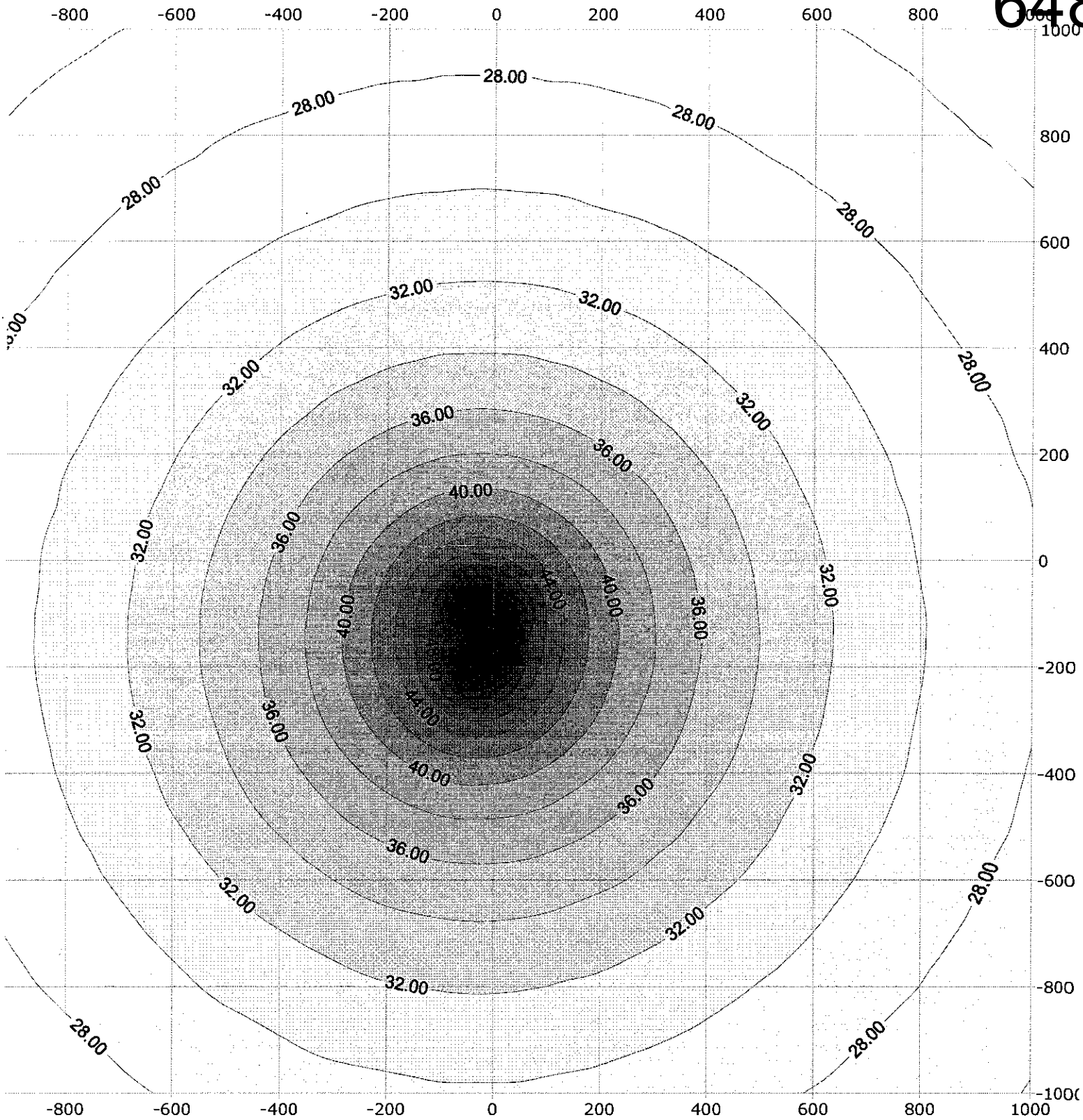
that workers will be exposed for short duration only that too intermittently. In addition to that, wearing earplugs will be made compulsory for all employees and visitors entering smelter premises near noisy equipments.

4.2.6.1Noise Attenuation Measures

The following control measures will be implemented for the proposed project:

- High noise generating sources shall be insulated adequately by providing suitable enclosures;
- The air compressor, process air blower, pneumatic valves shall be provided with acoustic enclosure;
- All the design/installation precautions as specified by the manufacturers with respect to noise control shall be strictly adhered to;
- Design and layout of building to minimize transmission of noise, segregation of particular items of plant and to avoid reverberant areas;
- Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment;
- The noise control system shall be designed to form an integral part of the plant;
- Other than the regular maintenance of the various equipment, ear plugs/muffs shall be recommended for the personnel working close to the noise generating units;
- The oxygen plant shall be installed in double wall building and no operator shall be working within the building;
- All the openings like covers, partitions shall be designed properly; and
- Inlet and outlet mufflers shall be provided which are easy to design and construct.

644


-800
-600
-400
-200
0
200
400
600
800
1000
800
600
400
200
0
-200
-400
-600
-800
-1000
28.00
32.00
36.00
40.00
44.00

4.2.7 Impact on Ecology

4.2.7.1 Impacts on Terrestrial Ecology

There are no records of any fauna of significance in the area. The fauna which is present is of very common species and available near almost all human settlements. There are no other endangered species of fauna reported or observed in the vicinity of the proposed project, except for Peacock which is a Schedule-I bird which is known to live close to human settlements and agricultural lands in Semi-arid climates of Gujarat.

The main sources of air pollution from the plant will be from the process stacks. The pollutants from the plant include sulphur dioxide and particulate matter. The air dispersion modeling simulations are done to evaluate SO_2, PM and NOx likely to be contributed by the plant. The incremental concentrations were found to well within the limits as per National Ambient Air Quality Standards. Hence, only marginal impact is envisaged due to copper refinery plant on the terrestrial ecology.

4.2.7.2 Impact on Aquatic Ecology

The unit will be operating on zero discharge process. Further, there is no proposal to divert the nallah. The existing nallah will be suitably trained. In addition, 15 m width of buffer on either side of the nalah will be left unworked. Hence, no major adverse impact is envisaged.

4.2.7.3 Conservation Measures for Protection of Peacock

As per the primary data collected and also from the secondary data sources, Peacock belongs to Sch-I as per Wildlife Protection Act, 1972. It has been assessed as Least Concern bird as per the International Union for Conservation of Nature (IUCN).

Following measures are proposed for the conservation of peacock:

a. Develop dense tree plantation of highly branching trees that can provide shelter and habitat for the peacocks. Protect and maintain the naturally occurring species of plants prominent in the area;
b. Providing plant species that are conducive to breeding of insects and reptiles on which the peacocks feed;
c. Provide at least 2 water holes/ponds of adequate size with perennial water source for the peacocks and other fauna species;
d. Increase awareness among the employees and also the local population on the importance and methods of conservation of peacock;
e. Protection against any poaching – through community patrolling parties;
f. Ensuring fire protection – to save its food i.e. seeds, insects and small reptiles, and also save eggs and young ones of Peacock itself; and
g. Educating the community against actions that harm peacocks and providing a corpus fund for compensating the community against loss to crop due to peacocks, if any.

4.2.8 Prediction of Impacts on Socio-Economics

4.2.8.1 Impacts on Employment Generation

The requirements of skilled/unskilled manpower during operation will be met from nearby villages as far as possible based on skill set & eligilibility requirement as per the job and the vacancies available. The project will also help in generation of significant indirect employment. This will be a positive socio-economic development for the region and general upliftment of standard of living in the region.

4.2.8.2 Impacts on Infrastructure Development

The area is well developed with the entire basic infrastructure. AEL is strictly committed and is going to implement the proposal to uplift the social infrastructure surrounding the copper refinery plant area. Positive impact is envisaged on the infrastructure of the region.

There will be no damage to fisherman due to the proposed project. The roads used by fisherman will not be disturbed due to the proposed project.

The Social Imapct Assessment report is enclosed as **Annexure-XII.**

4.3 Greenbelt / Green Cover Development

4.3.1 Objective

The main objective of the greenbelt is to provide a barrier between the plant and the surrounding areas. The greenbelt helps to capture the fugitive emissions and to attenuate the noise generated in the plant apart from improving the aesthetics of the plant site. In order to control the industrial pollutants, dense tree plantations are necessary.

As the sedimentation pattern of the pollutants, ambient and ground level concentration of pollutants are usually determined by the direction and speed of prevailing wind and vertical and horizontal thermal gradients prevailing in the area, the belt of plantations will be designed accordingly. The width of the tree belt depends on the gaseous emissions, availability of land and site characteristics etc.

Geometry of planting of tree is more important in order to have effective wind break by the plantation. For an effective green belt, a mixture of tree species is necessary and some shrubs and grasses will be inter-cropped. As far as possible, there will be no gaps in the green belt. Where opening is imperative, alignments to roads will be such that open gaps are prevented to overcome funneling action of wind.

The trees will be planted in several rows with a tree density of 2000-2500 trees/ha with adequate width around the plant boundary and maintained as per CPCB guidelines. The inter-spaces will be planted with grasses, bushes and

hedges. Greenbelt is thus a set of rows of trees planted in such a way that they form an effective barrier between the plant and the surroundings.

4.3.2 Design of Greenbelt

Green areas will be developed in about 85.79 ha which is earmarked as per GPCB norms.

- Shrubs and trees will be planted in encircling rows around the project site;
- The short trees (<10-m height) will be planted in the first rows (towards plant side) of the green belt. The tall trees (>10 m height) will be planted in the outer rows (away from plant side);
- Planting of trees in each row will be in staggered orientation (triangular form); and
- The spacing between the trees will be maintained slightly less than the normal spaces, so that the trees may grow vertically and slightly increase the effective height of the green belt.

4.3.3 Plant Species for Greenbelt

While selecting the plant species for the proposed greenbelt, the following points will be taken into consideration:

- Should be a fast growing type;
- Should have a thick canopy cover;
- Should be perennially green;
- Should be preferably of native origin;
- Should have a large leaf area index; and
- No fruit bearing trees should be grown in the vicinity of the copper refinery plant premises.

4.3.4 Recommended species in the Greenbelt Area

The recommended species for the greenbelt development are given in **Table-4.14.**

TABLE-4.14
LIST OF SPECIES SHOWING HIGH AIR POLLUTION TOLERANCE INDEX (APTI)

Sr. No	Scientific Name	Common Name	Family	Air Pollution Tolerance Index levels
1	*Azadirachta indica*	Neem	Meliaceae	For controlling Suspended Particulate Matter (SPM), SO_2, NOx and Noise
2	*Dalbergia sissoo*	Sisoo, Shisham	Fabaceae	For controlling Suspended Particulate Matter (SPM), SO_2, NOx and Noise
3	*Tamarindus indica*	Imli	Caesalpinaceae	For controlling Suspended Particulate Matter (SPM), SO_2, NOx and Noise

Sr. No	Scientific Name	Common Name	Family	Air Pollution Tolerance Index levels
4	*Pongamia pinnata*	Karanj	Fabaceae	For controlling Suspended Particulate Matter (SPM), SO_2, NOx and Noise
5	*Acacia nilotica*	Babul	Mimosaceae	For controlling Suspended Particulate Matter (SPM), SO_2, NOx and Noise
6	*Salvadora persica*	Piloo	Salvadoraceae	For controlling Suspended Particulate Matter (SPM), SO_2, NOx and Noise

All the above mentioned species are ideally suited for the arid ecological habitat of Kutch region, and they are all fast growing species, ideal for undertaking greenbelt plantations. The choosing of the species should be ratified by the horticulturist of the project site and local forest department.

Their planting should be interspersed with each other to create mixed canopy of the plants and the ideal stance for planting all trees.

Chapter-5
Analysis of Alternatives (Technology & Site)

vi. Port

Receipt of copper concentrate will be through pipe conveyor from west port at Mundra which is about 5.1 km from site.

5.1.3 Site-III (Near Mundra Village)

i. Location

The proposed site is located at a distance of 7.5 km from south of Mundra village. The sea is adjoining the proposed site via creek at south east of the proposed site.

ii. Land & Terrain

The total identified land is notified SEZ land and available for the proposed project. The terrain is flat and average elevation of the site is +7.5 m CD. Due to closeness of sea majority of area approx. 65% of land area fall under CRZ area.

iii. Road

The proposed site is accessible through existing state highway at west, which further connects Mundra and is about 7.5 km from the site. The existing NH-8A connecting Mundra to Mandvi is about 18 km from the site.

iv. Water

The requirement of desalinated water for the plant has been estimated as 32,000 KLD, which will be sourced from desalination plant of APSEZ Ltd M/s. MUPL will be supplying the total water requirement for the project.

v. Power

The requirement of power will be about 300 MW. To meet the above requirement the power will be made available from 400 kv switch yard of Adani Power Plant. Development of bay and HT line of about 20 km from bay to site will be developed as infrastructure facilities.

vi. Port

Receipt of copper concentrate will be through pipe conveyor from west port/south port at Mundra which futher transfer by road is about 30 km from site.

5.1.4 Comparison of Salient Features of Alternative Sites

The salient features of alternative sites are presented in following **Table-5.1** and is shown in **Figure-5.1.**

TABLE-5.1
SALIENT FEATURES OF ALTERNATIVE SITES

Sr. No	Description	Site-1	Site-II	Site-III
1	Location	24 km east of Mundra, Gujarat	13.9 km west of Mundra, Gujarat	7.5 km south of Mundra, Gujarat
2	Latitude – Longitude (Average Center of Plot)	22°54'53.63"N 69°47'46.81"E	22°48'55.78"N 69°34'32.02"E	22°46'43.82"N 69°42'56.42"E
3	Terrain	Flat	Flat and sloping south east to north west	Flat
4	Average elevation from MSL	8.5 – 9.5 above MSL	7 - 10 m above MSL	7.5-8.5 m above MSL
5	Land Availability	323.76 ha (outside SEZ) Mostly agricultural land	256.58 ha (154.19 Ha within SEZ)	485.63 ha (outside SEZ)
6	Land development requirement	Bushes/jungle clearance	Bushes/jungle clearance required	Flat vacant land No land development
7	Distance from nearest National Highway no. 8A	adjoining at north	5 km	18 km
8	Distance from nearest State Highway No. 6/ nearest APSEZ road	8 km	Close to site	Adjoining at west
9	Approach Road requirement	Road is existing	Road is existing	Shall require new approach
10	Distance from Power Source	Mokha Sun Station about 5 km	APL Switch Yard at about 0.5 km from site	APL Switch Yard at about 20 km from site
11	Distance from Water Source	Water will be supplied by APSEZ, 35 km	Water will be supplied by APSEZ, 5 km	Water will be supplied by APSEZ, 25 km
12	Distance from West Port	40 km	10 km	30 km
13	River/ Streams/ Nallahs	Various Streams passing between the site	Natural Steam passing through the site	Nil
14	Mangroves	Nil	Nil	Nil
15	Fish Landing Centres	Nil	Nil	Nil
16	Forest	Nil	About 253 acres of land is reserved forest land, proposed for diversion. State Govt. has recommended for FC.	Nil
17	Erosion Prone areas	No	No	Yes
18	Social and R&R Issues	Nil	Nil	Nil
19	Recommendations	Less Suitable	Suitable	Less Suitable

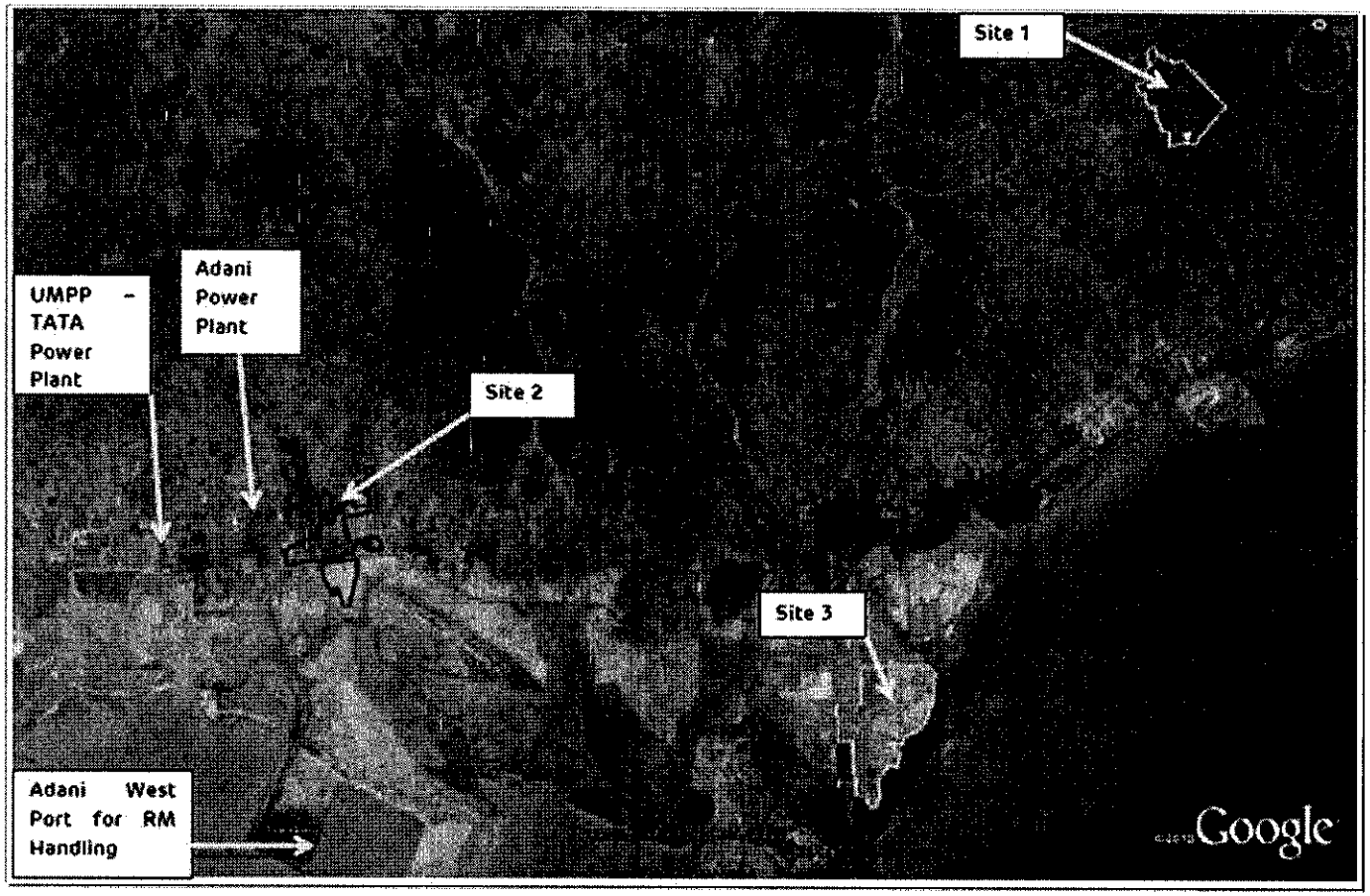


FIGURE-5.1
GOOGLE IMAGERY SHOWING THE ALTERNATIVE SITES

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5.1.5 Conclusion/Recommendation

The details presented in preceding paragraphs mandate that Site-II in Siracha & Navinal village adjacent to existing APL emerges as technically superior site such as availability & closeness of water and power source, land development, closeness to road and rail, etc. It is substantially advantageous in terms of environmental and technical criteria.

5.2 Technology Selection

Various processes available for pyrometallurgical extraction of copper are presented following **Table-5.2.**

TABLE-5.2
TECHNOLOGY SELECTION

S.No.	Technology	Remarks
1	Reverberatory smelting	Obsolete technology
2	Electric smelting	Not suitable for large scale plant
3	Outokumpu Flash smelting (Currently Outotec)	Widely accepted as proven technology
4	Furukawa Flash smelting	Not widely accepted
5	INCO Flash smelting	Not widely accepted
6	Noranda process	Not widely accepted
7	Mitsubishi process	Not suitable for large scale plant
8	Contop process	Less popular and accepted process
9	Ausmelt Process	Not suitable for large scale plant
10	ISA smelt process	Accepted as proven technology
11	Vanukov process	Information for a substantiated Judgement is not available. No Definite analysis available
12	SKS Process	Potential for further development, New Emerging Technology

The above mentioned technologies available for copper smelting were evaluated against factors like technical proneness investment and operating costs, commercial acceptability, environment considerations, technical considerations like copper recovery, sulphur recovery, flexibility in operation etc.

1. Outotec flash smelting; and
2. ISAsmelt process.

Flash Smelting Technology developed by M/s. Outokumpu (Currently known as Outotec) is one of the proven and well reconginsed technology for manufacturing of copper by Pyrometallurgical route. Plants based on this technology are installed all around the world including in developed countries in Europe, North and Latin America, Australia, Asia as well as in emerging countries from Africa. More than 32 million tonnes of copper containing materials are smelted each year with Flash Smelting technology.

ISASMELT™ is installed in major copper smelting and converting operations around the world, including Australia, USA, Belgium, Germany, Great Britain,

India, Malaysia, China and Zambia. More than nine million tonnes of copper containing materials are smelted each year with ISASMELT™ technology.

The proposed technology either Flash Smelting or ISASMELT™ are having the following features:

- Ensures high copper recovery;
- High energy recovery;
- Technology conserves water and other natural resources;
- High end automation; and
- Interlocking with pollution control equipment.

Smelting technology of the plant will be designed based on one of the two technologies mentioned above.

Chapter-6
Environmental Monitoring Program

6.0 ENVIRONMENTAL MONITORING PROGRAM

This chapter presents the details of environmental monitoring, schedule, institutional arrangements for pollution control and cost for environmental protection measures for the proposed project.

6.1 Environmental Monitoring

The environmental monitoring is important in terms of evaluating the performance of pollution control equipment installed in the project. The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/ Gujarat Pollution Control Board (GPCB). The frequency of sampling and location of sampling will be as per the directives of CPCB/GPCB.

Environmental monitoring will be conducted on regular basis by AEL to assess the pollution level in the surrounding area. Usually, as in the case of the study, an impact assessment study is carried out over a short period of time and the data cannot bring out all the variations induced by the natural or human activities. Therefore, regular monitoring program of the environmental parameters is essential to take into account the changes in the environment.

The objective of environmental monitoring is:

- To verify the result of the impact assessment study in particular with regard to new developments;
- To follow the trend of parameters which have been identified as critical;
- To check or assess the efficacy of the controlling measures;
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical through the commissioning of new installations;
- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures; and
- To establish a database for future impact assessment studies for new projects.

The attributes, which require regular monitoring, are specified underneath:

i Air quality;
ii Water and wastewater quality;
iii Noise levels;
iv Soil quality; and
v Ecological preservation and afforestation.

The post project monitoring to be carried out at the industry level is discussed below.

6.2 Monitoring Schedule

A monitoring schedule is very important in order to ensure that effluent and emissions conform to the standard for which control measures have been

designed. As it is required that installation and operation of water pollution control facilities should limit concentration and quantum of pollutants released to the environment properly, regular continuous monitoring of flow and pollutants should be done. A comprehensive monitoring program for construction phase and operation phase is suggested in **Table-6.1** and **Table-6.2** respectively.

The environmental attributes shall be monitored as given below:

➢ **Ambient Air Quality and Meteorology**

- The ambient air quality shall be monitored as per National Ambient Air Quality Emission Standards issued by the MoEF&CC vide GSR No.826 (E) dated 16th November, 2009;
- The ambient air quality shall be monitored twice in a month in line with the guidelines of Central Pollution Control Board at about 3-4 locations in and around the plant as per the parameters specified by CPCB;
- Further, the particulate matter shall be analyzed for the metals such as iron, copper, manganese, lead, zinc and cadmium etc.;
- The fugitive emission in and around of the individual unit should also be measured for particulate matter regularly and as per the latest CPCB guidelines; and
- Automatic weather monitoring station shall be provided to monitor wind speed, wind direction, temperature, relative humidity, atmospheric pressure, rainfall, evaporation rate, solar radiation and cloud cover. The parameters will be recorded at one hour frequency. The same data will be used for the improvement of environment.

➢ **Stack Emissions**

- Regular stack emission monitoring shall be carried out at all stacks for particulate matter, HF, SO_2 and NOx for checking the compliance to emission standards by respective plant; and
- The programme of stack monitoring should be prepared in such a way that the concerned appropriate parameters are included.

➢ **Water Quality**

The wells in the surrounding villages and downstream of solid waste dumping yards (especially copper slag storage area, gypsum pond and secured land fill) shall be identified based on the ground level contours. Ground water quality shall be monitored on quarterly basis.

➢ **Wastewater Quality**

Unit wise monitoring at effluent treatment plant would help in keeping a check over the operation of treatment unit and to take measures to correct

malfunctioning of the units. The main parameters for the effluent monitoring are pH, oil & grease, suspended solids and heavy metals.

- **Noise Levels**

Noise levels in the work zone environment such as plant area, truck parking area, administration block and all other work zone shop floors shall be monitored. The frequency shall be once in a month in the work zone. Similarly, ambient noise levels at about four locations (preferably nearby settlements) shall be monitored on a seasonal basis.

TABLE-6.1
ENVIRONMENTAL MONITORING DURING PROJECT CONSTRUCTION PHASE

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1	Air Emissions	All equipments are operated within specified design parameters	Random checks of equipment logs/ manuals	Periodic
		Vehicle trips to be optimized to the extent possible	Vehicle logs	Periodic during site clearance & construction activities
		Maintenance of DG set emissions to meet stipulated standards	Gaseous emissions (SO_2, HC, CO, NOx)	Periodic emission monitoring
		Ambient air quality within the premises of the proposed unit to be monitored	The ambient air quality shall conform to the standards for PM_{10}, $PM_{2.5}$, SO_2, NO_x, and CO	As per CPCB / GPCB requirement or on monthly basis whichever is earlier
2	Noise	List of all noise generating machinery onsite along with age to be prepared. Equipment to be maintained in good working order.	Equipment logs, noise reading	Regular during construction activities
		Night working is to be minimized.	Working hour records	Daily records
		Generation of vehicular noise.	Maintenance of records of vehicles	Daily records
		Noise to be monitored in ambient air within the plant premises.	Spot noise recording	As per CPCB/ GPCB requirement or on quarterly basis whichever is earlier.
3	Wastewater Discharge	No untreated discharge to be made to surface water, groundwater or soil.	No discharge hoses shall be in vicinity of watercourses.	Periodic during construction activities
4	Soil Erosion	Protect topsoil stockpile where possible at edge of site.	Effective cover in place.	Periodic during construction activities
5	Drainage and	Ensure drainage system	Visual inspection of	Periodic during

Sr. No.	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
	wastewater Management	and specific design measures are working effectively. The design to incorporate existing drainage pattern and avoid disturbing the same.	drainage and records thereof	construction activities
6	Waste Management	Implement waste management plan that identifies and characterizes every waste arising associated with proposed activities and which identifies the procedures for collection, handling & disposal of each waste arising.	Comprehensive Waste Management Plan should be in place and available for inspection on-site. Compliance with MSW Rules, 2016 and Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2016	Periodic check during construction activities
7	Health	Employees and migrant labour health check ups	All relevant parameters including HIV	Regular check ups
8	Loss of flora and fauna	Re-vegetation as per Forest guidelines	No. of plants, species	During site clearance

TABLE-6.2
ENVIRONMENTAL MONITORING DURING PROJECT OPERATION PHASE

Sr. No.	Particulars		Monitoring Frequency	Method of Sampling	Important Monitoring Parameters
I	**Air Pollution & Meteorology**				
	A	**Stack Monitoring**			
	1	Acid Plant Stack	Continuous	On-line	SO_2, PM
			Every month	Manual procedure	PM, SO_2 and acid mist
	2	Smelting Furnace/ Settling & Slag Cleaning Furnace / Converter / Anode Furnace stack	Continuous	On-line	PM, SO_2
			Every month	Manual procedure	PM, SO_2
	3	Precious metal recovery plant stack	Continuous	On-line	PM, SO_2
	4	Phosphoric Acid Plant Stack (Dust Monitoring)	Continuous	On-line	PM
			Every month	Manual procedure	PM
	5	Work zone monitoring	Twice in a month	Low volume sampler	SO_2, PM
	B	**Ambient Air Quality Monitoring**			
	1	3 - 4 No. of AAQ locations	Twice in a week	24 hr.	As per NAAQs 2009

Sr. No.	Particulars	Monitoring Frequency	Method of Sampling	Important Monitoring Parameters
	2 **Dustfall** At ambient air quality locations	One month in every season	24 hr.	Dust, Copper, Arsenic, Lead, Zinc and Cadmium in dust.
	C Meteorology			
	1 Wind speed, direction, temperature, relative humidity, atmospheric pressure, rainfall etc shall be monitored at plant.			
II	**Water and Wastewater Quality**			
	A Domestic			
	1 Sanitary wastewaters from STP outlet	Once in a month	24 hr composite	As per CTO conditions
	B Industrial Wastewaters			
	1 Outlet of the ETP	Once in a Day	24 hr composite	As per CTO conditions
	C Water quality			
	1 **Ground Water** 1) Wells in the downstream of plant area 2) Wells in the upstream of plant area	Once in a season	Grab	Parameters specified under IS:2295 (Class C) and IS:10500,
III	**Industrial Noise Levels**			
	1 Near administrative office	Once in 5 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
	2 Process areas	Once in 5 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
	3 Air Compressor	Once in 5 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
	4 Blower and compressor of Oxygen plant	Once in 5 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
	5 Turbine Generator of WHRB	Once in 5 months	8 hr continuous with 1 hr interval	Noise levels in dB(A)
	Ambient Noise Levels			
	1 Four locations	Once in three months for the industry Once in each season for ambient noise levels	24 hr continuous with one hr interval	Noise levels in dB(A)
IV	**Soil Quality**			
	1) Near Copper slag storage area 2) Near Gypsum pond 3) Near Secured Land Fill 4) Nearby village	Pre-Monsoon and Post Monsoon season	Grab	Physio-chemical parameters and metals covering Zn, Pb, Cd, As and Cu.

6.3 Implementation Schedule of Mitigation Measures

The mitigation measures suggested in *Chapter-4* will be implemented so as to reduce the impact on environment due to the operations of the proposed project. In order to facilitate easy implementation of mitigation measures, the priority of implementation is given in **Table-6.3.**

TABLE-6.3
IMPLEMENTATION SCHEDULE

Sr. No.	Recommendations	Time Requirement (Months)	Immediate	Progressive
1	Air pollution control Measures	Before commissioning of respective units	*	-
2	Water Pollution Control Measures	Before commissioning of the plant	*	-
3	Noise Control Measures	Along with the commissioning of the plant	*	-
4	Ecological Preservation and Up gradation	Stage-wise implementation	*	*

Note (*) indicates implementation of recommendations

6.4 Infrastructure for Environmental Protection

6.4.1 Monitoring Equipment and Consumables

A well-equipped environmental laboratory will be set up within the plant premises. Proper periodic training will be given to EMD employees to carry out necessary environmental monitoring and analysis.

The production of copper can cause the following environmental problems:

(i) Emission to air;
(ii) Water pollution;
(iii) Solid wastes; and
(v) Hazardous wastes.

The major environmental issues for the copper production are the potential emission to air of dust and metals/metal compounds and of sulphur dioxide from roasting and smelting sulphide concentrates or using sulphur-containing fuels or other materials. The pyro metallurgical processes are potential sources of dust and metals from furnaces, reactors and the transfer of molten metal. The details of emission monitoring system installation is given in **Table-6.4**.

TABLE-6.4
DETAILS OF EMISSION MONITORING SYSTEM INSTALLATION

Particulars	Off-Line Monitoring	On-Line Monitoring Parameters	Monitoring System and Method as per NAAQS.
A. Stack Monitoring			
Acid Plant Stack	As per CPCB standard & Consent to Operate	SO_2, PM As per CPCB Standard	UV Fluorescence, UV Gravimetric technique, Beta Attenuation
Smelting Furnace/ Settling and Slag Cleaning Furnace	As per CPCB standard & Consent to Operate	SO_2, PM As per CPCB Standard	UV Fluorescence, UV Gravimetric technique, Beta Attenuation
Precious metal recovery plant stack	As per CPCB standard &	SO_2, PM As per CPCB	UV Fluorescence, UV Gravimetric technique,

Particulars	Off-Line Monitoring	On-Line Monitoring Parameters	Monitoring System and Method as per NAAQS.
	Consent to Operate	Standard	Beta Attenuation
Phosphoric Acid Plant Stack (Dust Monitoring)	As per CPCB standard & Consent to Operate	PM As per CPCB Standard	Gravimetric Technique, Beta Attenuation
B. Industrial Wastewaters			
Outlet of the ETP	As per CPCB standard & Consent to Operate	PH, BOD, COD, TSS, conductivity Residual Cl, DO.	Optical/ Ultra Sonic device/ Titrimetric method, electrochemical, Spectrophotometry

UV Fluorescence

The SO_2 analysis is based on the principle of the characteristic fluorescence released by the sulphur dioxide molecule when it is radiated by ultraviolet light of 190-230 nm. SO_2 absorbs light in this region of the spectrum without any quenching by air or most other molecules found in polluted air. The operating range for this method is 0-0.5 ppm or 0-0.1 ppm.

Gravimetric Technique

Gravimetric analysis is a technique through which the amount of an analyte (the ion being analysed) can be determined through the measurement of mass. Gravimetric analyses depend on comparing the masses of two compounds containing the analyte. The principle behind gravimetric analysis is that the mass of an ion in a pure compound can be determined and then used to find the mass percent of the same ion in a known quantity of an impure compound.

Beta Attenuation

Beta attenuation monitoring (BAM) is a widely used air monitoring technique employing the absorption of beta radiation by solid particles extracted from air flow. This technique allows for the detection of PM_{10} and $PM_{2.5}$, which are monitored as standards by most air pollution regulatory agencies. The amount by which the flow of beta radiation is attenuated by a solid matter is exponentially dependent on its mass and not on any other feature (such as density, chemical composition or some optical or electric properties) of this matter.

Ultra-Sonic Device

Ultrasound can be used for measuring wind speed and direction (anemometer), tank or channel fluid level, and speed through air or water. For measuring speed or direction, a device uses multiple detectors and calculates the speed from the relative distances to particulates in the air or water. The technology is limited by the shapes of surfaces and the density or consistency of the material.

Titrimetric Method

Titrations are performed manually point by point, or automatically, where the titrant is introduced continuously (monotonically or dynamically). In modern analytical chemistry automation is of increasing importance. Automation of a point-by-point titration is seldom trivial. Kinetic factors concerning the chemical reaction and the response of the indicating system are of paramount importance. Cell configuration, stirring, positioning of end-point detector and of input of titrant are to be considered for ensuring high accuracy.

Spectrophotometry

Spectrophotometry is a measurement of how much a chemical substance absorbs or transmits. A spectrophotometer is an instrument that measures the amount of photons (the intensity of light) absorbed after it passes through sample solution.

6.4.2 Environmental Budget

The total project cost for the proposed project is about Rs. 10,000 Crores, which may further escalate depending upon the project execution period. Out of this, about Rs. 1044 Crores will be spent on environmental protection. The break-up of the investment is given in **Table-6.5.**

TABLE-6.5
COST PROVISION FOR ENVIRONMENTAL MEASURES

Sr. No.	Description of Item	Capital Cost (Rs. in Crores)	Recurring Cost (Rs. in Crores)
1	Air pollution control system	639	2.5
2	Water pollution control system	360	1.5
3	Environmental management system: • Solid waste management system • Greenbelt development and others • Post project monitoring • Gas collection hood and energy conservation	45	1
Total		**1044**	**5**

Chapter-7
Additional Studies

7.0 ADDITIONAL STUDIES

This chapter describes the public consultation, risk assessment, disaster management plan and other additional studies carried out for the proposed project.

7.1 Public Consultation

The public hearing for the proposed project was conducted under the Chairmanship of Shri D R Patel (GAS) Additional District Magistrate and Resident Additional Collector on 29th April 2017 at 11.00 AM at Community Premises Centre (Samajvadi), Opposite Tunda Primary School, Tunda village, Mundra taluk, Kutch district, Gujarat.

The press notification indicating dates and venues of the public hearing was published in the national English daily of "The Times of India" and in the of Gujarati daily "Kutch Mitra" on 26th March, 2017 inviting suggestions, views and objections relating to environmental aspects of the proposed project.

The copies of environment impact assessment report along with executive summary in both English and Hindi language were kept in the following places:

1. The District Collocter, Bhuj, Kutch district;
2. District Development Office, Bhuj, Kutch district;
3. District Industry Centre, Bhuj, Kutch district;
4. Taluka Development Office, Mundra, Kutch district;
5. Taluka Development Office, Mandvi, Kutch district;
6. The Chief Conservation of Forest, MoEF&CC GoI, Regional Office (west zone), Kendriya Paryavaran Bhavan, E-5, Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal 462016; and
7. Regional office, Kutch (east), Gujarat Pollution Control Board (GPCB), room No. 215-216, second floor, Kandla Port Trust, Admin building, Sector-08, Gandhidham, Kutch.

Shri K.B. Chaudhari, Regional Officer, Kutch (East), GPCB briefed the public about the purpose of organizing the public hearing. The representative of proposed project, gave an audio visual presentation in Gujarati and specific reference to the impacts on environment and management and the representative of Vimta Labs Limited, Hyderabad has briefed the Environment Impact Assessment report (Draft EIA report).

Public hearing notification is shown in **Figure-7.1**. The photographs of the public hearing are shown in **Figure-7.2**. The issues raised by the public during the public hearing and reply by the project proponent along with the action plan are given in **Table-7.1** and the public hearing proceedings are given in **Annexure-XIII.**

Gujarat Pollution Control Board

Paryavaran Bhavan, Sector 10 A, Gandhinagar 382 010
Tel: 079-23232152 Fax: 079-23222784, www.gpcb.gov.in

PUBLIC NOTICE

It is hereby informed that as per the Ministry of Environment, Forests & Climate Change, Government of India, New Delhi vide its Notification no. S.O. 1533 dated September 14, 2006, Public Hearing of **M/s. Adani Enterprises Limited, for Proposed Greenfield Copper Refinery Plant-1 MTPA, At Adani Port Special Economic Zone Land in Village(S) Siracha and Navinal, Taluka: Mundra, District: Kutch,** covered under **Category "A"** as mentioned in their request application.

All local affected persons of the project are requested to remain present in the public hearing or send their response in writing to Member Secretary, Gujarat Pollution Control Board before the hearing date.

Other concerned persons having a plausible stake in the environment aspects of the project or activity can submit their responses to Member Secretary, GPCB in writing before the hearing date.

It may be noted that, draft Environmental Impact Assessment report and the Executive Summary of Environment Impact Assessment Report of the project has been sent to the following authorities or offices to make it available for inspection to the public during normal office hours, till the Public Hearing is over.

1. The District Collector Office, **Kutch**
2. District Development Office, **Kutch**
3. District Industry Centre, **Kutch**
4. Taluka Development Office, **Ta. Mundra, Gandhidham, Dist. Kutch.**
5. Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forests & Climate Change, GoI, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E- 5, Arera Colony, Link Road 3, Ravisankar Nagar, Bhopal 462 016
6. **Regional Office, (Kutch-East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Administrative Building, Sector 08, Gandhidham, Kutch - 370 201.**

The District Magistrate / District Collector / Deputy Commissioner or his / her representative not below the rank of an Additional District Magistrate shall supervise and preside over the entire public hearing process.

The Public Hearing is scheduled to be held on **29/04/2017 at 11:00 hrs, at Community Premises (Samajvadi) Centre, Opposite Tunda Primary School, Village: Tunda, Ta: Mundra, District: Kutch, Gujarat.**

Place: Gandhinagar
Date : 24.03.2017

K. C. Mistry
Member Secretary

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ

પર્યાવરણ ભવન, સેક્ટર ૧૦ એ, ગાંધીનગર ૩૮૨ ૦૧૦
ટેલી: ૦૭૯-૨૩૨૩૨૧૫૨, ફેક્સ: ૦૭૯-૨૩૨૨૨૭૮૪, www.gpcb.gov.

જાહેર સૂચના

ભારત સરકારના પર્યાવરણ, વન અને જળ વાયુ પરીવર્તન મંત્રાલય, નવી દિલ્હીના નોટિફીકેશન નં. એસ.ઓ. ૧૫૩૩ તારીખ ૧૪.૦૯.૨૦૦૬ અન્વયે જણાવવાનું કે, **મેસર્સ. અદાણી એન્ટરપ્રાઇઝ લિમીટેડ, અદાણી પોર્ટ સ્પેશીયલ ઇકોનોમીક ઝોનની જમીન ખાતે, ગામ: સિરાચા અને નાવીનાળ, તા. મુન્દ્રા, જિલ્લો. કચ્છ દ્વારા ગ્રીનફિલ્ડ કોપર રીફાઇનરી પ્લાન્ટ-૧ મેટ્રીકટનના ઉત્પાદન માટેની સુચિત પરીયોજના (પ્રોજેક્ટ) કેટેગરી 'એ'**, અંતર્ગત તેઓની અરજી અનુસંધાને પર્યાવરણીય લોકસુનાવણી આયોજીત કરવામાં આવે છે.

લોકસુનાવણીની મહીયાના ભાગરૂપે લાગતાવળગતા સ્થાનિક અસરગ્રસ્ત લોકોનું ધ્યાન દોરીને તારીખ લોકસુનાવણી દરમિયાન હાજર રહેવા અથવા તેઓની ટીકા-ટિપ્પણી લેખિતમા પર્યાવરણ સુનાવણીની તારીખ પહેલા સભ્ય સચિવશ્રી, ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડને મોકલવા વિનંતી છે.

રસ ધરાવતી અન્ય વ્યક્તિઓને પણ તેઓની ટીકા-ટિપ્પણી પર્યાવરણ સુનાવણીની તારીખ પહેલા લેખિતમાં સભ્ય સચિવશ્રી ગુ.પ્ર.નિ.બોર્ડને મોકલી આપવા વિનંતી છે.

અત્રે ઉલ્લેખનીય છે કે, પ્રોજેક્ટના દરજ્જાએ (એન્વિરોન્મેન્ટ ઇમ્પેક્ટ એસ્સેસમેન્ટ) અહેવાલના મુસદ્દાની પ્રત તથા એન્વિરોન્મેન્ટ ઇમ્પેક્ટ એસ્સેસમેન્ટનો સંક્ષિપ્ત અહેવાલની પ્રતને નીચે દર્શાવેલ ઑથોરિટી / કાર્યાલયો ખાતે કામકાજના દિવસો દરમિયાન લોકસુનાવણીના દિન સુધી નિહાળી શકાશે.

૧. જિલ્લા કલેક્ટરશ્રીની કચેરી, **કચ્છ**
૨. જિલ્લા વિકાસ અધિકારીની કચેરી, **કચ્છ**
૩. જિલ્લા ઉદ્યોગ કેન્દ્ર, **કચ્છ**
૪. તાલુકા વિકાસ અધિકારીની કચેરી, **તા. મુન્દ્રા, જી. કચ્છ**
૫. અધિક અગ્ર મુખ્ય વન સંરક્ષકશ્રી (સી), પર્યાવરણ, વન અને જળ પરિવર્તન મંત્રાલય, ભારત સરકારની પ્રાદેશિક કચેરી (પશ્ચિમ ઝોન), કેન્દ્રીય પર્યાવરણ ભવન, ઇ-૫, અરેરા કોલોની, લીન્ક રોડ-૩, રવીશંકર નગર, ભોપાલ - ૪૬૨૦૧૬.
૬. **પ્રાદેશિક કચેરી, કચ્છ (પૂર્વ) ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, રૂમ નંબર: ૨૧૫-૨૧૬, બીજો માળ, કંડલા પોર્ટ ટ્રસ્ટ, વહીવટી બિલ્ડીંગ, સેક્ટર ૦૮, ગાંધીધામ, કચ્છ - ૩૭૦ ૨૦૧.**

જિલ્લા કલેક્ટર / જિલ્લા મેજિસ્ટ્રેટ / ડેપ્યુટી કમિશ્નર અથવા તેમના / તેણીના પ્રતિનિધિ, કે જેનો હોદ્દો અધિક જિલ્લા મેજિસ્ટ્રેટથી ઊતરતી કક્ષાનો ન હોય, તેવી વ્યક્તિ સદર લોકસુનાવણીની કાર્યવાહીનું દેખરેખ અને સંચાલન કરશે.

લોકસુનાવણીની તારીખ **૨૯/૦૪/૨૦૧૭**ના રોજ **૧૧.૦૦** કલાકે, **કોમ્યુનીટી પ્રીમાયસીસ (સમાજવાડી) સેન્ટર, તુન્દા માધ્યમિક શાળાની સામે, ગામ: તુન્દા, તા. મુન્દ્રા, જિલ્લો. કચ્છ, ગુજરાત** ખાતે યોજવામાં આવેલ છે.

સ્થળ: ગાંધીનગર
તા. ૨૪-૦૩-૨૦૧૭

કે. સી. મિસ્ત્રી
સભ્ય સચિવ

FIGURE-7.1
PUBLIC HEARING NOTIFICATION

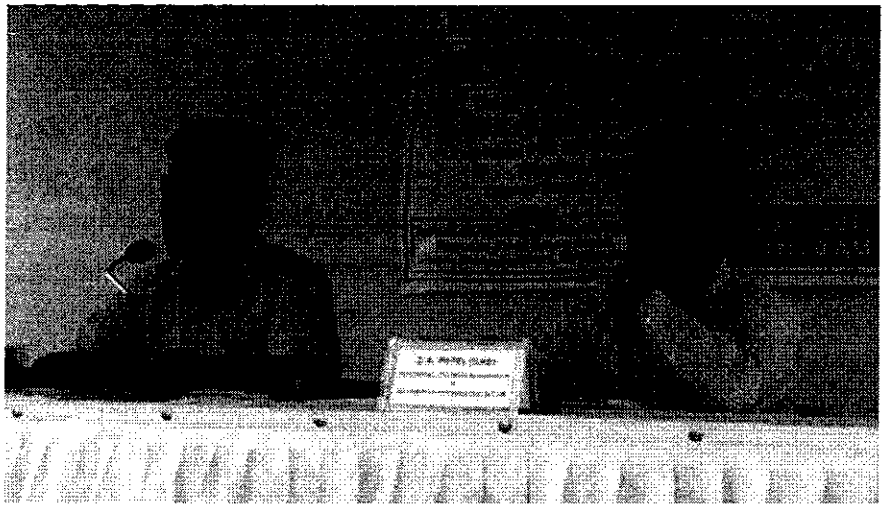






FIGURE-7.2(A)
PUBLIC HEARING PHOTOGRAPHS





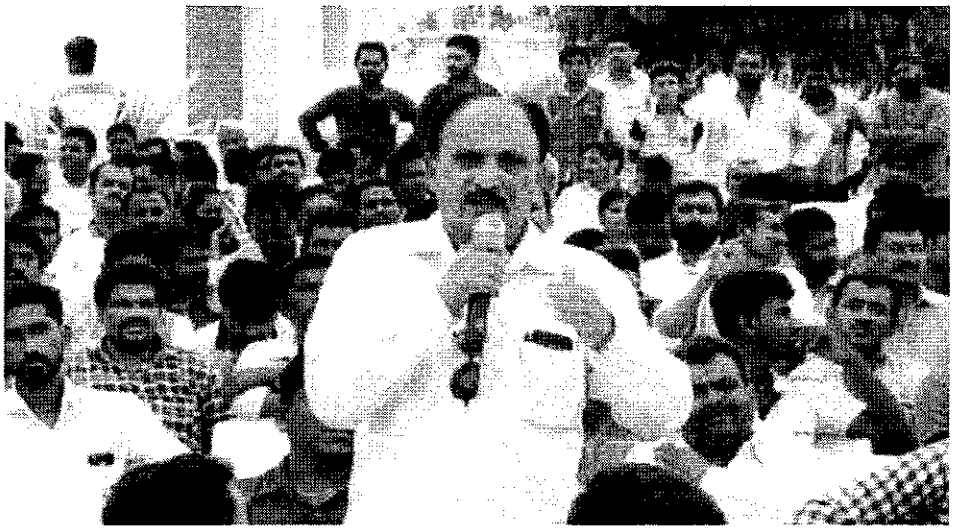


FIGURE-7.2(B)
PUBLIC HEARING PHOTOGRAPHS

TABLE-7.1(A)
PUBLIC HEARING PROCEEDINGS AND RESPONSE ALONG WITH THE ACTION PLAN

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
1	Shri Punshibhai Gadhavi Member of Taluka Panchayat, Mandvi Village: Mota Bhadiya Taluka: Mandvi	He represented that: • How many villages of the Mandvi and Mundra taluka are affected in this project? Provide the details about distance. I was a Sarpanch for a period of ten years and I made submissions during that time also but the company did not provide a proper reply. • At the time of making this report, how many numbers of villages have been visited by the company and were the local people present at that relevant point of time? • How does police behave with ladies of our village? The people of Nana Bhadiya, Mota Bhadiya and Kandagra village are sent back.	The representative of project proponent informed about his designation and qualification and then replied that: • The area of this project includes Siracha and Navinal villages. As per the guidelines under EIA Notification of Ministry of Environment, Forests and Climate Change, Government of India 16 villages within the 10 km radius are included. Out of this, the monitoring is done in 8 villages.	• The proposed project is located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat. • The environmental baseline monitoring location have been decided based on the predominant upwind and down wind direction and other environmental sensitive locations and based on EIA guidelines. • The study area of 10 km radial distance from the boundary of the proposed project consists of 16 villages. The list of Number and locations of monitoring stations (as per CPCB guidelines) are decided based on the nature of project, meteorological conditions, Topography, selected pollution pockets in the area and likely impact areas. • The list of villages with demographic details are enclosed as Annexure-X in the EIA report.
2	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra Shri Rambhai Kanani Village: Zarpara, Taluka: Mundra	He represented that: • All our questions shall be replied to in Gujarati language. The project representative does not reply in Gujarati language and therefore this means that the local public will not receive employment. The project officer should provide his qualification and identification before giving reply in Gujarati. • How many villages are affected? What is the	The regional officer asked the project representative to translate the replies from Hindi to Gujarati language. Representation of project Proponent replied that: • As per the guidelines under EIA Notification of Ministry of Environment, Forests and Climate Change, Government of India, 16 villages within 10 km radius are included.	• The baseline ambient air quality, noise and soil monitoring was carried out at 8 location. The monitoring locations were selected based on the nature of project, meteorological conditions, topography, land use conditions, existing pollution pockets in the area and the likely impact areas. • The study area of 10 km radial distance from the boundary of the proposed project consists of 16 villages. The list of villages

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
		radius of affected area? How many people were met? How many villages were visited? • At the time of presentation the list of only 8 villages is shown. Why other villages are not included? Why is monitoring done in only 8 villages? Show us the list of 16 villages. Give the proof of 08 villages visited.	Names of villages where monitoring is carried out are mentioned in the EIA report. All the villages falling within the 10 km radius are covered as per the EIA notification. The date of lab testing report is also provided in the EIA report. The company has prepared the EIA report as per the guidelines. The EIA report was made available at five places.	with demographic details are enclosed as Annexure-X in the EIA report. • Monitoring photographs along with the respective sampling locations are given Annexure-VIII in the EIA report.
		• The laboratory reports should be provided. How old are these reports? At which five places were the sampling done? Which organization has conducted the study? We should be provided with the analysis report of the company. Which laboratory has conducted the monitoring? Provide certificate of the same. • At which five places were the EIA reports placed? We have objection to the hearing and proposed project. We have objection as there will be impacts on environment.	• With the due permission of chairman the regional officer informed that the person is asking for monitoring reports and requested the representative of the project proponent to provide the same. Representation of project Proponent replied that: • The Chapter-3 (page no. 43) of the EIA report provides the entire information as to the analysis of air at 8 (eight) places. The monitoring was carried out by Government of India, NABET Accredited M/s. VIMTA Labs Ltd., Hyderabad. The certificate is provided in the report. • As per the EIA notification of the Government of India, the draft EIA report is made available at following offices: 1. District Collector office, Kutch-Bhuj 2. Office of District Development officer, Kutch-Bhuj 3. District Industrial Center, Bhuj-Kutch, 4. Office of the Taluka Development officer, Mundra 5. Office of the Taluka Development officer, Mandvi	• **M/s. Adani Enterprises Limited (AEL)** has retained the services of NABET accredited EIA Consultant **M/s. Vimta Labs Limited (VLL)**, Hyderabad to prepare EIA report for various environmental components including air, noise, water, land and biological components along with parameters of human interest which may be affected and to prepare an Environment Management Plan (EMP) for mitigating possible adverse impacts. • The Consultant details (like certification and list of team member involved in the proposed project) are given as Chapter-11. The QCI issued certificate no. NABET/EIA/1619/RA0043, Valid upto 19th May 2019. • The analysis results are already included in the EIA Report (Chapter-3).

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
			• The executive summary of EIA report is provided in 14 gram panchayats. The monitoring is done in 8 villages. The monitoring has been carried out as per the EIA guidelines. We have come here to provide the replies to the objections related to the information provided under the EIA report. You will be heard and a proper reply will be provided. This will be included as part of public hearing proceedings and the final EIA report will be submitted to MoEF. • Analysis report will be provided after public hearing is completed.	
3	Shri Punsibhai Gadhavi, Taluka Panchayat Member – Mandvi Village: Mota Bhadiya Taluka: Mandvi	He represented that, when was the report submitted to Mandvi Taluka Panchayat? Is the report provided to community leaders? We oppose this public hearing.	The regional officer has informed that the copy of report and CD is provided to Mandvi Taluka Panchayat office on 27.03.2017.	-
4	Shri Vishrambhai Gadhavi, Village: Zarpara Taluka: Mundra	He represented that, • The photographs of place and equipment used shall be shown from where the samples were collected. • You are showing the photographs of your proposed project, show the photographs of the monitoring carried out.	The representative of the project proponent replied that, we have photographs of 8 locations and these will be provided.	• The photographs of monitoring had been shown during the public hearing. • Monitoring photographs along with the respective sampling locations are given Annexure-VIII in the EIA report.
5	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that the person providing the reply on behalf of the company must provide the company photo ID card, only then he will be allowed to reply. Our boys are not permitted to enter the company without an ID-card.	The representative of the project proponent showed the photo ID-card on LED screen.	-
6	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra	He represented that, • Give the information about how much carbon dioxide is emitted from the thermal power plant at Mundra? Provide the figure of carbon dioxide that is emitted in 24 hours.	The representative of the project proponent replied that: • The amount of carbon dioxide is 870 gram/kilowatt hour. 67,525 tonnes of CO_2 equivalent is emitted per day.	This question is not directly connected to the proposed project. However, in the proposed project employment about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
		• At the time when I went to Mr. Mukesh Saxena for job, he stated that the recruitment of job is done from Ahmedabad. I was kept as apprentice, after a period of 4 months, for duration of 12 months. Thereafter I was given the job as supervisor at the PowerMech Company. I have not been taken on roll in the company. I was shown my social category. The people coming from outside are given direct jobs while I was not kept on permanent job at any place. Therefore I left the job after 6 months and at present I run a shop. • I did not get the job as per my studies and thus provide job. Will I be given job at the new plant? • What is the duty time and salary of on roll employees?	• The representative of the project proponent replied that, you came directly to me and there was no recommendation for you. We kept you on training for a period of 12 months on apprentice. For this you were given a stipend of Rs. 12000 per month. During the apprentice required training is provided. The company provides you further training when you become an employee from apprentice. You were in a list wherein there were 60 persons and out of which 15 were engineers. We gave you job on contract after the apprentice. You will be provided the list of the resident of Zarpara who have been given employment. • One should not expect that he shall get a job as per his wish. Intention of learning is important for any job. • The employee on contract has a service of 8 hours but the employee has to stay for longer hours when there is additional work load. No discrimination is done in the company. • The local hearing video copy may be provided by presiding officer.	will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
7	Shri Dayabhai Viram Gadhavi, Village: Mota Kandagara, Taluka: Mundra	• He represented that; provide video copy of local hearing.	The local hearing video copy may be provided by presiding officer.	-
8	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that a person becomes an engineer by spending lacs of rupees and you give such replies to him!	-	Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
9	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra	He represented that, • Adani Power has obtained the permission for	The regional officer stated that, • This public hearing is for the Copper Refinery project and therefore the questions	The anticipated potential impacts analysis, cumulative impacts due to increase of pollutant and its mitigation measure are provided in

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
		Phase IV. Why have you installed FGD? The pollution load had increased in Mundra. • At Mundra one tonne Carbon Dioxide is produced per Megawatt. Adani Power and TATA Power emit CO_2 that is much more than the capacity of Mundra. Then, why do you wish to bring this new plant?	related to that issue only shall be asked. Your representations shall be noted down. Your representations and objections will be included as part of the proceedings. The CD will be submitted along with the proceedings to Ministry of Environment, Forests and Climate change of Govt. of India. • The representative of the project proponent replied that, 0.87 Ton carbon dioxide is produced for 1 Mega Watt. The FGD system is installed as per the clearance provided by Ministry of Environment, Forests and Climate change. This is installed for sulphur dioxide scrubbing. There is no statutory limit for carbon dioxide emissions.	Section-4.2.2 of Chapter-4 in the EIA report. The cumulative impacts of exiting power pla of Adani and Tata power have been consider and incorporated in the Section-4.2.2 of E Report.
10	Shri Dayabhai Gadhavi Village: Mota Kadagra Taluka: Mundra	He represented that, why are you not listening to us? Why don't you reply? Are the questions raised by us relevant or not?	-	-
11	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that the company conducted the public hearing for power plant also in this manner. The promises that were made at that time have not been fulfilled and now you wish to establish a new project.		-
12	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra	He represented that we have been informed to ask questions related to environment only. Should we not be provided with the platform to make representations on other questions?	-	-
13	Shri Gajendrasinh Jadeja Sarpanch Navinal Village: Navinal Taluka: Mundra	He represented that, • You were complained through email for cancellation of the public hearing on 11.04.2017 and a meeting was held with Mr. D R Patel. But no reply was given for the same. The project proponent has not complied with the terms of reference as per my complaint. How can the public hearing	The representative of the project proponent replied that: • As per the circular of MoEF&CC dated 31.03.2011, if the forest land cannot be avoided, the application shall be filed by project proponent to obtain forest clearance. After this stage-I application, the project proponent can apply for TOR.	MoEF&CC (forest conservation division) l granted Stage-1 approval for diversion 1576.81 ha of reserved forest land in favou Adani Ports & Special Economic Zone Limi (APSEZL) vide letter F.No.8-04/2016-FC da 16th November 2018. Stage-I FC has b obtained as given in Annexure-V in the l report.

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
		be conducted for this project when the process of forest clearance is still going on? • The project proponent has concealed the information in Form-1. As per the S.No. 16 and 26 of Basic Information of Form-1, with reference to the Gochar land, PIL no. 17/2011 judgment, the project proponent has mentioned that there is no pending PIL for this land. This information is not mentioned in Form-1. • In the S.No. 2 and 10 of Form-1, it is not mentioned that the Daneshwari river passes through the forest land.	• The TOR application is filed after the Stage-I application for forest clearance is applied. Thereafter the MOEF&CC provides the TOR to project proponent. Afterwards EIA can be made. After the entire process of EIA, the MOEF&CC checks the status of the application for forest clearance and the project is approved on that basis. • We have not concealed any information. The PIL has been disposed. The judgment is under review. The application is filed for the acquisition of forest land. Under the Form-1, it is stated that the non-forest land is of APSEZ and the application for forest land is under process. • In the EIA report. maps are provided and Daneshwari river is shown in it.	The PFR submitted along with the For application clearly shows the water stre passing through proposed project site. same is available in the Annexure-VII of PFR submitted along with the Form-I. Dhaneshwari river also refered as Danesri N (as per Topo sheet no: F42 J9 & 10) stre passing within site (west side). Dhaneshwari, a seasonal river which flows the western part of the proposed site. The ri will not be diverted but suitably trained al the boundary. The flow of the river will maintained, as shown in the plant layout Figure-2.1 of EIA report.
14	Shri Pravinsinh Bhurubha Chauhan Village: Siracha Taluka: Mundra	He represented that, • As per the EIA report, you state that no perennial river is present within the project land. There is no perennial river in whole of Kutch. From the 2011, 2013 and the present Satellite image, it is clear that you have diverted the river. • Your hospital is also constructed on the river. It is clear from the Satellite image of year 1991. Show the CD of Satellite image to all. • I wish to show Figure No. 1 from the EIA report. The river is tampered with in the Figure.	-	Dhaneshwari, a seasonal river flows in western part of the proposed site. The flow the river will be maintained, as shown in plant layout on Figure-2.1 of Chapter-1 in EIA report.
15	Shri Punshi Gadhavi Taluka Panchayat member, Mandvi, Village: Mota Bhadiya	He represented that: • What will Adani do for the education, health and fodder for cattle? A written submission is	The representative of the project proponent replied that Adani Foundation is already carrying out development works in areas of education, health and other social sectors on	A budget of Rs. 8 crores per each year been allotted for enterprise so responsibility/CSR activities for five years. The CSR details (like CSR policy, initiative

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	Taluka: Mandvi	also done for this. • You have not given the reply to the previously asked question of Punshibhai Gadhavi. Provide reply to it.	the basis of the written representation of Punshi bhai. This will also be done for this project. A budget of 8 crores rupees per year is allotted for CSR activities. Particular focus shall be given to the villages that are affected.	activities, CSR budget expenditure data fo 2010 to 2016, Proposed CSR budget plan next 5 years and CSR implement photographs) is given in Section-8.5 Chapter-8 of EIA report.
16	Shri Asariya Lakha Gilwa Village: Zarpara Taluka: Mundra	He represented that the company officers should make submissions in the local Gujarati language.	It is noted down and replied in Guajarati language only	-
17	Shri Bharat Kalyan Sheda Village: Zarpara Taluka: Mundra	He represented that the people residing here want clean environment and we don't need any project. Why do you want to establish this project here?	-	For establishment of this project, thr alternative sites have been studied. The three sites include: Site-I: near Gundala & Mokha villages; Site-II: near east side of Adani power plan and Site-III: near near Mundra village. Among three above sites, the site-II near ea side of the Adani Power Plant has been chos based on the comparative merits and demer of the three sites. The comparison of salient features alternative sites done and details a presented in Table-5.1 and shown in Figu 5.1 of the EIA report.
18	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that; • A total 12 crore ton of CO_2 is generated daily. Why is the FGD for phase-IV installed? • This plant will emit 30 lakh tons of Sulphuric acid so why do you want to establish this plant?	The representative of the project proponent replied that: • Adani Power produces 25 million ton of CO_2 per year and around 25 million ton is produced by TATA Power. In this manner the total CO2 produced is around 50 million ton. • In the Adani Power Phase-IV, MoEF had stipulated a condition based on which the FGD system is fixed. • Sulphur Dioxide will be produced from Copper Smelter. In the sulphuric acid	• The SO_2 generation is a continuous proce during smelting activity. Primary g stream will be routed to sulphuric a plant (SAP) plant and the fugitive g stream will be routed through scrubb Further, there is no provision in t plant/process for storage of SO_2 gases a will be processed immediately to produ sulphuric acid. • Sulphuric acid plant (SAP) will be install with highly efficient (Double Conversi

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			plant, the sulphur dioxide will be absorbed and sulphuric acid will be produced. The residual amount of sulphur dioxide from the proposed project will be within the limits stipulated by CPCB, Government of India.	Double Absorption) DCDA process control the SO_2 emission to less than kg/t of sulphuric acid produced. • The residual amount of sulphur dioxi from the proposed project will be witl the limits stipulated by CPCB, Governme of India. • The process of extraction of copper met sulphuric acid is recovered as a by-prodi from the off-gases generated from t smelting and converting furnaces. A part sulphuric acid produced is utilized phosphoric acid production and rest will sold in the market based on mark requirement. • About Rs. 1700 crores will be invested install sulphuric acid plant.
19	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra	He represented that, in one day, a total of 1,25,988 ton of CO_2 is emitted in the atmosphere. The average temperature of emitted CO_2 is 150 degree Celsius. Why should the new plant be approved even thereafter?	The representative of the project proponent replied that: • The average temperature is 120 to 130 degree Celsius. World level efforts are made to stop global warming. The power plant is based on super critical technology and produces lesser amount of CO_2 in the atmosphere. Till date it is not found that the level of CO_2 would have decreased on world level. The government of India has targeted to reduce CO_2 emissions by 30 to 35% in comparison with the year 2005. The power plant that is based on old technology produces 1 to 1.5 Ton CO_2 per Megawatts hour, while the plant based on new Super Critical technology produces a total of 0.8 ton CO_2 per	• The emissions of carbon dioxide from t proposed copper refinery project will 4 tonnes per day. Further, the project v have 85.79 ha (33% of the project area) greenbelt/green cover to absorb a gaseous emissions in the proposed proje • Further, regular post project monitori will be carried out for the gasec emissions and the test reports will submitted to GPCB and MoEF&CC. Regu monitoring will help to keep a check on t gaseous emissions.

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			Megawatt hour.	
20	Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	He represented that, • Our agriculture is adversely impacted. The characteristics of the Male Date Seeds seem to be transforming to that of Female Date Seeds. • We do not want this project. EIA report states that there is no living organism and only wild plants are present. No information is provided about river, vegetation and other living organisms. No ground reality is provided. 80% people of this area are dependent on agriculture. We do not want this project.	-	The proposed project will implement all t control measures at the source level, which a incorporated in the Draft and Final EIA repor Further, it will comply with all the conditio stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent environmental pollution control measures this project.
21	Shri Vishrambhai Gadhavi, Village: Zarpara Taluka: Mundra Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	He represented that, • Our agriculture is adversely impacted. The characteristics of the Male Date Seeds seem to be transforming to that of Female Date Seeds. • We do not want this project. EIA report states that there is no living organism and only wild plants are present. No information is provided about river, vegetation and other living organisms. No ground reality is provided. 80% people of this area are dependent on agriculture. We do not want this project.	-	The proposed project will implement all control measures at the source level, which incorporated in the Draft and Final EIA repor Further, it will comply with all the conditio stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent environmental pollution control measures this project.
22	Shri Vishrambhai Gadhavi, Village: Zarpara Taluka: Mundra	He represented that; • Why is the chimney of Adani Power tilted? What is the height of Chimney?	The representative of the project proponent replied that: • The height of chimney of power plant of Adani Power having a capacity of more than 500 megawatts is 275 m. The height of chimney is kept for the dispersion of gases in the air. There are no norms on limit of carbon dioxide emissions.	The proposed project is a greenfield cop refinery project. The proposed project will implement all control measures at the source level to k the emissions under permissible levels. Further, it will comply with all the conditi stipulated by GPCB and MoEF&CC.

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		• It rains less due to this. A large amount of difference in rain is seen in Bhadiya and Zarpara village due to this. • Crores of tons of CO_2 is emitted daily. Is there any limit to it?	• The pollution is diluted around 2000 times due to the height of chimney. There is no study done which suggests that due to power plant it would have rained less at any place. Rain is almost found same in both villages. • The estimate of CO_2 in atmosphere at world level is around 350 to 400 ppm. There is no statutory limit for this. As per the NAAQ standard for sulphur dioxide, the 24 hour average limit is 80 microgram/m^3.	About Rs.1044 crores will be spent environmental pollution control measu under this project.
23	Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	• He represented that the wind direction is shown wrong.	• The representative of the project proponent replied that the wind direction is shown as per the winter season data. It is shown from South South West (SSW) to North North East (NNE).	The wind directions given in the wind ro indicate from direction. During the st period (October-December, 2016), predominant wind direction is from SSW NNE. This is generally in agreement with nearest IMD data at Kandla and repres coastal conditions.
24	Shri Bharat Kalyan Seda Village: Zarpara Taluka: Mundra	• He represented that It is submitted that the reply be given in Gujarati	Point noted and agreed.	-
25	Shri Nanji Mithubhai Maheshwari Village: Mota Kandagra Taluka: Mundra	He represented that; • Show on LED screen the letter with signatures and stamp of Sarpanch and Talati for the 8 affected villages that have been surveyed. • How will employment be provided in this plant?	-	It may be noted that the project area falls two villages namely Siracha and Navinal. The proposed project will provide employm to about 2000-3000 persons on average day during construction phase and dur operation phase, about 2000 dir employment and 5000 indirect employm will be provided. Locals will be given preference to employm based on skill set & eligibility requirement per the job and the vacancies available. A budget of Rs. 8 crores per each year been allotted for CSR activities for five years
26	Shri Bahrat Kalyan Seda	He represented that; Thousands of people are	-	The monitoring photographs and name

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	Village: Zarpara Taluka: Mundra	objecting. Show us the photographs of your visit in 16 villages.		sampling locations are enclosed as Annexure-VIII in the EIA report.
27	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that; • In the executive summary of page no. 2.1 the nearest village is shown as Mundra. Provide the list of all the affected 16 villages. Why is village Mundra included in affected villages? • What would be the time limit of this public hearing?	The representative of the project proponent replied that: • Through this public hearing, all your representations will be provided to the MoEF. The company will work in a transparent way. Mundra is the closest town to the Project area. The land of Siracha and Navinal villages are covered in this project. • In the EIA report, the Annexure-X contains demographic report. It contains list of 16 villages. This includes Siracha, Tunda, Mota Kandagra, Moti Khakhar, Nani Khakhar, Moti Bhujpur, Nani Bhujpur, Desalpar, Bharora, Zarpara, Pratapur, Mota Bhadiya, Dhrub, Tragadi, Nana Bhadiya and Navinal. • In chapter-3 of the EIA report, details of all the villages are provided. The EIA report is made as per the MOEF guideline. • The presentation contains the details of the impacts on environment. Moreover these details are also included in the EIA report. EIA covers study of all the aspects and its management plan is also shown. • The regional officer stated that, the public hearing will be completed after all the representations are heard.	Mundra is the closest town (22 km – road distance) to the project area. The land of Siracha and Navinal villages are only covered in this project. The demographic details of the entire study area is given in Section-3.10 of Chapter-3 in the EIA report.
28	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that when any company comes, it is required that 33% green belt shall be provided and as part of the same when Sunita Narayan committee visited, the plants were grown on both sides of the road. These plants	The representative of the project proponent replied that Respectable Sunita Narayan came in the year 2013. The green belt at present is much more than what was at the time of her visit. Even further plantation will be done.	About 85.79 ha of the proposed copper refinery complex (33%) will be reserved for greenbelt / green cover development as per prevailing guidelines from GPCB/CPCB/MoEF&CC. Native species with rich

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		do not exist at present.		canopy will be planted. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report.
29	Shri Gadhavi Kalyan Asariya Village: Zarpara Taluka: Mundra	He represented that in the past, I came for training in Adani Foundation on behalf of the KSKV University. At that time in the river and other places, around 60 thousand trees were planted but these are not found at present.	The representative of the project proponent replied that you both have asked different questions. One relates to village and the other relates to APSEZ.	About 85.79 ha of the proposed copper smelter complex (33%) will be reserved for greenbelt / green cover development as per prevailing guidelines from GPCB/CPCB/MoEF&CC. Native species with rich canopy will be planted. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report.
30	Shri Gajendrasinh Jadeja, Sarpanch Navinal Gram Panchayat Village: Navinal Taluka: Mundra	He represented that; • The sr. no. 10 on page C1-4 of the draft EIA report states that, there is no archaeological place at this site. However, at a distance of around 500 to 1000 meters from the proposed project site, the site of Navinal Archaeological site is present. I have the report of the MS University which states that it relates to the Harappa civilization. • The fisheries harbour is not developed at Bhadreshwar. The access roads for the fishermen were closed and are not opened again.	The representative of the project proponent replied that: • There is no mention of such a site on the Archaeological Survey of India Website. You shall be provided the list of notified site. • There was no permission to go to the Randh bunder (Bhadreshwar) at the time of Sunita Narayan committee visit. At present Foundation provides various facilities like water, electricity, etc. at that place. • After the visit of Sunita Narayan committee, the fishermen access roads were developed which are open even as on date.	There is no notified archaeological site within 10 km from the proposed project site.
31	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that: • The road to Bharadi Mata has been opened after a lot of troubles. You did not spare any effort to close down the road.	The representative of the project proponent replied that the road leading to Bharadi Mata has been kept open. As on date, not just one but two approach roads are available.	-
32	Shri Valji Bhai Tapariya Village: Zarpara Taluka: Mundra	He represented that; • In the production of copper plant, Sulphur is to be used and this will have acidic processes. • Environment will be impacted due to this. The effect of this sulphuric acid is shown in radius of around 10 km. This is around 20 to 25 km as per the opinion of experts.	The representative of the project proponent replied that: • No addition in the capacity of the copper smelter is envisaged for the refinery after the project approval. • The copper concentrate is processed in the copper smelter. Sulphur dioxide is generated from it. It is captured and	The process of extraction of copper metal, sulphuric acid will be recovered as a by-product from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced will be utilized for phosphoric acid production and rest will be sold in the market based on market requirement.

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		• At a humanitarian level, the GPCB should also take interest in this considering its personal responsibility for longer terms. No one is against development. The effect of copper refinery is even more than power plant. The plant should be taken away from human population if its place can be moved. In the past, electricity was generated with atoms and this eradicated the entire lineage of people. The fishermen should also not be affected. The government should take proper care and consider that no negative effect is found.	sulphuric acid is produced. This sulphuric acid is converted into phosphoric acid. • The sulphuric acid will be converted to phosphoric acid in the phosphoric acid plant. It will used in fertilizer plants. • Other than this, a by-product, fluoro-silicic acid will be made which will be used in the making of toothpaste.	The impacts and mitigation measures are given in Section-4.2.2.3 of Chapter-4. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
33	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that; • Will you make a residential place near the plant and reside at that place? If that is the situation, we do not object. We reside in the farms outside. • Is there any power plant, at any other place, with such big capacity?	The representative of the project proponent replied that: • Many a times our high ranking officers reside at the guest house of power plant. Many copper plants in the entire world are present beside cities. We will also make guest house in our copper plant. • Yes, there are power plants of total 20 thousand Megawatt capacities at Singroli. Angul, Andhra Pradesh has 16 thousand Megawatts capacity power plants. Tuticorin at Tamilnadu has 12 thousand Megawatt capacity of power plants. These all are coal based power plants. Now the government of India approves all big power plants with FGD only.	The employees of the proposed copper plant will be staying in the existing township of Adani at Mundra. The copper plant will have guest houses in its premises.
34	Shri Naran Gadhavi Village: Zarpara Taluka: Mundra	He represented that • The highest officer of the district was addressed and a letter was written on 27/4/17 and it was mentioned that the land on which the copper plant is proposed is subjudice matter. The collector has not	The representative of the project proponent replied that: • I give an elaborate reply to your question. With respect to the PIL no 12/2011, the committee visited APSEZ and its report was kept on record of the Honourable High	The proposed project area is not under the disputed land as claimed. All the show cause notices have been disposed. This proposed copper refinery project does not have any connection with this case pending before the Honourable Gujarat High court.

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		taken any decision till date. • It is mentioned under it that after the Honorable sitting principal judge and Sunita Narayan committee, two other committees also visited. First of all the committee of the Honorable sitting judge visited. The visit report was submitted to the high court. The report of this committee is subjudice. The second report (dated 05.11.2015 and 01.04.2016) one expert was called from Goa and another from Calcutta on the basis of the order passed by the Honourable Gujarat High Court. • The committee recommended that the 6 thousand acres of land should be returned to the government. No decision till date has been taken in this regard. • As for this the contempt of court proceedings shall be held against the competent officer. The map is also shown in the EIA report. Why is the public hearing been done, even if the matter is subjudice? • GPCB is also a party in this matter. On the basis of our complaint, the Sunita Narayan committee provided a report on 17.09.2015 to MoEF&CC, government of India. • Two maps have been submitted to the Gujarat High Court committee. These are on the record of the high court. You submitted the map with topo sheet. These were for entire land. This includes your	Court. The matter was disposed by the Honourable Gujarat High Court on 17.04.2015. • As per previous proceedings the contempt petition (no. 9124) dated 12.07.2011 was filed. Thereafter on 15.10.2015, the order was passed. The matter with reference to the Sunita Narayan committee report, was disposed of in the year 2015. As per the order passed by the Honourable Gujarat High Court there is no contempt order. The report was submitted by the committee including expert from Goa and Calcutta on 08.06.2016. That particular matter is pending before the Honourable High Court of Gujarat. The committee recommended that 100 ha or more mangroves plantation should be undertaken. The project area is not part of the disputed land. All the show cause notices have been disposed. The recommendation is done in the survey by the committee. It is not an order. The company will accept the final order passed by the Honourable High Court. The land of the proposed project does not have any relation with this matter. The land under notified SEZ shall be used for this land. The MOEF will consider the matter that is pending before the High Court. The proposed project does not have any connection with this matter. • The MOEF has provided the direction to the company and the company is working on it. The report for this is submitted to the MOEF every 6 months. The matter	

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		project. • As mentioned by you, the forest area is to come under the project. The High court committee has stated that, the land should be taken away from Adani and provided to the government. The 5,333 ha of forest area should be restored. • This matter is under consideration at the Gujarat High Court. Why is this case not mentioned in your EIA report?	you have stated is about the survey of the report of the committee. It is a recommendation and not a decision. The Gujarat High Court will consider the submissions of the company along with the committee report and the company will comply to the guidelines provided by the court thereafter. • The government of India will decide further course of action on your matter and our reply. • The representative of the project proponent replied that this proposed project does not have any connection with this case pending before the Honourable Gujarat High court. This is our submission.	
35	Shri Bharubhai Ranshibhai Shankra Secretary, Kehti Vikas Seva Trust, Village: Zarpara Taluka: Mundra	• He represented that: Do thing that would be favourable for the people. Do not leave after taking money. I do not have any objection for the company to either come or not. Do all that is in the interest of people.	-	A budget of Rs.8 crores per each year has been allotted for enterprise social responsibility/CSR activities for five years. The CSR details (like CSR policy, initiatives & activities, CSR budget expenditure data from 2010 to 2016, Proposed CSR budget plan for next 5 years and CSR implemented photographs) is given in Section-8.5 of Chapter-8 in the EIA Report.
36	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that, we will not let the permission be granted for a new plant. The regulations laid down by the GPCB, CPCB, MOEF&CC are violated by the company and the officers present at this place should inspect the matter. We do not want a new project.	-	There is no violation with respective to GPCB, CPCB, MOEF&CC by the proposed project. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC.

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				About Rs.1044 crores will be spent for environmental pollution control measures in this project.
37	Shri Bharat Kalyan Shetha Village: Zarpara Taluka: Mundra	He represented that, the people here do not want this project to come. The people here want clean environment. The people do not want this progress; the people do not want the long term destruction, Kindly take note of this.	-	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
38	Shri Anwarbhai Ibrahimbhai Vagher, Village: Navinal Taluka: Mundra	He represented that, no damage has been done to the fishermen access roads or any other things. Our access roads are not closed. The people from Patel community and our villagers do not have any objection for the plant to be established.	-	There will be no damage to fisherman due to the proposed project. The total budget of Rs.40 crores will be spent on CSR activities in which fishermen welfare will also be included.
39	Shri Kadar Ismail Village: Navinal Taluka: Mundra	He represented that our roads are open and we do not have any objection.	-	-
40	Shri Gajendrasinh Jadeja Sarpanch, Navinal Gram panchayat Village: Navinal Taluka: Mundra	He represented that, • The fishermen of my village do not have proper knowledge. I can show the maps of forest department and other maps to confirm which access roads are closed down. The access road which is shown in the map belongs to forest dept. The fishermen access road to the sea passes through the project site. • This is government road. It is not owned by you. I am talking about the road that has been made by the government for the fishermen.	-	There will be no damage to fisherman due to the proposed project. The roads used by fishermen will not be disturbed due to the proposed copper smelter project. Further, a total budget of Rs.40 crores will be spent on CSR activities in which fishermen welfare will also be included.
41	Shri Anwarbhai Ibrahimbhai	He represented that our roads are open. Kotdi	-	-

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	Vagher/ Shri Kadar Ismail, Village: Navinal Taluka: Mundra	Bandar and Sodawadi Creek are open. We do not have any kind of objection.		
42	Shri Pravinsinh Bhurubha Chauhan Village: Siracha Taluka: Mundra	He represented that information be provided if the road from Navinal to Daneshwar, which existed, is closed down or not?	-	
43	Shri Asariya Lakha, Village: Zarpara Taluka: Mundra	He represented that, it is the responsibility of the chairman to ascertain that no one comes for the purpose of praising someone. The proceeding should be as per instruction from chair. The purpose of this public hearing is to hear the representations of the affected people.	-	-
44	Shri Gandrasinh Jadeja Sarpanch, Navinal Gram Panchayat, Village: Navinal Taluka: Mundra	He represented that first of all compliance of existing environmental clearance for power and SEZ should be met and then this project should come.	-	The proposed project is an independent greenfield copper refinery plant. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
45	Shri Rambhai Kanani Village: Zarpara Taluka: Mundra	He represented that the company has a strategy to bring some hired people after two hours of hearing and these people will take the entire hearing out of track.	-	-
46	Shri Gandrasinh Jadeja Sarpanch, Navinal Gram Panchayat, Village: Navinal Taluka: Mundra	He represented that • 102 ha of land of the forest department will be used in this project. Adani had in the year 2004 made a demand of 1576.81 ha of land but the forest department has not approved it till date. Navinal and Shiracha, both villages have claimed their rights under the Forests Rules. The people of	The representative of the project proponent replied that: • You know very well what is the land use of the 102 ha of forest land and as per the report of the forest department, no major displacement would be required. The 33% green belt will be developed at	The total land required for the proposed project is about 256.58 Ha (634 acres), out of which 154.19 ha (381 acres) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Memorandum of Understanding (MoU) is in place between Adani Ports & Special

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		Navinal and Shiracha graze their cattle and obtain livelihood. If this forest is given, where will the wild animals and grazing domestic animals go? And lastly when the remaining forest land, government land and Gochar land is given, where will the people, animals and birds go? • This is the last reserve forest of this area. Bharadi Mata is sand dunes. This is coastal and mangrove forest. This area is under the CRZ-1 area. There is no provision for approval of such land.	the time when plant comes. As per the report of the forest department, no major displacement would be required. The land of this area will be used by the company for the development of green belt and specific care will be taken for the animals and birds. The animals shall be provided fodder through CSR activities. • The forest department will take all these aspects into consideration while providing clearance. • Other than this, the Bharadi Mata reserve and coastal forest is situated near the project site. The animals obtain fodder from that place. The project will utilize 111 ha of Navinal land. While 102 ha of land of Shiracha will be used for development of green belt.	Economic Zone Limited (APSEZL) and Adani Enterprises Ltd (AEL) for 154.19 ha (381 acres). MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. Stage-I FC has been obtained as given in Annexure-V in the EIA report. The conditions stipulated in the Forest Clearance and Environmental Clearance will be strictly adhered to and complied with. It is also committed that the fodder to cattle in the nearby villages such Siracha and Navinal will be provided through CSR initiatives. About 85.79 ha of the proposed copper refinery complex (33%) will be reserved for greenbelt/green cover development as per prevailing guidelines from GPCB/CPCB & MoEF&CC. Native species with rich canopy will be planted. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report. Further, the proposed project is outside the CRZ area, the approved CRZ map with proposed project is shown in Figure-1.5 of Chapter-1 in the EIA report.
47	Shri Pravinsinh Bhurubha Chauhan, Village: Siracha Taluka: Mundra	He represented that, • The Dates, Deshi Babool, etc. trees present on the forest department land and located adjacent to the power plant have dried out due to smoke from stack and cooling	The representative of the project proponent replied that: • Even at present the land is under the forest department and the plants that you	The plants are existing in the study area. The proposed green belt/green cover will also have native plants. The proposed plant area does not have the presence of Nilgai, Jackal.

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		tower. • Where will the animals like Nilgai, Jackal, fox and others go? They will come at our farms.	state are alive. No such thing has occurred. • This is not true and the forest department would have informed us if such a thing would have occurred.	However, they are present in the buffer area and all the precautions will be implemented as suggested under Forest Clearance and Environmental Clearance.
48	Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	He represented that there is a difference between the EIA report and the presentation. The details mentioned in the Gujarati report are not actually true. There is difference in the description of environment. Under the project area, only Babool and peacock are shown. But the actual situation is different. There are medicinal plants also at this place. The description of the nature is given but it is not ground reality.	The representative of the project proponent replied that, the summary of the EIA report is shown as part of the presentation. The entire EIA report is not to be shown in the public hearing. In case if you have found any discrepancy in the EIA report, you may draw attention as to the same in writing and this will be included under the public hearing proceedings and it will also be submitted to MoEF&CC, Government of India. Moreover EIA report is prepared based on the information obtained at that relevant point of time.	As per primary ecology and biodiversity survey the details are given Section-3.9 of Chapter-3 in the EIA report. The faunal species were categorized as per conservation status of Wildlife Protection Act, 1972 and reveals that peacock is the only Sch-I species in the study area. However, it has been assessed as Least Concern bird as per the International Union for Conservation of Nature (IUCN). Further, the conservation plan and measures for Peacock are recommended in Section-3.9.9 of Chapter-3 in the EIA Report.
49	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that the company has shown its video during the hearing. All good things are being projected. No information is provided about the side effects, risk, etc. from the project. The video of the person submitting representation shall be shown.	The chairman stated that, • Please submit your CD we will be include the same in proceedings. Note: It was tried to show the video of representation by mobile on LED screen however it could not be run due to any reasons.	-
50	Shri Pravinsinh Bhurubha Chauhan Village: Siracha Taluka: Mundra	He represented that, I wish to show the CD related to the scams committed by the Adani Power and SEZ. It is mentioned under the Form-1 that there is no mangrove at this site but as per my view there are mangroves presents.	-	There is no mangrove planation within the proposed project site.
51	Shri Rambhai Kanani Village: Zarpara Taluka: Mundra	He represented that the people are facing problems from your existing plants and therefore people do not welcome your project.	-	-
52	Shri Usman Gani H Sheraseeya Village: Vakaner	He represented that • How much water will be obtained for this project and from which place will it be	The representative of the project proponent replied that, 32800 cubic meters of water will be required for this project which will be used	The total water requirement for the project is about 32,800 m^3/day which will be sourced from desalination plant of APSEZ Ltd, through

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	Taluka: Morbi	taken? • Will you discharge salty water after desalination in the sea?	after desalination of the sea water by APSEZ.	M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD). The water requirement details are given in Section-2.2.3 of Chapter-2 of the EIA Report.
53	Shri Devendrasinh Jadeja Village: Mota Kardagra Taluka: Mundra	He represented that we are in favour for the company to establish this plant. But what is the percentage of local public that will get employment? Provide in writing.	The representative of the project proponent replied that the company will require around 3000 persons at the time of construction. We will try that maximum unskilled labour is employed from local people.	The proposed project will employment about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
54	Shri Lakhubhai Rabari Village: Tunda Wandh Taluka: Mundra	He represented that: • The officer present at the time of construction of the project are transferred after the starting of operation of the project and therefore proper solution to our problems are not provided. • What kind of employment will be given to the unskilled people?	The representative of the project proponent replied that: • The feeling of the local public will be considered and problems will be properly solved. Efforts will be made to ensure that local public is provided employment to an extent possible. • Efforts will be made to ensure that unskilled people also get employment.	The proposed project will employment about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
55	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that the company wishes to bring project at this place for its own benefit not for the development of the local public.	The representative of the project proponent replied that the company can establish industry at other place also but the decision to establish project at this place is for the development of Mundra.	A budget of Rs.8 crores per each year has been allotted for CSR activities for five years. The CSR details (like CSR policy, initiatives & activities, CSR budget expenditure data from 2010 to 2016, Proposed CSR budget plan for next 5 years and CSR implemented photographs) is given in Section-8.5 of Chapter-8 in the EIA Report. Further, Locals will be given preference to

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				employment based on skill set & eligibility requirement as per the job and the vacancies available.
56	Shri Valjibhai Tapariya Village: Zarpara Taluka: Mundra	He represented that in the forthcoming projects and the existing projects, Adani and other voluntarily organizations should make an exchange centre, the record of qualified persons should be prepared and the people should be taken on service as per the requirement of the company and their qualifications.	The representative of the project proponent replied that, we are in process of making Adani Skill development centre. Efforts will be made in future to create employment opportunities. Moreover linkages will be established with the employment exchange and the registered persons having appropriate qualification shall be given priority.	As promised, Adani skill development centre will be developed at the project site. Necessary budgetary allocation will be done.
57	Shri Hussain Vasu Luhar Village: Tunda Taluka: Mundra	He represented that how many people of Tunda village serve at Adani? I was also provided employment but was terminated without providing any reason.	The representative of the project proponent replied that more than 100 persons of the Tunda village serve at Adani company. In the year 2012, a total of 35 persons were given employment on the basis of the representation of the Gram Panchayat. You were given much better salary increments as you were the resident of village. You are not terminated from service as on date.	Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
58	Shri Gulabsinh Babubha Jadeja Village – Mota Kandagara Taluka: Mundra	He represented that we do not have any objection towards this project. Due to company we have progressed.	-	-
59	Shri Viram Naran Shekhara On behalf of Bharatiya Kisan Sangh Village: Zarpara Taluka: Mundra	He represented that • A large number of objections are represented during public hearing. If the company comes and if there are any chances of environmental degradation, then the government authority should consider it seriously. The work should not remain only on paper. • It should be considered that the local public are not receiving employment. • If the NGT can issue notice to even Shri Ravishankar, then no one is over and above the environment.	The representative of the project proponent replied that: We undertake all kinds of work in a transparent manner. We are making efforts so that at least ten persons from each village receive employment. The suggestion of tissue culture laboratory for the development of agriculture is welcome and the relevant process will be considered for the same. We are ready to consider the requirements of the farmers through meeting with their committee, we shall do work on required issues, a 5 year plan will be undertaken with you and such opportunities will be undertaken	Pollution Control: The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.

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		• Even in the past, before the establishment of the solar plant, the number of jobs were promised but the same is not observed. • The company should work for developing new sources of water. • By ignoring agriculture and developing industries, how many days will we survive? Agriculture development should also take place. • Moreover development of education is also necessary. Also, the Adani Company should establish a laboratory at Mundra for Tissue culture development of date farming. So farmers concerns can be addressed.	that the employment opportunities are created through employment exchange. The company will work towards satisfaction of local people. Efforts will be made to provide the Drip Irrigation system for Date farming. As part of CSR activities, provision of eight crores rupees every year has been done separately for this project.	CSR Initiatives: A budget of Rs.8 crores per each year has been allotted for CSR activities for five years. The Tissue Culture Laboratory development will be considered. Further, drip irrigation system for date farming will be included in the CSR initiatives.
50	Shri Dayabhai Gadhavi Village: Mota Kandagara Taluka: Mundra	He represented that • As per the page no. 8 of the EIA report, the impact of sulphur dioxide on environment is negligible. How is it possible? • Why do you not operate the ESP at night in the Adani Power?	The representative of the project proponent replied that, • In order to avoid harmful impacts to environment, concentration of sulphur dioxide emissions is regulated by stipulated norms. The emissions of sulphur dioxide will be within the prescribed limits after the erection of copper plant. • At the Adani Power, the ESP is always in operation when the plant is in operation.	The SO_2 generation is a continuous process during smelting activity. Primary gas stream will be routed to sulphuric acid plant (SAP) plant and the fugitive gas stream will be routed through scrubber. Further, there is no provision in the plant/process for storage of SO_2 gases and will be processed immediately to produce sulphuric acid. Sulphuric acid plant (SAP) will be installed with highly efficient (Double Conversion Double Absorption) DCDA process to control the SO_2 emission to less than 1 kg/t of sulphuric acid produced. About Rs. 1700 crores will be invested to

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				install sulphuric acid plant.
				The details of episodal SO_2 stack emissions are addressed in Section-4.2.2.3 of Chapter-4 of the EIA Report. The process of extraction of copper metal, sulphuric acid is recovered as a by-product from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for phosphoric acid production and rest will be sold in the market based on market requirement.
61	Shri Ranjitsinh Jadeja President, Taluka Panchayat Mundra Taluka: Mundra	He represented that, I hereby submit as a political leader that due to the establishment of the company, employment opportunities will be increased and the local people, taluka, state and entire country will develop.	-	The employment of local people in primary and secondary sectors of project shall upgrade the prosperity of the region. This in-turn will improve the socio-economic and infrastructure conditions of the area. Further, a total budget of Rs.40 crores will be spent on CSR activities in the five year period, which will help the socio-economic development of the region.
62	Mrs. Devalben Gadhavi Village: Shekhadiya Taluka: Mundra	She represented that, it is submitted that by way of this project, care should be taken that the local ladies and other local public is given employment.	The representative of the project proponent replied that, as for the employment of ladies, arrangement has been made so that 120 ladies will get employment. Moreover, we will sign an MOU with Welspun Company in order to provide proper training and employment to ladies so that their condition will improve.	Locals will be given preference in employment in the proposed copper refinery project. As promised, about 120 ladies will get employment. Further, proper training will be imparted to the ladies so that their employability will increase.
63	Shri Ibrahim Turk Village: Dhurb Taluka: Mundra	He represented that you are portraying this project as a green field project. But around 103 ha of land of forest department is taken in this project. How can this project be termed as green field project?	The representative of the project proponent replied that, any new project is stated to be green field project. There is no relation of word 'green field' with vegetation. It is only an English word.	About 85.79 ha of project area (33% of the project area) will be developed with greenbelt / green cover as per prevailing guidelines from GPCB/CPCB/MoEF&CC. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report.
64	Shri Hirabhai Patariya Sarpanch, Deshalpar Kanthi	He represented that this project is only 5 km away from our village. Therefore it is submitted	The representative of the project proponent replied that, as discussed earlier, attempts will	As promised by the project proponent, about 10 persons from each village in the study area

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	Gram Panchayat, Village: Deshalpar Kanthi Taluka: Mundra	that our village should also be given priority in the manner that Navinal and Shiracha are given priority.	be made to employ 10 persons from each village.	will be employed. Necessary skills will be developed through the Skill Development Centre as proposed.
65	Shri Ibrahim Turk Village: Dhurb, Taluka – Mundra	He represented that • You are to take sea water for this project and therefore what would be the impacts of this activity on the marine ecology? Have you conducted any study in this regard? • What will be the impact of salinity ingress on agriculture? • There is increase in salinity and loss to agriculture in the Tunda, Kandagra and other such areas due to cutting of mangroves.	The representative of the project proponent replied that: • The NIO organization has conducted study for the Intake and Outfall channels per the rules and regulations of MoEF&CC. The 11 km long outfall channel will meet the sea near West port and will dilute the quality of outfall. Moreover it is always ensured that the water temperature does not exceed more than 5 degree higher than the sea water ambient temperature and the salinity does not exceed 57 PPT. • We had undertaken a study through M/s Gujarat Institute of Desert Ecology (GUIDE) for assessment salinity of underground water. The salinity in the underground water has increased not only in the project surrounding area but also in the entire Kutch area. This is due to lack of rain and over-drawl of ground water. • The industries of this area are not dependable on ground water.	The total water requirement for the project is about 32,800 m3/day which will be sourced from desalination plant of APSEZ Ltd, through M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).
66	Shri Natubha Jadeja Village: Shiracha, Taluka: Mundra	He represented that 100 people of my village were employed by Adani Power Company. Hence, my village has received employment. Thus it is our submission that this plant should be established so that the employment is increased and the problem of unemployment of rest of our villagers is resolved.	-	As promised by the project proponent, about 10 persons from each village in the study area will be employed. Thus local people will be given preference. Necessary skills will be developed through the Skill Development Centre as proposed. The employment of local people in primary and

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				secondary sectors of project shall upgrade the prosperity of the region. This in-turn will improve the socio-economic and infrastructure conditions of the area.
57	Shri Bharat Kalyan Seda Village: Zarpara Taluka: Mundra	He represented that • The water to be sourced from sea will be through pipeline of open canal? In case if you dig a canal, the farmers will be impacted. • He represented that a charge of Rs. 200 is levied on trucks at entry gate by Adani Company.	The representative of the project proponent replied that • The water to be used in this project will be obtained from existing intake channel. Thereafter, the desalinated water from APSEZ will be transferred through pipeline to proposed project. • The contractor that works in the area of the company or APSEZ are provided with zero amount gate pass for their trucks and therefore no charge is levied from them.	The total water requirement for the project is about 32,800 KLD (32.8 MLD). The total desalinated water requirement for the project would be sourced from APSEZ Ltd, through M/s. Mundra Utility Pvt Ltd (MUPL). The desalinated water from the APSEZ will be transferred through the pipeline only. There will not be any open channel flow. Further, an integrated water system is proposed, the effluent from the process units is treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEF) for further recovery and solids generated will be sent to Secured Land Fill (SLF). This water would be utilized to meet the DM water and plant/utility water requirement of proposed project. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).
58	Shri Valji Sumar Gadhavi Village: Zarpara Taluka: Mundra	He represented that, I have been working with the Adani Company since the last 15 years. My 50 trucks are working for this company. Rs. 200 charge is not charged for my trucks.	-	-
59	Shri Kirtibhai Gor Village: Tunda, Taluka: Mundra	He represented that there was no such public hearing conducted for the solar project. Certain boys have received employment in this project. Around 50% of people from the bio-data sent by me have received employment. The persons that have completed B.E. should receive	The representative of the project proponent replied that for the protection of the environment, latest technology and equipment will be installed and operated in this project. Treatment plants for air and water both will be installed. The entire process will be as per the	Pollution Control: The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels.

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		employment after the completion of apprenticeship and thus what are the plans of the company to employ such persons? Such projects are welcome. We are 100% in favour of the development but not at the cost of environment. I had written to the GPCB officer that large amount of emission is emitted from the chimney. If the emission that is emitted today comes out regularly, then it is acceptable. The letter is written to GPCB for emission. Also received reply from GPCB. The development should be such that no one suffers due to impacts on environment.	rules and regulations stipulated by the government so that environment will not be damaged due to this. .	The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project. CSR Initiatives: A budget of Rs.8 crores per each year has been allotted for CSR activities for five years.
70	Shri Dayabhai Gadhavi Village: Mota Kandagra, Taluka: Mundra	He represented that the project is entirely chemical based, which will be spread in water, air, noise, land, etc. and it will affect the agricultural land. I feel that such kind of project should be around 20 to 25 km away from the residential area. What are the measures for protection from such kind of project?	The representative of the project proponent replied that as part of this project, manufacturing of copper from copper concentrate will be through smelting and electrochemical process, the polluted water that comes out from this project will be sent to the RO plant after treatment in ETP. Therefore, no polluted water will be released outside. Thereafter, this water will be used again in the process. The rejects will be treated through multi effect evaporation and thus the water will be removed from it. Flue gases released from the process will be captured and converted to intermediate products through chemical process. It shall be ensured that no storage leakage is possible by performing the risk analysis and hazard identification. Thus, there will be minimal chances of water and air pollution.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
71	Shri Lakhdirbhai Gilwa Village: Zarpara, Taluka: Mundra	He represented that the farming of Chickoo and Dates have suffered a lot due to existing projects. The ground water levels have gone	The representative of the project proponent replied that: Adani Port and Adani Power do not use ground water. The new project will also	There is no ground water withdrawal (consumption/ utilization) for proposed project and project operates on zero discharge

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		down after establishment of these projects. It has impacted production of Chickoo and Dates and thus the farmers have strong objection against this project.	not use ground water. Both these projects use sea water.	concept. Hence, due to proposed project there is no scope of ground water levels reduction and contamination.
72	Shri Khengar Gilva Village: Zarpara, Taluka: Mundra	He represented that the plantation from Bhadreshwar to Tunda Vandh was removed after establishment of projects. Due to this reason, the wild animals like pigs and Nilgai enter our farms. Therefore, it is our submission that please do something for the protection of the crops.	The representative of the project proponent replied that prior to this also, support for drip irrigation is provided to the farmers from many villages since last three years. Special attention will be given to provide support for drip irrigation as and when required.	As part of the CSR program, drip irrigation facilities will be provided in the nearby villages. The total budget of Rs.40 crores will be spent on CSR activities in five year period.
73	Ms. Shital Rajgor Village: Mota Kandagra, Taluka: Mundra	She represented that we do not have any objection for the establishment of company. Ladies like us get employment. We are in favour of the company.	-	-
74	Shri Dayabhai Gadhavi Village: Mota Kandagra, Taluka: Mundra	He represented that • What would be the concentration of Sulphur Dioxide and at what height it will be released? • How sludge will be disposed? • How much quantity of Sulphur Dioxide will	The representative of the project proponent replied that: • Sulphur dioxide will enter the sulphuric acid plant directly from the copper smelter. Acid will be made in this plant. After making acid, it will be scrubbed in tail gas scrubber and after that the gas will be released in air which will mainly contain oxygen and nitrogen. Concentration of sulphur dioxide will be below the prescribed limits by the Government of India. • Gypsum will be manufactured from gas scrubber using lime. This will be used in the cement industry. The flue gases will be released in atmosphere at a height of 100 m. • As per CPCB norms, 1 kilogram sulphur	• The SO_2 generation is a continuous process during smelting activity. Primary gas stream will be routed to sulphuric acid plant (SAP) plant and the fugitive gas stream will be routed through scrubber. Further, there is no provision in the plant/process for storage of SO_2 gases and will be processed immediately to produce sulphuric acid. • Sulphuric acid plant (SAP) will be installed with highly efficient (Double Conversion Double Absorption) DCDA process to control the SO_2 emission to less than 1 kg/t of sulphuric acid produced. About Rs. 1700 crores will be invested to install sulphuric acid plant. The process of extraction of copper metal, sulphuric acid is recovered as a by-product from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for

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		be released in air? What will be the density of Sulphur Dioxide?	dioxide will be released per ton of sulphuric acid produced. The density of the flue gas will be same as the air. It will contain very less amount of sulphur dioxide. The same will be around 150 to 200 ppm. We will establish a plant that would be one of the best plants in the world.	phosphoric acid production and rest will be sold in the market based on market requirement. • Secured Land Fill (SLF) is proposed over 30 acres within the project premises for disposal of ETP waste sludge and spent catalyst. Other hazardous waste will be disposed through the approved recyclers.
75	Shri Ashariya Lakha Gilwa, Village: Zarpara, Taluka: Mundra	He represented that the average temperate keeps on increasing every year. In copper project 300 Megawatt power will be required and you will generate steam that would be capable to produce 40 Megawatt of electricity and thus will this increase the temperate?	The representative of the project proponent replied that there will be no increase in temperature due to this project. It would be preferable to use steam for production of electricity instead of releasing it in air. Fuel consumption can be reduced. The electricity will be produced using steam as per rules and regulations. Thus the temperature outside the plant will not increase.	The electricity will be produced using steam as per rules and regulations. Thus the temperature outside the plant will not increase. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project
76	Shri Naran Gadhavi, Village: Zarpara, Taluka: Mundra	He represented that the objection is done because the effect of pollution will be same for all. We are talking about the impacts that are found on the environment, ground water, human health, mangroves, fishermen, cattle rearers, Dates crop, children, etc. should be discussed. We do not object to the development. We would welcome the development if proper environmental measures are taken care of. The objection is only against pollution and randomly placed electric lines. CRZ rules have been violated. Water has turned saline and its TDS has become more than 4500.	The representative of the project proponent replied that • Proper attention will be given to your representations. You have raised important points as an NGO and we have undertaken the appropriate actions as well. One should always talk as a responsible citizen. • We will undertake all kinds of development by following the rules and regulations and we hereby give assurance for the same. The guidelines will be considered while development of new plant.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. The budget allotted for environmental protection will be about Rs. 1044 Crores, out of which for air pollution control systems is Rs. 639 Crores, water pollution control system is Rs. 360 Crores and other environmental management systems (like solid waste, greenbelt, post project monitoring, gas collection and energy conservation) is Rs. 45 crores.

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				Further, a total budget of Rs.40 crores will be spent on CSR activities in five year period.
77	Shri Paresh Rajgour Village: Tunda, Taluka: Mundra	He represented that it is our expectation that the plant will be established by considering the rules framed by the Government of Gujarat and Central Government as well as considering the public interest.	The representative of the project proponent replied that the company is responsible for maintaining public interest and environment. The company will operate the plant by considering the public interest and environment.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC.
78	Shri Pravinsinh Bhurubha Chauhan Village: Siracha, Taluka: Mundra	He represented that TATA Power plant took Gochar land. They have entered into agreement to provide either green or dry fodder. Why you do not enter into such kind of written agreement?	The representative of the project proponent replied that: • In your case the Gujarat High Court has ordered to provide fodder for a particular duration and this duration is even now in effect. Thus, there is no question of entering into any kind of agreement or contract as the order is passed by the High Court. • We are providing the dry and wet fodder to the villages having requirement on the basis of the order passed by the Honourable High Court. We are also providing fodder voluntarily to the villages from which the people have not gone to the courts.	A budget of Rs.8 crores per each year has been allotted for CSR activities for five years. The provision of fodder to the needy villages will be covered under CSR initiatives.
79	Shri Viram Naran Sankhra (Member of Kishan Sangh) Village: Zarpara, Taluka: Mundra	He represented that the issue is not limited to fodder, it is a request to maintain positive attitude from your side on permanent basis. So that such a public hearing would not even be required in the years to come. Such kind of submission is done.	-	-
80	Shri Vishram Gadhavi, Village: Zarpara, Taluka: Mundra	He represented that, I am worried about my existence, the existence of my village, the existence of agriculture and therefore I have come to object. It is expected that you undertake your role in an unbiased manner.	-	-
81	Shri Naran Gadhavi,	He represented that	The representative of the project proponent	The proposed project will be designed as per

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
	Village: Zarpara, Taluka: Mundra	• Three reports have been found for the production of copper plant. Out of this 1) Regional Institute of technology, Jamshedpur, 2) Energy Laboratory and department of biology science Cambridge University, London and 3) Public Health report. Which reports contains the details of serious side effects of production of copper. Therefore provide the information that what diseases are possible due to the dust of copper? • As per the report, hair falls, stomach ache, cancer and other inhalation related diseases, etc. occur due to dust. How you will control the dust? How many teams will you have? How many doctors will be available? • The second question is that, how will you control the air emissions that will be released in the atmosphere? What is the facility that is done by you as for this? • The sulphur dioxide that is released in air will damage health and so what steps have been taken by the company?	replied that: • The reports that you are mentioning are related to plants that are very old. The plants with latest technology are even present in developed countries. The dust from the plant is collected and used in furnace. Moreover, the dust on the road is also collected by vacuum truck. At the places where the workers are required to work in dusty area, they will be provided personal protective equipment (PPE). • Copper concentrate material contains 8 to 10% moisture and therefore there is very less chance of dust emissions. Even thereafter, if this dust goes into breathing, the material is inert and therefore there would not be any specific effect. The effect is just like the diseases that are caused by normal dust. • The sulphur dioxide will be used as intermediate product, its chemical process will be undertaken and sulphuric acid will be made from it. Therefore, there is no question of the toxic gases releasing in the atmosphere. • The chemical process of these gases will be done and intermediate product will be developed. It shall be ascertained that no leakage is possible by performing the risk analysis and hazard identification. Thus, there will be minimal chances of air pollution. • After making sulphuric acid, it will be	the latest technology with all in built pollution control measures. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
			scrubbed in tail gas scrubber and the gas will be released in air. The lime will be used during the gas scrubbing process and gypsum will be made. This will be used in cement industry.	
82	Shri Dayabhai Gadhavi, Village: Mota Kandgara, Taluka: Mundra	He represented that what kind of storage would be done by the company for raw material and how raw material will be transferred?	The representative of the project proponent replied that the company's copper concentrate storage will be entirely covered. The pipe conveyor will be used to transfer material from port to plant.	-
83	Shri Valjibhai Tapariya, Village: Zarpara, Taluka: Mundra	He represented that with bottom of their hearts, everyone wishes that industries should come. Industries should take corrective actions when there are objections. Industries are welcome with the conservation of environment.	The representative of the project proponent replied that all points that are represented here will be taken care of. We will also consider the benefits of common public on behalf of the company. We are 100% responsible for the common public as a developer. We will consider that properly.	-
84	Shri Mayur Aatu Maheswari Village: Tunda, Taluka: Mundra	He represented that • What is number of the employment opportunities provided to the local public by the existing industries? Why are the local people sacked from their jobs? A committee should be constituted so that the local public gets employment and an open discussion / meeting should be held between the company officers and committee for the purpose of providing employment to local public. This discussion should be done openly not behind closed doors. As per the rules of the government, the local public should receive 85% of employment. • Provide the list showing how many local persons have received employment / work in the existing industries.	The representative of the project proponent replied that the list of the local persons working in the company will be provided. We undertake the process of employing the local people in consultation with the Sarpanch and Gram panchayat. Even this process will be made further transparent. The main reason for termination of job is that the workers are irregular.	The proposed project will give employment to about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
85	Shri Mithu Jakhu Maheshwari Village: Mota Kandagara, Taluka: Mundra	He represented that • The preservation of water and environment should be made for farming. Farming gets	The representative of the project proponent replied that Considering your representation, without any pressure, the work will be done	The total water requirement for the project is about 32,800 m^3/day which will be sourced from desalination plant of APSEZ Ltd, through

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
		affected due to sea water, Dates do not grow up. Water is not fit for drinking within the radius of 3 KM. Therefore the company should think about this loss. • The work for 3 storage area for Cowsheds is stopped in Kandagara. The representation has been made to restart the construction work of storage area. • The representation has been made for fair work.	and efforts will be made to finish incomplete works.	M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).
86	Shri Salu Kumbhar, Village: Tunda, Taluka: Mundra	He represented that three Fishermen access roads towards sea have been closed, due to which we have to take 5 km long route, we do not have vehicles, therefore, the demand has been made to open three routes.	The representative of the project proponent replied that we will fully cooperate with fishermen and will make sure that no hindrance is made in the route of fishermen, if there is any obstacle, they can approach us any time.	As committed, the fishermen routes will not be disturbed during the construction and operation of the proposed green field copper plant.
87	Shri Kirtibhai Gor, Village: Tunda, Taluka: Mundra	He represented that which water will be used in the upcoming plant?	The representative of the project proponent replied that in the proposed plant, seawater will be used after removing salt (desalination).	The total water requirement for the project is about 32,800 KLD (32.8 MLD). The total desalinated water requirement for the project would be sourced from APSEZ Ltd, through M/s. Mundra Utility Pvt Ltd (MUPL).
88	Shri Dayabhai Gadhavi Village: Mota Kandagara, Taluka: Mundra	He represented that • As per the notification of Government of Gujarat / Government of India, 85% of people shall be employed from local areas, how many have you employed? • What steps have been taken to develop the unskilled people to give them the right opportunity?	The representative of the project proponent replied that we are trying to provide employment to the local people to a great extent, but in the initial stage, due to the lack of requisite qualification, the company was facing problem to provide the employment. After the ITI has started and after the training of RTG is provided, the proportion of local employment has increased and will continue to increase.	The proposed project will give employment about to 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
89	Shri Hamir Rabari Village: Wandh, Taluka: Mundra	He represented that one of my two handicapped children who cannot hear and the other one cannot speak. The representation had been made for their job.	The representative of the project proponent replied that we had employed their children, but they said that one of their boys is working in the Tata Company; and they do not want to join here now.	-

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90	Shri Dosabhai Gadhavi Bhurubha Chauhan, Village: Siracha Taluka: Mundra	He represented that if the industry comes then damage will be done. We are not against the plant. You will fill the vacancy on contract basis. But, what will you do for farmers like us and our children? TDS analysis been carried out by me in the 2007 and 2012, the TDS was reached up to 2200, which is not fit for drinking. We used to get drinking water from bore well, now we have to buy water bottle. In the last 5 years 800 to 900 TDS has been increased. In fact, nothing has been done for the farmers; we demand that something is done for the farmer and farming. The fruits from our farm are not worth eating.	The representative of the project proponent replied that, we will work towards solving problems of farmers. Efforts will be made to open the Kishan School for the children of the farmers. The planning as to how the ground water level can be increased, has been made by Adani Foundation, along with Mr. Yogesh Jadeja to improve the water supply in 10 villages and for the purpose of employment, the children of farmer will be given priority for this purpose.	The issues raised will be covered under CSR development program. Under this project a total budget of Rs.40 crores will be spent on CSR activities in five year period.
91	Shri Pravin Singh Bhurubha Chauhan, Village: Siracha Taluka: Mundra	He represented that the power plant's intake channel, the outfall channel, and the water reservoir are *Kuchcha* or *Pucca*?	The representative of the project proponent replied that, Outfall channel is Stone Masonry Lined, while the Reservoir is Clay Lined and Sheet Piling is done. This question is not about the proposed project.	-
92	Shri Khimraj Gadhavi Village: Zarpara Taluka: Mundra	He represented that the people from village used to drink the water with high TDS and the company uses Narmada water for sprinkling on coal piles.	-	The total water requirement for the project is about 32,800 m3/day which will be sourced from desalination plant of APSEZ Ltd, through M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).
93	Shri Pravin Singh Bhurubha Chauhan Village: Siracha, Taluka: Mundra	He represented that • What does High water line, Low water line in the figure No. 1 in the E.I.A. report indicate? • Different CRZ maps are submitted in the Public Hearing for the years 1991, 2008, 2010 and 2017, which is the correct map out of those? If one map is correct out of four then this shows that the other three	The representative of the project proponent replied that • CRZ maps are prepared by the institution recognized by the Government of India. Project proponent has no authority over it. Projects are approved on the basis of maps prepared by the authorized institution.	As informed, the proposed project is outside the CRZ boundary. The map of proposed project is superimposed on CRZ map of the area prepared in 2011 by Centre for Earth Science Studies (CESS) Thiruvanantapuram, an institution recognized by Government of India. The proposed project site is outside CRZ and doesn't attract CRZ clearance.

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		are false which indicates the Company has violated the rules of CRZ. • The tidal waters were reaching at a place in Siracha, now waters are not reaching there which shows that the company has violated the CRZ Act. • There is no clarification in the report about from where the Conveyor belt, Road, Railway line will pass and how they will be used in the plant. • Three sites in total were selected for the project, site number 2 is selected from that. What is your purpose behind it? • When you already own the site No. 1, why you have selected site No. 2? You have selected site No. 2 to get forest land.	• The map of proposed project is superimposed on CRZ map of the area prepared by an institution recognized by Government of India in 2011. • CZMP plans are prepared by the Government of India which are not public domain. When any approval is required for CRZ by any project then the CRZ map is submitted to compare with CZMP and on that basis only approval is accorded. We do not agree with your opinion in this matter. • The project is proposed in notified SEZ area and part of the forest land. So the Roads, Railway line falling under APSEZ will be used. Conveyer belt will pass through the existing conveyor corridor; this matter is mentioned on Page No. C 2/6 Point No. 2.2.7 of EIA report. • Detailed information regarding this matter is mentioned in Chapter-5. • For analysis of three alternative sites for project, about 18 factors were examined. The site No. 2 was found to be more suitable, so it is selected. • We have submitted our reasons in EIA report. We do not agree with your view.	The approved CRZ layout is shown in Figure-1.5 of Chapter-1 in the EIA report.
94	Shri Dayabhai Gadhavi Village - Mota Kandagara Taluka: Mundra	He represented that we have received report of VIMTA. This VIMTA is a Private organization which is favouring the company. We don't accept VIMTA's report.	The representative of the project proponent replied that VIMTA is a NABET accredited agency.	M/s. Vimta Labs Limited (VLL), Hyderabad is a QCI/NABET accredited and MoEF&CC recognized and NABL accredited Laboratory. The credentials of M/s. Vimta Labs Limited are given in Chapter-11 of the EIA Report.
95	Shri Vajjibhai Taparya	He represented that what area of land will be	The representative of the project proponent	

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
	Village – Zarpara Taluka: Mundra	affected during Acidic Process in the plant? Where the Acidic Water and Chemicals will be released?	replied that the process of this copper plant is not acidic, but along with production of copper, sulphur dioxide will also be produced which will be used for making sulphuric acid. And, it will be transported through pipeline of suitable material and there is no possibility of leakage. The tail gas will be scrubbed in the scrubber by lime stone.	-
96	Shri Dayabhai Gadhavi Village - Mota Kandagara Taluka: Mundra	He represented that • Will waste material be generated from the plant? • What is the arrangement for waste material? • Is there any chance of any kind of blast? • In what manner will the finished product be taken out?	The representative of the project proponent replied that: • Lime will be used in the scrubber process and Gypsum will be made. This will be used in the cement industry. • Certain part of the waste material coming out of the plant will be sent to the CPCB authorized processor and other non-recyclable hazardous waste will stored in secured land field constructed as per guidelines of CPCB. • The finished goods in the form of copper plate will be transported in truck or container. Sulphuric acid will be transported in tanker. Chances of blast are not possible.	The details of solid waste generation and their disposal is addressed in Section-2.4.3 of the EIA Report. A total budget of Rs.1044 crores will be spent for environment pollution control and management.
97	Shri Pravinsinh Bhurubha Chauhan, Village: Shiracha, Taluka: Mundra	He represented that • You have mentioned that you will make road from the waste. So what will do for making road from this waste? • What would be the constituents in raw material that would be stored? • Which chemicals will be contained in the	The representative of the project proponent replied that: • We will not make roads from waste. • The waste material coming out of the plant will contain calcium, silica and arsenic. This waste material will be stored in secure land fill sites. • Mercury product is made from the waste	Secured Land Fill (SLF) is proposed over 13.35 ha within the project premises for disposal of ETP waste sludge and spent catalyst. Other hazardous waste will be disposed through the approved recyclers.

Sr. No.	Name and Address of the Representative	Point Represented	Chronological Reply given by Representative of Project Proponent	Action Plan
		waste that comes out from the plant and will mercury come out from this waste?	material that contains mercury and material named calomel is produced. This material will be exported. No process for mercury will be done in this plant.	
98	Shri Naran Gadhavi Village: Zarpara, Taluka: Mundra	He represented that • What steps have been taken for reducing emissions and water conservation as per the gazette notification dated 07.12.2015 of MoEF&CC, Government of India? • What effect will this project produce on sea creatures that have direct connection with fishermen?	The representative of the project proponent replied that: • This question does not relate to this project. • No liquid will be discharged from this plant. • A total of 32,800 m^3/d of water will be used in the plant and out of that 6,448 m^3/d of polluted water will be produced. This will be treated in ETP, the water will be purified by process in RO plant and it will be again used in the plant. The rejects will be treated through the multi effect evaporation process. Therefore there is no question of discharge of any kind of liquid from this project	A total of 32,800 m^3/d of water will be used in the plant and out of that 5,432 m^3/d of polluted water will be produced. This will be treated in ETP, the water will be purified by process in RO plant and it will be again used in the plant. The rejects will be treated through the multi effect evaporation process. Therefore there is no question of discharge of any kind of liquid from this project. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD). About Rs. 360 crores will be spent for ETP design and wastewater management

TABLE-7.1(B)
PUBLIC HEARING REPRESENTATIONS AND REPLY ALONG WITH THE ACTION PLAN

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
1	Ravilal K Maheshwari (Advocate & Notary, B.A., L.L.B.), 15, Ground Floor, Adarsh Tower, Mundra-Kutch	1. My clients are the residence of the village on which the project shall be made and the villages around the project.	1. We heartily congratulate the villages related to the project and the villages around it as they are the important participants of the project.	1. -
		2. This project will use hazardous substances and material that will be for the human health/animals/vegetation and water flow as per the rules of the MSIAC and this shall cause a serious effect to environment. What steps will be taken by the company for this and what are the solutions as for this with the company?	2. Non Saline water shall be used in this project. The ground water shall not be used. The waste that comes out of the project shall be recycled. No liquid type waste shall come out from this project. The chemicals that damage the environment and the waste hazardous for the environment shall be disposed off in such a manner that no serious effect is found on the environment.	2. No ground water will be abstracted durir the operation phase. The water system, highly integrated and is designed for Ze Liquid Discharge (ZLD). Secured Land F (SLF) is proposed over 13.35 ha within th project premises for disposal of ETP was sludge and spent catalyst. SLF will b designed as per CPCB guidelines. Oth Hazardous waste will be disposed throug the approved recyclers.
		3. A serious damage shall occur to the health of humans and animals along with environment of the village around the project as there shall be emission from the plant, there shall be emission or dust from the related construction activities and other such places. What steps shall be taken as per legal in case if any damage occurs. Provide in detail the corrective step with the company so that the protection can be done.	3. In this project the chemicals like SO_2 and NOx shall be released. Sulphuric Acid shall be manufactured with the use of SO_2. In order to lessen the production of PM and NOx, scrubber shall be used. The chemical coming out at the time of the operation stage shall be restricted and NAAQ maintenance shall be undertaken ambient air quality. Therefore no long term effect shall be found.	3. The proposed project will implement all th control measures at the source level, whic are incorporated in Draft and Final E report. Further, it will comply with all th conditions stipulated by GPCB ar MoEF&CC. About Rs.1044 crores will b spent for environmental pollution contr measures in this project.
		4. What are the provisions laid down by the company for protection from blast, liquification, fire, etc. during the production? Provide the details that the company shall take. This is because (prior to this a boiler had blasted in a project of this very company and many humans/workmen had suffered serious injuries). This company has violated the rules for	4. Steps under statutory provisions shall be taken at the time of transport of hazardous chemicals. As for this the disaster management plant and risk analysis plan shall also be prepared. This has been included under the Chapter-7 of the EIA. The accident of blowing of boiler, that is point out, is an unfortunate incident that has occurred even after proper	4. The necessary safety measures will b provided in storage facilities and safe equipments & PPE's for staff and workme in the proposed plant. The hazar identification, risk assessment and disast management plan (onsite & offsite) deta are given in Chapter-7 of the EIA report.

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		protection prior to this also.	protective facilities.	
		5. The project is planned on the land and out of this the sanction is sought from the government of India and the same is pending before the government by file no. 8-04/2016 for land totaling of 1576.81 heacter and located at the Siracha-Navinal village. This file is returned by the central government to the Gujarat government for the purpose of opinion. It is specifically mentioned in it that this company has been provided with forest land prior to this also. Therefore additional land cannot be given. In this manner the forest land can be given in rare cases and in very serious requirement, as per the forest laws. In this manner the land of the company is not approved and the representative of the common public named Mahesh Mohanlal Desai has submitted objections before the Central government and Gujarat government and it is submitted that the land should not be approved. In short, the forest land is not provided to the company yet the work for project has been started. The company should provide explanation to all points in a detailed manner.	5. The construction in the forest for this project shall only be done after obtaining final approval. The application for conversion of this land is pending before the government of India. The company shall comply by the decision taken by the government of India.	5. MoEF&CC (forest conservation division) h granted Stage-1 approval for diversion 1576.81 ha of reserved forest land in favo of Adani Ports & Special Economic Zo Limited (APSEZL) vide letter F.No. 04/2016-FC dated 16th November 201 Stage-I FC has been obtained as given Annexure-V. The construction will start or after getting all required statutory clearan from concern department.
		6. Prior to this, the environment department had issued show cause notices to other project of this company and on the basis of the report submitted by Sunita Narayan team, the company was asked to pay penalty of Rs. Two hundred crores i.e. 1% amount of project, for breach of environmental condition. Thus, what is the assurance that this company shall not violate the conditions for environment laid down by the environmental law? Moreover the company has also not paid the amount of penalty. In this	6. This case relates to APSEZ. The show cause notice was disposed off on the basis of certain instructions. These are to be followed by the company. In this notice it is not mentioned that the environmental approval is not provided	6. This is outside the scope of EIA report f the proposed project. About Rs.1044 crores will be spent f environmental pollution control measures the proposed greenfield copper project.

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		manner the company has openly breached the conditions for environment. As for this the environment related approval should not be given. Further the company should give a detailed explanation as for this issue.		
		7. As for the other revenue land of the project, the amount of stamp duty is pending as per the land approval orders. Meanwhile the company states that, they have exemption. But the fact is that as per the section 21 of the Gujarat Special Economic Zone Act 2004, the exemption on stamp duty is on transaction that is carried out, between the developer and unit owner for lease, after the development of SEZ. This has been wrongly interpreted by the company and thereby the amount of stamp duty payable based on the land approval orders, for the land on which the project is brought, has not been paid. The company should provide a detailed explanation as to this. It should provide explanation as per the provision of law.	7. This project is under notified SEZ and the forest land is not forested and therefore the submission was made to convert the same. The point raised here relates to land revenue. It does not connect with environment in any manner.	7. The total land required for the propose project is about 256.58 ha (634 acres), ou of which 154.18 ha (381 acres) of identifie land for this project belongs to the APSE (an Adani Group Company) and is alread designated for industrial purpose as per th local land use plan.
		8. As for the other revenue land of the project, as per the section 67(a) of the Revenue act, when the land is transferred for other purpose i.e. to non-agricultural purpose, the conversion tax at Rs. 6 lacs is to be paid per meter. The company has not paid the crores of rupees of conversation tax payable on the basis of the approvals provided for the land by the collector and taluka development officer. As for this the audit has also been conducted by the CAG being the audit department of government. The collector issues number of notices to the company for paying the above mentioned amount but the company has not paid this revenue amount. The amount of	8. This project is under notified SEZ and the forest land is not forested and therefore the submission was made to convert the same. The revenue amount, taxes, etc. shall be paid on time.	8. Memorandum of Understanding (MoU) is i place between Adani Ports & Special Economi Zone Limited (APSEZL) and Adani Enterprise Ltd (AEL) for 154.18 ha (381 acres). Th APSEZ notification and land allotment to AE is enclosed as Annexure-III and Annexure-IV AEL will pay all relevant taxes to stat government and central government on time.

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		revenue is outstanding for this land and therefore project cannot be initiated. The company should provide a detailed explanation as to this.		
		9. What arrangement will have the company undertake for the hazardous waste (as per Hazardous and Other Wastes Rules) coming from the project?	9. The administration of the hazardous waste management shall be done as per the management and movement rules.	9. Hazardous cake and scrubber cake will b stabilized and stored in secured land fill a per guidelines of MoEFCC/ CPCB/ GPCB. A area of around 13.35 ha is identified an allocated. For the initial years of coppe refinery plant operation till sustaine utilization/management of copper slag an phosphogypsum; in the above applicatio areas are developed, as well as fc emergency purpose, copper slag storag area and gypsum pond of around 105 acre would be identified and made available fc intermediate/emergency storage of th same. Provision would be made to reclair the disposed copper slag an phosphogypsum from gypsum pond at later stage for various utilization ventures.
		10. What taxes would be paid during the duration of Copper Smelter Project scheme? What would be the approximate annual tax amount?	10. The company shall pay all the taxes that are payable for the duration of project. These taxes shall be paid on time, as per the rules of the government of India.	10. AEL will pay all relevant taxes to stat government and central government o time.
		11. What kind of five thousand jobs shall be created due to Copper Smelter project? How many local persons shall be employed in these services?	11. The local public shall be given opportunities for service as per their capabilities and potential. In order to increase the potential of the local public, such workshops shall be organized.	11. The proposed project will employment abou 2000-3000 persons on average per da during construction phase and durin operation phase, about 2000 direc employment and 5000 indirect employmer will be provided. Locals will be give preference to employment based on skill se & eligibility requirement as per the job an the vacancies available.

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		12. What arrangement has the company made for the primary requirement of the community such as health services, educational facilities, roads facilities, etc? What is the preparation of the company for improvement in the social structure of the affected individuals/villages?	12. The company has kept a provision of eight crores for the proceedings of CSR. This includes education, health, cleanliness, etc.	12. A budget of Rs.8 crores per each year ha been allotted for Enterprise Socia Responsibility / Corporate Socia Responsibility (CSR) activities for five years The CSR details (like CSR policy, initiative & activities, CSR Budget expenditure dat form 2010 to 2016, Proposed CSR budge plan for next 5 years and CSR implemente photographs) is given in Section-8.5 c Chapter-8 in the EIA Report.
		13. How much fund would the company allot for environmental conservation and in what manner will it be used?	13. The budget of 1044 crores of rupees is for the environmental protection. The detailed information as for this is provided under the table no. 6.4 of EIA for water population control system, waste management system, green belt management, etc.	13. The budget allotted for environmenta protection will be about Rs. 1044 Crores out of which for Air pollution control system is Rs. 639 Crores, Water pollution contro system is Rs. 360 Crores and othe environmental management systems (lik solid waste, greenbelt, post projec monitoring, gas collection and energ conservation) is Rs. 45 crores.
		14. Even prior to this, the company had for another project clearly violated the conditions laid down under the environment clearance and costal regulations zone and thereby had violated the condition of not cutting mangroves and filling creek. The company has been issued show cause notices by the environmental department and penalty has also been paid. Thus even the environmental conditions laid down for this project shall also not be complied with, serious problems as to environment shall emerged around the project area and therefore our clients want that the Examination-in-Chief and NOC along with other approvals should not be provided to the company. Thus my clients have clear objections against this project.	14. No activity related to the project has been done prior to this at Mundra. The show cause issue of APSEZ has been disposed by MOFECC.	14. The construction will start after getting a required statutory clearance from concer department.

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
2	Shri P.C Gahavi, Ex. President, Taluka Panchayat, Lakhpat	Refer to the newspaper notification published by your department on the EC allocated by AEL, to establish 1 unit of Greenfield Copper Refinery Plant at Mundra in Kachchh district. Refer to this, a public hearing meeting on environment is schedule on 29-04-2017 regarding EIA report of the proposed plant. Herewith we request to arrange to take note of our objections and presentations, described point wise as under, and to respond in written.	We thank you for raising the concerns and providing us valuable suggestions for the development of the project and the area. With reference to your letter, we would like to submit point wise response as desired by you.	
		1. Project is cost of the proposed project is estimated to Rs. 10000 crores and Rs. 900 Crores is allocated towards environment maintenance? And it is very important that the proposed should be asked to allocated more amount towards Environment maintenance if the above allocation of Rs. 900 Crores (9% of the project cost) is less than the regulatory provisions.	1. Rs. 1044 crores has been allocated as capital expenditure for environment management measures for the proposed project which is more than 10% of the total project cost. We assure that world class and efficient process equipment shall be installed along with pollution control devices in all facilities of the project.	1. The budget allotted for environment protection will be about Rs. 1044 Crores, ou of which for Air pollution control systems Rs. 639 Crores, Water pollution control syste is Rs. 360 Crores and other environment management systems (like solid waste greenbelt, post project monitoring, ga collection and energy conservation) is Rs. 4 crores.
		2. The land where the project is proposed is owned by APSEZ and APSEZ acquired the land from the government for industrial use long back. President of APSEZ allocated this land to AEL, without any kind of Consideration, lease contract or sub-lease. As per the order of the honourable High Court of Gujarat, the ownership should be considered changed when any company transfers the land to other company OR its sister concern to use and stamp duty @ 1% of the market price of the land should be deposited with the superintendent of stamps office. So here (1) Has company obtained the land by taking due regulatory approvals and (2) Has it paid the stamp duty as per the norms? What actions would be taken if the company defaults in these two matters?	2. Commitment letter has been obtained by Adani Enterprises Limited (AEL) from the APSEZ for allotment of land for the proposed project. Allotment of the land and ownership transfer shall be implemented only after compliance with all regulatory requirements including statutory payments and due fee for transfer.	2. The total land required for the propose project is about 256.58 ha (634 acres), out which 154.18 ha (381 acres) of identified lan for this project belongs to the APSEZ (a Adani Group Company) and is alread designated for industrial purpose as per th local land use plan. MoEF&CC (fores conservation division) has granted Stage- approval for diversion of 1576.81 ha reserved forest land in favour of Adani Ports Special Economic Zone Limited (APSEZL) vid letter F.No.8-04/2016-FC dated 16t November 2018. The APSEZ notification an land allotment to AEL is enclosed a Annexure-III and Annexure-IV.

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		3. Some portion of the selected land of proposed project falls under forests. And is a residence of list of Peacock, which are declared protected wide the regulations of the Indian Forest Act and is our national bird too. They get feed from nearby agricultural areas in daytime and come back in this sand portion in the night time as feel unsecured in nearby areas. Note of these peacocks have also been taken in EIA report of this proposed project and steps to be taken to protect peacock are also mentioned. But these steps are not much clear and need to be discussed in detail we request to clarify on these preventive steps.	3. Application for diversion of forest land has been already filed as also mentioned in TOR in MoEFCC. All compliance shall be ensured as per procedure, Forest Diversion is recommended by State Government and Approved by Central Government after ensuring all compliance by the user agency.	3. Conservation Measures for Protection o Peacock are given in Section-4.2.7.3 o Chapter-4 in the EIA report.
		4. It is also mentioned that the daily water requirement of 32.8 MLD for the proposed plant will be supplied from the desalination plant established in APSEZ. So any desalination plant exists in APSEZ? And, if yes, what is the capacity and where this water is being used also need to be clarified.	4. APSEZ has approval for desalination plant. APSEZ has in principally agreed for augmentation of needful infrastructure and provide desalinated water for this project as clearly mentioned in the water allotment letter in Annexure-VI of EIA report.	4. The total water requirement for the projec is about 32,800 KLD (32.8 MLD). The tota desalinated water requirement for the project would be sourced from APSEZ Ltd through M/s. Mundra Utility Pvt Ltd (MUPL) The water requirement and breakup detail are provided in Section-2.2.3 of Chapter-2.
		5. It is mentioned that the polluted water generated by proposed plant will be treated and be used to grow trees and to develop green belt, but we have doubts that hazardous chemicals mixes in treated sea water while use in plant and to using such water to grow trees and develop Greenbelt, where proposed greenbelt land is also bit saline, needs some more clarification.	5. We assure that wastewater will be treated in state of the art effluent treatment facilities to make suitable before being used for greenbelt.	5. An integrated water system is proposed, the effluent from the process units is treate and reused to reduce water demand. It i also proposed to install a secondary Revers Osmosis (RO) plant to further treat wate from the effluent plant facility for effectiv use. Rejects from the reverse osmosis plan will be sent to Multi Effect Evaporator (MEF for further recovery and solids generate will be sent to Secured Land Fill (SLF). Thi water would be utilized to meet the DM water and plant/utility water requirement c proposed project. The water system, i

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				highly integrated and is designed for Zer Liquid Discharge (ZLD).
		6. We request to provide us the map of all the lands of the proposed project and of 209 acres land kept reserved to develop greenbelt. Because we doubt that many natural springs exist in these lands and as per norms land can't be level by hurdling these natural springs Greenbelt plantation is not possible in many out of this 209 acres land which is kept reserved for greenbelt plantation where trees really can be grown and greenbelt GPCB, in consultation with Forest Dept., should choose the lands for greenbelt plantation where really can be grown and greenbelt can be developed and the proposer should be asked to provide decrescent land to develop greenbelt. Because it seems that the company is allocating only those non-usable lands instead of good fertile land to develop greenbelt, like it provides land where trees cant be grown OR where land is non usable due to natural river/spring flow passes OR where old ponds, lakes located. Thus company tries to save its good land and allocating only bad land towards very important & vital issue of Environment.	6. Plant layout showing the green belt is provided in the EIA report in Figure-2.1. Forest department will be consulted for choice of species for plantation.	6. About 85.79 ha of the proposed coppe refinery complex (33%) will be reserved fc greenbelt / green cover development as pe prevailing guidelines fror GPCB/CPCB/MoEF&CC. Native species wit rich canopy will be planted.
		7. It is also mention that Disaster Management system will be set up in the proposed project and high standard risk emission equipment's will be used. This point also should be dealt in detail as the oxygen plant to be established in the proposed project will also be operated automatically and possibility is that may create risk for local community resides surrounding. So, clarification is also important that as per norms	7. Risk Identification and Risk Assessment (HIRA) study has been conducted for this project, including Oxygen plant, through functional area expert and former faculty of Regional Labour Institute (RLI). All regulatory permissions, as applicable will be obtained. Risk assessment and disaster management plan has been incorporated Section 7.2 of the EIA.	7. The necessary safety measures will b provided for storage facilities and PPE's fc staff and workers in the proposed plan. Th hazard identification, risk assessment an disaster management plan (onsite & offsite detail are in Chapter-7 of the EIA report.

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		how far such plant should be located from the community AND what type of safe guarantee is given by the company if any accident occurs in future AND whether the company obtained all necessary regulatory permissions to establish such plant?		
		8. It is mentioned that the total 256.58 hectors land is required and be used to establish the proposed project. Currently 154.18 hector land is available with APSEZ and rest 102.38 hectors land is of forest department, will be used. For this whether the company obtained necessary permissions? Whether local regulatory offices granted NOC? Whether the permission is obtained to use forest land for industrial purpose from the authorised regulatory? And if the forest land is yet not allotted to the company, how this environment public hearing for environmental clearance is called before allocation of land?	8. Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure-I, page AI-14 of EIA report) that "Forest land of 102.38 ha is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central Government through File No. 8-04/2016-FC". The requirement of Office Memorandum of MoEFCC dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance...". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR. We submit that there is no deviation from EIA Notification 2006 and we understand that Public Hearing can be organised by State Pollution Control Board after TOR is obtained by the project proponent.	8. The required land of 256.58 ha (634 acres will be acquired from Adani Port Specia Economic Zone Limited (APSEZL). Adar Enterprises Ltd (AEL) for 154.18 ha (38 acres) and Forest land of 102.38 ha (25 acres) is also involved which will b converted for industrial use. The APSE notification and land allotment to AEL i enclosed as Annexure-III and Annexure-IV MoEF&CC (forest conservation division) ha granted Stage-1 approval for diversion c 1576.81 ha of reserved forest land in favou of Adani Ports & Special Economic Zon Limited (APSEZL) vide letter F.No.8 04/2016-FC dated 16th November 2018 Stage-I FC has been obtained as given i Annexure-V. The construction will start onl after getting all required statutory clearanc from concern department.
		9. If the company demanded 102.18 hectors forest land, weather the forests department demanded for alternate lands for alternate forestation against allocated of above said lands and whether revenue department clearly intended to provide alternate land for alternate forestation?. If forest department has not demanded alternate land or Revenue Department has not yet responded positively on alternate forestation land	9. We would like to submit that compensatory afforestation is integral part of the forest diversion and we understand that Forest Clearance shall be granted by the Central Government only after compliance of all conditions by the user agency and compliance of all conditions of Stage-1 and Stage-2 forest clearance.	9. MoEF&CC (forest conservation division) ha granted Stage-1 approval for diversion c 1576.81 ha of reserved forest land in favou of Adani Ports & Special Economic Zon Limited (APSEZL) vide letter F.No.8 04/2016-FC dated 16th November 2018 Stage-I FC has been obtained as given i Annexure-V in the EIA report. Th construction will start only after getting a

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		demand, how Forest Department can be sinked with proposed project?. So, land portion based on anticipation of due forest land permission should be removed from the total land requirement detailed matter of the proposed project.		required statutory clearance from concer department.
		10. APSEZ president allocated the portion of 154.18 hector of land by written statement for the proposed project. but no details of land demand proposal for the proposed project, by the proponent, is mentioned. So details of land demand proposal should be made public and also inform that why permission is not obtained from the Development Commissioner appointed by the central government for all administration purpose at APSEZ?	10. Commitment letter has been obtained from the APSEZ for allotment of land for the proposed project. Ownership of the land shall be transferred only after compliance with all regulatory requirements including statutory payments and due fee for transfer.	10. The total land required for the propose project is about 256.58 ha (634 acres), o of which 154.18 ha (381 acres) of identifie land for this project belongs to the APSE (an Adani Group Company) and is alreac designated for industrial purpose as per th local land use plan. The APSEZ notificatic and land allotment to AEL is enclosed a Annexure-III and Annexure-IV. The lar ownership will be obtained to AEL after th getting all required NOC from concer department and statutory payment due fe for transfer.
		11. Details of local road development are also mentioned in the EIA report of the proposed project. Internal & external roads for the use of company are developed by APSEZ. Tollbooth is established on the state owned highway and toll is being collected from the vehicles entering into APSEZ form this toll booth near Mokha chokdi. Its seems that nothing is being done for maintenance of internal rural, panchayat or state roads by the company. Many of these internal rural, panchayat, state roads falling under proposed project area are in very poor condition and need maintenance. It is also important to make clear that among these roads which roads company intend to maintain and what new facilities company intend to develop?	11. Project proponent, Adani Enterprises Limited (AEL), is not collecting any toll near MokhaChokdi. CSR budget of Rs 8 crore per annum has been proposed by M/s AEL for proposed copper refinery project, which is over and above the existing budget of Adani Foundation for CSR activities in the area. We also assures local community members that proposed CSR budget will be utilised in consultation with local community members in the areas of development of rural infrastructure, health care, education and livelihood as desired.	11. A budget of Rs. 8 crores per each year ha been allotted for Enterprise Soci Responsibility/ Corporate Soci Responsibility (CSR) activities for five years The CSR details (like CSR policy, initiative & activities, CSR Budget expenditure dat form 2010 to 2016, Proposed CSR budg plan for next 5 years and CSR implemente photographs) is given in Section-8.5 Chapter-8 in the EIA Report.

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		12. Heath service provided by APSEZ in last 10 years by adopting hospitals, health sub centres, FSW centres in local Mundra, Mandvi are, if any, should also be provided as details of providing health services in local area also dealt in the proposed project. Company also should clarify on health service facilities provided in these two talukas or anywhere in Kutch if any.	12. Presently, Adani Foundation runs Mobile Health Care Units, Rural Clinics, Special Innovative Projects i.e Health Card to Senior Citizens and Kidney Stone Project and Variety of Health Related Camps. To increase availability of quality health care services to the remote villages, foundation runs mobile health care unit. These mobile units cover 36 Villages and 4 Fisherman settlements. There are 8 rural clinics in Luni, Vadala, Bhadreshwar, TundaWandh, Tunda, Siracha, Navinal and Nana Kapaya. As Rs 8 crores per annum has been proposed for CSR budget for the proposed project in addition to the existing CSR budget of the Adani Foundation, existing healthcare activities shall be augmented in the area and new activities shall be launched as per the needs of the area and consultation with local communities.	12. Prefer the above point no.-11.
		13. It is informed that 5000 direct new and many indirect employment chances will be generated by the proposed project. Then separately how many skilled, semi-skilled and unskilled jobs will be created and clarify also necessary on how many unemployed will be employed from the affected local area. Weather local youths will be trained and employed permanently in the company is also important because lots of localities work in APSEZ on contract basis or through private work contracts on daily wages.	13. People from local area will be given priority based on the skill sets available. Efforts also will be made to train the local youths. Priority will be given to local youths based on the skill sets and vacancy available.	13. The proposed project will give employmer to about 2000-3000 persons on averag per day basis during construction phase During operation phase, about 2000 direc employment and 5000 indirect employmer will be generated. Local people will be give preference to employment based on th skill set & eligibility requirement as per an vacancies available.
		14. Proposed project is intended to be completed within 30 months. Please clarify that from when	14. Proposed project completion is of 30-36 months from the start of the construction	14. The proposed greenfield copper project wi be implementation after receiving statutor

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		these 30 months will be counted, 30 months after this environment public hearing OR 30 months after obtaining all neceassry regulatory approvals?	activity at project site. Start date of the project will be decided after obtaining all the statutory clearances and tie up of the finance for the project.	clearance from concern authority. Th schedule for completion will be 30-3 months from the start of the constructic activity at project site.
		15. Industrial density in the area of proposed project is very high. Many large/small industries already exist in this and the nearby area. This territory traces heavy traffic of vehicles due to developed part activity and industrial pollution is high in this area due to industries and transportation water & air pollution is high is expected to be very high due to addition of this proposed mega project Agricultures in the nearby territory would be also badly effect due to increase in air & water pollution by new proposed project. Chances of deterioration of public health in nearby areas cannot be overseen due to ground water pollution by this propose project. So detailed clarification is required as this proposed project carries a threat or adverse effect on environment and community of the industry.	15. The baseline data on environmental parameters was collected for all the ongoing activities during post monsoon season of 2016. An assessment has been done for the incremental load due to this project. It has been found that the environmental parameters will be within the statutory limits after operation of the project	15. The primary baseline monitoring data which includes meteorology for pos monsoon and part winter season (Octobe to December) of 2016. The ambient a quality analysis results is given in Sectior 3.6 of Chapter-3. The incremental an Cumulative Incremental concentration given in Section-4.2.2 of Chapter-4 in th EIA report.
		Herewith you are requested to arrange to probe on this presentation and to reply in writing, please also include out all above points in the minutes of the environment public hearing meeting.		
3	Shri Mahesh Pandya, Paryavaran Mitra, Ahmedabad	We have studied the draft EIA report of the above mentioned project. Following are our observation/comments /questions regarding project and draft EIA report.		
		1. What was the previous land use of the land for proposed project? Has industry obtained NA permission for the land? Please provide the document.	1. The previous land use of the proposed project has been converted to Industrial by APSEZ and APSEZ has consented to allot this land to AEL. Present land use of the land for proposed project is 154.18 ha (381 acres) of APSEZ land	1. The total land required for the propose project is about 256.58 ha (634 acres), ou of which 154.18 ha (381 acres) of identifie land for this project belongs to the APSE (an Adani Group Company) and is alreac

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
			(Land allotment letter is enclosed as Annexure-III in EIA Report) and 102.38 ha (253 acres) of Forest land (Stage-I Forest clearance in process) which is State Govt. has recommended for Forest Clearance (FC) and is at Central Government [File number is 8-04/2016-FC].	designated for industrial purpose as per th local land use plan. The APSEZ notificatio and land allotment to AEL is enclosed a Annexure-III and Annexure-IV. MoEF&C (forest conservation division) has grante Stage-1 approval for diversion of 1576.8 ha of reserved forest land in favour of Adar Ports & Special Economic Zone Limite (APSEZL) vide letter F.No.8-04/2016-F dated 16th November 2018. Stage-I FC ha been obtained as given in Annexure-V.
		2. How the required land for the project is acquired? Was it a government or private land?	2. Reply is as per point no. 1 above.	2. Please refer the above point no.-1
		3. When was environmental clearance for this project in Form I applied?	3. The online application for prior EC (application No: IA/GJ/IND/53004/2016: Form-1 and Pre-Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April, 2016 and same was reviewed by the Expert Appraisal Committee (Industry I) held during 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. The Environmental Clearance is under process.	3. The Form-I application (Nc IA/GJ/IND/53004/2016) for prior EC on 21 April 2016 was submitted to MoEF&CC.
		4. What is the status of NOC application to GPCB for this project?	4. After receiving Environment Clearance from MOEF&CC. The necessary NOC (Consent to Establishment (CTE) or Consent to Operate (CTO) form GPCB shall be applied, as applicable.	4. After obtaining Environment Clearance fror MOEF&CC, the necessary clearances such a Consent to Establishment (CTE) and Conser to Operate (CTO) from GPCB shall b obtained.
		5. What is the status of Forest & CRZ clearance for this project? Please provide a copy of both of these clearances.	5. The Forest Clearance is still under process. The details are available on the website of MoEF&CC (File No. 8-04/2016-FC). Based on the survey which was carried out by Centre for Earth Science Studies (CESS, Thiruvanantpuram),	5. The prosed project is a Greenfield project an which is outside of the CRZ. The CRZ map shown in Figure-1.5 of Chapter-1 in the EI report. MoEF&CC (forest conservatio

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			which is an authorized agency by MoEF&CC, the proposed project site is outside CRZ and doesn't attract CRZ clearance.	division) has granted Stage-1 approval fo diversion of 1576.81 ha of reserved fores land in favour of Adani Ports & Speci Economic Zone Limited (APSEZL) vide lette F.No.8-04/2016-FC dated 16th Novembe 2018. Stage-I FC has been obtained as give in Annexure-V.
		6. How many mangrove trees will be uprooted due to this project? What is exact restoration plan for mangrove trees which would be displaced due to this project?	6. Proposed project area is devoid of mangroves. There is no question of mangrove destruction.	6. There is no mangroves identified in th project site at the time of baseline studies.
		7. What are the precautionary measures are to be taken to avoid negative impact of construction activities on marine environment, water quality, inter tidal and sub tidal habitat and sediment quality?	7. The anticipated impacts and mitigation measures during construction and operation phase is given in Chapter-4 of EIA report.	7. The will no impact on the marin environment. APSEZ Ltd, through M/s MPSEZ Utility Pvt. Limited (MUPL) ha considered the project requirement an assured for supplying 2,000 m^3/day of wate required during the construction phase. N ground water will be abstracted fo construction purpose. The wastewater generation during th construction period will be from the sanitar units provided for the construction workers. This wastewater will be treated i septic tanks and discharged into soak pits.
		8. Please give exact dates of ambient air quality, surface water, ground water, noise monitoring and soil quality monitoring.	8. The monitoring is conducted during 1st October, 2016 to 31st December 2016, is the study period for the Environmental Baseline data collection. The location and Ambient Air Quality and levels are given in Annexure-VI of EIA Report. All the environmental attributes such as sampling of air quality, water sampling (ground and surface), noise levels, and soil quality were carried out during the study period.	8. The baseline monitoring was conducte during 1st October 2016 to 31st Decembe 2016 of post-monsoon and partly winte The ambient air quality results with dates enclosed as Annexure-IX. The monitorin (sample collection) photographs are given i Annexure-VIII.

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		9. How will the project proponent plan to get coal—pet coke, met coke as a fuel in regular basis? Please provide any agreement made with the supplier.	9. The coal will be sourced from the local market and transported through trucks. Around 3000 tonnes of coal will be stored. Further details of fuel consumption quantity and source are given in Table-2.5 of Chapter-2 (Project Description).	9. The 100 TPD coal will be required fc proposed project, which will be source from the local market and transporte through trucks. Around 3000 tonnes of coi will be stored.
		10. What is the regular monitoring plan that shall be carried out for odour control by the project proponent?	10. The question is not relevant and therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to the permissions granted.	10. The comprehensive environmenta monitoring program for construction phas and operation phase is suggested in Table 6.1 & 6.2 of Chapter-6 in the EIA report.
		11. Please justify domestic water requirement.	11. Maximum domestic and service water requirement for the proposed project is 1000 KLD. The final requirement will be re-assessed during detail engineering.	11. The domestic water requirement fc proposed project is 400 KLD. The wate breakup details are given in Table-2.5 c Chapter-2.
		12. Please provide complete details of each ETP units.	12. The process details and schematic flow diagram of ETP is given in Figure-2.20 of Chapter-2.	12. Wastewater generated from copper smelte sulphuric acid plant and copper refinery w be treated in state of art effluent treatmer facility. The process details and schemat flow diagram of ETP is given in Sectior 2.4.2 and Figure-2.23 of Chapter-2 in th EIA report.
		13. Is there any cost benefit analysis carried out for proposed project benefits vs loss of eco system including flora, fauna and vegetation?	13. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.	13. The baseline flora and fauna study wa conducted and detail are given in Sectior 3.9 of Chapter-3 in the EIA report. Th peacock is identified, which is a schedule bird species as per Wildlife Protection Ac 1972. It has been assessed as Leas Concern bird as per the International Unio for Conservation of Nature (IUCN). Th conservation paln is given in Section-3.9. of Chapter-3 in the EIA report.

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		14. Please give the name of registered recycler to whom nickel sludge, arsenic bearing sludge, used oil and oil sludge will be sent for disposal.	14. The solid waste generation (quantity and mode of disposal) and waste characteristic is presented in Chapter-2 of the EIA report. The Secured Land Fill (SLF) is proposed over 30 acres within the project premises for disposal of ETP waste sludge and spent catalyst. Other Hazardous waste will be disposed through the approved recyclers.	14. The Secured Land Fill (SLF) is proposed ov 13.35 ha within the project premises f disposal of ETP waste sludge and spe catalyst. Other Hazardous waste will b disposed through the approved recycler The recycler agency names will b announced during operation phase.
		15. How many local people will get employment through this project?	15. Details on potential employment are mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.	15. The proposed project will give employme to about 2000-3000 persons on average p day basis during construction phase. Durir operation phase, about 2000 dire employment and 5000 indirect employme will be generated. Local people will be give preference to employment based on the sk set & eligibility requirement as per ar vacancies available.
		16. What will be the action plan for socioeconomic of an area by project proponent?	16. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.	16. A budget of Rs.8 crores per each year ha been allotted for Enterprise Soci Responsibility / Corporate Soci Responsibility (CSR) activities for five year The CSR details (like CSR policy, initiative & activities, CSR Budget expenditure da form 2010 to 2016, Proposed CSR budg plan for next 5 years and CSR implemente photographs) is given in Section-8.5 Chapter-8 in the EIA Report.
		17. What activities industry will take up as a part of CSR and what will be the budget for it?	17. Reply is as per point no. 16 above.	17. Reply is as per point no. 16 above.
		18. Please give the detail list of people who will be responsible for implementation of EMP?	18. Environment management cell structure has been provided in Chapter-9 of the EIA Report who will be responsible for implementation of EMP.	18. The organization structure of environment management is shown in Figure-10.1 Chapter-10 in the EIA report.

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		19. We request you to consider inspection report of the committee handed by Ms. Sunita Narain that was constituted by MoEF for M/s. Adani Port and SEZ Ltd, Mundra which submitted its report in April 2013 before granting environmental clearance. 20. We also request you to consider all the Supreme Courts pending and disposed cases that are filed against Adani Group of companies.	19. In the matter of Sunita Narain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015. 20. This is outside the scope of the EIA report for the proposed project. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	19. The proposed project is belongs to AEL an APSEZ allotted a land to AEL for propose project. 20. This is outside the scope of the EIA repo for the proposed project
4	Shri Gajendrasinh Jadeja (Sarpanch), Navinal Village, Mundra Taluka, Kutch District, Gujarat	This is with reference to public hearing or above mentioned copper refinery project scheduled for 29.04.2017 in Mundra taluka, Kutch [Attached as Annexure-1]. We would like to present to you certain facts and request you to immediately cancel the public hearing and reject on clear legal grounds. ***Non-compliance of ToR and violation of MoEFCC circular dated 31.11.2011*** • Section 5(i) of the Terms of Reference (ToR) issued for the project on 21st June 2016, clearly indicates that the project proponent has to provide a copy of the "Permission and approval for the use of forest land (forest clearance), if any and recommendations of the State Forest Department. (if applicable). "[Attached as Annexure-2]. • Further as per EDS by MoEF uploaded on the website at http://environment clearance.nic.in/auth/FORMAPDF.asx?catid=IA/I	With reference to the subject matter and your email, we submit that all requirements for obtaining the TOR from MoEFCC were fulfilled. After obtaining TOR, Environment Impact Assessment has been completed and all conditions of TOR has been complied with by project proponent for the purpose of public hearing. • Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure-1, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC". The file status is also available online at MoEFCC Forest Clearance. • As the project is proposed by M/s. Adani Enterprises Limited in APSEZ land, Forest Clearance has already been applied for this	MoEF&CC (forest conservation division) ha granted Stage-1 approval for diversion 1576.81 ha of reserved forest land in favour Adani Ports & Special Economic Zone Limite (APSEZL) vide letter F.No.8-04/2016-FC date 16th November 2018. Stage-I FC has bee obtained as given in Annexure-V. Th construction will start only after getting a required statutory clearance from concer department.

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		ND/53004/2016&pi=New and accessed on 8.4.2017, it is clearly indicated that "Forest Clearance under Process". The file is under process in file number 8-04/2016-FC. A copy of this web page is attached with this letter. [Attached as Annexure 3]. • In the EIA report on Page No. AI-14, it has also been stated that the forest clearance is pending at level of the central government [Attached as Annexure 4] This clearly indicates the project proponent is yet to obtain forest clearance and has not complied with ToR, making the EIA report liable for rejection. In this regards we would also like to bring your attention to (attached) to an Office Memorandum of the **MoEFCC dated 31.11.2011** which clearly emphasizes the need for forest clearance prior to either appraising or granting environmental clearance. In the case of greenfield projects like the copper refinery **Section III (iii) of this circular** [Attached as Annexure 5] clearly states that: *"In case of any green field project, which involves diversion of forest land, the project proponent are advised to re-examine the requirement of forestland and submit the proposal without forestland for consideration of the EAC. Otherwise the proponent should submit the proposal for ToRs under the EIA Notification, 2006 only after applying the stage-1 forest clearance for the forestland involved in the project."* As you are aware Section **8(vi) of the EIA notification, 2006 clearly states:** *"Deliberate concealment and/or submission of false or misleading information or data which is material to screening or*	land by APSEZ (erstwhile Mundra SEZ Ltd.). The requirement of OM dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR. • At no stage there is any concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application by the project proponent. There is no deviation from the Section 8 (vi) of EIA Notification 2006 also. Hence, we submit that required process for TOR has been fulfilled by now and requirements shall also be fulfilled for EC application. We also assure that all applicable environmental legal requirements shall be complied with.	

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		scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis.." *We therefore request you to take immediate by:* *1. Canclling the public hearing schedule for 29.04.207 in Mundra* *2. Reject the application attracting the Section 8(vi) of the EIA notification.*		
5	Shri Sanjay S. Bapat, Adarsh Tower, Mundra, taluka, Mundra, Kutch district, Gujarat	A study about the Greenfield Copper Refinery Plant of Adani Enterprise Limited was done only for the three months from October 2016 to December 2016 by M/s. Vimta Lab Limited, Hyderabad, and on the basis of it the E.I.A. has been prepared. There are mainly three seasons in a year and in every season the effect of the industrial activity on the environment, water level, and geography are different. But here the E.I.A. was prepared after the three months study only. Thus, this study of the environmental effects is incomplete/insufficient and faulty. There are already many industrial projects in this region. Moreover, these projects are close to the coastline so there are possibilities that they can have effects on the coastal environment also. There are mangroves, mudflat, rivers, Navinal Reserve Forest and Siracha forest area in this region. Thus, when a new project is coming up in such an environmentally sensitive region, this three-month study is insufficient. It seems that by completing the study on the future effects of this project, they have tried to hide the facts of the future effects. In the point no.1 of the official report it has been	We are herewith responding para wise to the issues raised by you: EIA studies have been carried based on TOR granted by MoEF&CC. Project will be implemented after obtaining required permissions and compliance will be done based on permissions granted. The proposed project area is outside CRZ and therefore no presence of mangroves and mudflats. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in Chapter–3 of the EIA report. Site selection is based on suitability criteria as studied and provided in the EIA report. Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure 1, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC." The file status is	As per MoEF&CC and CPCB guideline (monitoring data three months except monsoo season) monitoring is conducted, the EI studies have been carried for post-monsoon an partly winter (1st October 2016 to 31 December 2016) based on TOR granted b MoEF&CC. Project will be implemented afte obtaining required permissions and complianc will be done based on permissions granted. The baseline environmental studies is give Chapter-3 in the EIA report. The Environmental settings around the 10 kr radius from the proposed plant site boundary i given in Table-1.1 of Chapter-1in the EI report. The incremental and Cumulative Incrementa concentration is given in Section-4.2.2 c Chapter-4 in the EIA report. The total land required for the proposed projec is about 256.58 ha (634 acres), out of whic 154.18 ha (381 acres) of identified land for thi project belongs to the APSEZ (an Adani Grou Company) and is already designated fo

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		mentioned that 256.8 ha land is required for this project. Out of which 154.18 ha of the land is owned by the APSEZ (Adani Group) and remaining 102.38 ha is forest land. In the point no. 2.2 of the EIA report, it has been mentioned that the state government has recommended for the forest land, but this land has not been allotted to the company therefore it is clear that the procedure for obtaining the environmental clearance for this land is being done with incomplete information. Taking the above mentioned matters in consideration, you are requested that unless and until the requirements are fulfilled, this E.I.A. should be considered incomplete and faulty and the public hearing to be held on 29/04/2017 should be cancelled. "The development that destroys the environment is the sign of the destruction not the development."	also available online at MoEF&CC Forest Clearance. The land allocation is being granted to AEL by APSEZ, the correspondence is given in EIA report as annexure-III. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	industrial purpose as per the local land use plar The APSEZ notification and land allotment t AEL is enclosed as Annexure-III and Annexure IV. MoEF&CC (forest conservation division) ha granted Stage-1 approval for diversion c 1576.81 ha of reserved forest land in favour c Adani Ports & Special Economic Zone Limite (APSEZL) vide letter F.No.8-04/2016-FC date 16th November 2018. Stage-I FC has bee obtained as given in Annexure-V. Th construction will start only after getting a required statutory clearance from concer department.
6	Shri Naran B. Gaghavi, (President) Keti Vikas Seva Trust.	Jaybharat, with reference to the above with due respect it is to state that M/S Adani Enterprises Ltd. (A.E.L) is going to establish Greenfield Copper Refinery in the 634.12 Acre land of villages Siracha and Navinal of Mundra Taluka. A public hearing is being held at village Tunda on next 29th April for Environmental Clearance of the proposed project. The EIA report prepared for the proposed Refinery Project of Adani and site shown in the EIA report for the proposed project are very much disputed and the whole area is covered under CRZ and no permission is obtained from the Government of India for CRZ for the same. Therefore the public hearing for the copper project should be cancelled. Honourable Sir, With reference to the reference cited	With respect to the above stated subject matter, please note that reply to the representation made for the proposed ship recycling project is as follows: **About High court cases:** ➢ Kheti Vikas Trust had filed alleged public interest litigation, being Writ Petition (PIL) No.12 of 2011, before Hon'ble Gujarat High Court. In the main petition, the Applicant had made various allegations against APSEZ and Adani Power Limited. One such allegation made in the main petition was in respect of the alleged "deforestation of mangrove forests which forms the main part of mangrove forest of western region".	

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		at 1 above it is to inform you that we have filed a Public Interest Litigation in the year 2011 bearing No. WPPIL -12/2011 in the Hon. High Court Of Gujarat in protest against the violations of Environmental laws by Adani Port and Adani Power in the Sea area and this areas of Mundra Taluka. And it was requested there in to prevent violations of rules of Environment and Human rights by Adani Company and Hon. High Court was pleased to direct Adani to stop destruction of Mangrow forest situated in the sea region of Mundra Taluka , thereafter also Adani continuously violated this order , for that a new application bearing No. CAN -9124/2011 was filed for contempt of the court order in which Hon. Court issued various orders against Adani and formed three committees and all these issues were investigated and Hon. Court has formed Expert Committee on the basis of orders 05.11.2015 and 01.04.2016 on our application No. CA 9124/2011. Dr. Kalod Alvaris, Environment Expert of Goa and Dr. Subroto Maiti of Calcuttaa were included in the committee. And TOR of the committee was finalized by the High Court of Gujarat itself. In which it was directed to submit the detailed report of violations of environment by Adani after observation of the site of whole ADANI SEZ. This committee had visited this area prepared its report and submitted detailed report before Hon. Gujarat High Court on 8.06.2015. Committee has proved in its report that Adani has violated the rules of environment on the sea areas of Mundra and it is informed to Adani to grow Mangrow in about area of 200 hector and that 6000 acre land allotted to the company may be taken back by Gujarat Government . And there are rampant violations of rule in allotting this land. So it is recommended that all these lands to be taken back	➢ PIL alleging destruction of mangrove, filling up of creeks and violation of Environmental Laws & inaction of the State Authorities against the activities of APSEZ. It also alleged that due to construction of open intake channel, the salinity of ground water has increased and is damaging the fertility of the agricultural land. A prayer was made to appoint a committee. ➢ Subsequently, the Applicant filed the captioned Civil Application No.9124 of 2011 purportedly under the provisions of Article 215 of the Constitution of India, against APSEZ and APL, for alleged 'wilful and deliberate contempt' of the authority of Hon'ble Gujarat High Court. It is the case of the Applicant in the present civil application that APSEZ and APL had allegedly continued their operation of cutting/destruction of thick cover of Mangrove forest existing in Mundra Taluka of Kutchch District in violation of the aforesaid order dated 12.7.2011 passed by this Hon'ble Gujarat High Court. Kheti Vikas Trust has made no other allegations in present civil application, besides the allegation of destruction of mangroves of certain area in breach of the order dated 12.7.2011. ➢ APSEZ filed its reply and refuted the allegations. It was the case of APSEZ that the activities carried out by it at Mundra is permitted by various clearances granted by the concerned authorities from time to time. The petitioner failed to prove that any of the	

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		vesting in the government and returned to the Forest Department. (Report is enclosed herewith). Hon. Collector sahib, the committee has submitted its report to the Hon. High court. The committee has recommended to vacate the land but in the same land Adani Company is going to establish its Copper Refinery Project as shown in EIA. As all the recommendations and this report being under consideration of the court (subjudice) the public hearing is illegal and interference in the working of High Court of Gujarat. Therefore, these all procedures should stop immediately and the public hearing 29.4.2017 for environmental clearance should be cancelled. In spite of that if the public hearing is held on the pecified date and time these whole matter would be considered contempt of court of Hon. Gujarat High court, it should be seriously noted that. We bring this to your kind notice with request. Honourable Sir, With reference to the reference cited at 2 above it is to inform you that in the year 2011 for violations of Environmental laws by Adani Port and Adani Power in the Sea area and this areas of Mundra Taluka, Hon.Gujarat High Court has directed on dated 09.07.2015 to the Hon. Principal District Judge to carry out videography and photography of whole Adani Port and SEZ and to submit factual report to the Hon. High Court, and Hon. Principal District Judge has submitted CD of their report and videography/photography in the sealed cover on dated 24.07.2015 to the Hon. High Court. And in the report of Hon. Principal Judge it is proved that there are rampant violations of rules by Adani and also on the land on which Adani is going to establish its Copper Refinery Plant, is informed by Hon. Principal District Judge along with videography and	activities of APSEZ is not permissible. ➢ During the pendency of the petition, MoEF&CC appointed a committee headed by Ms. SunitaNarain which visited the site and submitted its report to MoEF&CC on 18.4.2013. MoEF&CC thereafter issued a Show Cause Notice dated 30.9.2013 to APSEZ which was pending for adjudication. ➢ Subject PIL was dismissed on 17.4.2015. The Gujarat High Court dismissed the petition on the premise that the prayer to appoint the committee is already granted by virtue of appointment of committee by MoEF&CC. MoEF&CC has already taken action and issued the show cause notice. It is for MoEF&CC to consider the report and take appropriate action and the petition does not survive any further. ➢ MoEF&CC has given final directions to APSEZ to comply with certain conditions vide their order dated 18.09.2015 thereby disposed off the pending show cause. With this, all allegations including that of destruction of mangrove are appropriately dealt with by MoEF&CC. The statutory authority has taken a considered view which has become final as the time limit to challenge the said order of MoEF&CC had expired way back. ➢ Appeal filed in Supreme Court by the petitioners against Gujarat High Court order dated 17.4.2015 which was dismissed on 18.3.2016. Upon dismissal of the matter by the Hon'ble Supreme Court, Kheti Vikas Seva	

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		Photography that, is disputed land. And the whole report is pending with (subjudice) Hon. High Court. When overall report of whole the matter is pending with Gujarat High Court all these matters are concealed by the Adani Company. These facts are informed neither to MOEF&CC nor to EAC which is a very serious matter. Therefore you being the Chairman of the Public hearing and the District Magistrate of the district on the basis of these designations it is our prayer that the public hearing may please be cancelled on immediate basis, and we are informing you with all these facts. As such as these facts are under consideration of High Court of Gujarat and if the public hearing for refinery takes place on the same land it is a very serious matter it would not only be against law but would be interference in the working of Hon. Gujarat High Court. Therefore it is our humble request that the public hearing may please be cancelled. With reference to the reference cited at 3 above it is to inform you that we have filed an application in the department of environment and forest of Government of India in the year 2011 in protest against the violations of Environmental laws by Adani Port and Adani Power in the Sea area and this areas of Mundra Taluka and in which the permission is granted with detailed conditions to AdaniPort and Adani Power to carry out industrial activities in the areas of Mundra but as Adani is violating environmental conditions in large scale we have submitted our representation to the Government of India and has requested to prevent the damages occurring due to the project of Adani. There after a committee of five environment experts was formed by Government of India under the leadership of well-known environmentalist Sunita Narayan to	Trust cannot be heard to say that there is any merit in their case against APSEZ. ➢ Thereafter, in its order dated 15.10.2015 in Civil Application No.9124 of 2011, the Gujarat High Court recorded that it would not be able to frame charges against APSEZ and APL for alleged contempt for breach of the order dated 12.7.2011. ➢ Hon'ble Gujarat High Court by its order dated 5.11.2015 proposed certain measures to be undertaken by APSEZ and appointed a committee of experts to survey the area in and around the Port/SEZ developed by the APSEZ, with a special focus on the question of mangroves in the area. Said committee of experts has already filed its report before this Hon'ble Court on 8.6.2016 and APSEZ has also filed its response to the said report on 18.07.2016. The said report and the response of the APSEZ are pending before this Hon'ble Court. ➢ Unfortunately however, the Committee has travelled much beyond the scope of the terms of reference delineated by this Hon'ble Court in its order dated 5.11.2015, which is demonstrated through our affidavit dated 18.07.2016 which clarifies that the contents of the report submitted by the Committee further reflects that the Committee has in fact proceeded with mala fides and with a view to pin down APSEZ and APL. In fact, one of the committee members was party to the earlier clearances granted to APSEZ and is therefore, barred from raising any objection or giving	

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		investigate Adani and this committee has submitted its report to Government of India on 18 April2013 and have reported and informed in the report that large scale violence's of rules and conditions are done by Adani and various detailed recommendations are made including to cancel the Environmental license of North Port and to impose penalty of 200 crores and before giving any permission to any project in Mundra it is very necessary that study of carrying capacity of this area is undertaken and no project should be sanctioned without this study. But here public hearing for Copper Refinery is held without any such study. Therefore it is our humble request that the Public Hearing may please be cancelled. It is very necessary looking to the Public Interest at large that this public hearing may be cancelled. Hon. Sir, with reference to the reference No. 4 it is to inform that Environment and Forest Ministry of Government of India has issued instructions vide Office Memorandum No. J-11013/25/2014-IAI Government of India Ministry of Environment and Forest Dated 11th August, 2014 to ministry for EIA and according to Company's Act 2013 it is essential to have detailed report in EIA regarding management of expenses and fund of Corporate Social Responsibility. But Adani has not given any such information in its EIA report which is violation of The Company's Act and circular dated 11th August 2014 of Government of India. And EIA notification and Section 135 of The Company's Act 2013 deal with the corporate social responsibility and Schedule –VII of the Act lists out activities which may be included by companies in their CSR policies. And this is also violation of Corporate Social Responsibility Policy Rules, 2014. As such Adani has concealed the facts in	any finding contrary to his own recommendations. ➢ In view of the aforesaid it becomes evident that the only issue pending before this Hon'ble Court in Civil Application No.9124 of 2011 is as to the extent of the measures (the extent and the place where mangroves can be planted by way of compensatory plantation) to be undertaken by APSEZ. The matter pending before the Hon'ble Gujarat High Court is limited to plantation of 100 ha of mangroves or more as may be directed by the Hon'ble Court at the location identified by the Committee. No other area is subject matter of this matter. **About CRZ area:** ➢ The project will be developed using notified SEZ area and forest land. The proposed layout superimposed on authorized CRZ map is presented in the EIA report as Figure 2.1 on page C2-3. From the said figure, it is clear that the entire project area is outside CRZ. **About compliance:** ➢ APSEZ as well as APL have obtained requisite clearances from time to time from respective authorities and have been submitting their compliance reports twice in a year to all concerned government authorities. ➢ MoEF&CC has dealt with the SunitaNarain Committee report and subsequent submissions of APSEZ as well as APL and has finally issued an order with certain directions.	➢ The map of proposed project superimposed on CRZ map of the are prepared in 2011 by Centre for Ear Science Studies (CESS) Thiruvanantapuran an institution recognized by Government India. The proposed project site is outsic CRZ and doesn't attract CRZ clearance. Th prosed project and CSZ area as shown Figure-1.5 of chapter-1 in the EIA report.

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		their report which are essential to be mentioned as per Law. Adani Company was knowing all these facts in spite of that has concealed all these facts. As such Adani has openly violated the law of India, therefore it is very essential that this public hearing shall be cancelled and it is very essential that facts of law are reinstated. Hon. Sir, for the copper refinery project of Adani, requirement of land is as under. Total 256.58 Hector (634 Acre) of land is necessary for the project proposed. Out of that land of 154.18 Hector (381 Acre) demarked land is in ownership of APSEZ (of Adani Group Company) and it has been allotted before in the scheme of local land use scheme for industrial purpose. Moreover, 102.38 Hector (253 Acre) forest land is also included which will be converted in to industrial use and state government has proposed for the forest land conversion (EC) and it is lying in the Central Government. (Its file No. are 8.04/2016-FC). There is no process involved for migration or rehabilitation for this scheme. In fact the public hearing is to be held on the place of proposed project, the land from forest department is not allotted to the company till now. And the land of 253 Acre of forest department which Adani has requested is not granted to them. And this land was occupied by the forest department after 1980 the object was to create green belt growing trees over there and to develop the forest and to prevent the progress of the desert and to decrease salinity by such types of activities, make available protection , shelter and grazing to the wild animals. And this whole forest is full of various herbal medicines and inland Acacia (deshi bawal) and this forest is playing	One of which is to carry out Cumulative Impact Assessment study for Mundra region. APSEZ has obtained ToR from GCZMA and started studies through NABET accredited consultant. Progress has been submitted to MoEF&CC from time to time. Study is in progress and on completion final report will be submitted to concerned authorities. **About CSR activities:** ➢ Adani Foundation is the CSR wing of Adani group. Adani Foundation works in four main areas for social upliftment of communities around all project locations of the Adani Group. They are Education, Community health, Social Livelihood and Rural Infrastructure development. With reference to the mentioned Office Memorandum of MoEF&CC and companies act with respect to the Corporate Social Responsibility, details about the activities carried out and planned by Adani Foundation in and around Mundra are mentioned in chapter 8 of the EIA report. **About Forest clearance:** ➢ As per procedures of EIA notification 2006, its subsequent amendments and other related notifications / circulars / office memorandums of MoEF&CC, it is clear that Environmental Clearance procedure can be carried out once application has been made for forest land diversion and environment clearance can be granted to any project activities involving forest land by reviewing the status of forest clearance at respective time. Proper	➢ A budget of Rs.8 crores per each year ha been allotted for Enterprise Socia Responsibility / Corporate Socia Responsibility (CSR) activities for five years The CSR details (like CSR policy, initiative & activities, CSR Budget expenditure dat form 2010 to 2016, Proposed CSR budge plan for next 5 years and CSR implemente photographs) is given in Section-8.5 c Chapter-8 in the EIA Report. ➢ The total land required for the propose project is about 256.58 ha (634 acres), ou of which 154.18 ha (381 acres) of identifie land for this project belongs to the APSE (an Adani Group Company) and is alread designated for industrial purpose as per th local land use plan. Memorandum c Understanding (MoU) is in place betwee Adani Ports & Special Economic Zon Limited (APSEZL) and Adani Enterprises Lt (AEL) for 154.18 ha (381 acres). The APSE

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		an important role in keeping the Environment clean. And as such Government of Gujarat and Adani Company have violated The Forest Rights Act 2006. In the Forest Rights Act it is established that the approval of Gram Sabha is essential in spite of that approval of Gram Sabha is not taken by the company. It is violation of Forest Rights Act 2006 and also the judgment of Hon. Supreme Court delivered in Vedant Copper Project of Orissa. So, establishing very much polluting copper refinery destroying such useful forest area is very much detrimental to local people and grabbing rights of local people. Government of Gujarat has already allotted pasture land of 14 villages to Adani so the people of these areas are suffering difficulties from lack of pasture land and these cattle breeders are getting their livelihood grazing their cattle in these areas of forest. While Adani is willing to give fatal blow on cattle breeders grabbing lands from these areas. These people are indigenous people of these areas and protection must be given to the rights of indigenous people and Government of India has signed charter of UN regarding protection of rights of indigenous people and is one of the country ratifying the charter of indigenous people of United Nations. So rights of these indigenous people must be protected. It is very necessary. Therefore, it is humbly requested that, the public hearing of Copper Refinery of Adani must be cancelled. Hon. Sir, it is further submitted that the land selected for Copper Refinery Project of Adani is land included in the CRZ. And no clearance is obtained from the ministry of Environment and Forest of Government of India, and according to CRZ notification 2011 this project is coming under CRZ area. So sanction of CRZ is necessary but company has done nothing for that	procedures are being followed for proposed project with respect to obtaining environment clearance as well as forest clearance. In view of the above clarifications, it is clear that the required procedures are being followed for obtaining prior environmental clearance for the proposed project activity and Public Hearing is part of the process.	notification and land allotment to AEL enclosed as Annexure-III and Annexure-IV The land use details of the proposed projec is given in Section-2.2.1 of Chapter-2 in th EIA report.

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		and directly asked for Environmental clearance. It is against the rules. Therefore, it is humbly requested that, the public hearing of Copper Refinery of Adani must be cancelled. Considering all the above facts, the public hearing of Greenfield Copper Refinery Project of Adani declared to be held on the next date 29.04.2017 at village Tunda is against Law. And the matter is subjudice in the High Court of Gujarat and hearing is to be held in that area, therefore, it is humbly requested that, the public hearing of Copper Refinery of Adani must be cancelled.		
7	Shri Debi Goenka, (Executive Trustee). Conservation Action Trust (West) Mumbai	1. Please furnish full details of the existing land use of the site proposed for the project. 2. Please furnish the detailed land use of the	1. Out of total area proposed for the project 256.58 ha area is notified SEZ and 102.38 ha is forest land for which forest clearance application is in process. 2. The layout has been marked on the CRZ map	1. The total land required for the propose project is about 256.58 ha (634 acres), ou of which 154.18 ha (381 acres) of identifie land for this project belongs to the APSE (an Adani Group Company) and is alread designated for industrial purpose as per th local land use plan. The APSEZ notificatio and land allotment to AEL is enclosed a Annexure-III and Annexure-IV. The land us details of the proposed project is given i Section-2.2.1 of Chapter-2 in the EI report. Remaining forest land 102.39 ha (25 acres), MoEF&CC (forest conservatio division) has granted Stage-1 approval fc diversion of 1576.81 ha of reserved fores land in favour of Adani Ports & Speci Economic Zone Limited (APSEZL) vide lette F.No.8-04/2016-FC dated 16th Novembe 2018. Stage-I FC has been obtained a given in Annexure-V. 2. The map of proposed project

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		proposed site as per the approved CZMP.	given in Figure-1.5 of Chapter-1 in the EIA report. The proposed project area is outside CRZ.	superimposed on CRZ map of the are prepared in 2011 by Centre for Ear Science Studies (CESS) Thiruvanantapuran an institution recognized by Government India. The proposed project site is outsic CRZ and doesn't attract CRZ clearance. Th proposed project area is outside CRZ. Th proposed project layout map superimpose on CRZ map is shown in Figure-1.5 Chapter-1 in the EIA report. There is r presence of mangroves and mudflats in th project site.
		3. Please furnish a copy of the CZMP of this area approved by MoEF.	3. GCZMA is the custodian of approved CZMP for the proposed project area. However project layout is superimposed on CRZ map prepared by authorized agency of MOEF&CC as per CRZ notification 2011 and same is provided in figure-1.5 of Chapter-1 of EIA report.	3. Refer the above point no.-2.
		4. Has the project proponent carried out mapping of the CRZ area and the HTL – LTL line, buffer area, as well as mud flats, sand dunes, and corals on 1:4000 scale on the CZMP approved by MoEF? If yes, kindly furnish a colour copy.	4. The proposed project layout has been marked on the authorized CRZ map given in Figure-1.5 of Chapter-1 in the EIA report. Same is in colour.	4. Refer the above point no.-2.
		5. Please furnish a satellite imagery of 1991 of the proposed project area.	5. The latest satellite imagery of the 21 Jan 2016/14 Feb 2016 is given in Figure-3.3.1 of Chapter 3 of EIA report	5. The latest IRS-Resourcesat-2 satellit imagery of the 21st an 2016/14 Feb 2016 given in Figure-3.3.1 of Chapter 3 of EI report
		6. Please give full land use details and categories of the proposed project area. Please mention how much area is under CRZ I - A, CRZ I, CRZ II, CRZ III and CRZ IV.	6. The land use details of the study area are given in Figure-3.3.2 of Chapter-3 of EIA report	6. Refer the above point no.-2.
		7. Does the proposed project area falls under	7. The proposed project area is outside CRZ.	7. Refer the above point no.-2.

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		ecologically sensitive and or geomorphologically important area, as per the CRZ Notification 2011?		
		8. Please specify what are the ecologically sensitive areas and or geomorphologically important areas observed at the proposed site and in the study area, along with the area details (in has).	8. There are no ecologically sensitive areas in the proposed project area. However mangroves are present outside the project area but within the study area. The land use break-up details as per satellite image classification for the study area is given in chapter-3 of EIA report.	8. There is no ecologically sensitive area withi the study area of proposed project. Ther are Dandedri RF (within project area), Mundr Mangrove RF (south of project area), Navina RF (0.5 km, E), Mundra Dhoa RF (0.7 km SE). The environmental settings 10 km radiu around the project site is given in Table-1.1 c Chapter-1. The land use details of study are is given in Section-3.3 of Chapter-3 in the EI report.
		9. Please furnish information on whether mangroves and mud flats are present at the site and the area (in has) covered by mangroves and mud flats.	9. The proposed project area is outside CRZ area therefore no presence of mangroves and mudflats.	9. There is no mangroves/ mudflats identifie in the project site at the time of baselin studies
		10. Please furnish information at the distance which mangroves and mud flats are observed from the proposed project site.	10. Mangroves are present at 100 m away in the southern side of the project area.	10. The study area consists of 7.78% mudflats tidal flats and 3.02% mangroves. Th Mundra mangroves are present at the sout of the project area.
		11. Please furnish details of salt pans and aquaculture ponds within the study area, and their distances from the project site.	11. Salt pans are located at a distance of around 5 KM in WSW direction from the project area.	11. The study area consists of 0.64% salt pans The environmental setting of 10 km radiu is given in Table-1.1 of Chapter-1 in the EI report.
		12. Please furnish details regarding the fishermen residing and/or fishing in the study area.	12. The fish species in the study area have been listed in Chapter-3 of the EIA report. Details on existing fisherman will be included in the Final EIA report.	12. The fishermen details are given in Section 3.10.6 of Chapter-3 in the EIA report.
		13. As per the study area map, the project area not only covers mudflats, it is also falls within the Mundra mangrove reserve forests. It is also in	13. Proposed Project area is outside CRZ and there are no mudflats and mangroves in the project area. Alternative site analysis is done for the	13. Three alternate sites were identified for th proposed refinery plant based on sitin criteria.

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		proximity of the Danderi reserve forests, Navinal reserve forest and the Mundra Dhoa reserve forest. Please explain why such an ecologically important area has been selected for this project.	project and site is selected based on its suitability. Project area includes forest land for which APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance.	The details of these three sites are a follows: Site-I: near Gundala & Mokha villages; Site-II: near east side of Adani power plant; and Site-III: near near Mundra village. The comparison salient features c alternative sites done and details ar presented in following Table-5.1 and shown in Figure-5.1 of Chapter-5 in the EI report.
		14. As per the information submitted for "Site Alternatives" in the Form I, Site I has no forest area, whereas the proposed Site 2 has 253 acres of forest land that the project proponent has proposed for diversion. Please explain the rationale behind selecting the site which has forest area and explain why the site that does not have forests has not been selected.	14. The alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter–5 of the EIA report. Site is selected on the basis of suitability from number of factors.	14. The Site-II in Siracha &' Navinal Villag adjacent to existing APL emerges a technically superior site such as availability closeness of water and power source, lan development, closeness to road and rail, et It is substantially advantageous in terms c environmental and technical criteria.
		15. It is also stated in Form I that mangroves are not present on the site. However, a bare perusal of the google earth images shows that the mangroves exist along the southern boundary of the proposed project. Also, the proposed conveyor belt from the port to the proposed site passes through the mangroves. This can also be observed from the "FIGURE 3.3.2 Landuse/Land Cover Map Based on Satellite Data" of the draft EIA report. Why has this been not mentioned in the Form-I? Please explain.	15. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1.	15. Mundra Mangrove RF (south of project area which is mentioned in Section-9 sub-claus (III) Environmental Sensitivity of form-1.

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		16. The proposed area has been illegally reclaimed by the APSEZ. Entire land use and land cover has been changed due to this. Please give information on the land use and cover as was during 1991 and also before the SEZ clearances were granted. Please also furnish a copy of the permissions issued by the State and Central Government agencies permitting the reclamation and destruction of mangroves.	16. The proposed project is planned over notified SEZ and Forest land that applied for diversion. No reclamation is proposed as part of proposed project activity. Details on present land use are provided in Chapter-3 of the EIA report.	16. The proposed project is planned ove notified SEZ and Forest land that applie for diversion. No reclamation land involve as part of proposed project activity. Detail on present land use are provided i Section-3.3 of Chapter-3 in the EIA report.
		17. Is the project proponent going to destroy the remaining mangroves of this area as well?	17. Proposed project area is devoid of mangroves. There is no question of mangrove destruction.	17. There no existing mangroves plantations i proposed site at the time of baseline study.
		18. Please explain on what basis the alternative site-1 is rejected.	18. The alternate site analysis was carried out. The site selection criteria and the study of alternate sites is detailed in chapter-5 of the EIA report.	18. Refer the above point no.-13 & 14.
		19. The Table-3.3.2 – "Land use breakup details in 10 km radius" clearly mentions presence of mudflats, mangroves and the reclaimed area in the study area. As per this table only 5.27% of the land in the study area is built-up, whereas 11% of the study area is wetland. Why is the site being selected for this proposal?	19. The proposed project area is outside CRZ and therefore no presence of mangroves and mudflats. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in Chapter – 3 of the EIA report. Site selection is based on suitability criteria as studied and provided in the EIA report.	19. The proposed project doesn't fall unde mudfalts/wetlands and mangroves as pe the landuse/ land cover map based on th satellite image is shown in Figure-3.3.2 c Chapter-3 in the EIA report.
		20. Please explain why the land with scrub vegetation has been categorised as wasteland.	20. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in Section-3.3 of Chapter – 3 in the EIA report.	20. The landuse/ land cover map based on th satellite image is shown in Figure-3.3.2 c Chapter-3 in the EIA report.
		21. Item 21 of Form I under Basic Information states that the proposal involves	21. The forest related information as asked in point no. 22 is replied properly.	21. Item 21 of Form-I related to interlin project and reply is no interlink. In item 2

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		approval/clearance under the Forest (Conservation) Act, 1980. However, under point 23 "Whether any Forest Land Involved? Area of Forest land Involved (has)" it is stated as "N/A". The Draft EIA report has mentioned at many instances the presence of 3 reserved forests and the Mundra mangrove forests. Please explain why such misleading information has been provided in Form-1.		of Form-I mentioned the forest clearanc required and file no.8-04/2016-FC mentioned. The item 23 of Form represents wildlife clearance, the propose project doesn't attract any wildli clearance.
		22. In form 1, the query under point 24 is "Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?" The project proponent has replied has "No". It is important to point out here that at-least two court cases are going on the APSEZ land – SLP 28788 of 2016 in the Supreme Court and WP (PIL) 12 of 2011 in the High Court of Gujarat. Please explain why this was not disclosed in the Form 1.	22. There is no case pending against the proposed project.	22. There no court case or any legal issue regarding proposed project against AEL.
		23. What action has been taken by the APSEZ as per the recommendations of the Claude Alvares led "Committee on Mangroves" in the Civil Application 9124 of 2011 under the PIL 12 of 2011? Please furnish the details of the actions taken by the project proponent.	23. The question is not related to proposed project.	23. This is outside the scope of the EIA repo for the proposed project.
		24. The Form 1, under "II Activity" states that no reclamation is envisaged. It is a well-known fact that the entire area has been reclaimed by the Adani group. This has been also stated in the Sunita Narain report. What measures have been taken to restore the area to its original state? How much mangrove plantation has been undertaken? Please furnish with the location details, along with coordinates and site	24. The question is not related to proposed project. No reclamation is proposed in the project under discussion.	24. This is outside the scope of the EIA repo for the proposed project.

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		photographs.		
		25. The Form 1 also mentions "construction of new approach road". However, the document on Alternative sites state that "Widening of existing Road" would be required for this site. Why is there such discrepancy in the information being provided?	25. As a part of the requirement for the proposed project the existing roads will be strengthened by widening or upgrading and extended to approach the proposed site.	25. The existing roads will be strengthened b widening or upgrading and extended t approach the proposed site.
		26. Where would this proposed new approach road and / or the widening of the existing road come? Please furnish details along with the map showing the proposed new approach road and or widening of the road.	26. The raw material transportation is proposed to be received from the approach road within notified SEZ which will be strengthened. The overall layout of the proposed plant is given in Figure-2.1 of EIA report.	26. The existing roads will be strengthened b widening or upgrading and extended t approach the proposed site and th proposed project layout is given in Figure 2.1 of Chapter-2 in the EIA report.
		27. Please furnish details on the impacts and mitigation measures of proposed new approach road and/or widening of the road.	27. The widening of existing road is within the notified SEZ and it is considered as part of the overall impact assessment of the proposed project. However, impact will be insignificant.	27. Refer the above point no-26. The existin roads will be strengthened durin construction stage of the project. Th impacts related to road developmer activities is temporary and insignificant. Th anticipated impacts during constructio phase is given in Section-4.1 of Chapter- in the EIA report.
		28. The Form 1 also mentions construction of new transmission lines. Please show location of the new transmission lines on coloured map. Has the area required for this mentioned in the Draft EIA report? Please mention the impact of the transmission lines and the mitigation measures for same. How much forest land is involved? Are these transmission lines passing through CRZ areas? Why can't the existing transmission lines be upgraded?	28. Power will be sourced from existing transmission lines by extending it to the proposed project site by using existing area of APSEZ. Same will be outside CRZ.	28. The total estimated power requirement fc proposed project is 300 MW out of which 4 MW would be generated from interna process steam and balance 260 MW powe would be sourced from APSEZ Ltd, throug M/s. Mundra Utility Pvt Ltd (MUPL). Th power allocation letter is enclosed a Annexure-V.
		29. For stream crossings, the Form-1 mentions that "Natural drainage passing through the site will	29. Natural drainage will not be disturbed due to the proposed project. The natural topography	29. Dhaneshwari river is a seasonal river whic flows in the western part of the project site

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		be suitably trained and maintained. There will not be any diversion. Further, conveyer for Copper Concentrate and Rock Phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required." The Adani group has already reclaimed large swathes of mudflats, mangroves and creeks in this area. Now the APSEZ wants to further "suitably train and maintain" the natural drainage. Please furnish details on the impacts of this and mitigation measures of same. Please also explain how this can be permitted in view of the fact that the reclamation has been carried out illegally without valid Environmental, CRZ and Forest Clearances. Please furnish copies of these clearances, if any.	will be maintained. The proposed project location is notified SEZ and forest land for which necessary clearance is under progress.	The river will not be diverted but suitabl trained along the boundary. The flow of th river will be maintained as shown in th plant layout on Figure-2.1 of Chapter-2 i the EIA report. Anticipated impacts and mitigatio measures during construction and operatio phase of project is given in Chapter-4 in th EIA report. No reclamation land involved as part proposed project activity. The propose project is outside the CRZ are as shown i Figure-1.5 of Chapter-1. MoEF&CC (fores conservation division) has granted Stage- approval for diversion of 1576.81 ha reserved forest land in favour of Adani Port & Special Economic Zone Limited (APSEZI vide letter F.No.8-04/2016-FC dated 16t November 2018. Stage-I FC has bee obtained as given in Annexure-V in the EI report.
		30. Further, there is already pollution in the area due to the coal dust and fly-ash and emissions of the power plant. There have been numerous complaints regarding this from the villagers of this area. Additional conveyor for Copper Concentrate and Rock Phosphate will further deteriorate the environment. Please give details on the impact of and mitigation measures of the conveyor for Copper Concentrate and Rock Phosphate, along with the impacts of the existing power plants.	30. The copper concentrate and rock phosphate will be transported through state of art pipe conveying method. The required EMP measures will be implemented as mentioned in Chapter-6. Project will be implemented after obtaining required clearances from concerned statutory authorities and complied with.	30. The copper concentrate and rock phosphat will be transported through state of art pip conveying method. The anticipated impact and mitigation measures are given Chapter-4 in the EIA report.
		31. It is mentioned in Form 1 that "Approximately	31. The locals will be given preference as per the	31. The proposed project will give employmer

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		3000 persons will be employed during construction phase and about 2000 people will be employed during operation phase". Also, please mention if the employment will be given to the locals or to outsiders.	eligibility. The skill development program will be implemented as a part of CSR program to improve employability.	to about 2000-3000 persons on averag per day basis during construction phase During operation phase, about 2000 direc employment and 5000 indirect employmer will be generated. Local people will be give preference to employment based on th skill set & eligibility requirement as per an vacancies available.
		32. What kind of residential and cooking facilities will be provided for the construction workers?	32. During construction phase, workers will be sourced through contractors and it will be ensured that workers get required facilities.	32. The workers from nearby will be employe through contractors in contract basics. Th details will be provided in detail engineerin stage.
		33. What sanitation facilities will be provided for them during the construction phase?	33. All the facilities including sanitation and others will be provided.	33. All required facilities (like drinking wate domestic toilets and shelters sheds) will b provided.
		34. How many locals have been employed so far by the APSEZ? Please furnish details. Please furnish how many are temporary and how many with permanent jobs.	34. This is outside the scope of the EIA report for the proposed project. However, local employment will be provided for the proposed project based on eligibility.	34. This proposed project is belongs AEL. Refe the above point no.-31 for employmer details.
		35. Under the "Environment Sensitivity", the Form-1 states that "Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value" are not present within 15 kms. However, mangroves are about 167 meters away from the boundary of the proposed project. Moreover, there are 3 reserved forest and the Mundra mangrove forest in the proposed project area. Mangroves are protected as per the Indian legislation. Please explain why this was not mentioned in the Form-1.	35. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1.	35. The Section-9 sub-clause (III) Environmenta Sensitivity of form-1.
		36. Moreover, the 15 kms area covers the villages	36. There is no notified/ declared turtle nesting	36. As per primary baseline survey, there is n

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		Tragadi. As per some of the reports Tragadi is turtle nesting sites. Why this has not been mentioned in the Form 1? Please explain. Have the impacts of the proposed project and related activities been studied for the turtle nesting? What are the mitigation measures for same? Please furnish full details of same.	site present within 15 KM of the proposed project area.	notified/ declared turtle nesting site prese within 15 KM of the proposed project area.
		37. Please give details on the pagadiya fishing along the APSEZ area. How many fishermen are engaged in this? How many have been impacted due to the APSEZ? Please furnish full details.	37. The details of pagadiya fishermen will be included in the final EIA report. No fishermen will be impacted due to the proposed project.	37. The fishermen details are given in Sectio 3.10 and Annexure-XII of Chapter-3 in th EIA report.
		38. What compensation has been provided to fishermen who earlier used to fish by this technique, but had to stop due to the APSEZ? Please furnish full details.	38. This is outside the scope of the EIA report for the proposed project.	38. The proposed project belongs to AEL. A part of CSR activities the will b help/support to fishermen communities.
		39. How many fishing boats are present in the area? Please furnish full details.	39. The proposed project area is outside CRZ. We do not have any information on fishing boats in the surrounding area. However, proposed project activity will have no impact on fisheries.	39. This is outside the scope of the EIA repo for the proposed project.
		40. From where would the sand be obtained for the proposed construction?	40. The sand for the proposed construction will be sourced from local available markets.	40. The required construction materials will b sourced from nearby local market.
		41. The proposed TOR document mentions under Land Use that - "The existing land use pattern in the study area of 10 km radius around the project will be established through the literature review of published Census records and latest available satellite imagery. Based on this review, the land use pattern is categorized into the following five categories: a. Forest;	41. The land use pattern of the study area covering 10 km radius is given in Figure-3.3.2, Chapter-3 of the EIA report. Same is in colour. Mudflats and mangroves are mentioned in Table-3.3.2, Chapter-3 of EIA report.	41. The land use pattern legends with colo identification of the study area covering 1 km radius is given in Figure-3.3.2 ar landuse pattern area (in ha.) is given Table-3.3.2, Chapter-3 of EIA report.

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		b. Irrigated and agricultural Land; c. Un-irrigated agricultural land; d. Culturable wasteland; and e. Land not available for cultivation, which includes built-up areas." Why are the mudflat areas and the mangroves not mentioned? Also, please demarcate the culturable wasteland and share a coloured map of the same.		
		42. The brief summary as well as the pre-feasibility report mentions that "There is no significant vegetation or habitation in the project site. The nearest significant features from the project site are 4620 MW Adani Power Plant and Tata Power (Western side of project area), and West Port of APSEZL (South – west direction from project)." Kindly explain why the mangrove vegetation or the three reserve forest areas and mangrove forest areas not significant.	42. Project area is notified SEZ and forest land for which diversion is under process. Mangroves and other RF are mentioned as part of Form-1 and EIA report. Mangroves are not present within the proposed project area.	42. Mangroves are not present within th proposed project area. Mundra Mangrove R (south of project area, which is mentioned i Section–9 sub-clause (III) Environment Sensitivity of From-1.
		43. The pre-feasibility report also mentions that "Land for different corridors (Power/ Road/ Raw Material Conveyor) would be additional." Please furnish full details of the land required and the existing land use for these corridors. Please furnish the existing land use, whether any eco-sensitive areas, forest lands, mangroves, beaches, etc. exist in these corridors. Please also furnish a coloured map of the proposed corridor area.	43. All the utility corridors will be part of notified SEZ. However, they will be finalized as part of detail engineering and only after obtaining required clearance for the proposed project.	43. The resource and requirement details ar given in Section-2.2 of Chapter-2 in the EI report. The total land required for th proposed project is about 256.58 ha (63 acres), out of which 154.18 ha (381 acres of APSEZ and 102.39 ha (253 acres) forest land (Stage-I FC is obtained). Th water and power sourced from APSEZ Ltd through M/s. Mundra Utility Pvt Ltd (MUPL)
		44. Why has information on the above-mentioned corridors not provided in the Draft EIA? Please explain.	44. Reply is as per point no. 43.	44. Refer the above point no.-43.

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		45. The pre-feasibility report mentions that "From South West to North East majority of area is of APSEZL where west port is also located. The land is having undulations and minor grading will be required." Kindly provide details on how the grading would be carried. What material would be used for this? From where would it be sourced? Please furnish full details.	45. Leveling of the land profile will be done as part of detailed engineering for the proposed project.	45. The land profile will be done as part detailed engineering for the propose project.
		46. How many creeks are present in the study area? Please furnish a coloured map and a satellite image showing the creeks.	46. Map showing the creek in the satellite imagery and land use map are provided in Chapter-3 of the EIA report.	46. The study area map is shown in Figure-1 of Chapter-3 in the EIA report.
		47. The pre-feasibility report states that "Since the entire land is vacant, hence no displacement and rehabilitation of local population is envisaged". What about the fishermen? How many of fishermen are engaged in fishing in this area? Please furnish full details.	47. Proposed project area is devoid of any human habitation. The fishermen in the surrounding areas will not be disturbed due the proposed project.	47. The fishermen details are given in Sectio 3.10 and Annexure-XII of Chapter-3 in t EIA report.
		48. How many fisher-folk/local people will be given permanent jobs in the proposed project?	48. Details on potential employment are mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.	48. Refer the above point no.-31 & 47.
		49. What kind of jobs will be given?	49. Based on the eligibility and available vacancies, jobs will be provided.	49. Reply is as per point no.-31.
		50. Will they be imparted appropriate training?	50. Training will be integral part of all the employees. The skill development program will be implemented as a part of CSR program to improve employability.	50. The Training is a part of CSR activities a given in Section-8.5 of Chapter-8 in the E report.
		51. Would the job be permanent or temporary?	51. Based on the eligibility and available	51. Reply is as per point no.-31.

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			vacancies, jobs will be provided.	
		52. How many salt pans exist in the study area. Please furnish full details.	52. Salt pans are present in the south west direction of the project area at a distance of around 5KM.	52. The study area consists of 0.64% salt pans The environmental setting of 10 km radiu is given in Table-1.1 of Chapter-1 in the EI report.
		53. From where will be the coal sourced for "addition in the concentrate for effective smelting"? What will be the ash content, Sulphur content mercury content and radioactivity of the coal proposed to be used? How will it be transported? What is the quantity of the coal envisaged to be stored? What are the ash utilization plan? Please furnish a detailed report on same. What are the mitigation measures for the SOx, particulate matter, arsenic, heavy metals, mercury, radionuclides emissions?	53. The coal will be sourced from the local market and transported through trucks. Around 3000 tonnes of coal will be stored. Coal is taking part in the smelting process and hence there is no ash generation. The details about mitigation measures have been covered as a part of EMP in the EIA report.	53. The raw material requirement and source i given in Section-2.2.2 of Chapter-2. Th impacts and mitigations for constructio and operation phase are given in Chapter- of EIA report.
		54. Are there any studies conducted on the long-term radioactivity of the ash? Kindly furnish the same if any. What are the mitigation measures proposed for the same?	54. There is no generation of ash in the process.	54. There is no generation of ash in the proces copper project.
		55. Please share details of the water circulation system proposed as mentioned in the Pre-feasibility report. Please show the layout on map of this proposed water circulation system. Please also share details of the land cover of this proposed area. Why has this not been mentioned in the Draft EIA?	55. The requested details are part of detail engineering. Preliminary water balance diagram is given in Figure-2.2 of the EIA report.	55. The water requirement and breakup detail are given in Section-2.2.3 and Preliminar water balance diagram is given in Figure 2.2 of Chapter-2 in the EIA report.
		56. The very first criterion for site selection is "Away from environmentally sensitive areas". However, this project falls under the reserve forest and mangrove areas. Please explain.	56. Environmental sensitivity analysis is done for 15 km area from the project boundary and same is provided in Form-1. The alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms	56. The comparison salient features alternative sites done and details ar presented in following Table-5.1 and shown in Figure-5.1 of Chapter-5 in the EI report.

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			of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter-5 of the EIA report. Site is selected on the basis of suitability from number of factors.	The Site-II in Siracha & Navinal Villag adjacent to existing APL emerges a technically superior site such as availability closeness of water and power source, lar development, closeness to road and rail, et It is substantially advantageous in terms environmental and technical criteria.
		57. Under section 6.4.2 "Merits & demerits" of the pre-feasibility report why the presence of reserve forests and mangrove forest not mentioned under "Site-II (East of APL)"	57. Details on alternative site analysis are provided in the Chapter-5 of the EIA report. Site is selected on the basis of suitability from number of factors.	57. Refer above point no.-56.
		58. How much green belt plantation has been undertaken by APSEZ so far? Please provide with the total area, the co-ordinates and the photographs of same.	58. This is outside the scope of the EIA report for the proposed project.	58. This is outside the scope of the EIA repo for the proposed project. AEL propose 85.79 ha for greenbelt development for th proposed project.
		59. What plant species have been planted in the green-belt in the APSEZ?	59. This is outside the scope of the EIA report for the proposed project.	59. This is outside the scope of the EIA repo for the proposed project.
		60. Are all the species proposed to be planted for the current proposal indigenous?	60. Yes, the present proposal will include the indigenous species.	60. The recommended species for greenbe development are given in Table-4.12 Chapter-4.
		61. Where is the sewage treatment plant proposed? Please show the location on the map.	61. STP will be part of ETP and same is shown in the layout map provided in the EIA report.	61. The generated domestic wastewater will b treated in STP will be part of ETP. Th process details and schematic flow diagra of ETP is given in Section-2.4.2 and Figur 2.23 of Chapter-2.
		62. Where would the sludge from the sewage treatment plant be disposed of?	62. The sewage sludge will be utilized as manure for the greenbelt.	62. The generated sludge will be utilized a manure for the greenbelt.
		63. Is there any facility proposed for the recycling and reuse of the sludge on site? Kindly provide	63. The sewage sludge will be used within the plant itself and the particulars will be available	63. The detasils will be provide in deta engineering.

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		the details along with the location on the map for the same if any.	post detail engineering.	
		64. The pre-feasibility report states that the "rejects from the secondary RO plant will be discharged into sea through the outfall channel of APSEZ's desalination plant." Please explain the impacts and mitigation measures of same.	64. The plant will be designed for Zero Liquid Discharge. The rejects from the RO plant will be sent to multi-effect evaporator. There is no discharge of any treated water into sea. Preliminary water balance diagram is given in Figure-2.2 of the EIA report.	64. An integrated water system is proposed the effluent from the process units i treated and reused to reduce wate demand. It is also proposed to install secondary Reverse Osmosis (RO) plant t further treat water from the effluent plar facility for effective use. Rejects from th reverse osmosis plant will be sent to Mul Effect Evaporator (MEF) for further recover and solids generated will be sent to Secure Land Fill (SLF).
		65. What will be the composition of the rejects from the secondary RO plant? Kindly provide the detailed analysis report for the same with the concentration of each constituent.	65. Reject from secondary stage RO containing higher TDS will be sent to multi-effect evaporator where water will be separated and re-used and salts (mainly calcium) will be stored in the SLF within the project area.	65. Refer above point no.-64.
		66. What are the "latest environment technologies" that would be used to treat the gaseous emissions before they are discharged in to the atmosphere?	66. Tail gas scrubbers will be installed to scrub residual gases from Sulphuric Acid Plant to produce Gypsum used in cement industries and high efficiency gas scrubbers will be installed in Phosphoric Acid Plant to produce Hydro Fluro Silicic acid which is used in manufacturing of Aluminum Fluoride.	66. The process description is given in Section 2.3 of Chapter-2.
		67. Please furnish a copy of the guidelines on "utilization of Copper Slag".	67. Copper slag can be used as a building material (added in concrete as well as in ready mix), road construction and shot blasting. The same is covered in EIA report. As per MoEF&CC notification dated 4th April 2016, copper slag does not fall under hazardous waste category and separate guidelines on the management of copper slag will be issued by CPCB separately	67. The impacts and mitigation on solid wast management is given in Section-4.2.5 c Chapter-4 in the EIA report.

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			and same is awaited.	
		68. Please furnish a copy of the guidelines on "utilization of Phosphogypsum".	68. Phosphogypsum is used for cement manufacturing, gypsum board manufacturing and fertilizer. The same is covered in EIA report. The "Guidelines for Management, Handling, Utilisation and Disposal of Phosphogypsum Generated from Phosphoric Acid Plants" published by CPCB is available online at: http://cpcb.nic.in/wast/hazardouswast/GuidelineforM,H,Utili&%20DisposalofPhosphogypsumfromPAPlants.pdf	68. Refer the above point no.-67.
		69. Please give full details of the location of the land fill sites for storage of Hazardous Cake and Scrubber Cake as well as a Map showing their locations.	69. An area of 30 acres has been demarcated for the SLF and shown in the plant layout in Chapter-2 of the EIA report, which takes care of the generated ETP cake and scrubber cake.	69. Secured Land Fill (SLF) is proposed ove 13.35 ha within the project premises fo disposal of ETP waste sludge and spei catalyst. Other Hazardous waste will b disposed through the approved recyclers.
		70. Please furnish area details and location map of ETP cake land fill.	70. Reply is as per point no. 69 above.	70. Reply is as per point no. 69 above.
		71. As per the draft EIA report almost 40% of the forest area is proposed to be converted to industrial use. Why is forest land required for this project?	71. Total area required for the plant is 256.58 ha. Three alternative sites were proposed. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. The site selection criteria and the study of alternate sites are detailed in chapter-5 of EIA report.	71. MoEF&CC (forest conservation division) ha granted Stage-1 approval for diversion o 1576.81 ha of reserved forest land i favour of Adani Ports & Special Econom Zone Limited (APSEZL) vide letter F.No.8 04/2016-FC dated 16th November 201 Stage-I FC has been obtained as given i Annexure-V.
		72. As per the Draft EIA section-3.9.6 - "Endemic	72. Project area includes forest land for which	72. Refer the above point no. 13, 14 & 71.

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		Flora Species and Threatened Flora of Navinal Area - Important threatened plant species reported from the region are Dipcadi erythraeum, Helichrysum cutchicum, Heliotropium rariflorum, Pavonia ceratocarpa, Convolvulus stocksii, Commiphora wightii. Gujarat State Biodiversity Board proposes to declare the area as Biodiversity heritage site and as the site is close to Mundra SEZ, it deserves more protection." Despite this, please explain why this site is being selected for this project?	APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. The proposed project site is away from biodiversity heritage site as proposed by Gujarat State Biodiversity Board. However, project will be implemented by taking all environmental safeguards.	
		73. Isn't it ironical that the project proponent proposes to build the proposed copper refinery with environment friendly technology while destroying 102.38 has of forests only for this particular project? The project proponent may please explain the logic behind doing this.	73. Total area required for the plant is 256.58 ha. Three alternative sites were proposed. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. The site selection criteria and the study of alternate sites are detailed in chapter-5 of EIA report.	73. Refer the above point no. 13, 14 & 71.
		74. The area identified for securing the hazardous cake and scrubber cake has not been specified. Neither has the area identified for intermediate/emergency storage of copper slag and phosphogypsum. As mentioned in the Draft EIA, area of 30 acres and 105 acres respectively has been mentioned for the said activities. Please give the location for these. Please also give the land use category of this areas. Have the clearances for this land been obtained? Please share the Forest, CRZ and environment clearances of same.	74. ETP cake and scrubber cake will be stored in the secured land fill (SLF). An area of 30 acres has been demarcated for the SLF and shown in the plant layout in Chapter-2 of the EIA report. Storage of copper slag, phosphogypsum and SLF is proposed within the project boundary. The proposed project site is outside CRZ. Forest clearance for the forest land in the proposed project has been applied. Environment clearance is under progress.	74. The solid waste generation an management details are given in Section 2.4.3 of Chapter-2 in the EIA report.
		75. What will be the composition of the hazardous cake? Kindly provide the detailed analysis report	75. The preliminary composition of the waste generated such as scrubber cake and ETP cake	75. The generated waste such as scrubber cak and ETP cake compostion details are give

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		for the same with the concentration of each constituent.	is provided in Chapter-2 of EIA report.	in Table-2.10 & 2.11 of Chapter-2 in th EIA report.
		76. As per the Table-2.9, ETP Cake contains heavy metals. What will be the impact of its disposal on the ground water table? What are the mitigation measures for the same?	76. ETP cake will be stored in SLF. Secured land fill is proposed to be developed over an area of 30 acres within the proposed project area. SLF will be constructed and operated as per the CPCB guidelines for treatment, storage and disposal facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done. Monitoring of environmental parameters will also be carried out. Therefore, there are no possibilities of contamination of ground water.	76. ETP cake will be stored in SLF. Refer th above point 74.
		77. Also, the project proponent is proposing to do away with 253 acres of forest area and then develop 209 acres of greenbelt/green cover. Kindly explain this.	77. Total area required for the plant is 256.58 ha. Forest land requirement is part of the total land estimated for the project. Greenbelt requirement on 33% of the area is proposed and shall be complied as per EC conditions. For the compensatory afforestation for the forest land shall also done as per established procedure.	77. As per guidelines and ToR point 33% lan should be allotted for greenbe development. AEL proposing 85.79 h (33%) land for greenbelt development.
		78. The draft EIA report states that "The proposed copper refinery project of AEL is a one of the important projects. AEL believes that the copper refinery project would add significant value to Indian economy. The project will not only help ensuring by becoming self-sufficient in terms of copper, phosphoric acid and sulphuric acid for India but will also drive macroeconomic growth." This growth driven approach of Adani has been detrimental to the environment of Mundra. Moreover, the project would be detrimental as it will lead to air pollution and will impact the health of people residing in the vicinity.	78. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Based on studies under EIA, ambient air quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.	78. The proposed project is with the state of a environment friendly technology. Th Anticipated impacts during construction an operation phase is provided for propose project. There will not be any significar adverse impact on the health of the peopl The proposed project will be implemente with all environmental safeguards. EMP i provided in Chapter-10 of the EIA repor Rs 1044 Crores has been budgeted toward the pollution control systems.

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		79. The draft EIA report mentions that "The proposed project would have few adverse impacts on the environment. However, with proper and judicious implementation of the mitigation and environment management measures, the impacts can be minimized and can be maintained well within the permissible limits specified by the regulatory authorities." The approach of Adani group and the indifference towards protection and conservation of environment has been reported time and again. The proposed project will not only lead to further reclamation of mangroves and mudflats, it will also be detrimental to the mangroves and the reserve forests in this area.	79. Proposed project is outside CRZ area, therefore there is no question of reclamation of mudflats and mangroves. Project will be implemented with all environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.	79. As primary survey of EIA studies, th project outside the CRZ area, there is n reclamation of mudflats and mangrove Refer the above point no.-78.
		80. The draft EIA report mentions that the "Mangroves are situated about 4.5 km near Kotri creek area/ SSW direction, distributed along the networks of creek system." The Google earth imagery dated 19.11.2015 clearly shows that mangroves exist at mere 167 metres from the proposed project. Why has this not been mentioned in the Draft EIA report? Please explain. Moreover, the project also falls under the Mundra mangrove forests. This too has been not mentioned here. Please explain.	80. Map showing the study area with satellite imagery and land use map are shown in in the Chapter-3 of the EIA report. Authorized CRZ map is also provided in figure-1.5 of Chapter-1 of EIA report. Mangroves are present at 100 m away in the southern side of the project area.	80. Map showing the study area with satellit imagery and land use map are shown in i the Chapter-3 of the EIA report. Authorize CRZ map is also provided in Figure-1.5 Chapter-1 in the EIA report. Mangroves ar present at the southern side of the proje area.
		81. Please furnish with the details of the APSEZ. How much area has been acquired under the APSEZ at Mundra and how much was permitted under the clearances?	81. This is outside the scope of the EIA report for the proposed project.	81. This is outside the scope of the EIA repo for the proposed project.
		82. Please furnish with all the CRZ, EC, Forest and wildlife clearances of the APSEZ, Mundra.	82. The proposed project site is outside CRZ. Forest clearance for the forest land in the proposed project has been applied.	82. This is outside the scope of the EIA repo for the proposed project. The propose project is outside the CRZ area. The Stage

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			Environment clearance is under progress. Wild life clearance is not applicable for the proposed project.	FC is obtained and there is no wildli clearance for proposed project. The EI report after public hearing will be submitte for EC.
		83. Has the APSEZ undertaken any mangrove plantation? Kindly furnish details of each location wherein the mangrove plantation has been undertaken, along with the area under plantation so far, locations' latitude-longitude, site photographs prior to plantation and post plantation, agency implementing the plantation and the compliance so far. Also furnish with the pre and post plantation satellite images of all the locations.	83. This is outside the scope of the EIA report for the proposed project.	83. This is outside the scope of the EIA repo for the proposed project.
		84. Please mention the area details for mangroves that have been destroyed so far for the APSEZ. Please furnish a 1991 and current satellite data.	84. This is outside the scope of the EIA report for the proposed project.	84. This is outside the scope of the EIA repo for the proposed project.
		85. Please furnish with the details of much of mudflats, sand dunes, creek, salt pans have been reclaimed so far.	85. Proposed project is outside CRZ. Project is developed on notified SEZ area and forest land for which clearance is under progress. No reclamation is proposed in the proposed project activity.	85. The proposed project is outside the CR area. Forest Stage-I clearance is ontaine There is no mudflats, sand dunes, cree salt pan identified in proposed project site.
		86. Please furnish with the complaints received for the existing projects, specifically regarding to the destruction of mangroves and violation of the CRZ Notification in the APSEZ area.	86. This is outside the scope of the EIA report for the proposed project.	86. This is outside the scope of the EIA repo for the proposed project.
		87. What action has been taken and what is the status and / or compliance of the show cause notices issued by the MoEF and the GPCB regarding the violation of the environmental clearances and the pollution in the APSEZ? Kindly furnish with the details and relevant documents.	87. This is outside the scope of the EIA report for the proposed project.	87. This is outside the scope of the EIA repo for the proposed project.

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		88. Has Cumulative impact analysis been conducted for the proposal on local livelihood? What are the findings of this study? Which all companies/projects have been undertaken under this study?	88. The impact analysis has been carried out for the proposed project as per TOR granted by MoEF&CC in which baseline conditions are monitored and prediction of impacts has been carried out with respect to proposed project activity. The details have been provided in Chapter-4 of the EIA report.	88. The anticipated potential impacts analysis cumulative impacts due to increase c pollutant and its mitigation measure ar provided in Chapter-4 in the EIA report.
		89. What is the carrying capacity of this area to undertake the proposed project with respect to already existing projects? Has any carrying capacity study been conducted? Details thereof may please be furnished.	89. EIA studies have been carried based on TOR granted by MoEF&CC. Project will be implemented after obtaining required permissions and compliance will be done based on permissions granted.	89. With the all related guidelines an standards the EIA studies has carried ou After obtaining all necessary NOC th proposed project construction will take place.
		90. Have there been any complaints/grievances from the fishing community? Kindly furnish with same.	90. Representations received from fishing community were addressed during public hearing as well as in written responses. There are no complaints or grievances from the fishing community for the proposed project activity.	90. The fisherman and community details ar given in Section-3.10.6 and Annexure-XI of Chapter-3 in the EIA report.
		91. Please furnish full details of the environmental clearance and the CRZ clearance, Environmental clearances, Forest clearances and the Wildlife clearances received for the existing APSEZ, Mundra.	91. Project is located in notified SEZ area. APSEZ has obtained EC and CRZ clearances from MoEF&CC vide their letter dated 15th July, 2014 for multi-product SEZ at Mundra. Project area also includes forest land for which APSEZ is in the process of obtaining forest clearance. Wild life clearance is not applicable.	91. The proposed project is located in notifie SEZ are and it is outside the CRZ area Forest Stage-I clearance is under process There is no wildlife clearance is required fc the proposed project.
		92. Please furnish details of the CRZ clearance, Environmental clearances, Forest clearances and the Wildlife clearances received for all the facilities existing in the APSEZ.	92. Reply is as per point no. 91 above.	92. Refer the above point no. 91.
		93. How much land was reclaimed for the existing APSEZ after 20th February 1991?	93. This is outside the scope of the EIA report for the proposed project.	93. This is outside the scope of the EIA repo for the proposed project.

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		94. How has the APSEZ impacted the livelihoods of local fisher folk communities?	94. This is outside the scope of the EIA report for the proposed project.	94. This is outside the scope of the EIA repo for the proposed project.
		95. What will be the impact of the additional transport of raw materials and the finished products on the road, rail and the SEZ infrastructure? Please furnish with details of same.	95. The impacts due the additional traffic of the proposed project have been considered while calculating the cumulative impact and the details are available in Chapter 4 of the EIA report. There will not be any significant impact due to increase of traffic due to proposed project.	95. The traffic density study have been carrie out and detail are given in Section-3.11 Chapter-3. The cumulative impacts detai are given in Section-4.2.2 of Chapter-4 the EIA report.
		96. Please furnish details of the transportation – road, railway lines, as well sea borne, impacts and mitigations studies conducted for the proposal.	96. The impacts due the additional traffic of the proposed project have been considered while calculating the cumulative impact and the details are available in Chapter 4 of the EIA report. Existing railway lines will be used based on requirement. Existing port facility available at west port and south port of APSEZ will be utilized for transportation of materials.	96. Existing railway lines will be used based c requirement. Existing port facility availabl at west port and south port of APSEZ w be utilized for transportation of material Refer the above point no.-95.
		97. The proposed area falls under Seismic Zone V. What are the mitigations measures to handle the situation due to earthquake?	97. The plant design will be done considering seismic zone-V as per IS 1893 (part-I)-latest edition. Disaster management plan has been prepared and available in Chapter-7 of the EIA report.	97. The plant will be design by considering th latest technology and safety measur guideline for seismic zone. The DMP fc onsite and offsite is given in Section-7.3 Chapter-7 in the EIA report. The details w be given in detail engineering report.
		98. Please furnish full details of the field visits conducted to undertake the ecological study including copies of the field notes. Please mention full details of the team members, their qualifications, and the number of man days spent on the ecological data collection.	98. Ecological study has been carried out during the study period by an EIA agency approved by QCI-NABET. The NABET certificate and personnel involved in the ecological study is available in Chapter-11 of the EIA report.	98. **M/s. Adani Enterprises Limited (AEL** has retained the services of NABE accredited EIA Consultant **M/s. Vimt Labs Limited (VLL)**, Hyderabad t prepare EIA report for variou environmental components including ai noise, water, land and biologic components along with parameters human interest which may be affected an

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				to prepare an Environment Managemer Plan (EMP) for mitigating possible advers impacts. The consultant details and list c experts involved in the EIA report i provided in Chapter-12.
		99. Has the project proponent carried out Social impact assessment report? If yes please furnish if any.	99. EIA studies have been carried based on TOR granted by MoEF&CC. Socio economic study has been carried out as part of EIA and same is available in Chapter-3 of the EIA report.	99. The Social Impact Assessment report i enclosed as Annexure-XII.
		100. Please furnish the latitude-longitude coordinates of the corners/boundaries of the entire APSEZ, Mundra.	100. This is outside the scope of the EIA report for the proposed project. However, coordinates of the proposed project boundary are provided in Chapter-1 of the EIA report.	100. This is outside the scope of the EIA repo for the proposed project.
		101. What are the existing facilities for the parking, washing, repairs and maintenance of trucks and other heavy equipment?	101. All the infrastructural facilities like parking, washing, repairs and maintenance etc will be part of detail engineering and same will be carried out after obtaining required clearances.	101. All the required infrastructure facilitie detail will be given in detail engineerin stage and same will be carried out afte obtaining required clearances.
		102. What facilities are provided for the drivers and cleaners?	102. Separate truck parking and rest rooms will be provided to the drivers and cleaners involved in the transportation of the raw material and end products.	102. Facilities like truck parking, truck cleanin facilities, rest rooms and canteen will b provided for drivers and cleaners.
		103. What will be the impact of the water/sewage discharged into the creeks and gulf of Kachchh on the overall salinity of the water? Has any such report been conducted?	103. The proposed plant will operate on Zero discharge concept. There is no discharge of any treated water into creeks or Gulf of Kachchh.	103. The proposed plant will operate on Zer discharge concept. There is no discharge c any treated water into creeks or Gulf c Kachchh.
		104. Please furnish No Objection Certificates, Consents, from the State Pollution Control Board for the projects involving discharge of effluents, solid wastes, and sewage waste under Environmental Protection Act 1986.	104. This is outside the scope of the EIA report for the proposed project.	104. After receiving Environment Clearanc from MOEF&CC. The necessary NOC c Consent to Establishment (CTE) c Consent to Operate (CTO) form GPCB sha be applied.

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		105. Has the project proponent carried out mangrove conservation plan? If yes then furnish full details with photographs and maps showing the mangrove conservation areas, along with details of the cost of mangrove conservation.	105. The proposed project is outside CRZ area and no mangroves are present at the proposed project site.	105. The proposed project is outside CRZ are and no mangroves are present at th proposed project site.
		106. What is the original plot level? What is the proposed plot level? How this will affect the land terrain? Has the proponent conducted any analysis on its impact on the environment? Please furnish details.	106. The proposed project will be implemented in notified SEZ and forest land. The land terrain is gently sloping and no major cutting and filling for leveling of land will be involved. Impact on land environment is carried out and details are in chapter-4 of the EIA report.	106. Impacts on Land use during constructic and operation phase is provided Chapter-4 in the EIA report.
		107. Please furnish the status of NABET accreditation for all EIA consultants hired with their experience in details as of the period the Draft EIA studies were conducted and published.	107. The NABET certificate of the EIA consultant (NABET/EIA/1619/RA0043 Valid upto 19 May 2019) is provided in Chapter-11 of EIA report.	107. Refer above point no.-98.
		108. Have all the ToRs been followed for the preparation of the documents?	108. TOR granted by MoEF&CC vide their letter dated 21st June, 2016 has been followed for preparation of draft EIA report.	108. The entire EIA study is carried out c basics of the issued TOR by MoEF&CC vic their letter dated 21st June, 2016.
		109. Has authenticated English translation of all material in Regional languages been provided, as stated in the EAC minutes dated 3th – 4th May 2016?	109. All documents have been provided in English. The representations received in local language will be translated into English and same will be authenticated.	109. Complied and incorporated.
		110. It has been reported that the coastal areas of Mundra harbour mangroves and have mudflats, sand dunes, creek network etc. ecologically important areas. Despite this, projects are being allowed to set-up in this area. Why does Adani group always have to either reclaim the mangroves and mudflats or use a site which they have already reclaimed without proper clearance?	110. This is outside the scope of the EIA report for the proposed project. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	110. Refer the above point no.-56.

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		Please explain.		
8	Shri Dharmesh Mistri, Block no: 14, house no. 1340, Narmada Apartment, Opp. Mamlatdar office, Bharuch	1. It is requested to take copy of QCI-NABET approved company consultant's functional area experts' names, the details of their area of functioning, their time limits along with their signature and stamp, within the MOM.	1. The environmental consultants engaged are QCI NABET approved and the certificate of the EIA consultant (NABET/EIA/1619/RA0043 Valid upto 19th May 2019) is provided in Chapter-11 of EIA report. Names and Qualifications of the team of functional area experts engaged by M/s. Vimta Labs will be provided in the final EIA report.	1. **M/s. Adani Enterprises Limited (AEL** has retained the services of NABE accredited EIA Consultant **M/s. Vimt Labs Limited (VLL)**, Hyderabad t prepare EIA report. The Consultant detail (like certification and list of team membe involved in the proposed project) are give as Chapter-11. The QCI issued certificat no. NABET/EIA/1619/RA0043, Valid upt 19th May 2017.
		2. The details showing whether QCI-NABET approved company consultant's functional area expert is an officer on regular pay or not?	2. Details are as per point no. 1 above.	2. Refer the above point no.-1.
		3. It is requested to take along with the MOM, the copy of agreement that is held between the federation area expert and consultant, in case if the QCI-NABET approved functional area for the company consultant is enrolled from external source.	3. This is outside the scope of EIA report for the proposed project.	3. This is outside the scope of EIA report fo the proposed project.
		4. It is requested to take details of work undertaken by them with the names of the companies for which they have signed for the EIA report during environmental public hearing, in case if the QCI-NABET approved functional area for the company consultant is enrolled from external source.	4. This is outside the scope of EIA report for the proposed project.	4. This is outside the scope of EIA report fo the proposed project.
		5. Provide the information of the fees paid, in case if the QCI-NABET approved functional area for the company consultant is enrolled from external source.	5. This is outside the scope of EIA report for the proposed project.	5. This is outside the scope of EIA report fo the proposed project.
		6. The details of the responsibilities decided for the	6. The draft EIA report has been prepared by	6. The NABET accredited EIA Consultant **M/s**

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		consultant for environmental public hearing and as for this project.	NABET accredited consultant and same was submitted for public hearing. The public hearing is conducted based on the EIA notification 2006 and its subsequent amendments. The concerns of public have been addressed during public hearing and same will be incorporated in the final EIA report which will also be prepared by NABET accredited consultant.	**Vimta Labs Limited (VLL)**, Hyderabad t prepare draft EIA report for public hearir by considering various environment components including air, noise, water, lan and biological components along wit parameters of human interest which may b affected and to prepare an Environmer Management Plan (EMP) for mitigatin possible adverse impacts. The public hearin concerns and its action plan will b incorporated in final EIA report, which w be submitted to MoEF&CC for EC.
		7. The details of the fees paid by the company to the consultant and the agreement between the consultant and company to be kept in the MOM.	7. This is outside the scope of EIA report for the proposed project.	7. This is outside the scope of EIA report fc the proposed project.
		8. It is requested to place under the MOM, the copy of the document provided under the EIA report as accreditation certificate by the company consultant along with the signature and stamp of the competent office in the hard copy.	8. Details are as per point no. 1 above.	8. Refer above point no.-1.
		9. The accreditation certificate considered valid by NABET-QCI shall be taken in MOM.	9. Details are as per point no. 1 above.	9. Refer the above point no.-1.
		10. The name, designation, organization's name and address of the individual providing presentation of the EIA report shall have to be provided along with photocopy copy of identification proof to be kept along with the MOM.	10. EIA report has been prepared as per EIA notification 2006 and subsequent amendments. During public hearing the identification of representatives from project proponent has been made and it is not required to include them as part of the MOM.	10. During public hearing the identification representatives from project proponent ha been made and it is not required to incluc them as part of the MOM.
		11. The list of the names of companies for which the consultant has prepared draft EIA report. (From 01.01.2015 to 10.05.2017)	11. This is outside the scope of EIA report for the proposed project.	11. This is outside the scope of EIA report fc the proposed project.

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		12. The show cause notices and closer notice issued by the Gujarat Pollution control board to the company, to be placed in the MOM.	12. No show cause notice and closure notice issued by GPCB for proposed project.	12. The proposed project is a greenfield, ther is no show cause notice and closure notic issued by GPCB for proposed project
		13. In case if the company has a unit outside the state of Gujarat and the show cause notice is issued by the Pollution control board, the copy of the same to be kept in the MOM.	13. This is outside the scope of EIA report for the proposed project.	13. This is outside the scope of EIA report fc the proposed project.
		14. Provide the names of the Hazardous chemicals that are harmful for environment and humans and are to be used, provide the type of damage that such Hazardous chemicals shall do to the environment and inform what kind of diseases are possible to the humans.	14. Risk analysis has been carried out for identified representative hazardous chemicals as part of the manufacturing process. Same has been provided in Annexure-XIV and Preliminary Hazard Analysis is provided in Chapter-7 of the EIA report. Mitigation measures have also been suggested in the EIA report and same will be strictly implemented. Disaster management plan is also proposed as part of the EIA report.	14. Risk Assessment and Disaster Managemer Plan is provided in Section 7.2 & 7.3 c Chapter-7 in the EIA report.
		15. If the QCI-NABET payment is made, place the copy of the payment receipt in MOM, along with signature and stamp upon it.	15. This is outside the scope of EIA report for the proposed project.	15. This is outside the scope of EIA report fc the proposed project.
		16. As per the rules of QCI-NABET, how many EIA reports can be signed within one year by the ad-hoc functional area expert appointed by the consultant?	16. This is outside the scope of EIA report for the proposed project.	16. This is outside the scope of EIA report fc the proposed project.
		17. Provide the details of the trees plated as per the demand of the GIDC. Provide the details of source of water used for the purpose of plantation of trees. If the water is purchased, provide the bills in MOM. Take into MOM the digital photographs of the trees planted till date.	17. As part of the proposed project, greenbelt will be developed in 33% area. Details of type of plantation are given Chapter-4 of the EIA report. Plantation activity will be carried out during the implementation phase of the project.	17. Details of type of plantation are give Chapter-4 of the EIA report.
		18. Specify if 100% truthful compliance is undertaken of the TOR provided by SLEAC to the company?	18. Terms of Reference (TOR) granted by EAC, MOEF&CC has been complied and compliance	18. Terms of Reference (TOR) granted by EA(MOEF&CC has been complied ar

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			is provided in Annexure-I of the EIA report.	compliance is provided in Annexure-I of th EIA report
		19. The company should provide a written assurance that 100% truthful compliance is undertaken of the TOR provided by SLEAC to the company.	19. Details are as per point no. 18 above.	19. Refer the above point no.-18.
		20. The names and addresses of the Land Losers to be taken under MOM and the certificate for Land Losers provided by the GIDC to be placed in MOM.	20. No private land acquisition is planned as part of the proposed project.	20. Memorandum of Understanding (MoU) is place between Adani Ports & Speci Economic Zone Limited (APSEZL) and Ada Enterprises Ltd (AEL) for 154.18 ha (38 acres). Land allotment letter is enclosed a Annexure-III.
		21. It is instructed that from the initiation of the company, the names of the employees to be published in the notice board outside the gate and 85% of local public to be provided employment.	21. Local employment will be provided for proposed project based on eligibility.	21. The proposed project will give employmer to about 2000-3000 persons on average pe day basis during construction phase. Durir operation phase. about 2000 dire employment and 5000 indirect employmer will be generated. Local people will be give preference to employment based on the sk set & eligibility requirement as per ar vacancies available.
		22. From the initiation of the company, if any fire accident, gas accident or other kind of accident has taken place at company units in other areas, the names & details of the workmen or other persons as well as compensation provided to be placed in the MOM. It is requested to place the closer notice under point 40(2) by the Industrial Safety and Health office and the entire set of proceedings carried out as for the same to be placed in the MOM. Moreover the details of the penalty inflicted on the company to be placed under MOM.	22. There are no cases pending against the proposed project. The points raised are outside the scope of EIA report for the proposed project.	22. AEL is proposing a greenfield copper refiner project. There are no accident occurred, r damages to surrounding areas and no case pending against the proposed project. Th points raised are outside the scope of EI report for the proposed project.

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		23. After the indication of the company, if the GPCB has issued closed notice to the Ankleshwar and other units of the company, provide the information that how did the company obtain revoke of the notice. Moreover place all documents in the MOM for the proceedings held for obtaining revoke. Moreover place in the MOM, the amount deposited at government office or receipt of penalty.	23. The points raised in your letter are not relevant to the proposed project. This is outside the scope of EIA report for the proposed project.	23. This is outside the scope of EIA report f the proposed project.
		24. Place in the MOM the application filed by the consultant for obtaining accreditation certification from the QCI-NABET and the proofs placed along with the same.	24. This is outside the scope of EIA report for the proposed project.	24. This is outside the scope of EIA report f the proposed project.
		25. Provide details as to the date, month and year of joining the organization by the individual that undertakes the presentation of the EIA report.	25. This is outside the scope of EIA report for the proposed project.	25. This is outside the scope of EIA report f the proposed project.
		26. Provide information as to the responsibility of the individual that is to undertake the projection of the EIA report during the environmental public hearing and project.	26. The public hearing is conducted based on the EIA notification 2006 and its subsequent amendments.	26. The EIA report for public hearing pepared as per grant TOR from MoEF&C and public hearing is conducted based c the EIA notification 2006 and i subsequent amendments.
		27. Provide the information that how many people are affected area have knowledge of English language.	27. Demographic details based on census data 2011 for the study area are provided in Chapter-3 of the EIA report; however it is not possible to know exactly how many people are able to understand English.	27. Its not possible to know the how mar people knows English language. The literac rate and demographic details based c census data 2011 for the study area a provided in Section-3.10 of Chapter-3 of th EIA report. The Social Impact Assessme (SIA) report is enclosed as Annexure-XI.
		28. Provide village wise figurative information of the individuals residing within affected area.	28. Demographic details based on census data 2011 for the study area are provided in Chapter-3 of the EIA report.	28. Refer the above point no.-27.

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		29. Provide village wise figurative information of the educational qualifications of individuals residing within affected area.	29. Demographic details based on census data 2011 for the study area are provided in Chapter-3 of the EIA report.	29. Refer the above point no.-27.
		30. Take into the MOM the affidavit for assurance signed by company or competent officer of the company, while remaining present before a notary, signifying that the individuals of affect area and company employees shall not suffer any kind of damage due to the pollution, fire accident or toxic gas generated due to the project.	30. Risk analysis has been carried out for the proposed project. Same has been provided in Annexure-XIV and Preliminary Hazard Analysis is provided in Chapter-7 of the EIA report. Mitigation measures have also been suggested in the EIA report and same will be strictly implemented. Disaster management plan is also proposed as part of the EIA report.	30. The necessary safety measures will l provided in storage facilities and safe equipments & PPE's for staff and workm in the proposed plant. The haza identification, risk assessment and disast management plan (onsite & offsite) det are given in Chapter-7 of the EIA report.
		31. Take into the MOM the affidavit for assurance signed by company or competent officer of the company, while remaining present before a notary, signifying that the individuals other than that of affect area and company employees shall not suffer any kind of damage due to the pollution, fire accident or toxic gas generated due to the project.	31. Details are as per point no. 30 above.	31. Refer the above point no.-30.
		32. Is the consultant responsible or not, in case if individuals and company employees suffer any kind of damage due to the pollution, fire accident or toxic gas generated due to the project.	32. Consultant's responsibility is to prepare EIA report as per TOR granted by MOEF&CC. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	32. Consultant's is not responsibility for a kind of damage due to the pollution, fi accident or toxic gas generated due to t proposed project activities. The role of M/ Vimta Labs Ltd. is only to prepare E report as per TOR granted by MOEF&CC f Environmental Clearance.
9	Shri Nagshi Maunshi Gadhvi (On Behalf Of Sonbaiben Munshi Gadhvi), Sarpanch, Mota Bhadiya, Taluka-Mandvi.	This is to inform that in all surrounding villages falling within 15 km radius from the existing project of the company, till date no support if provided for the employment, jobs, fodder for cattle, drinking water, problems relating to agriculture, roads, and public health facilities etc. Further, one more hazardous	We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. There are many such projects operating in the world, including the developed	-

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		project which can seriously harm the public health and agricultural corps etc is proposed here which we strongly object.	countries. We will also be adopting the latest technology for pollution control. We are confident of operating this plant with all the safeguards to mitigate the pollution. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. We assure you that all the environmental standards will be complied during plant implementation and operation.	
10	Shri Abdbdreman Jusab Turk, Drub Village Sarpanch	With respect to the subject mentioned above we would like to state that as part of corporate social responsibility in Mundra, the Adani Group has carried out many activities in the field of education, healthcare, infrastructure development, agriculture, animal husbandry and after existence of this company many business and employment opportunities have been generated and due to establishment of proposed Greenfield copper Refinery Project many job and business opportunities will be created. We have no objection if you observe the environment preservation rules and corporate responsibility are observed for the development of our area, we are always with you on this ground.	We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area. We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project. As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibilityfor development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. The project will also provide various business opportunities as mentioned by you. We will be	-

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			happy to support the same. We thank you for your support and would like to continue our engagement with the community for development of the area.	
11	Siracha Gram Panchayat Village: Siracha Tal. Mundra-Kachchh	With respect to the subject mentioned above we would like to state that there is new Copper refinery Project is going to be established between the village Siracha and Navinal we have no objection if the poor and untrodden people of Siracha and Navinal will be uplifted , if unemployed get employment, agriculture and animal husbandry industry are not damaged but developed, and if the environment is taken care of, and the fodder in adequate quantity supplied to cows and supplied regularly and supplied accordingly to season such as dry or wet fodder if such types of activities are undertaken by the company then we welcome such project.	Refer Sl. No.-10	-
12	Shri Punshi Khetshi Turiya, Gadhavi. Membershri, Taluka Panchayat Mandvi Kachchh, Post Bhadiya, Tal. Mandvi, Kutch	It may be noted that the various development projects has been implemented in our area with the good cooperation of companies like Adani Foundation situated in our area and still for the employment of youth, health facilities for the people, structural primary facilities for public like housing, education, roads and fodder for animals and many matters and you have a lion share for the overall development of this area, we whole heartedly welcome your new project, we hope you will accept our feelings by continuously carrying out developmental activities as you have been doing in the past.	Refer Sl. No.-10	-
13	Shri Punshi Khetshi Turiya, Gadhavi. Membershri, Taluka Panchayat Mandvi Kachchh, Post Bhadiya, Tal. Mandvi, Kutch	It may be noted that the various development projects has been implemented in our area with the good cooperation of companies like Adani Ports & SEZ ltd. situated in our area and still for the employment of youth, health facilities for the people, structural primary facilities for public like housing, education, roads and fodder for animals and many matters and	Refer Sl. No.-10	-

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		you have a lion share for the overall development of this area, we whole heartedly welcome your new project, we hope you will accept our feelings by continuously carrying out developmental activities as you have been doing in the past.		
14	Shri Valbai Shamji, Sarpanch, Nana Kapaya Juth Gram Panchyat Cluster Villages: Nana Kapaya, Borana Tal. Mundra - Kachchh	It may be noted that the Copper Refinery Project which is going to take place between Siracha and Navinal is beneficial for the local people as far as generation of employment and their development likewise we hope that it will help in development of village and nation and we welcome the Adani Copper Refinery Project.	Refer Sl. No.-10	-
15	Shri Bairajba Lakhubha Jadeja, Sarpanch, Tragadi, mandvi. Kachchh	It may be noted that the Greenfield Copper Refinery Project has been scheduled to come in this area. We welcome the said project on behalf of Tragadi Gram Panchayat and by this project the employment opportunities in this area will be increased and we hope that surrounding area will be developed and we hope that this project will come on priority.	Refer Sl. No.-10	-
16	Shri Atul Pandya, President, Rotary Club Of Mundra, Kutch	It is utmost respectfully said that due to the Copper Refinery Project going to be established by Adani Group in Mundra Taluka, the unemployed youth will get employment and contractors and laborers will get more opportunities to get work and standard of living of the people of the area will rise and from the presentation and video watched by us we can say that it is not harmful to agriculture and health of the people and environment. If this project will be established than other projects will also come, by which the people of Mundra will get more opportunities for employment and professional opportunities. On establishment of this industry the people will get more opportunities in their profession and business. And we expecting this plant to be established as soon	Refer Sl. No.-10	-

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		as possible and people get benefited. We welcome this copper refinery plant.		
17	Shri Karvan-E-Mustafa, Medical and Educational Trust, Near Jama Masjid, Mundra	It may be noted that the social development activities carried out by Adani Group is really praise worthy. By Adani group, education, health and income generation related activities are being undertaken which is very much beneficial and industry houses established by them has increased the business and employment in Mundra Taluka and in the near future the new copper refinery project will increase the business and employment, we welcome such developmental activities.	Refer Sl. No.-10	-
18	Letter from Lions Club Of Mundra, Poonam Arcade, 1st Floor, Baroi Road, Mundra, Kutch	It may be noted that the Adani Group is going to establish copper refinery project by which the people of this Taluka will get employment and laborers will get their labor work which will uplift the standard of living of local people. There is no threat for damage to environment by this project, and many ancillary industrial units will also come with this project which will increase the employment opportunities in villages of our Taluka. Due to the copper refinery project the people will get more business opportunities and we wish that this project will be established as soon as possible and people will get benefited out of this project. We welcome this copper refinery project.	Refer Sl. No.-10	-
19	Shri R.M.Sama, Mystical Corporation, All Type Of Civil Works And Material Supply, Add: 5, Rajiv Complex, Baroi Road, Mundra	It may be noted that the Adani Foundation is doing social development activities in Mundra Taluka very efficiently including educational, health and income generation activities. We hope the same will be continued in future as well. Thanks	Refer Sl. No.-10	-
20	K.G.N. Construction, R.C.C. Construction – R.C.C. Alivation Load Bearing, Village	We would like to state that the various activities done by Adani Group are useful to the people and the activities undertaken by Adani Foundation are praiseworthy like electricity, water and access road	Refer Sl. No.-10	-

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	Tragadi, Tal. Mandvi, Kutch	facilities in fishermen settlements as well as education and health facilities are also provided which is going to be very useful to the community and its future generation. We hope that Adani Foundation and Adani Group will do such type of social works continuously. Thank you.		
21	Shri Daya Ranshi Gadhvi, Civil Contractor And Supplier, Village-Zarpara, Ta. Mundra (Kutch)	On the subject mentioned above we would like to state that after Arrival of Adani Group in this area the level of economic stability has been increased in this area. Opportunity and employment has been provided to the needy people and most of the contracts have been given by Adani Group to the local contractors and we are thankful for this and express our gratitude that in future they will keep up this good work.	Refer Sl. No.-10	-
22	Shri Gadhvi Kalyan, President/ Secretary, Mota Bhadiya Tal. Mandvi – Kachchh	With respect to the subject mentioned above we welcome the copper plant proposed by Adani Port and Special Economic Zone Ltd. by which the employment in surrounding villages will be increased and Business/professional activities will also increase. The surrounding areas will also develop and since the company will develop,the facilities provided by company like education and health will also increase. We hope that company will provide contracts, labor work, development of agriculture, development of animal husbandry, health and education related facilities to surrounding villages. We hope that company will give more attention to agricultural development. We hope that your company will provide much assistance to surrounding agriculture and animal husbandry. We hope that your plant will become more useful to local people, animal rearing people, farmers and labor class and also in the development of nation with our collective support.	Refer Sl. No.-10	-
23	Mithani Enterprise,	With respect to the subject mentioned above we	Refer Sl. No.-10	-

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	Civil Contractor And Manpower Supply	would like to respectfully state that the social responsibility conducted by Adani Foundation of Adani Group has been very efficient. Adani Foundation is doing many activities like education, health and income generation in our area and due to this the level of education has been improved and many activities are undertaken in the field of health. We are very thankful to Adani Group.		
24	Shri M. L. Baraiya (Director) Vivekanand Rural Development Institute, N.H.No.8a, Near Jain Ashram, Mandvi, Kutch	With respect to the subject mentioned above, we have experienced in Kachchh that the industry houses as a part of their corporate responsibilities are providing training to rural women and skill development to youth for giving stability to their income generation. In this regard, your industry house is working in a very responsible way. In Kachchh the preservation of environment is also an important thing. You shall be a role model in this field in Kachchh. We welcome your new project proposal. Furthermore we are expecting you to do more and more work in the field of rural development.	Refer Sl. No.-10	-
25	Shri Salim Mamad (President), Ekta Machhimar Seva Vikas Samiti Tragadi Bundar, Gundiyali, Tal. Mandvi, Kutch	On the subject mentioned above Our Ekta Machhimar Seva Samiti whole heartedly welcome your new venture by Adani Port and Special Economic Zone Ltd. for establishing copper refinery plant near Mundra-Mandvi Area. The unemployed persons of the surroundings area will get employment in your plant and we are agreeable for the development of area. We, Ekta Machhimar Seva Vikas Samiti welcome your new venture.	Refer Sl. No.-10	-
26	Shri Dahyabhai Gadhvi, Kandagara,	It is cordially informed that I, Gadhvi Dahyabhai Virambhai Gadhvi, resi. Mota Kandagara, Wadi Area,	We acknowledge the receipt of your representation and have noted your concerns. We assure you that	All anticipated impacts are identified ar mitigation measure for the proposed project

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	Kutch	Mundra Kutch. I hereby expect your favor that the projects established and yet to be established do not take any care of the people from health as well as economic point of view. I hereby oppose the hearing for the plant held here today and aver that this project should not come here at any cost. The health and agriculture whatsoever left in this area will be ruined totally. The agriculture and cattle rearing are affected seriously by dust and polluted air due to establishment of coal based industries. The agriculture production and milk production are reduced to a great extent due it. The air will be polluted due to such industries, The poisonous chemicals such as sulphur dioxide, Hydrogen fluoride, will be mixed in the air and will pollute the air heavily. There is high probability of spreading of disease such as cancer, asthma, T.B., and other disease of lungs and skin, blindness and many other diseases due to air pollution. So, this project endangering health and livelihood should not be established here. There will be water pollution. Lead, chromium, sulphuric acid will be leached to ground water and will come out through irrigation. The cattle rearing and agriculturist class will be affected heavily due to polluted water. It is not possible to use such water for farming. The cultivable land will be affected due to such chemical rich water and consequently cattle rearing will be reduced resulting into reduction in economic activity based on food products based on milk, buttermilk and ghee. So, this project shall not come here. Such projects should be established in the area	all the environmental safeguards will be put into place before operation of the project. There are many such projects in the world, including the developed countries. The apprehensions mentioned by you have never happened at any of the plants. We are confident of operating this plant with all the safeguards to mitigate the pollution. We will also be adopting the latest technology for pollution control. We are herewith responding para wise to the issues raised by you: 1. All measures for mitigating the air & water pollution will be adopted. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. 2. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing. High efficiency gas scrubbers will be installed in Phosphoric Acid plant to scrub Hydrogen Fluoride to produce Hydro Fluro Silicic Acid before releasing the residual gases through the stack. The emissions leaving the various stacks/ vents proposed as part of this	presented in Chapter-4. The EMP budget of R 1044 Crores is proposed. As part of improvir employability within local youth, there is a pla to set up a Skill Development Centre throug Adani Foundation. A Budget of Rs. 8.0 Crore per each year has been provided unde Corporate Social Responsibility for developmer of the local community through Ada Foundation. The areas of intervention will b education, health & sanitation, sustainab livelihood and rural infrastructure. The CSR details (like CSR policy, initiatives activities, CSR Budget expenditure data for 2010 to 2016, Proposed CSR budget plan f next 5 years and CSR implemente photographs) is given in Section-8.5 of Chapte 8 in the EIA Report. The water system, is highly integrated and designed for Zero Liquid Discharge (ZLD). Th water requirement details is given in Sectio 2.2.3 of Chapter-2. Secured Land Fill (SLF) proposed over 13.35 ha within the proje premises for disposal of ETP waste sludge ar spent catalyst. Other Hazardous waste will b disposed through the approved recyclers. Th environmental monitoring will be conducte construction and operation phase is given Chapter-6.

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		having no population in surrounding of 50 kilometer. This is residential area within 2-3 kilometer only where thousands of people are living. It is to be specifically noted that the industries established here earlier have not at all taken care of the health and employment of the economic scarce local people. The business opportunities are given to only 4-5 selected persons only based on commission. So, we oppose this project.	project will be meeting the prescribed norms of Central Pollution Control Board (CPCB). Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report. 3. The project will be implemented with Zero Liquid Discharge. Waste produced from the proposed plant will be stored in Secured Land Fill (SLF) which will be developed over the area of 30 Acres within the proposed project area. SLF will be constructed and operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done. Monitoring of environmental parameters will also be carried out. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. 4. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social	

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			Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.	
27	Shri Ashariya Lakha Gelva, Kapuriya Wadi, Village: Zarpara, Mundra Kutch	1. It is cordially informed that there are flowing streams of water falling within the project area of Greenfield copper refinery project area, which will be closed. So, it is requested not to give permission to this project.	1. Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. No streams will be closed or blocked by the project.	1. The Dhaneshwari river will not be diverte but suitably trained along the boundary. Th flow of the river will be maintained, a shown in the Plant Layout on Figure-2.1 EIA Report
		2. There is environment area in surrounding of this project. There is a Bharadima dune on the south of this project. There are various types of vegetation in it. It is a stay for animals and birds. There is Siracha forest on the west of the project site. There are birds and animals in it. It is requested not to give permission to this project as the project will adversely impact the environment heavily.	2. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.	2. The baseline ecological study conducted ar details are given in Section-3.9 of Chapte 3. The ecological anticipated impacts a identified and mitigation measure for th proposed project is presented in Sectio 4.1.6 (construction phase) & 4.2 (operation phase) of Chapter-4 in the E report.
		3. The agriculture in surrounding of the project will be affected. There are already existing industries like power plants. Horticulture is heavily impacted due to that. The fertile agriculture such as dates, chickoo, pomegranate, coconut is damaged. The damage will be increased due to this project. So, it is requested not to give permission to this project.	3. All measures for mitigating the air & water pollution will be adopted. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem.	3. The EMP budget of Rs. 1044 Crores proposed. The water system, is high integrated and is designed for Zero Liqu Discharge (ZLD). The water requireme details is given in Section-2.2.3 of Chapte 2. Secured Land Fill (SLF) is proposed ov 13.35 ha within the project premises f disposal of ETP waste sludge and spe catalyst. Other Hazardous waste will b disposed through the approved recycler The anticipated impacts on air quality ar mitigation measure to control pollutic during construction and operation phase a provided in Section-4.1.3 and 4.2.2 Chapter-4 in the
		4. There will be increase in temperature due to	4. The project is estimated to emit 0.53 Million	4. Refer the above point no.-3.

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		copper refinery and it will cause damage to the livestock and environment. The temperature increases every year and temperature will increase further due to this project. So, it is requested not to give permission to this project.	Tons of CO2 equivalent of GHG per year from proposed project which is insignificant in the context of Local or Global Warming. Heat available from the plant process will be converted to produce power with the waste heat recovery boiler as well as hot water for plant process requirements.	
		5. There are villages such as Shiracha, Navinal, Kandagara, Zarpara, Dhrub etc. in surrounding of this project. So, the mankind in the area will be terribly impacted due to pollution. So, it is requested not to give permission to this project.	5. All measures for mitigating the air & water pollution will be adopted. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem.	5. The environmental monitoring will b conducted during construction and operatic phase is given in Chapter-6. The baseli monitoring was conducted in 8 locations a part of EIA studies. The monitorir conducted in different location (lik industrial, commercial and residential area within the 10 km of study area. Refer th above point no.-3.
28	Shri Girish D. Nagda (C.E.O), Bhagwan Mahavir Pashu Raksha Kendra, Pragpur Road Junction, Tal. Mundra 370415, Kutch, Gujarat	The Indian ARYA public is spending their lives on the life cycle of DHARMA – ARTHA – KARM - MOKSHA but development is necessary according to time. In Mundra Taluka of Kachchh District the local public has got a golden opportunity for earning income after entry of Adani Group. The people are witness to the improved facilities in the employment, education, health etc. like routine life necessities due to fine arrangements done by Adani Group. We must accept where there is development; we must support the promoters. One Greenfield copper Refinery Project is proposed in A.P.S.E.Z. by Adani Group, the above mentioned organization does many inspirational work of humanity and environmental preservation. When this organization is doing the project work as per rules it is most welcome and we will support the same.	We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area. We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project. As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibilityfor development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.	-

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			We thank you for your support and would like to continue our engagement with the community for development of the area.	
29	Shri Naran B. Gaghavi, (President), Keti Vikas Seva Trust, Village Zarpara, Tal: Mundra, Dist- Kutch.	Mundra taluka was rich in its unique environment and biodiversity. Fishermen, farmers and cattel herders would run their business and occupation here. But the adani company has ruined huge paches of mangroves forest that existed here. The mangroves forest was a kind of blessing for the people of the surrounding area as in times of famine. Cattle and camels would survive on mangroves during advers times. Fishermen and local community used mangroves wood to build their small houses, ships and other implements. Fish breeding would take place in mangrove trunks. Mangroves would save the surrounding area from being flooded, tsunami or earthquake, and acted as a natural protecting wall. Such useful mangroves forest has been destroyed in order to build Mudra Port and SEZ. The surrounding area has been severely affected. In case the M/s. Adani Enterprise Limited has the proposed Greenfild Copper Refinery Project if allowed, even the remaining patches of mangroves forest will be dangerously Impacted. The company has deliberately not mentioned anything about the mangroves forest and the probable impact on it in its Environmental Impact Assessment Report (EIA Report) prepared for the Greenfild Copper Refinery Project. The EIA Notification 2006 has been violated. The marine and ecology of the area have not been studied. **Filling up of Creeks:** The creeks of mundra were filled by up by MPSEZ in	1. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1. Proposed project area is devoid of mangroves. There is no question of mangrove destruction. 2. Impact Assessment has been carried out covering 10 km area surrounding the project site and it includes water bodies (if any), local residents and villages. There is no proposal of closing any creeks. 3. There are no sand dunes in the proposed project site. Hence, there is no question of demolition of sand dunes. 4. No fishermen will be impacted due to proposed project and will have no impact on fisheries. Project will be implemented with all the environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems. 5. Project will be implemented with all the environmental safeguards. There is no proposal of using groundwater for the proposed project. Water requirement for the proposed project will be supplied through desalination plant of APSEZ. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts	As primary survey of EIA studies, the prose project site outside the CRZ area, there is n reclamation of mudflats and mangroves. Ther is no sand dunes in the project site. The proposed project is with the state of ai environment friendly technology. Th Anticipated impacts during construction an operation phase is provided for propose project. There will not be any significant advers impact on the health of the people. Th proposed project will be implemented with a environmental safeguards. EMP is provided i Chapter-9 of the EIA report. Rs 1044 Crores ha been budgeted towards the pollution contr systems. The proposed project is with the stat of art environment friendly technology. The CSR details (like CSR policy, initiatives activities, CSR Budget expenditure data forr 2010 to 2016, Proposed CSR budget plan fc next 5 years and CSR implemente photographs) is given in Section-8.5 of Chapte 8 in the EIA Report. During construction phase of the project, th project will provide temporary employment t many unskilled and semi-skilled laborers i nearby villages. During operational phas considerable number of people will be benefite by provision of various services, such a transportation, technical services, skilled

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		order to reclaim land. Which has been cited in the report of the Sunita Narain Committee of Ministry of Environment forest and climate change (MOEF&CC) Government of India. It has brought harmful impact of the surrounding area. The Adani SEZ has filled uo Koyla vadi creek, Navinal Creek, Dhaja vadi creek, Bhradimata creek, Sonaper vadi creek, the creek near old port, kotadi creek land kotadi creek. These were all natural creeks and the fishermen of the surrounding 15 villages used thses creeks as a path to enter into the sea, Va liable fish catches were available in these creeks. The area was full of mangroves. The EIA has not mentioned what would be the impact on these creeks due to Copper Refinery Project? **Demolition of Sand Dunes:** In the coastal area of Mundra there were sand dunes as high as 40 to 60 meters. High quality frss would grow on thes sand dunes. Cattel herders of the area used to graze their cattel in this grass land for six to eight months. The land on which the company wants to build the Copper Refinery contained high grass land and forestry land. These have been demolished by the Adani Company. Such sand dunes would help against natural calamities. The Copper Refinery project may lead to further destruction of sand dunes, accelerating the danger of natural calamity, severely damaging the environment as also human and animal population of the area. Nothing has been mentioned in the EAI report about this. **Impact on fishermen community:** The Importance of Mundra taluka for fishing community and their village is next only to the	after operation of the project are found to be within the prescribed standards for Air and Water and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report. 6. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. 7. Proposed project will directly source the copper concentrate from outside which will be transported through state of art pipe conveying method. Thus, the process in this plant will directly start from smelting and will not involve mining, commination operation, floatation, etc. Project will be implemented with all environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems. The proposed project is based on Zero liquid discharge system and hence there will be no discharge of any effluent outside the proposed project boundary. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	semi-skilled services and indirectly it w flourish various business activities. The fishermen details are given in Sectio 3.10.6.1 and Annexure-XII of Chapter-3 in th EIA report.

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		jakhau fisheries Port. The sea shore along the taluka was used by fishermen from Mandvi and Gandhidham for fishing. Fishermen would get huge quantity of fish here, but due to the activities of the Adani Port &SEZ and Adani Power, the fisheries business has been severely affected. The fisheries production has decreased considerably. Due to this, major challenges have risen in front of the fishing community regarding their livelihood and economy of the area. With the Adani Copper Refinery Project, the area will be further adversely affected. Fishery activity will come to an end due to chemicals and poisonous, materials released from the Copper Refinery. This will create crisis for human being. **Impact on Agriculture and Horticulture:** The land between Mundra and Mandviis rich in horticultural crops and green farms. The stretch is known as its greenbelt, including rich green farms. Water of this area is sweeter than any other part of kutch. The crop of dry dates is found only here in the entire India. This area has remained a green field due to dry date crop. But after 2005, due to the activities of Adani Port &SEZ and Adani Power, the dry date crop has been affected. The ash form the Adani Power Plant spreads over farms of dry dates which spoil fruits, and the raw fruits fall without becoming ripe. More, the dry dates are not as sweet as they used to be earlier. This has adversely affected the livelihood of those who lived on agriculture. The saline water of the ocean now invades the land, contamination sweet water, adversely affecting ground water. Agriculture cannot be done in saline water. Thus, the area is already facing problems, and if the Copper Refinery Is built here, the entire area		

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		will be further impacted. The rich farms and agriculture will be destroyed, and this will trouble the farmer's community. **Impact on Animal Husbandry:** In the whole of India, only kutch is the only district where animal population is more than human population. Mundra taluka has been a leader in animal husbandry and related business. Sweet water, vast gaucher land, forest,etc. which are requirement for animal husbandry, are found here. The business of milk and items made from milk flourished in this area. But as the Adani Group has acquired most of the gauchar land and government waste land, no land is left for cattle breeders and animal husbandry, Milk amd milk production has decreased. Cattle breeders have lost their economy. Above and above this Adani Port &SEZ and Adani Power has acquired gauchar land of 10 village from the government of Gujarat. The details have been given In the table below: **Sources of Pollution in Copper Industry:** Copper industries is a mineral based industry. Copper bearing materials in the form of oxides or sulphides occur below the earth surface. The copper mineral is axtracted by various methods of mining. During mining large quantity of waste materials are generated. After the ore is taken out, it is crushed and milled. In crushing and grinding enormous amounts of dusts are generated. The ground ore is subjected to flotation for separation of copper rich mineral known as concentrate is then smelted in smelter to produce blister copper. The copper so		

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		produced is impure and is called anode copper. Copper production all of them contribute as sources of pollution in the copper industry. Thus the main sources of pollution in copper industries are (I) mining (2) comminution operation, (3) flotation, (4) roasting and smelting, (5) fire refining and electro refining stages, (6) sulphuric acid plant and (7) water treatment plants etc. So we are request to you and MoEF&CC New Delhi government of India cancelation of Adanis TOR and not given environment clearance.		
30	Shri Mahesh Pandya, Paryavaran Mitra, 502, Raj Avenue, Bhaikaka Nagar Road, Nr. Thaltej Cross Road, Thaltej, Ahmedabad	Refer Sr.no 3	Refer Sr.no 3	Refer Sr.no 3
31	Shri Ibrahim Abdulkar Turk, Jamadarwadi, Post Dhrab Ta Mundra Dist, Kutch	As local journalist I welcome the project of the proposed copper refinery project would produce 10 LTPA of copper cathode; 5 LTPA of copper rod; 30 LTPA of sulphuric acid; 5 LTPA of phosphoric acid (as 100% P205); 30.000 TPA of aluminum fluoride, 288 TPA of selenium, 50 TPA of gold; 500 TPA of silver etc with the state of art environment friendly technology in Kutch district. The huge development will be based on sustainable development principal and not with devastation of ecology and environment. The precautionary principle applies to the project and on this principal I would like to prevent possible huge pollution. I humbly request MOEFCC and Project proponent Adani Enterprise Ltd to kindly consider the below discussed queries for the abatement of pollution. There is need to modify some of the points/subject matter shown in draft Environmental Impact Assessment report and respective changes should be there in the EMP to achieve the aims and objective of		

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		the sustainable development of the region along with business interest. Suggestions 1.....The EIA report says *1.2.4 ... Location of the Project " The proposed project site is located in Siracha and Navinal villages at APSEZ Mundra taluka, Kutch district in the state of Gujarat. The total area earmarked for the proposed project is 256.58 ha (634 acres), in which 381 acres (154.18 ha) of land belongs to APSEZ area and 102,38 ha (253 acres) of land belongs to forest area for promoting industrial development.* The question arises here is that when the proposed forest land which is yet not cleared by the MOEFCC stage I or Stage II and pending for consideration how proponent can ask EC over the land??? Es MOEFCC not obeying the own OM? We demand that, the forest land must not be converted as the SEZ has more land available for this project. Why the Adani Enterprise Ltd is asking the Reserve Forest??? We demand detail investigation of the balance land available in SEZ or private land availability in the vicinity. The RF should not be disturbed at all. We demand from proponent that they must have sustainable solution for land availability than the diversion of Reserve forest of 102.38 hector. The entire coastline is going to be industrialised in next few years and there will be no green cover in the semi arid zone. The present forest has the trees and shrubs so it must not be disturbed when the project is going to increase the Sox and other air pollutants in larger quantity. I suggest the project authorities to shift the project if possible at deep in northern side of coast line where the unfertilized land available in huge quantity. *The image on EIA Page C3-16 is showing the project site is in the Shiracha Reserve Forest and Danderi*	1. Alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors. Project area includes forest land also for which APSEZ has applied for Forest clearance and same is under process. As a process, State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. As per OM of MoEF&CC, after making an application for forest land project proponent can apply for obtaining ToR for the proposed project and proceed with the procedures as per EIA notification 2006 and subsequent amendments. Same is complied fully.	1. The comparison of salient features c alternative sites done and details ar presented in Table-5.1 and is shown in Figure 5.1 of Chapter-5 in the EIA report.

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		Reserve Forest. So the project site should be out of this two RE. The Annexure-4 land allotment letter is meaningless if the SEZ president is not clear about the land to be given to this project. The letter is not showing clear piece of land with area and its possession with the SEZ authority it is talking about planning. This issue should be addressed by the AEL authority before taking EC. If The land belong to the government and SEZ does not own it at present than how it can assure the land transfer to AEL.		
		2.The diversion of forest land wide file number is 8-04/2016-FC has taken valid consent from gram or not? Under Forest Right Act 2006 settlement of rights of local grazers and people are settled or not? I suggest not to divert the forest land but in any circumstances 5 times more land should be developed as forest in 25 kms of the project site with state forest department. MOEFCC should force the company to develop forest in this 25 kms radius only to balance the forest cover.	2. As a process, State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. Compliance will be done as per forest clearance and Compensatory afforestation for the forest land will be done as per established procedure.	2. MoEF&CC (forest conservation division) ha granted Stage-1 approval for diversion c 1576.81 ha of reserved forest land in favou of Adani Ports & Special Economic Zon Limited (APSEZL) vide letter F.No.8 04/2016-FC dated 16th November 2018 Stage-I FC has been obtained as given i Annexure-V. The construction will start onl after getting all required statutory clearanc from concern department.
		3.Provide the date of the issuance of the CRZ map by NI() to AEL.	3. Proposed project layout is superimposed on CRZ map of the area prepared by authorized agency of MOEF&CC as per CRZ notification 2011 and same is provided in Chapter-1 of the EIA report. CRZ map is prepared by NCESS in June 2011.	3. The prosed project is a Greenfield projec and which is outside of the CRZ. The CR map is shown in Figure-1.5 of Chapter-1 i the EIA report.
		4.Provide the factual details on the distance of various streams/rivers/coast/creek. The EIA report has shown the point 14 in Form 1 (which shown below). The distances of the natural river/creek/estuary/water body needs to be corrected. As per my knowledge the information is given by mistake and I request to verify the same and introduce the fact in Final EIA report also	4. The details provided with respect to distance of various streams/rivers/coasts/creeks in Form-1 and EIA report are factual in nature. We will again verify the details and same will be reported in the final EIA report.	4. There is no change in data and all dat which is provided in EIA report is relevant.

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		provide the copy to me. • Streams/Rivers Kotri creek (0.5 km, 5) • Khari Nadi (1.9 km, W) • Gulf of Kachchh (3.9 km, S) • Nagavanti Nadi (4.7 km, E) • Phot Nadi (8.7 km, ENE) 5. Please provide the details of TSDF as described in the project for Hazardous waste disposal. There is no design shown in EIA report for TSDF site. i. No technical details regarding the TSDF site shown. ii. No Cell details and its capacity defined and no closer plan shown, iii. No details regarding the waste characterisation shown. iv. No details regarding heavy metal encapsulation shown which is to be disposed off in to TSDF, v. The compliance of the Hazardous and Other Waste (Management and Trans boundary Movement) rules 2016 for the smelter base waste not shown. vi. This project component must be shown differently in the said area of 12.14 Hectors. SLF cell is shown just adjacent to the public road which is not suitable. vii. The criteria for site selection is not studied and followed as defined by MOEFCC/CPCB. viii. The ground water geology, hydrology and contour maps of the area are not studied. ix. The flow pattern of ground water is not studied. x. The ground water table is not studied. (only 2-5 meter as shown on page C3-10) How TSDF is possible in such type of ground water area.	5. SLF will be constructed and operated as per the CPCB guidelines for treatment, storage and disposal facility (TSDF). All required approvals will be taken from concerned authorities. The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done. This was disclosed in Form-1; Aspects related to ground water has been studied and relevant information has been provided. Regular monitoring will be carried out as per Environment monitoring programme. Further detailing is part of detail engineering. The proposed project is outside CRZ area.	5. Hazardous cake and scrubber cake will b stabilized and stored in secured land fill a per guidelines of MoEFCC/ CPCB/ GPCB. A area of around 13.35 ha is identified an allocated. For the initial years of coppe refinery plant operation till sustaine utilization/management of copper slag an phosphogypsum; in the above applicatio areas are developed, as well as fc emergency purpose, copper slag storag area and gypsum pond of around 105 acre would be identified and made available fc intermediate/emergency storage of th same. Provision would be made to reclair the disposed copper slag an phosphogypsum from gypsum pond at later stage for various utilization venture: The solid waste generation, wast characterisation and mode of disposal given in Section-2.4.3 of Chapter-2

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		So this component is illegally inserted in the Draft EIA report as per my belief. The Form I do not have such details and the TOR also, The site specific TOR should be given for such kind of huge 12 hector secure land fill site for disposal of the highly toxic heavy metal baring waste which needs stabilization first. In absence of the waste characterisation the secured LF/TSDF for the hazardous heavy metal baring waste could not be the part of this copper smelter. This component should be taken EC separately along with the phosphogypsum and copper slag storage yard. This plant is very near to coastal area also. Keeping in mind the coastal hazard this site should be out of the coastal zone. I demand the MOEFCC EAC to look in to the matter and ask the proponent to obtain fresh EC as separate project with proper EMP and EIA report or dispose the toxic metal baring waste of Cr, Cd, Ni, As, Pb, and some types of active radioactive metals in common TSDF available. The MOEFCC and CPCB always ask for common disposal of Hazardous waste in country. Gujarat has more than 20 Captive TSDF sites and there are problems started in it. Such kind of captive landfill site will not be sustainable for future. 6. The copper slag and phosphogypsurn reuse plan is not shown in the EIA report. There will be mountains of the two type of waste if not disposed or used properly. There are problems of this waste having some hazardous characteristics due to traces of heavy metals. The haphazard disposal of these two waste can be hazardous for the environment if disposed without assessing the toxic nature of metals. As	6. Details on production quantity of copper slag and phosphogypsum are provided in the EIA report. The uses of copper slag and phosphogypsum are also mentioned in the EIA report. Both the materials will be handled with all precautions as they are valuable raw materials for several applications.	6. Refer the above point.no-5.

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		all over India all the copper smelter are facing critical problems of disposal. I request the AEL to make a plan for Zero Dump of these two types of waste at site. There should be detailed utilization plan from day 1st and according to plan it should be immediately used. MOEFCC should not permit the proposed dumping in open to avoid the mountains of these two types of waste near the Kutch coast.		
		7. The premise of this project has the gypsum pond. Please provide the details on gypsum pond and its liner system to avoid leaching in to ground water and coastal sandy soil of the project site. The site is reclaimed with soil where the gypsum pond is proposed and it is located near the CRZ area. This pond can lead ground water pollution. Detailed engineering of the pond should be given to MOEFCC in final EIA report along with its handling mechanism, We demand to shift the gypsum pond to northern portion of the project where the soil is stable and having some more load baring capacity than the sandy part.	7. Gypsum storage area will be constructed as per the "Guidelines for Management, Handling, Utilisation and Disposal of Phosphogypsum Generated from Phosphoric Acid Plants" published by CPCB and which is available online at: http://cpcb.nic.in/wast/hazardouswast/GuidelineforM,H,Utili&%20DisposalofPhosphogypsumfromPAPlants.pdf. Compliance will be done as per permissions granted from statutory authorities. There will not be any impact on soil and ground water due to operation of gypsum storage area.	7. The process description is given in Section 2.3 of Chapter-2. The impacts an mitigation on solid waste management given in Section-4.2.5 of Chapter-4 in th EIA report.
		8. The project will have the water from Mundra Utility Pvt Ltd (MUPL). The water allocation letter is enclosed as Annexure-VII. What will be balance capacity of MUPL after allocating the 32.8 MLD. What will be source of water of MUPL.	8. MUPL will be supplying water for the proposed project from its approved desalination plant capacity. Approved capacity is 300 MLD.	8. The water requirement for proposed proje meet from approved 300 MLD capacit desalination plant of MUPL.
		9. The ETP will have 1.2 MLD of water but where will be the treated water go? Please provide the justification of the water balance diagram shown on page C2-5.	9. The proposed project is based on Zero Liquid Discharge (ZLD) system. Preliminary water balance diagram is given in figure-2.2 of the EIA report. The treated water from ETP will be further treated into the RO plant. The purified water	9. The treated water will be reuse in process an for horticulture. The detail water balance fo proposed project is shown in Figure-2.2 Chapter-2 in the EIA report.

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			from the RO plant will be reused in the proposed project and rejects will be sent to multi-effect evaporator to achieve zero discharge. There is no discharge of any treated water into the sea.	
		10. Approximately 3 LTPA copper scrap and electronic scrap is also used as input to proposed copper smelting plant and copper scrap melting facility. Will all the 3 LPTA copper waste imported by AEL? Is such e-waste import or scrap permitted to refine in India? Provide the details from where such huge copper waste will be procured for this proposed plant.	10. Copper scrap and E-scrap will be sourced domestically as well as from import market based on availability. All the applicable rules and regulations will be complied with.	10. The detail will be provide in deta engineering.
		11. Is the technology selection process based on the environmental friendly technology with special consideration of semiarid atmosphere? The EIA has shown the Outotec Mercury Removal Process with selection of chloride scrubber Please provide the technological justification of the selection of technology with considering the temperature and humidity of the Kutch region. Will this project manufacture high purity metallic mercury at the site?	11. Environment friendly technology will be selected and pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems. The list of products manufactured from the proposed project facility is mentioned in Chapter-1 of the EIA report.	11. The project description details is given Section-2.3 of Chapter-2 in the EIA report.
		12. What will be level of radioactivity in the copper slag and other metal waste? EIA does not have touched up the issue. Please provide the details with proper justification.	12. EIA has been conducted as per the TOR granted by MoEF&CC and all conditions of the same have been complied with. Project will be implemented in line with the permissions granted and all the conditions will be complied as per permissions.	12. The detail will be provide in deta engineering.
		13. What will be the pollution load of water/ electrolyte / hazardous waste from the Kaldo Furnace and PMR Plant? There are no word written on it and no details are given in EMP.	13. Effluent from PMR plant will be treated in the state of art ETP as shown in Chapter-2 of the EIA report. The waste generated from Kaldo furnace will be recycled in the proposed plant.	13. The preliminary composition of the was generated such as scrubber cake and E cake details are given in Table-2.10 & 2.1 of Chapter-2 in the EIA report.

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		Please provide the information. What will be done of the solvent used in it will it be recycled or disposed off.		
		14. Table 2.6 exhibit the emission of the all vents from the whole smelter and allied plants. The SO_2 will be from H_2SO_4 Plant will be 3 Lac NM^3/Hr which will be 1 Kg/Ton H_2SO_4 produced. Is it not the huge quantity of SO_2? Is the coastal region have that much capacity to take the load of SO_2 in 25-30 kms area in ambient environmental situation? Can the AEL reduce the emission of SO_2 below 0.75 kg or more less / ton of H_2SO_4? I sincerely request the AEL management to reduce SO_2 emission from the H_2SO_4 plant. This is the critical gas which can deteriorate the health of people and animals and affect the environment seriously. I suggest MOEFCC to give the condition of 0.75 kg emission/ton of H2S0$_4$ produced. The SO_2 Level in ambient air is ranging between 20-35 micro-gram/m^3. After the proposed smelter it may cross the ambient air quality limit. So I am suggesting for decrease of SO_2 emission at the time of planning,	14. The SO_2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.	14. The sources of pollution from the propose project activities is given in Section-2.4 Chapter-2 and Impacts & its mitigatic measures are given in Chapter-4 in the E report.
		15. I suggest assessing the cumulative emission from all stakes shown in the EIA report for SO_2. The dispersion modelling should be carried out on the cumulative emission study. I believe that the cumulative study will show shocking result and the stake height can go above 150 -180 meters. The MOEFCC should increase the height of stake of Main Stack Secondary Gas Scrubber-18z II (Bi flue) Sr. no 10 and of H_2SO_4	15. The impact analysis has been carried out for the proposed project as per TOR granted by MoEF&CC in which baseline conditions are monitored and prediction of impacts has been carried out with respect to proposed project activity. The details have been provided in Chapter-4 of the EIA report. Proposed project is outside CRZ area and there will not be any impact on marine ecology.	15. The air quality modelling with increment and cumulative is given in Section-4.2.2 Chapter-4 in the EIA report.

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		no 12. The southern portion of the project site shows the presence of mangrove and it is inter tidal zone falling under CRZ 1A as per the CRZ map attached in EIA report. The southern portion is reclaimed land with sand. So I suggest that AEL should restore the mangrove in 1000 hector in Gujarat coastline to protect the coastal environment and balance the nature.		
		16. The air quality sampling point is carried out at 5 points between 0-5 kips of project site. There are only 3 location selected between 5 to 10 krns why? To complete the air quality monitoring as per procedure I suggest to carryout air quality analysis at new 5 points between 5 to 10 lams radius of study area and the data should be submitted in final EIA. Necessary changes in air modelling should also be done to minimise the impact of air pollution.	16. Air quality monitoring is done based on ToR granted and is as per CPCB and MoEF&CC guidelines. Details are provided in the EIA report.	16. Refer the above point no.-15.
		17. Please provide the air pollutants dispersion modelling based on sensitive receptors like habitat, village etc which is not done in draft HA report and is asked under TOR 10 (i) point	17. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.	17. Refer the above point no.-15.
		18. I suggest online stake monitoring system for all major stakes emitting SO_2, with showing cumulative emission data online at main gate. There should be display board showing the	18. Standards laid down by CPCB and SPCB will be complied.	18. AEL will complied

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		parameters with permissible limits.		
		19. Figure-9.1 page C9-6 EIA report has shown the organisational structure of Environment Management Cell. Excluding 5 safety engineer there are only 8 person staff shown which i feel highly inadequate to handle the most important pollution control system and manage the environment. I suggest there should be more Environmental Scientist, Chemist and Engineer needed for the pollution control components of such kind of big smelter. The environmental cell should have employee strength of 25 or more.	19. Proposed Environment management cell is as per requirements. Apart from the employees in environment management cell, line managers in Operations & Maintenance will also be well trained for environment protection.	19. The budget allotted for environment protection will be about Rs. 1044 Crore out of which for Air pollution control system is Rs. 639 Crores, Water pollution contr system is Rs. 360 Crores and othe environmental management systems (lik solid waste, greenbelt, post proje monitoring, gas collection and energ conservation) is Rs. 45 crores. The EM budget is given in Table-6.4 of Chapter-6.
		20. Adani group is working in the region having ports, power plants and SEZ from 2008. The female literacy rate in the study area of 10 KMS is only 23.58% which is highly unacceptable. I suggest the company should share and increase its CSR budget towards female literacy in the area.	20. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.	20. The CSR details (like CSR policy, initiative & activities, CSR Budget expenditure dat form 2010 to 2016, Proposed CSR budge plan for next 5 years and CSR implemente photographs) is given in Section-8.5 Chapter-8 in the EIA Report.
		21. I also suggest the utilization of 3% of the project cost not the profit share for the benefits of the local people and their health from the date of the start of project. MOEFCC has in past given these conditions to various high pollution potential projects.	21. Reply is as per point no. 20 above	21. Refer the above point no.20.
		22. As per TOR point IV no plan regarding Arsenic baring sludge is submitted in draft EIA report. Please provide the report for arsenic and mercury baring sludge. I suggest to provide a detailed plan of haz waste disposal in proper way with detailed information,	22. Arsenic bearing sludge will be stabilized and stored in the secured land fill (SLF). Mercury will be recovered as Calomel as well as mercury metal and will be sold in the market. SLF will be constructed and operated as per the CPCB guidelines for treatment, storage and disposal facility (TSDF). The SLF, once filled to	22. Refer the above point no.5.

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			its capacity will be capped on top and soil cover will be spread and landscaping will be done.	
		23. As per Model TOR the point no x is not complied with. There are no data shown for the flood and river discharge near by the Greenfield project. I request to provide the same from governmental department in final EIA report along with mitigation measures if any.	23. Profile of the area has been provided in the EIA report. Suitable information will be obtained from Government authorities and if available same will be incorporated in the final EIA report.	23. Dhaneshwari, a seasonal river flows in th western part of the proposed site. The flo of the river will be maintained, as shown the Plant Layout is shown in Figure-2.1. Th river steam will not be disturbed.
		24. How the zero discharge status will be achieved by this plant is not shown in water table diagram and in draft EIA report. Please furnish details of all the components of ETP and stage wise pollution reduction to achieve the zero discharge status in final EIA.	24. Reply is as per point no. 9 above.	24. Refer the above point no.9
		25. I suggest during construction phase a 2 Nos of high capacity truck mounted dust collector should be used round o clock for controlling dusting in the construction area and introduction of coal tar temporary roads in the whole construction area.	25. Good housekeeping will be maintained in the plant premises; road sweeping machine will be used to clean roads.	25. Anticipated impacts and mitigations durir operation phase is given in Section-4.1 4.2 of Chaper-4 in the EIA report.
		26. As per the map submitted in draft EIA there is no 33% area left for the plantation. So from where the land will be taken for this 33 % plantation area? Please provide the breakup of the land.	26. The break-up of land has been provided in the PFR. However, the same will be included as a part of final EIA report. 33% of the project area is proposed for green belt.	26. The greenbelt development design ar recommended species details are provide in Section-4.3 of Chapter-4 in the EI report.
		27. On Model Tor point 9- CEP..,Point No -- iii- iv no answer is given in ETA report. I suggest that any violation or any environmental issue the highest authorities should be informed and they should address the problem/grievance/violation with spirit. These grievance redressal mechanism and details must be shared with public also in any such issue and publish on web site.	27. Project will be implemented in line with the permissions granted and same will be complied fully.	27. The construction will starts after getting a required statutory clearance from concer department.

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		28. If share holders and board of directors are not aware about the issues/problems of pollution then the management will not work effectively. I suggest that the environmental issues/problems should be addressed in the grievance redressal mechanism and it should be online in local language on web site of proponent.	28. Our reply same as per point 27 above.	28. AEL will compile
		29. I suggest online complaint redressal mechanism for greater transparency and accountability of pollution control facilities in such huge industry like this. I demand that company should initiate the online complaint redressal mechanism and display all the respective answers of company to avoid misunderstanding and confusion among the citizens/environmental groups/media. The *MOEFCC should give the condition in Environmental Clearance for this demand.* This move will lead smooth industrial development of the area avoiding litigations in court and public protest.	29. Our reply same as per point 27 above. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	29. AEL will compile
32	Shri Debi Goenka, (Executive Trustee), Conservation Action Trust, 5 Sahakar Bhavan, 1st Floor Lbs Marg, Narayan Nagar, Ghatkopar (West) Mumbai	Refer Sr.No 7	Refer Sr.No 7	Refer Sr.No 7
33	Shri Chauhan Pravinsinh Bhurubha, Village: Siraya, Tal. Mundra, Dis. Kutch	1. What kind of forest area is 102.38 has?	1. Forest land involved in the project is a terrestrial forest as mentioned in Chapter-4 of the EIA report. As mentioned in Chapter-2 of EIA report, State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC".	1. Forest land involved in the project is terrestrial forest
		2. The site is located in the seismic zone-V, what is	2. The plant design will be done considering seismic	2. The plant design by considering sesm

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		the vulnerability of the site due to its seismic sensitivity	zone-V as per IS 1893 (part-I)- latest edition. Disaster management plan has been prepared and available in Chapter-7 of the EIA report.	zone-V and details will be given in deta engineering report.
		3. Figure-1.2 is illegible. Please provide a better of the same map	3. Study area map on a larger size paper will be provided in final EIA report.	3. Noted and will be incorporated in final EI report.
		4. Please provide list of all the raw a materials that are required for the purpose of proposed project	4. Raw materials requirement and sources has been provided in Chapter-2 of the EIA report.	4. The raw material and source details ar presented in Section-2.2.2 and th proposed project layout is given in Figure 2.1 of Chapter-2 in the EIA report
		5. Please provide name of the sources, along with distance from the plant, from which raw material would be brought to the project site?	5. Reply is as per point no. 4 above.	5. Refer the above point no.-4.
		6. What are all the different air pollution which will be added to the Ambient Air Quality (AQQ) because of the transportation of raw material to the project site?	6. The copper concentrate and rock phosphate will be transported through state of art pipe conveying method. The required EMP measures will be implemented as mentioned in Chapter-6. Project will be implemented after obtaining required clearances from concerned statutory authorities and complied with.	6. The anticipated impacts on air quality an mitigation measure to control pollutio during construction and operation phase ar provided in Section-4.1.3 and 4.2.2 c Chapter-4 in the EIA report. Th comprehensive environmental monitorin program for construction phase an operation phase is suggested in Table-6.1 6.2 of Chapter-6 in the EIA report.
		7. What is the incremental concentration (in µg/m3) of each of air pollution which will be added to the AAQ because of the transportation of the raw material to the project site?	7. Reply is as per point no. 6 above.	7. Refer the above point no.-6.
		8. Give us a fully list of all the industries within APSEZ area, along with there production capacities.	8. As per TOR, the study area is 10 km around the proposed site and major industries and ports within 10KM radius study area of the proposed project have been given in chapter-1 of the EIA report. Full list of industries in study area, as desired, will be given in final EIA report.	8. As per TOR, the environmental settings 1 km radius around the project site is given i Table-1.1 of Chapter-1 in the EIA report.

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		9. Give us a full list of the all the industries within 15 kilometers radius of APSEZ area, along with their production capacities.	9. As per TOR, details of 10KM radius study area are covered.	9. Refer the above point no.-8.
		10. Give us a full list of all Air Pollutants which are discharged by each and every industry within APSEZ area, along with the quantum of discharge per hour.	10. The impact analysis has been carried out for the proposed project as per TOR granted by MoEF&CC in which baseline conditions, which reflect emissions from existing industries, are monitored and prediction of impacts has been carried out with respect to proposed project activity. The details have been provided in Chapter- 4 of the EIA report.	10. Refer the above point no.-6.
		11. Give us a full list of all Air Pollutants which are discharged by each and every industry within 15 kilometers of the APSEZ area, along with the quantum of discharge per hour.	11. As per TOR, details of 10 KM radius study area are covered. Environmental sensitivity is identified for 15KM radius area as per TOR.	11. Refer the above point no.-6 & 8.
		12. What is the maximum baseline concentration of $PM_{2.5}$ within 15 kilometers radius of the project site?	12. The maximum baseline concentration of $PM_{2.5}$ in ambient air, in the study area, is given in Chapter-3 of the EIA report.	12. The baseline AAQ monitoring location an results are given in Section-3.6 of Chapter- in the EIA report.
		13. What is the incremental $PM_{2.5}$ pollution which will be added by the project?	13. Incremental concentrations for PM_{10}, SO_2, and NO_2 have been given in Chapter-4 of the EIA report.	13. The Air modeling and incrementi concentrations for PM_{10}, SO_2 and NO_2 given in Chapter-4 in the EIA report.
		14. What is the impact of water withdrawal from the Sea on marine ecology?	14. There is no separate desalination plant proposed for the project. APSEZ will be supplying water for the proposed project from its approved desalination plant capacity. Therefore there will not be additional impact due to proposed project.	14. The impacts and mitigation measures o water quality is given in Section-4.2.4 Chapter-4 in the EIA report.
		15. The EIA Report is completely silent on feasibility of Zero Liquid Discharge (ZLD). The typical style of Vimta Labs, which is the consultant for the EIA	15. Besides the water balance diagram, technical scheme to achieve Zero Liquid Discharge (ZLD) is also given in Chapter-2 of the EIA report. The	15. The treated water will be reused in proces operation. The water requirement an breakup details are provided in Sectior

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		Report, is that they provide Water balance diagram in the EIA Reports and say that it is there is no waste water discharge from the plant. Is water balance diagram sufficient to evaluate the feasibility of ZLD? Therefore, give us scientific explanation about the feasibility of ZLD for the proposed project.	rejects from the RO plant will be sent to multi-effect evaporator to achieve zero discharge and salts (mainly calcium) will be stored in the SLF within the project area. There is no discharge of any treated water into the sea.	2.2.3 of Chapter-2.
		16. Have you obtained prior Forest Clearance for the project?	16. Project area includes forest land for which APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. As per procedure, EC shall be obtained from MoEF&CC after compliance of applicable requirements.	16. MoEF&CC (forest conservation division) ha granted Stage-1 approval for diversion 1576.81 ha of reserved forest land in favo of Adani Ports & Special Economic Zor Limited (APSEZL) vide letter F.No.8 04/2016-FC dated 16th November 201 Stage-I FC has been obtained as given Annexure-V. The construction will start on after getting all required statutory clearanc from concern department.
		17. What is the total amount of Forest which has been diverted/cleared so far for the purposes of different project within APSEZ area?	17. As per TOR, forest land involved for the proposed project has been mentioned in Chapter-1 and in Land Use for the proposed project is given in Chapter-2 of the EIA report.	17. Refer the above point no.16. The land us breakup is given in Table-2.2 of Chaper-2 the EIA report.
		18. What has been the environmental damage which has happened as result of the Forest diversion so far?	18. As per TOR, baseline environment of the study area and environmental impacts of the proposed project have already been studied and provided in EIA report.	18. The baseline studies, impacts & mitigatic measures and EMP for proposed project hav already been studied and provided in EI report.
		19. How much money does the company owe to different banks?	19. This is outside the scope of the EIA report for the proposed project.	19. This is outside the scope of the EIA report f the proposed project.
		20. How much money does the company owed to public sector banks?	20. This is outside the scope of the EIA report for the proposed project.	20. This is outside the scope of the EIA report f the proposed project.
		21. What is the source of money for this project?	21. This is outside the scope of the EIA report for the	21. This is outside the scope of the EIA report f

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			proposed project.	the proposed project.
		22. Why should we have a project promoted by a company which is deeply into debt?	22. This is outside the scope of the EIA report for the proposed project.	22. This is outside the scope of the EIA report f the proposed project.
		23. Have you paid the 2000 crores money imposed as fine/penalty for damaging the Environment?	23. This is outside the scope of the EIA report for the proposed project.	23. This is outside the scope of the EIA report f the proposed project.
		24. If not, when will the company pay penalty imported?	24. This is outside the scope of the EIA report for the proposed project.	24. This is outside the scope of the EIA report f the proposed project.
		25. The environmental damage which has already been caused by your company is punishable under Section 15 of the Environmental (Protection) Act, 1986 and you are liable to be imprisoned for the same. Why has the criminal action not been taken against you?	25. Adani Enterprises Limited has not violated any provision of Environment (Protection) Act, 1986. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	25. There is no court cases, litigations ar violation take place on the proposed project
34	Shri Chauhan Pravinsinh Bhurubha, Village: Siraya, Tal. Mundra, Dis. Kutch	1. **Non compliance of Terms of Reference and Breach of Circular dt. 31-03-2011 of the Government of India (Encl.: 1)** a) A T.O.R. (Terms of Reference) was issued for this project of dt. 21st June, 2016, in which it was clearly stated in Section 5(I) that clearance for forest land of 102 ha should be submitted. i) It is declared in Form No.1 (MoEF&CC uploaded by them on their website) to obtain Environment Clearance by Adani Enterprise that forest clearance is under the process. ii) It is declared on draft E.I.A. report on page no. AI 14 that (T.O.R. is not compliance by Adani) but forest clearance is pending. Thus, considering the abovementioned issued it is clear that T.O.R. is not compliance by Adani	1. We submit that all requirements for obtaining the TOR from MoEF&CC were fulfilled. After obtaining TOR, Environment Impact Assessment has been completed and all conditions of TOR has been complied with by project proponent for the purpose of public hearing. Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure-I, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC". The file status is also available online at MoEFCC Forest Clearance. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report.	1. As per TOR obtained from MoEF&CC and poi are addressed in the EIA report along wi TOR compliance. MoEF&CC (forest conservation division) hi granted Stage-1 approval for diversion 1576.81 ha of reserved forest land in favo of Adani Ports & Special Economic Zor Limited (APSEZL) vide letter F.No.8-04/201 FC dated 16th November 2018. Stage-I has been obtained as given in Annexure- The construction will start only after gettir all required statutory clearance from conce department. There is no litigations and court case relate to the proposed project.

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		Enterprise. So, Environmental Public Hearing is not valid until the T.O.R. compliance is not made. b) According to Circular dt. 31-03-2011 of MoEFCC (Encl:4) that forest clearance should be obtained first for any new project, in which the land of forest department is to be utilized and the environmental clearance process should be made thereafter. The land of 102 Ha is of Forest in this project of Adani Enterprise and Forest Clearance is pending. It is proved by Encl: 2 and Encl:3. Thus, any environment clearance process made before forest clearance is illegal and Public Hearing may also be treated illegal. c) As per Section 8(iv) of E.I.A. Notification, 2006 if any information is concealed deliberately, the application should be cancelled. Thus, the abovementioned information pertaining to forest clearance is concealed by Adani Enterprise deliberately to misguide. Hence, their application for environment clearance must be cancelled. d) Why any action is not taken in spite of the complaint (encl.:5) regarding abovementioned point no. 1 is made by me by e-mail on 11/04/2017 to (1) K. C. Mistry, Member Secretary, Gujarat Pollution Control Board, Gandhinagar and (2) Arvind Agrawal, Chairman, Gujarat Pollution Control Board, Gandhinagar, (3) Regional Officer, Gujarat Pollution Control Board, Gandhidham, (4) M. A. Gandhi, Collector, Kutch, (5) M. K. Sing, Joint Secretary, MOEFCC., New Delhi?. Why the process pertaining to Environment Clearance is not stopped? On what basis Public Hearing is arranged?	As the project is proposed by M/s Adani Enterprises Limited in APSEZ land, Forest Clearance has already been applied for this land by APSEZ (erstwhile Mundra SEZ Ltd.). The requirement of OM dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR. At no stage there is any concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application by the project proponent. There is no deviation from the Section 8 (vi) of EIA Notification 2006 also. We do not offer any comment related to point 1(d) of your letter.	

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		2. **Information concealed in Form-1** a) Review Petition is filed on judgment of P.I.L. No.17 of 2011 of the grazing land of Navinal on the land proposed in point no. 16 and 26 of basic information. It is concealed that it is under proceeding. b) The information of Daneshwari River is concealed by Adani in point nos. 2 and 10. But, this river passes through the proposed project. Thus, the information is concealed. Thus, as per Section 8(iv) of E.I.A. Notification, 2006 if any information is concealed deliberately, the application should be cancelled. The abovementioned information is deliberately concealed in Form No.1 by Adani Greenfield Copper refinery. Hence, their application deserves to be cancelled.	2. A) The PIL 17 of 2011 has been disposed by the High Court. The judgment is under review. B) Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Google Map is provided in EIA Report (Schedule –C 1-6).	2. B) Dhaneshwari, a seasonal river flows the western part of the proposed site. Th flow of the river will be maintained, a shown in the Plant Layout is shown Figure-2.1. The river steam will not b disturbed.
		3. **Deficiencies in E.I.A. report** a) It is declared by Adani in point no. 10 on page Nos. 1-4 of E.I.A. report that there is no archaeologically important place within the radius of 10 km. But, an archeologically place is situated in Navinal Reserve Forest, about 1 km. from the proposed project area. Accordingly, survey of this area is made by archaeologically department of M. S. University. The primary report is attached herewith. Thus, this information is concealed.	3. A complete list of archaeological monuments in the state of Gujarat is available at http://asi.nic.in/asi_monu_alphalist_gujarat.asp. Further, a complete list of excavations is available at http://asi.nic.in/asi_excavations.asp. As on date, there is no Notified Archeological Site located within 10 km from the proposed project site.	3. There is no notified archaeologically site withi 10 km from the proposed project site.
		4. **Violation of Sunita Narayan Committee** a) It is mentioned on page no. 69 of Sunita Narayan	4. The Committee and its report pertain to APSEZ. The points mentioned are not related	4. This is outside the scope of the EIA report f the proposed project.

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		Committee Report that fishing port should be made at Bhadreshwar so that people of surrounding villages may make fishing activity there. But nothing such is made there. b) It is mentioned on page no. 69 of Sunita Narayan Committee Report that arrangement of coming and going should be made so that fishermen may move on coast. But nothing such is made there by Adani. c) It is mentioned on page no. 75 of Sunita Narayan Committee Report that collective grazing land should be given back voluntarily so that people may graze their animals. But nothing such is made there. d) It is mentioned on page no. 75 of Sunita Narayan Committee Report that studied till now. So permission for new project should not be granted. e) The committee has mentioned in recommendation no. 7.2.2 that environment permission for north port should be cancelled, because Bocha Island is situated there and mangrove is caused heavy damage there. In spite of that permission is not withdrawn. f) As per the Sunita Narayan Committee report maping of HTL AND LTL should be made and kept in public domain, which is not placed till date. 5. **Issue of land of forest department** a) A demand of land of reserve forest of 8 villages	to the proposed project activity therefore we do not offer any comment. 5. APSEZ has applied for diversion of forest land for industrial purpose. The forest diversion is	5. MoEF&CC (forest conservation division) h granted Stage-1 approval for diversion

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		aggregating to 1576.81 ha is made by Adani on dt. 19th July, 2004. Its forest clearance is under process. Out of 1576.81 ha of demanded land to be used for project, 102.38 Ha of land is of Shiracha Danderi Rakhal (reserve forest). b) According to Forest Privilege Act, 2006 the villagers making use of the land have prior right on it and it cannot be allotted for industrial or other use without permission of the village meeting. c) According to Forest Privilege Act, any community in use of the land for last three generations or earning livelihood from it may have right on it. d) The villagers of surrounding are making use of this forest land of 1576.81 Ha. So this land cannot be allotted for industrial purpose according to Forest Privilege Act. e) Shiracha Gram Panchayat has put it claim before Prant Stariya Van Adhikar Samiti to settle its community rights on the forest land to be used for proposed project. f) Out of the 1576.81 ha of land under demand, 89 ha of land is of Navinal village and Navinal Village Committee has put collective claim on it. g) According to Forest Privilege Act, the villagers have prior right on it. So, its forest clearance cannot be availed and it cannot be used for the project. h) It is the last reserve forest in the area. If it is allotted for industrial purpose, the area will remain without forest and more forest are	under process. All the rules will be complied for forest diversion, as applicable. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.	1576.81 ha of reserved forest land in favc of Adani Ports & Special Economic Zo Limited (APSEZL) vide letter F.No. 04/2016-FC dated 16th November 201 Stage-I FC has been obtained as given Annexure-V. The construction will start or after getting all required statutory clearan from concern department.

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		essential for industrial area. 6. **Noncompliance of Environment Clearance of Adani Port and Special Economic Zone** a) As per condition (2) conservation of creeks, rivers mangroves coming within the area is to be made. It can be seen from the photographs of different years taken from satellite annexed herewith that the creeks, rivers mangroves coming within the area are exterminated by Adani. Thus, the condition is violated. b) As per condition of every creek should be kept in comparison with the satellite image, 2005.But, the condition is not followed by the Adani Port and S.E.Z. c) It is directed in Specific Condition (5) that a recent satellite map should be submitted once a year so that it can be compared with the Satellite map of year 2005 and confirmed whether there is any change in creeks, rivers, mangrove and mouth of creek. No such map is submitted by A.P.S.E.Z. till date. Thus, condition compliance is not followed. d) As per condition (6) A.P.S.E.Z. must observe order passed by the Ministry of Environment and Forest considering the report submitted by Sunita Narayan Committee. But, it is not followed by A.P.S.E.Z. e) As directed in condition (12) and (13) NCSCM/NIOT will control and verify the implementation as per action plan approved by Ministry of Environment and Forest. Execution	6. The issues raised are for APSEZ and are not related to the proposed project activity therefore we do not offer any comment.	6. This is outside the scope of the EIA report fc the proposed project.

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		Report of Action Plan will be required to be submitted with six monthly monitoring reports. This condition is not complied till date. a) As per condition (15) no change should be made in flow of river. But, The route of river of Kandagara passing through Adani Power is changed.The Kamandwala flow between Navinal and Shiracha is changed. The mouth of Nagmati River is closed. O.C.C.L. Company is established on river of Dhrab. Construction of Adani Hospital is made on Kevdi River. Thus, breach of this condition is made. f) As per condition (18) no development should be made up to 50 meter from mangrove area. But, many constructions are erected by project proponent such as construction of Adani House building. Thus, breach of this condition is made. 7. **Report of Gujarat Ecology Commission.** a) A report is prepared by Gujarat Ecology Commission upon study of effect on mangrove and its ecology due to coal handling. Mundra Port is a part of it. b) According to the report growth of mangrove is affected by coal dust. c) As per the report BOD (Biological Oxygen Demand) was 9.52 in 2010/11 which has reached to 27 in 2012/13 which is the highest in the areas under survey. d) COD (Chemical Oxygen Demand) was also 38 in 2010/11 which reached to 92.65 in 012-13.	7. The Report on Coal Handling and its impacts are not relevant to the proposed project activity therefore we do not offer any comment.	7. This is outside the scope of the EIA report fo the proposed project.

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		e) DO (Dissolved Oxygen) has reached to 4.92 from 4.8. which is CPCB is higher than permissible line. f) SO (Suspended Solid, blirness in water) has reached to 162 from 56 which is CPCB is higher than permissible line. g) Nitrate 0.313 in 2010-11 has reached to 1.154 in 2012-13. 8. The grazing land of Navinal village will be used for Copper Refinery Project of Adani Enterprise Ltd. The matter of land is sub-juiced. No judgment is passed in favor of any party. 9. In spite of having so many industries, nothing is made for the employment to local people. I.e. 400 Ha of land of surrounding villages is given to Adani Power and fishermen, farmers, cattle breeders are left unemployed. In reward thereof only 500 out of 7000 laborers and 15 out of 1500 employees are local. Consequently, nothing but unemployment and pollution will be available from this project. 10. This is a coastal area. So, C.R.Z. clearance is required so as to make action plan for salvage against earthquake or tsunami.	8. The PIL 17 of 2011 has been disposed by the High Court. The judgment is under review. 9. Details on potential employment is mentioned in Chapter-2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth. 10. The proposed site is outside CRZ and hence there is no requirement of Clearance under the CRZ Notification. The same is shown in Fig. 1.5 of EIA Report. Risk Analysis and Disaster Management Plan has been prepared to	8. The PIL 17 of 2011 has been disposed by th High Court. The judgment is under review. 9. Employment requirement details durin Construction and operation phases is given i Section-8.4 of Chapter-8 in the EIA report. budget of Rs.8 crores per each year has bee allotted for Enterprise Social Responsibility Corporate Social Responsibility (CSR activities for five years. The CSR details (lik CSR policy, initiatives & activities, CSR Budge expenditure data form 2010 to 2016 Proposed CSR budget plan for next 5 year and CSR implemented photographs) is give in Section-8.5 of Chapter-8 in the EIA Report 10. The prosed project is a Greenfield project an which is outside of the CRZ. The CRZ map i shown in Figure-1.5 of Chapter-1 in the EI report. Disaster management plan has bee prepared and available in Chapter-7 of th

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		11. 32800 K.L.D. will be utilized by the company and desalination plant will be used for it, which will affect the sea-life adversely. This desalination is connected with the company. But no study of its effect is made.	identify and address the natural disasters, which is covered in EIA Report. 11. There is no separate desalination plant proposed for the project. APSEZ will be supplying water for the proposed project from its approved desalination plant capacity. Therefore there will not be additional impact due to proposed project.	EIA report. 11. The water requirement for proposed projec meet from approved 300 MLD capacit desalination plant of MUPL.
		12. There are two power projects and biggest coal handling port in Asia is situated here but it is not mentioned in E.I.A. report.	12. References of Adani and Tata Power Plants as well as west & south ports of APSEZ are mentioned in Table 1.1 of Chapter 1 of the EIA Report.	12. The list of industries within the 10 km radiu from the project site is given in Table-1.1 c Chapter-1 in the EIA report.
		13. Environment Clearance Compliance of other projects of Adani is not made. So, people in surrounding should not be caused damage by giving permission to new project.	13. Comment being general in nature, we do not offer comment.	13. This is outside the scope of the EIA report fc the proposed project.
		14. The livestock of our villages were grazing on the grazing land of the proposed project. The livelihood is ruined by snatching it. Now there will be no grazing land by giving remaining forest land to new project.	14. As established procedure, forest clearance is recommended by State Government and approved by MoEF&CC only after completion of all requirements and compliance by user agency. Adani foundation is working for Sustainable Livelihood in the surrounding villages through CSR projects.	14. The CSR details (like CSR policy, initiative & activities, CSR Budget expenditure dat from 2010 to 2016, Proposed CSR budge plan for next 5 years and CSR implemente photographs) is given in Section-8.5 c Chapter-8 in the EIA Report.
		15. The hazardous chemical such as sulphuric acid will come out due to copper refinery. The possibility of pollution and acid rain will increase. So, this project should be cancelled.	15. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. Sulphuric Acid is a saleable product from this project. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control	15. The process of extraction of copper meta sulphuric acid is recovered as a byproduc from the off-gases generated from th smelting and converting furnaces. A part c sulphuric acid produced is utilized fc phosphoric acid production and rest will b sold in the market based on marke requirement. The process description of SA is given in Section-2.3.8 of Chapter-2.

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		16. The land in surrounding will be washed out due to closure of the river and danger of flood will increase in surrounding villages.	Board (CPCB). Therefore no significant adverse impacts are envisaged. 16. No closure of river is envisaged in the proposed project.	16. Dhaneshwari, a seasonal river flows in th western part of the proposed site. The flo of the river will be maintained, as shown i the Plant Layout is shown in Figure-2.1. Th river steam will not be disturbed.
		17. Old roads will be closed. One of which from Navinal to Kotdi creek will be closed.	17. Proposed project will not affect the access from Navinal to Kotdi Creek.	17. The existing roads will be strengthened b widening or upgrading and extended t approach the proposed site.
		18. Wild animals are living in this area, what about their restoration?	18. Flora and Fauna study has been conducted as part of the EIA and details are provided in the Chapter 3 and management plan is also provided in Chapter 4.	18. There is no wild animal in the project site Conservation Plan for Protection of Peacoc is provided in Section-3.3.9 of Chapter-3 i the EIA report.
35	Shri Vijay U. Gadhavi, President, Kutch Charan Sabha, Mandvi Naliya Road, Mandvi – Kutch	It is humbly submitted that, due to Copper Refinery Project of Adani Enterprise Limited (AEL) proposed to be established in the district of Kutch in the villages of Navinal and Siracha is a serious danger to the local public, local community depending on the forest, fishermen, and environment and coastal ecology. There are many discrepancies, mistakes and wrong information in the draft EIA report. It transpires from the study report that if such a big project is established on the sea shore human health, animal – birds, and coastal life as a whole will be jeopardized seriously and permanently that cannot be compensated. This is such a dangerous pollution emanating project that, the future generations of locals residing in the surrounding villages may be crippled , lame and impotent. Therefore we are objecting establishment of the project at this location. We are submitting our written objection on the basis of the points mentioned below. And we demand to prevent establishment of this project at this location	We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control and environmental protection. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:	

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		as it is not suitable here.		
		1. We object selection of land of reserved forest as project site by Adani Enterprise Limited (AEL). The options selected for the project site are wrong. This project shall be established away from the sea shore. As close pipeline conveyor system for transportation of raw material is already in existence it is possible to establish this project away from sea shore in spite of that the company management has decided to establish it near sea shore. It is not fair. Water and electricity also can be supplied there easily and water disposal being zero there is no problem of water discharge. It is dangerous to establish such an industry on the sea shore. Damaging the environment of the sea and creating land by reclamation using sand and establishing such project on it is harmful. So we object the project under Forest Rights Act 2006 as livelihood of people of village who are dependent on the forest is under risk. Forest lands are reducing so the land of Danderi and Shiracha forest should not be given to the company for other industrial purpose. Cattle of the village graze in this forest. So we are taking strong objection against the use of the forest for the company.	1. The Copper Project is based on the import of Copper Concentrate, which is not available in our country in required quantity. Also, most of the finished products will be dispatched through sea route. These factors were considered as site selection criteria. The site is advantageous in terms of proximity to the port. With all the pollution control measures proposed, the environmental risks and impacts will be mitigated. The project is also based on zero liquid discharge. There are many such plants on coastal locations and have been operating without any significant impact on the coastal ecology. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. The entire process and conditions of forest clearance will be complied, once obtained.	1. The prosed project details are given Chapter-2 in the EIA report.
		2. Adani Company has done permanent damage by cutting the Mangrove trees and filling up the creeks. Sand dune available in the forest on the sea shore of Navinal has been used for development of port. So the whole geography of the coastal area has changed. And as on date our case is pending with Hon. Supreme Court in the matter. During development of APSEZ the damage has been done to the environment, the	2. The para has alleged Adani Group of violations that have not been substantiated. There have been such allegations and legal suits in the past which have been dismissed by the Hon'ble Courts. The points raised do not pertain to proposed project and therefore we do not offer any comments. However, project will be implemented in line with the permissions granted and by implementing environmental	2. The budget allotted for environment protection will be about Rs. 1044 Crores, o of which for Air pollution control systems Rs. 639 Crores, Water pollution contr system is Rs. 360 Crores and oth environmental management systems (lik solid waste, greenbelt, post proje monitoring, gas collection and energ conservation) is Rs. 45 crores. The EM

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		sea shore and livelihood of the people, so we object the company and the proposed project. The matter has been proved in the court and the government that the company is establishing industries by damaging environment and coastal life. Therefore considering the company being disputed and its spoiled past this project deserves to be rejected.	safeguards.	budget is given in Table-6.4 of Chapter-6.
		3. Why the details of all survey numbers of land in which the said project is proposed to come up is not mentioned in the report. Please provide the entire detail about the area including the respective villages.	3. The proposed project is located partly in notified SEZ and partly in forest land applied for diversion. The Survey Numbers for notified SEZ have been incorporated in the Form-1 application and its details are: *APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), unsurveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL*. Same will also be included in the final EIA Report.	3. The survey numbers of proposed project given in Table-1.1 of Chapter-1 in the EI report.
		4. Please mention plot numbers and its area in respect of APSEZ land given to AEL for the project and also provide plot wise details of land ownership in writing.	4. APSEZ has given in principle approval to transfer/ allot the land in favour of AEL after obtaining due permissions. A copy of letter is provided in the Annexure-III of the EIA report.	4. Memorandum of Understanding (MoU) is place between Adani Ports & Special Econom Zone Limited (APSEZL) and Adani Enterprise Ltd (AEL) for 154.18 ha (381 acres). Lar allotment letter is enclosed as Annexure-III.
		5. Furnish area wise details of all the plots which are with APSEZ at present. Also furnish details of plots sold out and unsold.	5. The land details related to proposed project are provided in the Point No. 3 above.	5. Refer the above point no.-3.
		6. Is the land proposed for the project and owned by the APSEZ, a notified SEZ? Provide the copy of the notification.	6. Part of the proposed project land, 154.18 ha is within the Notified SEZ. A copy of notification is enclosed as Annexure-? And same will be	6. Refer the above point no.-4.

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			included in the final EIA Report.	
		7. Is the area of the project that shall be given by APSEZ to AEL, to be considered under the SEZ? Provide the relevant details as per the Government record and status.	7. Part of the proposed project land, 154.18 ha is within the Notified SEZ.	7. Refer the above point no.-4.
		8. Provide the government documents showing the ownership of APSEZ for the land where the project is to be established.	8. Proposed project includes notified SEZ area and the forest land. A copy of notified SEZ area is as per point no. 6 above. APSEZ has applied for forest land diversion and same is under progress. Details of land are provided in the chapter-2 of EIA the report.	8. Refer the above point no.-4.
		9. Provide the details of the land that is illegally encroached by MPSEZ at Shiracha, Danderi forest. Provide the details of the land that is not denotified by the Government of India but has been taken into possession by the company.	9. We do not agree with your observation. AEL has not started any activity at the site and there is no encroachment on any land.	9. The construction will starts after getting all required statutory clearance from concern department.
		10. Provide the date of the submission in case if the APSEZ would have sought approval of SEZ denotification (for AEL project area) from the Government of India.	10. At the moment, there is no requirement of SEZ denotification for the proposed project area.	10. Refer the above point no.-4.
		11. Provide the planning and logic for undertaking project for AEL copper plant while obtaining the land at Shiracha, Daderi forest.	11. Alternative site analysis was carried out. The site selection criteria and the study of alternative sites is detailed in Chapter-5 of the EIA Report.	11. The comparison salient features alternative sites done and details a presented in following Table-5.1 and shown in Figure-5.1 of Chapter-5 in the E report.
		12. Provide the copy of the permission for reclamation provided by the Government of India, if any, to the MPSEZ for forest land and other land.	12. There is no proposal of reclamation in Forest Land. The proposal for diversion of forest land is under process. Other land under the proposed project is notified SEZ area.	12. There is no reclamation in the propose project. Forest land of 102.38 ha (25 acres) is also involved which will t converted for industrial use. MoEF&C (forest conservation division) has grante Stage-1 approval for diversion of 1576.8

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				November 2018. Stage-I FC has bee obtained as given in Annexure-V. Th construction will start only after getting a required statutory clearance from concer department.
		17. If the forest land proposed to be denotified for other industrial use, then provide the copy of no objection certificates given by local Panchayats in this regard.	17. The Forest Land diversion is under process and all the conditions of the forest clearance will be complied once granted.	17. Refer the above Point no.-16.
		18. Please provide a copy of the certificate given by the district collector under the Forest Rights Act, 2006, stating that private or Government land is not available in this area other than the forest in this area.	18. The Forest Land diversion is under process and the requirements of Forest Rights Act, as applicable, will be complied with.	18. Refer the above Point no.-16.
		19. Provide the information about what is the dispute under the SLP 28788/2016 being heard in the Supreme court and WP (PIL) 12/2011 being heard in the Gujarat High Court against MPSEZ.	19. SLP28788/2016 in the Supreme Court and WP (PIL) 12/2011 at Gujarat High Court are dismissed vide respective orders dated - and -. Therefore, there is no dispute.	19. There no dispute regarding the propose project.
		20. What is the amount of penalty paid by the company to the Government on the basis of the recommendation provided by Sunita Narayan committee to the Forest and Environment ministry? Provide the current status of the penalty and provide the legal information about the same.	20. In the matter of SunitaNarain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015.	20. This is outside the scope of EIA report fo the proposed project.
		21. Apart from the EIA report, please provide the additional details about how many natural rivers, drains are located in the land selected for Project Site and forest land, so that no river, drains would be left to be mentioned in the final EIA report out of knowledge. Our demand is to re-study with more accuracy and the demand is	21. Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Impact Assessment has been carried out covering 10 km area surrounding the project site and it includes water bodies (if any), local	21. Dhaneshwari, a seasonal river flows in th western part of the proposed site. The riv steam will not be disturbed.

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				ha of reserved forest land in favour of Adar Ports & Special Economic Zone Limite (APSEZL) vide letter F.No.8-04/2016-F dated 16th November 2018. Stage-I FC ha been obtained as given in Annexure-V. Th construction will start only after getting a required statutory clearance from concer department.
		13. The reserved forest is not mentioned in Form 1 of the project but it is shown in map and EIA report. Why such contradictory information is provided?	13. The details of Forest Land are also shown in Form-I (Basic Information, Sl. Nos. 9, 12, 21 and 23).	13. The details regarding reserved forest hav been mentioned in Section-9 (II Environmental Settings of Form-I and Table 1.1 of Chapter-1 in the EIA report.
		14. The company has to make 30% green belt compulsorily. Therefore 157 hector comes as 30% of green belt of 526 hector. Out of the 526 hector does the company wish to obtain 102 hector of reserve forest and show it as green belt? If yes, from where will the company bring the rest of the 55 hector of reserve forest? Thus, this company wants to encroach the forest illegally.	14. Company has proposed 33% area for Green Belt. The 102.38 ha forest land, once diverted and allotted, will be part of the project area. The Green Belt will be developed in 33% of the total project area of 256.58 ha. There is no illegal encroachment of forest area.	14. As per guidelines and ToR point 33% lan should be allotted for greenbe development. AEL proposing 85.79 (33% land for greenbelt development.
		15. As shown under the EIA report page no. C-3 16, most part of the project falls in Shiracha, Dedari forest land. Is this map false? If so, provide a correct map.	15. As per the map on Page C3-16, the project site also includes part of the Siracha Reserve Forest. Correct map is provided in the EIA report.	15. The details which are incorporated in th EIA report is correct and relevant to th proposed project.
		16. Provide the forest clearance copy that was received by the APSEZ for the above mentioned point.	16. The Forest Clearance is still under process. The details are available on the website of MoEF&CC (File No. 8-04/2016-FC).	16. Forest land of 102.38 ha (253 acres) is als involved which will be converted fc industrial use. MoEF&CC (fores conservation division) has granted Stage- approval for diversion of 1576.81 ha c reserved forest land in favour of Adani Port & Special Economic Zone Limited (APSEZL vide letter F.No.8-04/2016-FC dated 16t

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				same. Provision would be made to reclai the disposed copper slag ar phosphogypsum from gypsum pond at later stage for various utilization venture The solid waste generation, wast characterisation and mode of disposal given in **Section-2.4.3** of **Chapter-2** in th EIA report.
		31. Provide the detail as to whether the Navinal forest has been declared as biodiversity heritage place by the Gujarat State Biodiversity Board, or it is being under proposal.	31. There is no notification on Navinal Forest being notified as Biodiversity Area.	31. There is no notification on Navinal Fore being notified as Biodiversity Area.
		32. Whether a study has been conducted to identify carrying capacity of the Navinal- Shiracha coastal area? Provide information if the study is undertaken. Provide information on how much capacity will be left after AEL's project.	32. Carrying Capacity Studies are undertaken by Statutory Authorities. We are not aware of any Carrying Capacity Studies carried out for this area. EIA studies have been conducted for the study area as per TOR granted by MoEF&CC.	32. EIA studies have been conducted for th study area as per TOR granted by MoEF&C(
		33. Provide the information on whether the comparison is made on EIA reports of both projects for the combined impact of air- water pollution caused due to the power plant of Adani and Tata Power, air, water pollution and after AEL's Copper plant.	33. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for Air and Water and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.	33. Refer the above point no. 29.
		34. Provide the information about where the copies of the environmental literature of this project were kept which were translated from English to Gujarati according to the EAC meeting minutes.	34. The Gujarati Summary was placed at all the Gram Panchayats within 10 km of the proposed site in addition to the 7 places- The District Collector, Bhuj, District Kutch, District Development Office, Bhuj, District Kutch, District Industry Centre, Bhuj, District Kutch, Taluka Development Office, Mundra, District	34. The public hearing proceeding details given in Chapter-7 in the EIA report.

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			Kutch, Taluka Development Office, Mandvi, District Kutch, The Chief Conservator of Forest, Ministry of Environment, Forests and Climate Change Government of India, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E-5, Arera Colony, Link Road -3, Ravishankar Nagar, Bhopal 462016 and Regional Office, Kutch (East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Admn Building, Sector 08, Gandhidham, Kutch.	
		35. So far, how many ha of Mangrove afforestation is carried out by Adani Group and where is plantation done? Provide the detailed information.	35. This is outside the scope of the EIA Report for the proposed project.	35. This is outside the scope of the EIA Repo for the proposed project.
		36. Will the power transmissions line of APSEZ be moved due to AEL's project? Provide more details.	36. Power Transmission Lines will be retained with some deviation.	36. The details will be given in deta engineering.
		37. The staff required (8 persons) for the Environmental Management Plan of highly polluted Copper Refinery Plant is proper as shown in the EIA report? This is a best example of how serious the Adani group is to the pollution issues.	37. 8 persons are proposed as a part of Environment Cell alone. The Environment Management is not only limited to these 8 persons, but it includes the operations carried out by various departments for the management of environment.	37. The environmental monitoring cell is show in Figure-10.1 of Chapter-10 in the EI report.
		38. Will Adani Port staff also look into environmental and pollution issues in this AEL project? Currently, how many staff are there who serves in the Adani Group and also have contributions in all the projects of the group (port, SEZ, power plant etc.)? Is it appropriate to perform such jobs. Is it legally allowed?.	38. Adani Enterprises Limited will have its own Environment Management Team headed by an environmentalist, capable of handling all the environmental and pollution issues of the Copper Project. Other issues are outside the scope of the EIA Report for the proposed project.	38. Refer the above point no.-37.
		39. Why no information is given in TOR or any other	39. The area under SLF is provided in the Pre-	39. Secured Land Fill (SLF) is proposed ov

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		place about the 30 acres of SLF? Is this plan possible Without TOR?.	feasibility Report, which is a part of the TOR Application.	13.35 ha within the project premises f disposal of ETP waste sludge and spe catalyst. Other Hazardous waste will t disposed through the approved recyclers.
		40. Who will be responsible for destroying surrounding villages located in wind direction by spreading sulfuric acid and other toxic gases and other tons of sulfur dioxide gas from more than 46 chimneys?.	40. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.	40. The SO2 generation is a continuous proce during smelting activity, primary gas strea will be routed to SAP plant and t secondary gas stream will be routed throu scrubber. And, there is no provision in t plant/process for storage of SO2 gases ar will be processed immediately to produ sulphuric acid. Sulphuric acid plant (SAP) has bee installed with highly efficient (Doub Conversion Double Absorption) DCD process to control the SO2 emission to le than 1 kg/t of sulphuic acid produced. T Details of Episodal SO2 Stack Emissions Section-4.2.2.3 of Chapter-4.
		41. If you have studied about the impact of these Toxic Gases on people's lungs, then provide the copy of it and if not, then our demand is that the approval or rejection should be given on the basis of such study.	41. Our reply is same as point no. 40.	41. Refer the above point no.-40.
		42. Does the GPCB have the instruments to measure toxic gases concentration in air? If GPCB is unable to measure concentrations of metals then who will measure the pollution? Provide the	42. The question does not pertain to us, therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to	42. Environmental monitoring duri construction and operation phase is given Table-6.1 & 6.2 of Chapter-6 in the E report.

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		detail about it.	the permissions granted.	
		43. Will the effluent of the Smelter project be directly or indirectly discharged in the sea?	43. Proposed project will have zero liquid discharge facility and no treated water will be sent to the sea.	43. The water system, is highly integrated ar is designed for Zero Liquid Discharge (ZLD The water requirement details is given Section-2.2.3. The process details ar schematic flow diagram of ETP is given Section-2.4.2 and Figure-2.23 of Chapter-2
		44. The CEPT design in which industrial waste water will be treated is not mentioned in EIA. So, provide the copy of that design.	44. There is no proposal of tie up with any CETP. AEL will have its own ETP for treatment of wastewater. Details are provided in the EIA report.	44. Refer the above point no.-43.
		45. The information or design of the water recycling plant is also not provided. Provide its information.	45. The Flow Diagram and the Capacities are provided in the EIA Report. Further planning will be carried out during detailed engineering.	45. Refer the above point no.-43.
		46. Provide the copy if the company has done the study of the existing health conditions of the local village people. Provide the details if the local village people have been explained the information in the simple language about this project.	46. EIA report includes details on demographic information about the study area. The Executive Summary of the EIA Report was prepared in local language and made available to all the panchayats within 10 km radius of the proposed site. The Executive Summary in local language was also made available at 5 Government Offices along with EIA Report. Adani foundation is working in the area of community health covering all the villages in the surrounding.	46. The demographic and socio-econom details are given in Section-3.10 of Chapte 3 in the EIA report.
		47. Provide number of total employment given to locals by APSEZ till date.	47. This is outside the scope of the EIA Report for the proposed project. However, local employment will be provided for proposed project based on eligibility and details are provided in the EIA report.	47. This is outside the scope of the EIA Repc for the proposed project.
		48. The number of contracts received by local people	48. This is outside the scope of the EIA Report for	48. This is outside the scope of the EIA Repc

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		established at a distance of more than 10 kms away from the coastal line, there is no logic behind establishing the project on coastal line. Water and electricity also can be made available there. Since zero water discharge, there is no issue of water wastage to be disposal. It is dangerous to establish such project on coast line and establishing such project by harmful of marine life and environment by leveling the area with sand is harmful.	site selection criteria. The site is advantageous in terms of proximity to the port. With all the pollution control measures proposed, the environmental risks and impacts will be mitigated. The project is also based on zero liquid discharge. There are many such plants on coastal locations and have been operating without any significant impact on the coastal ecology. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. The entire process and conditions of forest clearance will be complied, once obtained.	
		2. Please provide us details of survey numbers of land in which the said project is proposed to come up with details of villages under which the said land falls and please include the same in final EIA Report.	2. The proposed project is located partly in notified SEZ and partly in forest land applied for diversion. The Survey Numbers for notified SEZ have been incorporated in the Form-1 application and its details are: *APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), unsurveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL*. Same will also be included in the final EIA Report.	2. The survey numbers of proposed project given in Table-1.1 of Chapter-1 in the EI report.
		3. Please mention plot numbers and its area in respect of APSEZ land given to AEL for the project and also mention give plot wise details of persons in whose possession the same and please include the same in final EIA Report.	3. APSEZ has given in principle approval to transfer/ allot the land in favour of AEL after obtaining due permissions. A copy of letter is provided in the Annexure-III of the EIA report.	3. Memorandum of Understanding (MoU) is place between Adani Ports & Speci Economic Zone Limited (APSEZL) and Ada Enterprises Ltd (AEL) for 154.18 ha (38 acres). Land allotment letter is enclosed a Annexure-III.
		4. Furnish area wise details of all the plots which are with APSEZ at present. Also furnish details of	4. The land details related to proposed project are provided in the Point No. 2 above.	4. Refer the above point no.-3.

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		in APSEZ and the detail of development activities including examples with name and village. 49. Why nothing has been written in the EIA report about the objections of local village panchayat about the loss of local people and environmental damage? Provide the complete information about it. As the local people, animal-husbandry, health, environment and country may be adversely affected rather than benefits from above mentioned project, hence it is my submission that the project be abandoned. As we do not want to suffer from the pollution in future, we do not want the project and the development from it.	the proposed project. 49. The EIA Report has been prepared as per the Terms of Reference issued by the Ministry of Environment, Forests and Climate Change.	for the proposed project. 49. As per TOR point public hearing i conducted, the minutes of meeting an proceeding with action plan is given i Section-7.1 of Chapter-7 in the EIA report.
36	Shri Usmangani H. Sherseeya (Secretary), Natinal Fisheries Forum, At Post Kancoat, Taluka Vakaner, District Morbi	With respectful regards we have to inform that, National Fisher folk Forum is engaged in welfare of communities residing on coastal areas, fishermen and conservation of marine environment. Fisheries, Marine environment and life shall have serious threat because of proposed copper refinery project of Adani Enterprise Ltd. in Navinal and Shiracha villages of Kutch District. In respect of the same, we have studied Draft EIA Report and on the basis of the same it is observed that such project on costal area, marine life shall have serious and irreparable loss. Hence we oppose the project at the site. We submit our written objections on issues mentioned hereunder and since the project site is not proper, we demand stoppage of the project at the site. 1. Options for selection of project site by Adani Enterprise Ltd. are improper. There is no need to establish such project in coastal area. Since close pipeline conveyer system is available for transportation of raw material, this project can be	We acknowledge the receipt of your representation and have noted your concerns. We are herewith responding para wise to the issues raised by you: 1. The Copper Project is based on the import of Copper Concentrate, which is not available in our country in required quantity. Also, most of the finished products will be dispatched through sea route. These factors were considered as	1. The proposed project details are given i Chapter-2 in the EIA report.

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		plots sold out and unsold and please include the same in final EIA Report.		
		5. Is the site for the project owned by the APSEZ a notified SEZ? Provide the copy of the notification. Please include the same in the final EIA report.	5. Part of the proposed project land, 154.18 ha is within the Notified SEZ. A copy of notification is enclosed as Annexure-III and same will be included in the final EIA Report.	5. Refer the above point no.-3.
		6. Is the area of the project that shall be given by APSEZ to AEL, to be considered under the SEZ? Provide the relevant details as per the government record and status. Please include the same in the final EIA report.	6. Part of the proposed project land, 154.18 ha is within the Notified SEZ.	6. Refer the above point no.-3.
		7. Provide the documents showing the ownership of APSEZ for the site at which the project is to be undertaken. Place the same in the final EIA report.	7. Proposed project includes notified SEZ area and the forest land. A copy of notified SEZ area is as per point no. 6 above. APSEZ has applied for forest land diversion and same is under progress. Details of land are provided in the chapter-2 of EIA the report.	7. Refer the above point no.-3.
		8. Provide the details of the land that is illegally siphoned off by MPSEZ at Shiracha, Danderi forest. Provide the details of the land that is not denotified by the government of India but has been taken into possession by the company. Place the same in the final EIA report.	8. We do not agree with your observation. AEL has not started any activity at the site and there is no encroachment on any land.	8. The construction will starts after getting a required statutory clearance from conce department.
		9. Provide the date of the submission in case if the APSEZ would have sought approval of SEZ denotification (for AEL project area) from the government of India. Place the same in the final EIA report.	9. At the moment, there is no requirement of SEZ denotification for the proposed project area.	9. Refer the above point no.-3.
		10. Provide the planning and logic for undertaking project for AEL copper plant while obtaining the land at Shiracha, Daderi forest. Place the same	10. Alternative site analysis was carried out. The site selection criteria and the study of alternative sites is detailed in Chapter-5 of the	10. The comparison salient features alternative sites done and details a presented in following Table-5.1 and

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		in the final EIA report.	EIA Report.	shown in Figure-5.1.
		11. Provide the copy of the permission for reclamation provided by the government of India, in any, to the MPSEZ for forest land and other land.	11. There is no proposal of reclamation in Forest Land. The proposal for diversion of forest land is under process. Other land under the proposed project is notified SEZ area.	11. There is no reclamation in the propos project. Forest land of 102.38 ha (2 acres) is also involved which will converted for industrial use. MoEF&C (forest conservation division) has grant Stage-1 approval for diversion of 1576.4 ha of reserved forest land in favour of Ada Ports & Special Economic Zone Limit (APSEZL) vide letter F.No.8-04/2016-I dated 16th November 2018. Stage-I FC h been obtained as given in Annexure-V. T construction will start only after getting required statutory clearance from conce department.
		12. The reserved forest is not mentioned under project of Form-1 but map and EIA report is shown. Why is this contradictory information provided?	12. The details of Forest Land are also shown in Form-I (Basic Information, Sl. Nos. 9, 12, 21 and 23).	12. The details regarding reserved forest ha been mentioned in Section-9 (I Environmental Settings of Form-I and Tabl 1.1 of Chapter-1 in the EIA report.
		13. The company is to make 30% green belt mandatory. Therefore 157 hector comes as 30% of green belt of 526 Ha. Out of the 526 Ha does the company wish to obtain 102 Ha of reserve forest and show it as green belt? If yes, from where will the company bring the rest of the 55 Ha of reserve forest?	13. Company has proposed 33% area for Green Belt. The 102.38 ha forest land, once diverted and allotted, will be part of the project area. The Green Belt will be developed in 33% of the total project area of 256.58 ha. There is no illegal encroachment of forest area.	13. As per guidelines and ToR point 33% la should be allotted for greenb development. AEL proposing 85.79 (33%) land for greenbelt development.
		14. Is it proper to cut off the ready forest and initiate new plantation? Provide further information as for this in the report.	14. Forest land is part of proposed project area for which all necessary procedure and compliance will be made. Green Belt will be developed around the facilities as per desired norms.	14. The recommended species for greenb development are given in Table-4.12 Chapter-4.
		15. As shown under the EIA report page no. C-3 16, most part of the project is situated on the	15. As per the map on Page C3-16, the project site also includes part of the Siracha Reserve	15. The details which are incorporated in t EIA report is correct and relevant to t

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		Shiracha, Dedari forest land. Is this map false? Therefore, provide a correct map. And place the same in the final EIA report.	Forest. Correct map is provided in the EIA report.	proposed project.
		16. Provide the forest clearance copy that was received by the APSEZ for the above mentioned point. Moreover, place the same in the final EIA report.	16. The Forest Clearance is still under process. The details are available on the website of MoEF& CC (File No. 8-04/2016-FC).	16. Refer the above Point no.-11.
		17. Provide the names of all present directors/owners of APSEZ and AEL project and provide them in the final EIA report.	17. Present list of directors of AEL is enclosed as Annexure-xxx. Same will be included in the final EIA report.	17. List of directors of AEL is enclosed a Annexure-XVI in the EIA report.
		18. Provide the information that what is the dispute under the SLP 28788/2016 held before the Supreme court and WP (PIL) 12/2011 held before the Gujarat High Court against MPSEZ. Place the same in an elaborate manner under final EIA report.	18. SLP28788/2016 in the Supreme Court and WP (PIL) 12/2011 at Gujarat High Court are dismissed vide respective orders dated - and -. Therefore, there is no dispute.	18. There no dispute regarding the propose project.
		19. What is the amount of penalty paid by the company to the government on the basis of the recommendation provided by Sunita Narayan committee to the Forest and Environment ministry? Provide the current status of the penalty and provide the legal information as for the same. Provide the file with remarks as for this issue in writing within the final EIA report.	19. In the matter of SunitaNarain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015.	19. This is outside the scope of EIA report fo the proposed project.
		20. Apart from the EIA report, Please provide the additional details as to how many natural river, drains are located in the land selected for Project Site and forest land, so that no river, drains would be left to mentioned in the final EIA report out of knowledge. Our demand is to re-study with more accuracy. Our demand is to open all closed canals, bays and creeks again. Place	20. Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Impact Assessment has been carried out covering 10 km area surrounding the project site and it includes water bodies (if any), local residents and villages. There is no proposal of	20. Dhaneshwari, a seasonal river flows in th western part of the proposed site. The rive steam will not be disturbed.

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		information in the final EIA report.	closing any creeks.	
		21. Please provide GCZMA approved CZMP copy of the costal area near the AEL project.	21. Gujarat Coastal Zone Management Authority is the custodian of approved Coastal Zone Management Plan. However, authorized CRZ map superimposing project area prepared by authorized agency of MoEF&CC is provided in the Chapter-3 of the EIA report.	21. The prosed project is a Greenfield proje and which is outside of the CRZ. Based c the survey which was carried out by Cent for Earth Science Studies (CES Thiruvanantpuram), which is an authorize agency by MoEF&CC, the proposed proje site is outside CRZ and doesn't attract CR clearance.The CRZ map is shown in Figur 1.5 of Chapter-1 in the EIA report.
		22. Please provide a detailed colour copy of the CRZ map prepared by NIO which readable and understandable.	22. The CRZ Map enclosed is prepared by National Centre for Earth Science Studies and enclosed on Page C3-17 of EIA Report. More clear copy will be included in the final EIA report.	22. Noted and will be incorporated in the fin EIA report.
		23. Keep the difference of mangroves trees that come into the CRZ 1 in close vicinity of the project. And provide a copy of the records required for it.	23. The proposed site is outside CRZ and the minimum distance from existing Mangrove in southern direction is more than 100 m.	23. The Study area and CRZ map are shown a Figure-1.2 and 1.5 of Chapter-1 in the EI report.
		24. Provide information about the number of fishermen residing in the coastal area and about their existing business.	24. The occupational structure of the people in the area is detailed on Page C3-65 of the EIA Report. The main workers account for 90.57% of the total workers. The Work Participation Rate is 56.36%. Fishing is one of the activities. Details on number of fishermen in the study area will be included in the final EIA report.	24. The demography and socio-economic detai are given in Section-3.10 of Chapter-3 the EIA report.
		25. Show the number of fishermen who have become unemployed due to MPSEZ project	25. No fishermen will be impacted due to proposed project.	25. The proposed project is Greenfield projec There is no impacts on fisherman due to th proposed project.
		26. Provide the number of fishermen who do Pagadiya fishing near the project.	26. The details on pagadiya fisherfolk will be included in the final EIA Report.	26. The fisherman details is given in Sectio 3.10.6 of Chapter-3 in the EIA report.
		27. How many roads for commuting are closed for	27. Project will be developed over notified SEZ	27. Refer the above point no.25.

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		the fishers due to this project? or has been closed in the past? And update this information in the final EIA report.	area and forest land applied for diversion. APSEZ has created dedicated approach road for fishermen of Navinal and Siracha. Fishermen access roads will not be closed due to proposed project.	
		28. Provide the information on how many animals rely on forests and how people will be affected who use the forests in community by this project. And put it in the final EIA report.	28. There is no resettlement involved in the diversion of 102.38 ha of forest land. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.	28. The anticipated impacts and mitigatio measure to control pollution durin construction and operation phase ar provided in Section-4.1 and 4.2 of Chapte 4 in the EIA report.
		29. To make copper product, provide the information about Sulphur content, mercury and radiation and amount of active metals in raw material. And also mention how much amount of them will be there in slag. And place in the final EIA report.	29. Copper Concentrate will be the principal raw material, which has sulphur and mercury content of 34% and 50 ppm respectively. There is no known Uranium or Thorium content and its radiation in the raw material. Copper slag will contain Sulphur (0.5-1.5%) and mercury (BDL).	29. The process description and raw materi details are given in Section-2.3 and Table- 2.3 of Chapter-2 in the EIA report.
		30. Provide the information on the management of Copper Slag and Phospho gypsum according to the CREP.	30. There are no CREP Guidelines for Copper Smelter & Refinery.	30. There are no CREP Guidelines for Coppe Smelter & Refinery.
		31. According to the CREP, show the steps to follow emissions from the sulfuric acid plant and put it in the final EIA report.	31. There are no CREP Guidelines for Copper Smelter & Refinery.	31. There are no CREP Guidelines for Coppe Smelter & Refinery.
		32. Provide the information about the management of emissions reduction of sulfur dioxide as per CREP.	32. There are no CREP Guidelines for Copper Smelter & Refinery.	32. There are no CREP Guidelines for Coppe Smelter & Refinery.

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		33. Make utilization plan for copper slag and Phosphogypsum. And put it in the final EIA report.	33. Details on production quantity of copper slag and phosphogypsum is provided in the EIA report. Copper Slag can be used as a building material (Added in Concrete as well as in ready mix), Road Construction & shot blasting and Phosphogypsum is used for Cement manufacturing, gypsum board Manufacturing andfertilizer. Both the materials will be sold in domestic and overseas market.	33. Hazardous cake and scrubber cake will b stabilized and stored in secured land fill a per guidelines of MoEFCC/ CPCB/ GPCB. A area of around 13.35 ha is identified an allocated. For the initial years of coppe refinery plant operation till sustaine utilization/management of copper slag an phosphogypsum; in the above applicatic areas are developed, as well as fc emergency purpose, copper slag storag area and gypsum pond of around 105 acre would be identified and made available fc intermediate/emergency storage of th same. Provision would be made to reclai the disposed copper slag an phosphogypsum from gypsum pond at later stage for various utilization venture The solid waste generation, wast characterisation and mode of disposal given in Section-2.4.3 of Chapter-2 in th EIA report.
		34. For the implementation of all CREP Guidelines of CPCB, applicable to the smelter, I demand that the specific plan is to be included in this draft EIA report and in the final EIA report, and to be placed before the Ministry of Environment and Forest at the time of approval. A copy of this is to be given to us too. Put the complete information in the final EIA report.	34. There are no CREP Guidelines for Copper Smelter & Refinery.	34. There are no CREP Guidelines for Coppe Smelter & Refinery.
		35. Provide the detail as to whether the Navinal forest has been declared as biodiversity heritage place by the Gujarat State Biodiversity Board, or it is being under proposal. Put information in the final EIA report.	35. There is no notification on Navinal Forest being notified as Biodiversity Area.	35. There is no notification on Navinal Fore being notified as Biodiversity Area.

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		36. Whether a study has been conducted about the Navinal- Shariya costal area carrying capacity? Provide information if the study is undertaken. Provide information on how much capacity will be left after AEL's project. Place information in the final EIA report.	36. Carrying Capacity Studies are undertaken by Statutory Authorities. We are not aware of any Carrying Capacity Studies carried out for this area. EIA studies have been conducted for the study area as per TOR granted by MoEF&CC.	36. EIA studies have been conducted for th study area as per TOR granted by MoEF&CC
		37. Provide the information on whether the comparison is made on EIA reports of both projects for the combined impact of air- water pollution caused due to the power plant of Adani and Tata Power, air, water pollution and after AEL's Copper plan. Put this information in the final EIA report.	37. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for Air and Water and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.	37. Refer the above point no. 28.
		38. Provide the information about where the copies of the environmental literature of this project were kept which were translated from English to Gujarati according to the EAC meeting minutes.	38. The Gujarati Summary was placed at all the Gram Panchayats within 10 km of the proposed site in addition to the 7 places- The District Collector, Bhuj, District Kutch, District Development Office, Bhuj, District Kutch, District Industry Centre, Bhuj, District Kutch, Taluka Development Office, Mundra, District Kutch, Taluka Development Office, Mandvi, District Kutch, The Chief Conservator of Forest, Ministry of Environment, Forests and Climate Change Government of India, Regional Office (West Zone), KendriyaParyavaranBhavan, E-5, Arera Colony, Link Road -3, Ravishankar Nagar, Bhopal 462016 and Regional Office, Kutch (East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Admn Building, Sector 08, Gandhidham, Kutch.	38. The public hearing proceeding and actic plan details is given in Chapter-7 in the EI report.

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		39. So far, under the mangrove aforestation Program, in how many total numbers of has mangrove are planted by Adani Group and where are planted? Provide the detailed information along with the map and with the total amount of money spent.	39. This is outside the scope of the EIA Report for the proposed project.	39. This is outside the scope of the EIA Repo for the proposed project.
		40. Will the power transmissions line in APSEZ be moved due to AEL's project? Provide more details.	40. Power Transmission Lines will be retained with some deviation.	40. The details will be given in deta engineering.
		41. The staff required (8 persons) for the Environmental Management Plan of highly polluted Copper Refinery Plant is proper as shown in the EIA report? This pack is a best example of how serious the Adani group is to the pollution issues	41. 8 persons are proposed as a part of Environment Cell alone. The Environment Management is not only limited to these 8 persons, but it includes the operations carried out by various departments for the management of environment.	41. The environmental monitoring cell is show in Figure-10.1 of Chapter-10 in the E report.
		42. Will Adani Port staff also look into environmental and pollution issues in this AIL project? Currently, how many staff are there who serves in the Adani Group and also have contributions in all the projects of the group (port, SEZ, power plant etc.)? Is it Possible legally? Provide the name and his eligibility of the APSEZ's environmental officer and head. Put information in the final EIA report.	42. Adani Enterprises Limited will have its own Environment Management Team headed by an environmentalist, capable of handling all the environmental and pollution issues of the Copper Project. Other issues are outside the scope of the EIA Report for the proposed project. The question does not pertain to proposed project and therefore we do not offer any comment.	42. Refer the above point no.-41.
		43. Why no information is given about TOR or any other place about the 30 acres of toxic waste in the chemical plant? Is this plan possible without TOR? Put information in the final EIA report.	43. The area under SLF is provided in the Pre-feasibility Report, which is a part of the TOR Application.	43. Secured Land Fill (SLF) is proposed ov 13.35 ha within the project premises f disposal of ETP waste sludge and spe catalyst. Other Hazardous waste will t disposed through the approved recyclers.
		44. What will be the effect on coral of Gulf of Kutch and Jamnagar Marine National Park by dissolving sulfuric acid and other toxic gas and other tons	44. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the	44. The SO_2 generation is a continuous proce during smelting activity, primary gas strea will be routed to SAP plant and t

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		of sulfur dioxide gas in the sea water in the direction of air surrounding marine area from 46 Chimneys ? Provide a copy of it if the study is undertaken about this. Put the information in the final EIA report. If the study is not done, then it is a demand to allow the project after studying and giving us a copy of it.	respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report. There will not be any impact on coral of Gulf of Kutch and Jamnagar due to proposed project activity.	secondary gas stream will be routed throug scrubber. And, there is no provision in th plant/process for storage of SO^2 gases an will be processed immediately to produc sulphuric acid. Sulphuric acid plant (SAP) has bee installed with highly efficient (Doubl Conversion Double Absorption) DCD process to control the SO^2 emission to les than 1 kg/t of sulphuic acid produced. Th Details of Episodal SO^2 Stack Emissions i Section-4.2.2.3 of Chapter-4.
		45. Provide us information about how much this plant will increase coral bleaching and marine acidification. By dissolving in moisture, Sulfur dioxide gets converted into sulfuric acid, how much pH will increase by going that into the ocean?	45. The project is being designed with zero liquid discharge, there is no likelihood of ocean warming or acidification due to proposed project. There will not be any coral bleaching and marine acidification due to proposed project.	45. The water system, is highly integrated an is designed for Zero Liquid Discharge (ZLD The water requirement details is given i Section-2.2.3. The process details an schematic flow diagram of ETP is given i Section-2.4.2 and Figure-2.23 of Chapter-2
		46. Due to the project what will be the increase in global warming?	46. The project is estimated to emit 0.53 Million Tons of CO_2 equivalent of GHG emission per year, which is insignificant in the context of Global Warming.	46. The Anticipated impacts on air an mitigation measures are given in Sectior 4.2.2 of Chapter-4 in the EIA report,
		47. How many billion tons of greenhouse gas will go to Earth's atmosphere by this project? Put information in the final EIA report.	47. The total GHG emission is estimated at 0.53 Million Tons of CO_2 equivalent per year. This information will be added as a part of final EIA Report.	47. Refer the above point no-46 in the EI report.

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		48. Show the plan to reduce the greenhouse gas in final EIA report.	48. We will be adopting advanced technologies which are having lesser footprint as compared to other existing conventional technologies in the market. However, alternative source of fuel will be explored to minimize the GHG emissions due to project activity.	48. Refer the above point no-46 in the El report.
		49. Provide in the final EIA report, the details of damage to the sea from the gypsum pond and the waste water that would be thrown out of it.	49. The Gypsum produced will have around 20% moisture and same will be stored in the Gypsum storage area proposed over 28.34 ha through dry conveying method. Gypsum storage area will be constructed with HDPE liner to prevent any leaching. Gypsum will be sun-dried and sold to the potential customers. There will not be any discharge of water outside the project premises.	49. Phosphogypsum produced during th process will be sold to cement industries a well as fertilizer and rest will be stock pile Hydro fluro silicic acid generated as a by product will be converted as aluminu fluoride as well as sold in the market.
		50. Provide the details of RO reject if it is to be discharge in the sea.	50. RO Rejects will be taken to Multi-Effect Evaporator. There will not be any discharge into the sea.	50. An integrated water system is proposed, th effluent from the process units is treate and reused to reduce water demand. It also proposed to install a secondary Revers Osmosis (RO) plant to further treat wat from the effluent plant facility for effectiv use. Rejects from the reverse osmosis plai will be sent to Multi Effect Evaporator (ME for further recovery and solids generate will be sent to Secured Land Fill (SLF).
		51. Does the GPCB have the instrument to measure toxic gases from air? If GPCB is unable to provide the measurement of pollution, who shall measure the pollution? What is the integrity and reliability of other agencies?	51. The question does not pertain to us, therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to the permissions granted.	51. Environmental monitoring durir construction and operation phase is given Table-6.1 & 6.2 of Chapter-6 in the El report.
		52. Will the industrial treated water for the entire Smelter project be directly or indirectly discharge	52. Proposed project will have zero liquid discharge facility and no treated water will be sent to the	52. The water system, is highly integrated ar is designed for Zero Liquid Discharge (ZLD

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		in the sea? Provide specific reply in yes or no.	sea.	The water requirement details is given i Section-2.2.3. The process details an schematic flow diagram of ETP is given i Section-2.4.2 and Figure-2.23 of Chapter-2
		53. Will this smelter work on the principle of zero discharge? Therefore provide the further details as to this in the final EIA report at the time of EMP.	53. The entire project will work on the principle of Zero Liquid Discharge. Details are provided in the EIA report.	53. Refer the above point no.-52.
		54. Will this smelter recycle reuse the entire water? Provide the entire reuse plan and the related final EIA report.	54. The project will generate 6468 KLD of wastewater. Entire wastewater will be treated and reused within the plant. The details are provided in the EIA Report.	54. There is no CETP proposal. AEL is proposin ETP for the proposed project.
		55. The CETP design for treatment of industrial waste water coming out from the entire project is not shown in the EIA. Provide the copy of that particular design.	55. There is no proposal of tie up with any CETP. AEL will have its own ETP for treatment of wastewater. Details are provided in the EIA report.	55. Refer the above point no.-52.
		56. The information or design of the water recycling plant is also not provided. Provide its information.	56. The Flow Diagram and the Capacities are provided in the EIA Report. Further planning will be carried out during detailed engineering.	56. The details will be provided in deta engineering.
		57. Provide the copy of the details as to proceedings undertaken by company for the recent judgment passed by the Honorable Supreme Court for preliminary treatment of the waste water. Place it under the final EIA report.	57. The judgement passed by Honorable Supreme Court is in relation to the existing industry and therefore not applicable, however details of the ETP for the proposed project is provided in the EIA report.	57. Not applicable
		The information as for these points has been kept hidden and a serious threat shall be generated for the Gulf of Kutch and Marine National Park along with fisheries. As the loss to people, animal-husbandry, health, environment and country is much more than benefit from the project, it is my submission that the project be abandoned while considering the legal		

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		tangles. It is our appeal to abandon this project that gives benefit of crores of rupees to the company against loss of multi crores to the people and government.		
37	Shri Shri Vijay U. Gadhavi, President, Kutch Charan Sabha, Mandvi Naliya Road, Mandvi –Kutch	We, the undersigned herewith oppose the coming up dangerous copper refinery project of M/s Adani Enterprise Limited. We submit herewith our objection taking petition to your good office with the points shown here under and request you to take suitable action as to with-held the project at the earliest possible:	We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:	
		1. The site shown by M/s. Adani Enterprise Limited (AEL) under the SEZ shown at Siracha village is a reserved forest and the only sustainability source of our cattle resulting in our only livelihood and income source. This land is still not allotted to the M/s. Adani Enterprise Limited (AEL) or MPSEZ and there still exist a forest land on the Government records which include the village Danderi forest land and is in government possession. Thus as on date no land is in the name of M/s. Adani Enterprise Limited (AEL) but the MPSEZ have proceeded for allotment of this land to the above company for its copper refinery project and have reported to the Government accordingly. So we are taking objection for this proposed project by M/s. Adani Enterprise Limited (AEL) without proper sanction. If the land in question is in the possession of M/s. Adani Enterprise Limited (AEL) they should have shown 7/12 extract to us. Thus the company has not acquired required land from Government and	1. Out of 256.57 Ha of total project area, 154.18 Ha land is notified SEZ and 102.38 Ha fall under forest land. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report. Forest Clearance has already been applied for this land by APSEZ (erstwhile MPSEZ Ltd). As the project proponent can submit the proposal for TOR, after applying the Stage-I forestry clearance, this requirement has also been complied with. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.	1. The land requirement details are given Section-2.2.1 of Chapter in the EIA report.

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		yet they are trying to set the project which is ridiculous.		
		2. We are totally against this project as the project will spread most dangerous toxic gas and stinking smell which is dangerous for the health of our children, cattle and other living elements as well as the sea **as its 300 ft high 46 chimneys will spread toxic gas all over the area 24 hours 365 days.**The Sulphur dioxide can even rust the iron, is a deadly gas which will come out from the plant process in lacs of tons and spread over nearby villages and will damage the lungs. Therefore, such project is not agreeable at any cost to us looking to the future of our generation, even if it contains golden features.	2. The SO_2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.	2. The process description of proposed proje is given in Chapter-2 in the EIA report.
		3. It is feared that the entire area will be affected by residue of the plant and will spread black power over the agricultural crops and affect it with acidic and many other gaseous pollution also. There are many examples in the country that such metal plant has damaged the atmosphere by creating pollution in many ways and hence we oppose the same. We have come to know that the plant organizers have not made demographic survey of connecting area and not shown the negative points involved in their proposed project and also not shown the	3. The project will be developed with all the environmental safeguards as detailed in Environment Management Plan (EMP) in Chapter 9 of EIA Report. There are many such projects in the world, including the developed countries in Europe, America, Asia, etc. The apprehension mentioned by you is not in our knowledge. We are confident of operating this plant with all the safeguards to mitigate the pollution and protect environment. Demographic details are provided in Chapter 3 of the EIA Report. Proposed project will have	3. The anticipated impacts on air quality ar mitigation measure to control pollutic during construction and operation phas are provided in Section-4.1.3 and 4.2.2 Chapter-4 in the EIA report. About Rs. 10 Crores will be spent on environment protection. Environmental monitoring w be conducted on regular basis by AEL assess the pollution level in the surroundir area. The proposed mitigation to t implemented during construction ar operation phase is given in Table-10.1 ar

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		reactions by toxic gas, We cannot say more due to lack of more scientific knowledge. But we come to know that by this plant's gaseous air pollution there will be effect on flowers of crops and it will not develop naturally to yield the anticipated production quality and quantity. This will affect our livelihood and health naturally which the Indian Government should consider sympathetically and save the villages in the interest of public at large.	facility to achieve Zero Liquid Discharge. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Ambient Air Quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter 9 of the EIA report.	Table-10.2 of Chapter-10. Tl environmental monitoring duri construction and operation phase is given Table-6.1 & 6.2 of Chapter-6 in the E report.
		4. The company will produce about 50% residue of raw material while making the end product from copper and this residue come to approximately 8-10 lac tons (i.e. 1 lac trucks) and this will affect the entire area of Kutch. In such circumstance there will be no alternate except to leave the village and hence we oppose this project.	4. Copper slag, estimated 8 to 10 Lac Tonnes per year, will be produced from the copper plant as a by-product. Copper Slag is widely used in construction industry, road making, shot-blasting etc. Copper Slag is also known as Ferro-Sand and Iron-Silicate which is used by Cement companies as raw material to produce the green-cement. Efforts will be made to maximize the sale of the Slag generated from the proposed project in domestic as well as in export market.	4. The anticipated impacts on air quality a mitigation measure to control pollut during construction and operation pha are provided in Section-4.1.3 and 4.2.2 Chapter-4 in the EIA report.
		5. There is problem of drinking water in our area and it is a question that how the company will manage for water requirement and if managed and what about effluent treatment?	5. The proposed project is based on desalinated sea water sourced from APSEZ. Proposed project will have facility to achieve Zero Liquid Discharge. Details are given in Chapter 2 of EIA Report.	5. The total water requirement for the proje is about 32,800 KLD (32.8 MLD). The tot desalinated water requirement for t project would be sourced from APSEZ Lt through M/s. Mundra Utility Pvt Ltd (MUPL The water allocation letter is enclosed Annexure-IV. The water requirement a breakup details are provided in Sectio 2.2.3 of Chapter-2.
		6. We have come to know that they are planning to make an hazardous waste plant for this 30 acre plant which will affect the villages.	6. Secured Land Fill (SLF) is proposed to be developed over the area of 30 Acres within the proposed project area. SLF will be constructed	6. An integrated water system is proposed, t effluent from the process units is treat and reused to reduce water demand. It

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
			and operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and then plantation will be done. Monitoring of environmental parameters will also be carried out.	also proposed to install a secondary Revers Osmosis (RO) plant to further treat wate from the effluent plant facility for effectiv use. Rejects from the reverse osmosis plar will be sent to Multi Effect Evaporator (MEI for further recovery and solids generate will be sent to Secured Land Fill (SLF). Thi water would be utilized to meet the DI water and plant/utility water requirement c proposed project. The water system, i highly integrated and is designed for Zer Liquid Discharge (ZLD).
		7. There are also some problems because of existing power plants in our area by Tata and Adani Group, even though we are going to face a new problem by this new project in the form of hazardous pollution which will affect our children and hence we oppose the project. Due to power plant some agricultural activities like date palm crop are affected but by this project it is sure that gas from copper refinery will affect our health also more make the atmosphere polluted, hence we oppose the project.	7. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for AAQ and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.	7. The solid waste generation an management details are given in Sectior 2.4.3 of Chapter-2 in the EIA report.
		8. The company, M/s. Adani Enterprise Limited (AEL) is assuring about local employment butthe earlier companies like Tata group has not fulfilled such promises.	8. Local people will be given preference in employment as per eligibility. Skill development programme will be implemented to improve the employability of local people.	8. Employment requirement details durin Construction and operation phases is give in Section-8.4 of Chapter-8 in the EI report.
		9. We have come to know that there will be residue of mercury and this is a toxic chemical element which will spread in the air, so we are representing our appeal to the Government to please set up such plant in any non-populated area.	9. Mercury recovery facility is part of the proposed project. Mercury will not be released in the environment. Details are given in Chapter 2 of EIA Report.	9. The details are given in Chapter 2 of EI Report.

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		10. We have come to know that there are other materials like gold, silver and platinum are also a by-product of the company yet it is useless activity looking the health problem etc. In view of above we request you to kindly recommend the government to take necessary actions as to cancel this project as we do not need industrial development at the cost of public health.	10. Precious metals like gold and silver will be recovered as part of the process. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. The penalty mentioned by you pertains to APSEZ and as informed to us same has been withdrawn. We assure you that all the environmental safeguards will be provided during implementation and operation of the project.	10. The details of products and by-products a given in Table-1.1 of Chapter-1 in the E report.
38	Shri Chauhan Pravinsinh Bhurubha, Village: Siraya, Tal. Mundra, Dis. Kutch	Refer Sr.No 37	Refer Sr.No 37	Refer Sr.No 37
39	Shri Jadeja Jaypalsinh M.	Refer Sr.No 37	Refer Sr.No 37	Refer Sr.No 37
40	Shri Turk Husen Ibrahim Nathani, Village Dhrab	Refer Sr.No 37	Refer Sr.No 37	Refer Sr.No 37
41	Shri Turk Ismail Abdul Kadar Jamadar, Village-Dharb	Refer Sr.No 37	Refer Sr.No 37	Refer Sr.No 37
42	Shri Turk Ismail Abdul Rashid Jamadar, Village-Dharb	Refer Sr.No 37	Refer Sr.No 37	Refer Sr.No 37
43	Shri Jadeja Gajendrasinh Bhimaji, Sarpanch, Kapuriya Wadi, Tal: Mundra Kutch	1. Damage caused by Adani Power Plant Project of Adani Enterprise Ltd. a) It is mentioned in point no. 2 of permission granted to Adani Power on dt. 21/10/2008 and point no. 2 of C.R.Z. clearance of Intake and Disposal Facility dt. 29/05/2008 that effluent discharge should be made through pipeline. But	The issues raised are for APL and are not related to the proposed project activity therefore we do not offer any comment.	This is outside the scope of the EIA report for th proposed project.

Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		effluent discharge is made by constructing open channel by Adani Power. Thus, environment permission is violated. b) The ground water has become more salty due to intake channel construction by Adani Power. c) Breach is found in guideline of coal handling. d) It is mentioned in condition no. 7 of CRZ clearance that no trouble someness should be caused to the local community due to Intake Channel and Effluent Discharge pipeline. But the roads are closed by Intake Channel and Effluent Discharge pipeline. The road to approach grazing land is closed for cattle breeders are closed and road to approach religious place on sea shore is closed. e) It is mentioned in condition no. 9 of CRZ clearance that no displacement of house of the people or fishermen should be caused due to project. Hindrance should not be caused due to pipeline in coming and going of fishermen and the officer boats. All those fishermen dwelling on old Kotdi Bandar since long are displaced due to intake channel. Open channel is built in place of pipeline for Effluent discharge and as it passes through Kotdi creek, the movement of boats of fishermen is interrupted. Thus, this condition is violated. f) It is mentioned in condition 21 of the environment permission that half yearly compliance report should be submitted. The compliance thereof is not followed.		

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Sr. No.	Name and address of the Representative	Representations	Chronological Reply given by Representative of Project Proponent	Action Plan after PH
		Refer Sl. No. 34	Refer Sl. No. 34	Refer Sl. No. 34
44	Shri Pravinsinh Bhurubha Chauhan, Siracha, Tal. Mundra	Refer Sl. No. 35	Refer Sl. No. 35	Refer Sl. No. 35

7.2 Risk Assessment

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the plant. On the other hand, risk analysis deals with the identification and quantification of risks, the plant equipment and personnel are exposed to, due to accidents resulting from the hazards present in the plant.

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks on the neighboring population are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc.

In the sections below, the identification of various hazards, probable risks in the proposed copper refinery project, maximum credible accident analysis, consequence analysis are addressed which gives a broad identification of risks involved in the plant. Based on the risk estimation for fuel and chemical storage Disaster Management Plan (DMP) has been prepared.

7.2.1 Approaches to the Study

Risk involves the occurrence or potential occurrence of some accidents consisting of an event or sequence of events. The risk assessment study covers the following:

- Identification of potential hazard areas;
- Identification of representative failure cases;
- Visualization of the resulting scenarios in terms of fire (thermal radiation) and explosion;
- Assess the overall damage potential of the identified hazardous events and the impact zones from the accidental scenarios;
- Assess the overall suitability of the site from hazard minimization and disaster mitigation points of view;
- Furnish specific recommendations on the minimization of the worst accident possibilities; and
- Preparation of broad Disaster Management Plan (DMP), On-site and Off-site Emergency Plan, including Occupational and Health Safety Plan.

7.2.2 Hazard Identification

Identification of hazards in the proposed copper refinery plant is of primary significance in the analysis, quantification and cost effective control of accidents involving chemicals and process. A classical definition of hazard states that hazard is in fact the characteristic of system/plant/process that presents potential for an accident. Hence, all the components of a system/plant/process need to be thoroughly examined to assess their potential for initiating or propagating an unplanned event/sequence of events, which can be termed as an accident. The following two methods for hazard identification have been employed in the study:

- Identification of major hazardous units based on Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 of Government of India (GOI Rules, 1989); and

- Identification of hazardous units and segments of plants and storage units based on relative ranking technique, viz. Fire-Explosion and Toxicity Index (FE&TI).

7.2.3 Classification of Major Hazardous Units

Hazardous substances may be classified into three main classes namely flammable substances, unstable substances and toxic substances. The ratings for a large number of chemicals based on flammability, reactivity and toxicity have been given in NFPA Codes 49 and 345 M. The fuel and chemical storage for proposed project is given in **Table-7.2** and the hazardous characteristics of the major flammable materials as employed in different process units are listed in **Table-7.3.**

TABLE-7.2
CATEGORY WISE SCHEDULE OF STORAGE FACILITIES

Sr. No.	Material	UOM	Storage Capacity	Classification
1	H_2SO_4 (Sulphuric Acid)	Ton	1,50,000	Corrosive
2	Furnace Oil	Ton	4,000	Flammable
3	HSD	KL	1,000	Flammable
4	LPG	Ton	400	Flammable
5	Oxygen (Liquid)	Ton	1,000	Flammable
6	Coal/pet coke	Ton	100	Flammable
7	Met Coke	Ton	100	Flammable
8	H_3PO_4 (Phosphoric Acid)	Ton	30,000	Corrosive
9	H_2SiF_6 (Hydro Fluro Silicic Acid)	Ton	4,000	Corrosive

TABLE-7.3
PROPERTIES OF FUELS

Chemical	Codes/ Label	TLV	FBP	MP	FP	UEL	LEL
			°C			%	
Furnace Oil	Flammable	5mg/m³	400	338	32.96	7.5	0.6
HSD	Flammable	5mg/m³	369	338	32.96	7.5	0.6
LPG	Flammable	1000 ppm	-	-	104.4	9.5	1.9

TLV : Threshold Limit Value
MP : Melting Point
UEL : Upper Explosive Limit
FBP : Final Boiling Point
FP : Flash Point
LEL : Lower Explosive Limit

7.2.4 Identification of Major Hazard Installations Based on GOI Rules, 1989

Following accidents in the chemical industry in India over a few decades, a specific legislation covering major hazard activities has been enforced by Govt. of India in 1989 in conjunction with Environment Protection Act, 1986. This is referred here as GOI rules 1989. For the purpose of identifying major hazard installations the rules employ certain criteria based on toxic, flammable and explosive properties of chemicals.

A systematic analysis of the fuels/chemicals and their quantities of storage has been carried out, to determine threshold quantities as notified by GOI Rules, 1989 and the applicable rules are identified. Applicability of storage rules is summarized in **Table-7.4.**

TABLE-7.4
APPLICABILITY OF GOI RULES TO FUEL STORAGE

Sr. No.	Chemical/ Fuel	Listed in Schedule	Total Quantity	Threshold Quantity (T) for Application of Rules	
				5,7-9,13-15	10-12
1	Furnace Oil	3 (1)	4000 T	25 MT	200 MT
2	HSD	3 (1)	1000 KL	25 MT	200 MT
3	LPG	3 (1)	400 T	25 MT	200 MT

7.2.5 Preliminary Hazard Analysis (PHA)

A preliminary hazard analysis is carried out initially to identify the major hazards associated with storages and the processes of the plant. This is followed by consequence analysis to quantify these hazards. Finally, the vulnerable zones are plotted for which risk reducing measures are deduced and implemented. Preliminary hazard analysis for fuel storage area and whole plant is given in **Table-7.5** and **Table-7.6.**

TABLE-7.5
PRELIMINARY HAZARD ANALYSIS FOR STORAGE AREAS

Unit	Phase-I	Phase-II	Total Capacity	Hazard Identified
Furnace Oil	2 x 1000 T	2 x 1000 T	4 x 1000 T	Fire/Explosion
HSD	1 x 500 KL	1 x 500 KL	2 x 500 KL	Fire/Explosion
LPG	2 x 100 T	2 x 100 T	4 x 100 T	Fire/Explosion

TABLE-7.6
PRELIMINARY HAZARD ANALYSIS FOR THE PROPOSED PROJECT IN GENERAL

PHA Category	Description of Plausible Hazard	Recommendation	Provision
Environ-mental factors	If there is any leakage and eventuality of source of ignition.	-	All electrical fittings and cables will be provided as per the specified standards. All motor starters will be flame proof.
	Highly inflammable nature of the chemicals may cause fire hazard in the storage facility.	A well designed fire protection including water sprinkler system, dry powder, CO_2 extinguisher will be provided.	Fire extinguisher of small size and big size will be provided at all potential fire hazard places. In addition to the above, fire hydrant network will also be provided.
	If there is any leakage in the duct and eventuality of source of emission SO_2	Periodical check-up of the wear and tear of the ducts and mechanical, Electrical and Instrumentation equipment.	-
	If there is a sudden trip of sulphuric acid plant main blower, the SO_2 gas in between smelter and SAP will become the eventuality of source of emission SO_2	Uninterrupted power supply.	If there is a sudden trip of sulphuric acid plant main blower, smelting will get stopped by trip interlock arrangement with sufficient back up arrangement to handle the gas trapped in the system.

- **Safety Measures in Storage Facilities**

Risk for storage units depends not on the extent of the consequence, but also on the probability of the failure of the safety measures and provisions provided. The safety measures to be provided in storage facilities in the proposed plant are given in **Table-7.7**.

TABLE-7.7
SUBSTANCE STORED AND SAFE GUARD

Substance Stored	Safe Guard
Sulphuric acid	• Bund wall will be constructed around the storage tanks for acid/ alkali spillage containment. • Collection pit / neutralization pit with pumping arrangement. • Buffer tank with equal capacity of maximum capacity of one tank. • Sufficient amount of neutralization agent.
Phosphoric acid	
Furnace oil	Following fire fighting measures will be provided: a) DCP extinguisher; b) AFFF extinguisher; c) Water cum foam monitor; and d) Sand bucket.
High Speed Diesel (HSD)	
Iso Propanol	Following fire fighting measures will be provided: a) DCP extinguisher b) Sand bucket c) Well laid fire hydrant system d) During unloading, tankers will be provided with extinguishers
Liquefied Petroleum Gas (LPG)	1. Hydrocarbon sensors will be provided for continuous monitoring of the flammable vapour in the atmosphere. 2. Medium pressure water sprinkler system will be provided with automatic detection and operation. 3. Water blanketing system will be installed to control outside fire 4. Following fire fighting facilities will be provided: • DCP extinguisher • Sand bucket • Water monitor 4. CO_2 extinguishers will be placed in LPG unloading area and in LPG tankers.
Copper Concentrate Ware house	• Well laid fire hydrant system • Dust suppression system • Mechanised operation • Air conditioned operator cabin • 5 kg DCP extinguisher
Rock phosphate	• Well laid fire hydrant system • Dust suppression /extraction system • Mechanized operation • Air conditioned operator cabin

7.2.6 Maximum Credible Accident Analysis (MCAA)

Hazardous substances may be released as a result of failures or catastrophes, causing possible damage to the surrounding area. This section deals with the question of how the consequences of the release of such substances and the damage to the surrounding area can be determined by means of models. Major hazards posed by flammable storage can be identified taking recourse to MCA analysis. MCA analysis encompasses certain techniques to identify the hazards and calculate the consequent effects in terms of damage distances of heat radiation,

toxic releases, vapour cloud explosion, etc. A host of probable or potential accidents of the major units in the complex arising due to use, storage and handling of the hazardous materials are examined to establish their credibility. Depending upon the effective hazardous attributes and their impact on the event, the maximum effect on the surrounding environment and the respective damage caused can be assessed. The reason and purpose of consequence analysis are many folds like:

- Part of risk assessment;
- Plant layout/code requirements;
- Protection of other plants;
- Protection of the public;
- Emergency planning; and
- Design criteria.

The results of consequence analysis are useful for getting information about all known and unknown effects that are of importance when some failure scenario occurs in the plant and also to get information as how to deal with the possible catastrophic events. It also gives the workers in the plant and people living in the vicinity of the area, an understanding of their personal situation.

- **Selected Failure Cases**

The purpose of this listing is to examine consequences of such failure individually or in combination. It will be seen from the list that failure cases related to storage of Furnace Oil, LPG and HSD have been identified.

7.2.6.1Damage Criteria

The fuel storage and unloading at the storage facility may lead to fire and explosion hazards. The damage criteria due to an accidental release of any hydrocarbon arise from fire and explosion. The vapors of these fuels are not toxic and hence no effects of toxicity are expected.

Tank fire would occur if the radiation intensity is high on the peripheral surface of the tank leading to increase in internal tank pressure. Pool fire would occur when fuels collected in the dyke due to leakage gets ignited.

- **Fire Damage**

A flammable liquid in a pool will burn with a large turbulent diffusion flame. This releases heat based on the heat of combustion and the burning rate of the liquid. A part of the heat is radiated while the rest is convected away by rising hot air and combustion products. The radiations can heat the contents of a nearby storage or process unit to above its ignition temperature and thus result in a spread of fire. The radiations can also cause severe burns or fatalities of workers or fire fighters located within a certain distance. Hence, it will be important to know beforehand the damage potential of a flammable liquid pool likely to be created due to leakage or catastrophic failure of a storage or process vessel. This will help to decide the location of other storage/process vessels, decide the type of protective clothing the workers/fire fighters need, the duration of time for which they can be in the zone, the fire extinguishing measures needed and the protection methods needed for the

nearby storage/process vessels. **Table-7.8** tabulates the damage effect on equipment and people due to thermal radiation intensity.

TABLE-7.8
DAMAGE DUE TO INCIDENT RADIATION INTENSITIES

Sr. No.	Incident Radiation (kW/m^2)	Type of Damage Intensity	
		Damage to Equipment	Damage to People
1	37.5	Damage to process equipment	100% lethality in 1 min. 1% lethality in 10 sec.
2	25.0	Minimum energy required to ignite wood at indefinitely long exposure without a flame	50% Lethality in 1 min. Significant injury in 10 sec.
3	19.0	Maximum thermal radiation intensity allowed on thermally unprotected adjoining equipment	-
4	12.5	Minimum energy to ignite with a flame; melts plastic tubing	1% lethality in 1 min.
5	4.5	-	Causes pain if duration is longer than 20 sec, however blistering is un-likely (First degree burns)
6	1.6	-	Causes no discomfort on long exposures

Source: Techniques for Assessing Industrial Hazards by World Bank.

7.2.6.2 Fuel Storage

The details of storages are given in **Table-7.2**. In case of fuel released in the area catching fire, a steady state fire will ensue. Failures in pipeline may occur due to corrosion and mechanical defect. Failure of pipeline due to external interference is not considered as this area is licensed area and all the work within this area is closely supervised with trained personnel.

7.2.6.3 Modeling Scenarios

There are two plots for storage of LPG and oil fuel, each covering 160 m x 80 m area, one for Phase-I and the other for Phase-II project. Each plot contains two above-ground LPG bullets, two Furnace oil tanks and one HSD tank. Based on the storage and consumption of various fuels and chemicals the following failure scenarios for the proposed Copper refinery project have been identified for MCA analysis and the scenarios are discussed in **Tables-7.9.**

TABLE-7.9
SCENARIOS CONSIDERED FOR MCA ANALYSIS

Sr. No.	Description	Capacity of Storage Tank		Remarks
		Phase-I	Phase-II	
1	LPG Bullets	2 x 100 T	2 x 100 T	Above-ground horizontal cylindrical pressure vessels
2	Furnace oil Tanks	2 x 1,000 T	2 x 1,000 T	Vertical cone roof tanks
3	HSD Tank	1 x 500 KL	1 x 500 KL	Vertical cone roof tank

7.2.6.4 Model Computations

Hazardous Properties of LPG & Oil Fuels

The flammable consequences of LPG release from equipment are mainly the following:

- Jet fire/pool fire/ flash fire
- Vapour cloud explosion

Properties of LPG relevant to this QRA study are as follows:

Composition	:	Mixture of Propane and Butane
Normal Boiling Point	:	(-)6 °C
Lower Flammable Limit (LFL)	:	1.8 % (vol)
Upper Flammable Limit (UFL)	:	9.5 % (vol)
Auto ignition temperature	:	410-580 °C (approx.)

LPG is stored as liquid under pressure. LPG vapours are heavier than air and disperse close to ground level. LPG odorized with ethyl mercaptan is received in the plant so as to provide warning in case of leakage.

High speed diesel (HSD) is Class 'B' petroleum product with minimum flash point of 35 °C. Furnace oil is Class 'C' petroleum product with minimum flash point of 66 °C.

7.2.6.5 Consequence Analysis

Jet/ Pool Fire Radiation

The effect from jet fire and pool fire is thermal radiation intensity on the receptor surface as shown in **Table-7.10**.

TABLE-7.10
DAMAGE EFFECTS DUE TO JET/ POOL FIRE RADIATION

Heat Radiation Intensity (kW/m²)	Observed Effect
4.5	Sufficient to cause pain to personnel if unable to reach cover within 20 seconds; 0% lethality.
12.5	Minimum energy required for piloted ignition of wood, melting of plastic tubing.
37.5	Sufficient to cause damage to process equipment.

- Thermal radiation intensity exceeding 37.5 kW/m² may cause escalation due to damage of other equipment.
- Thermal radiation intensity exceeding 12.5 kW/m² may cause ignition of combustibles on buildings and impairment of escape route.
- Thermal radiation intensity exceeding 4 kW/m² may cause burn injury on personnel injury.

Vapour Cloud Explosion (VCE)

When a large quantity of flammable vapour or gas is released, mixes with air to produce sufficient mass in the flammable range and is then ignited, the result is a vapour cloud explosion (VCE). In the LPG installation large release of LPG from equipment or piping has potential for vapour cloud explosion. The damage effect of vapour cloud explosion is due to overpressure as shown in **Table-7.11**.

TABLE-7.11
VCE OVER PRESSURE LIMIT AND OBSERVED EFFECT

Over-pressure Effect		Observed Damage
bar(g)	psig	
0.021	0.3	"Safe distance" (probability 0.95 of no serious damage below this value); projectile limit; some damage to house ceilings; 10% of window glass broken.
0.069	1	Repairable damage; partial demolition of houses; steel frame of clad building slightly distorted.
0.138	2	Partial collapse of walls of houses.
0.207	3	Heavy machines in industrial buildings suffered little damage; steel frame building distorted and pulled away from foundations.

Consequence Analysis Results

The failure scenario of leak of liquid LPG through 25 mm diameter hole which represents a maximum credible scenario. Results of consequence analysis carried out using Phast software are summarized in **Table-7.12**.

TABLE-7.12
CONSEQUENCE ANALYSIS RESULTS

Sr. No.	Description	Parameter	Downwind Distance (metres) Weather (Wind speed & Stability)		
			2 m/s; D	3 m/s; D	5 m/s; D
1	**LPG Bullet Liquid Leak (25 mm dia)**				
	Pool Fire Radiation Intensity	4 kW/m^2	45	45	44
		12.5 kW/m^2	28	28	29
		37.5 kW/m^2	13	14	15
	Jet Fire Radiation Intensity	4 kW/m^2	24	23	23
		12.5 kW/m^2	15	14	13
		37.5 kW/m^2	12	11	10
	Flash Fire Envelope	LFL (1.7%)	50	43	38
	VCE Overpressure	0.02 bar	81	80	58
		0.07 bar	53	52	39
		0.2 bar	Not reached	Not reached	Not reached
2	**Furnace oil Tank – Dyke Spill**				
	Dyke Fire Radiation Intensity	4 kW/m^2	40	42	43

Sr. No.	Description	Parameter	Downwind Distance (metres) Weather (Wind speed & Stability)		
			2 m/s; D	**3 m/s; D**	**5 m/s; D**
		12.5 kW/m^2	17	18	19
		37.5 kW/m^2	Not reached	Not reached	Not reached
3	**HSD Tank – Dyke Spill**				
	Dyke Fire Radiation Intensity	4 kW/m^2	39	41	43
		12.5 kW/m^2	17	18	19
		37.5 kW/m^2	Not reached	Not reached	Not reached

Graphical results of consequence analysis plotted on plot plan diagram are shown in the following **Figure-7.3** to **Figure-7.14**.

Weather: Category 3/D
Station Level
Ellipse @4 kW/m2
Effect Zone @4 kW/m2
Ellipse @12.5 kW/m2
Effect Zone @12.5 kW/m2
Ellipse @37.5 kW/m2
Effect Zone @37.5 kW/m2
dels
ani Mundra Copper Smelter Layout Revised (Section 2)
ani Mundra Copper Smelter Layout Revised (Section 1)

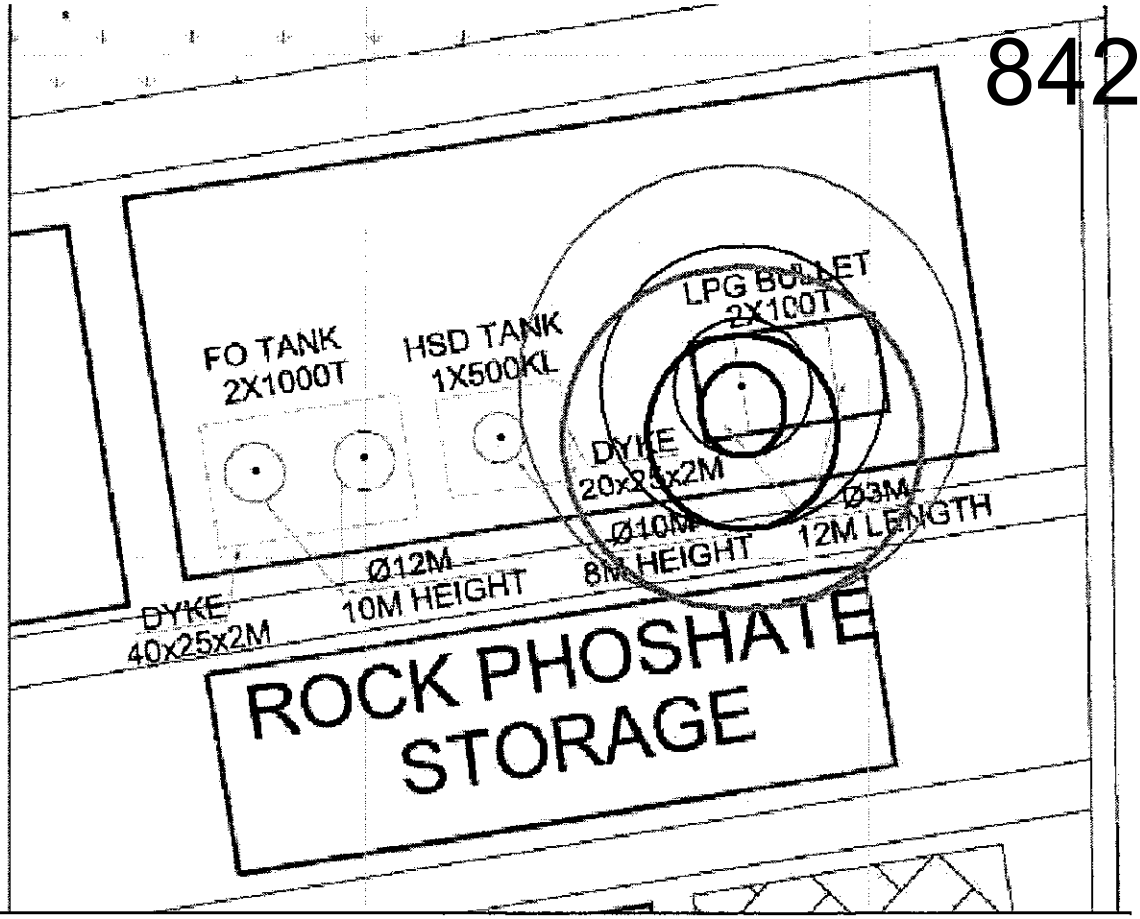
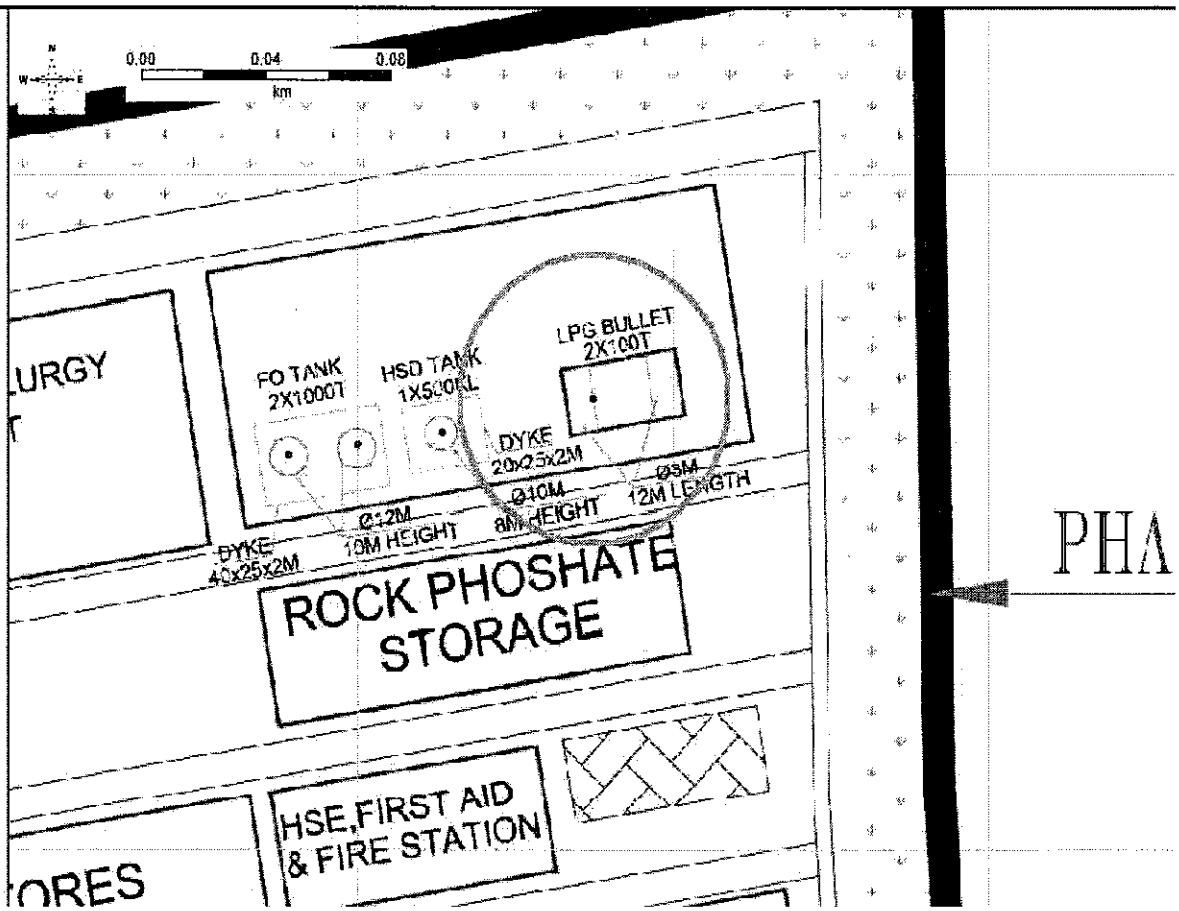


FIGURE-7.3
PHASE–I: LPG BULLET LIQUID LEAK - POOL FIRE RADIATION INTENSITY

Fire
Audit No: 177633
Material: LPG
Model: LPG Bullet Leak (Phase-I)
Study Folder: Mundra LPG_Fuel Oil Storage
Weather: Category 3/D
ntration
1.622e+004 ppm
1.622e+004 ppm
s
Mundra Copper Smelter Layout Revised (Section 2)
Mundra Copper Smelter Layout Revised (Section 1)



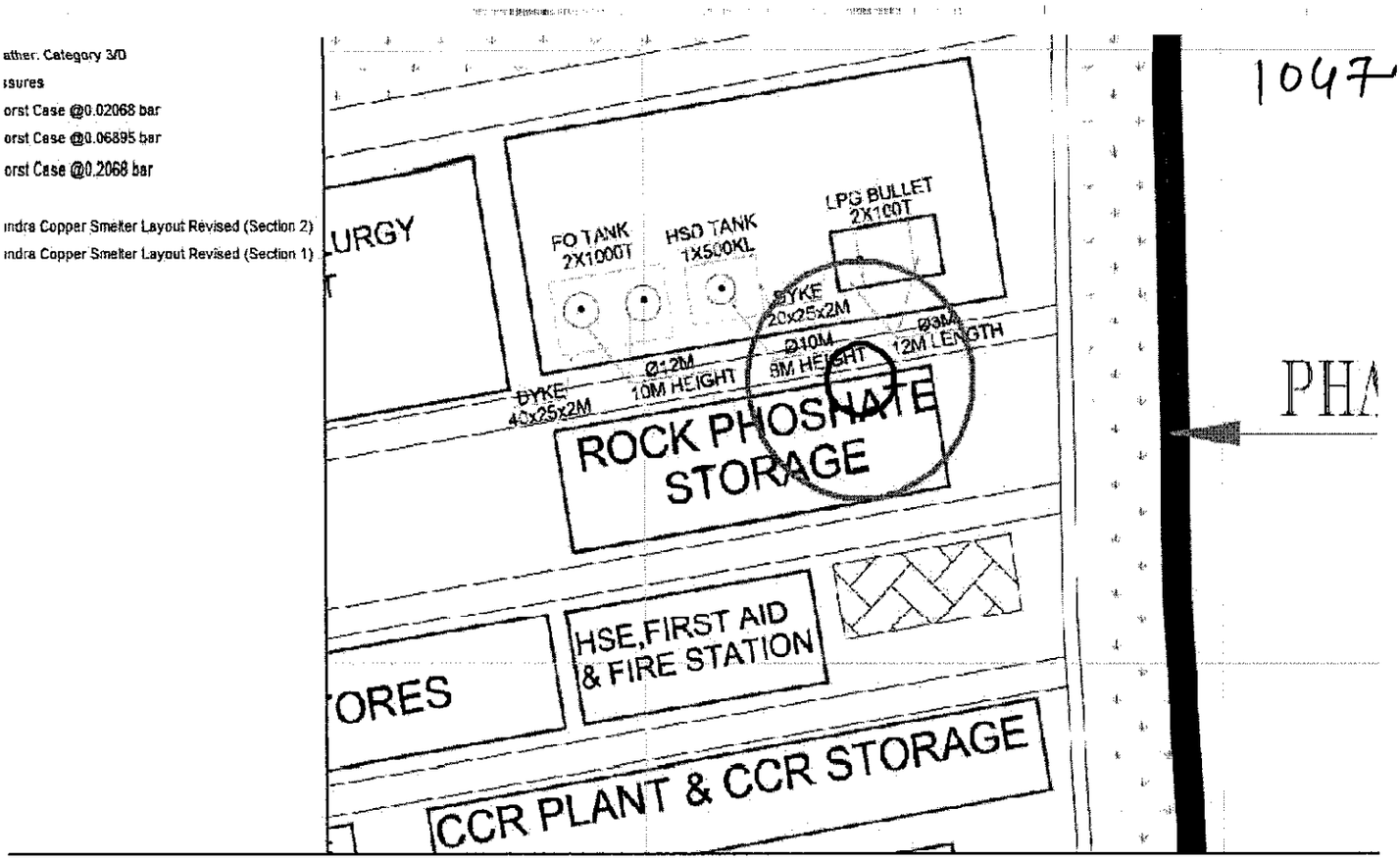
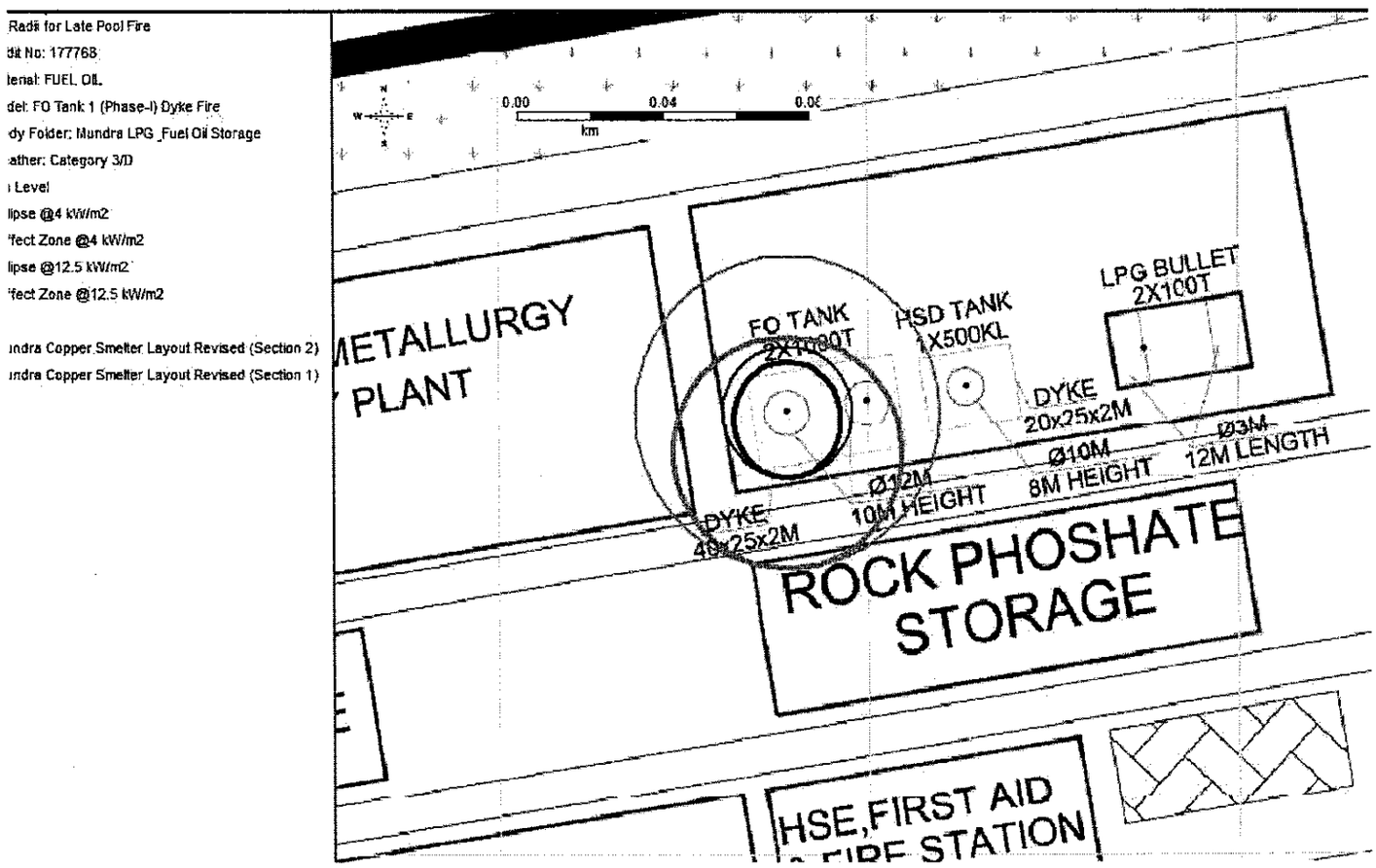


FIGURE-7.5
PHASE-I: LPG BULLET LIQUID LEAK - VAPOUR CLOUD EXPLOSION OVERPRESSURE



eather: Category 3/D 1048
n Level
llipse @4 kW/m2
ffect Zone @4 kW/m2
llipse @12.5 kW/m2
ffect Zone @12.5 kW/m2

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undra Copper Smelter Layout Revised (Section 1)

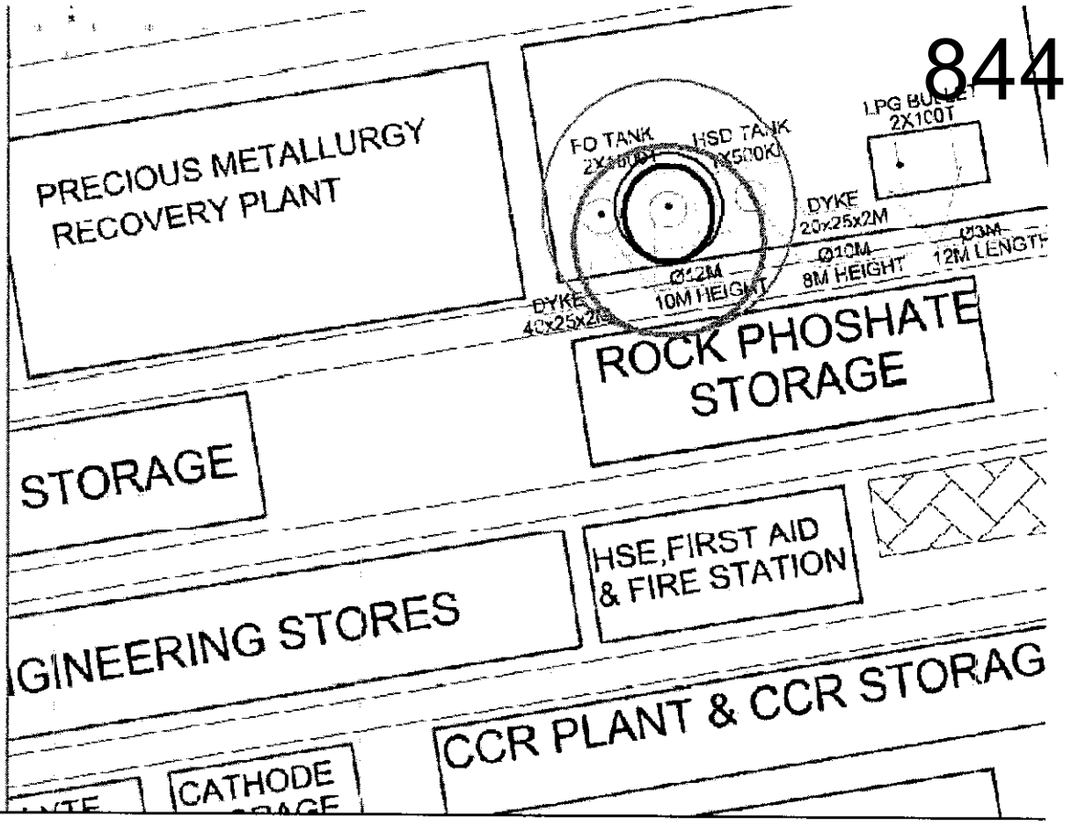
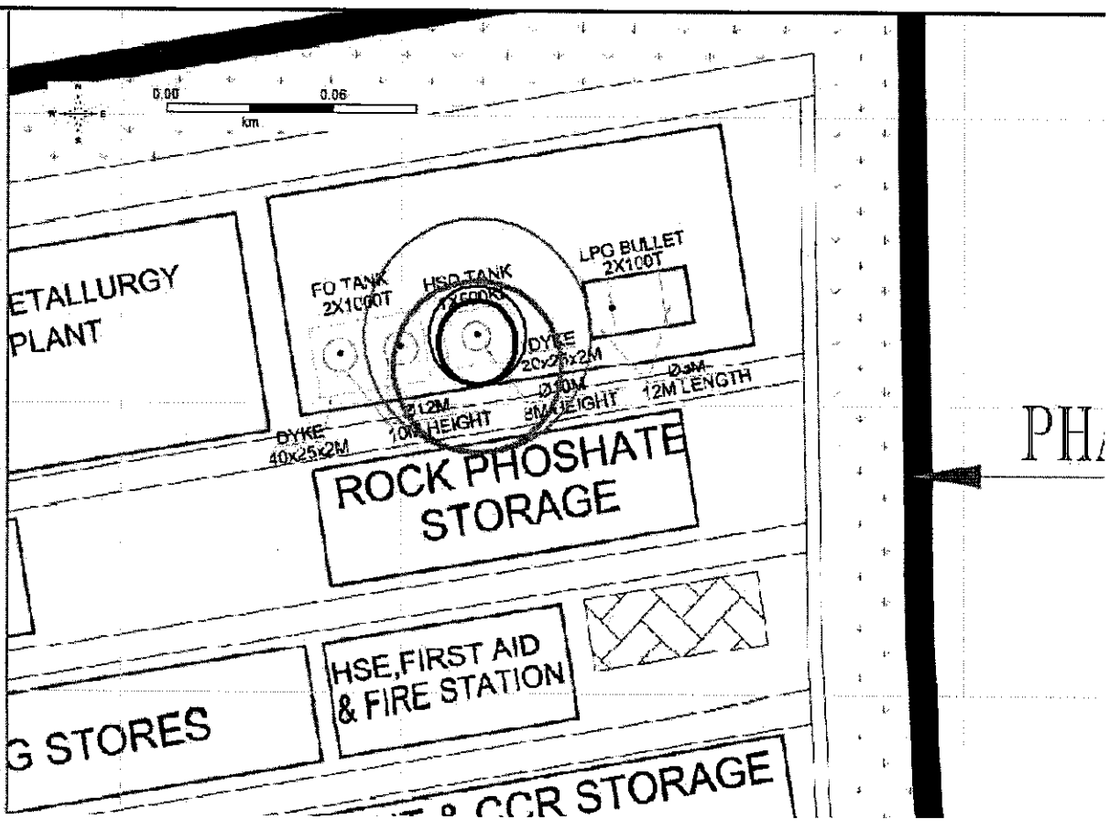


FIGURE-7.7
PHASE–I: FURNACE OIL TANK NO.2 DYKE FIRE - POOL FIRE RADIATION INTENSITY

:adii for Late Pool Fire
: No: 177907
rial: HSD
el: HSD Tank (Phase-I) Dyke Fire
y Folder: Mundra LPG ,Fuel Oil Storage
ther: Category 3/D
.evel
ise @4 kW/m2
ect Zone @4 kW/m2
ise @12.5 kW/m2
ect Zone @12.5 kW/m2

idra Copper Smelter Layout Revised (Section 2)
idra Copper Smelter Layout Revised (Section 1)



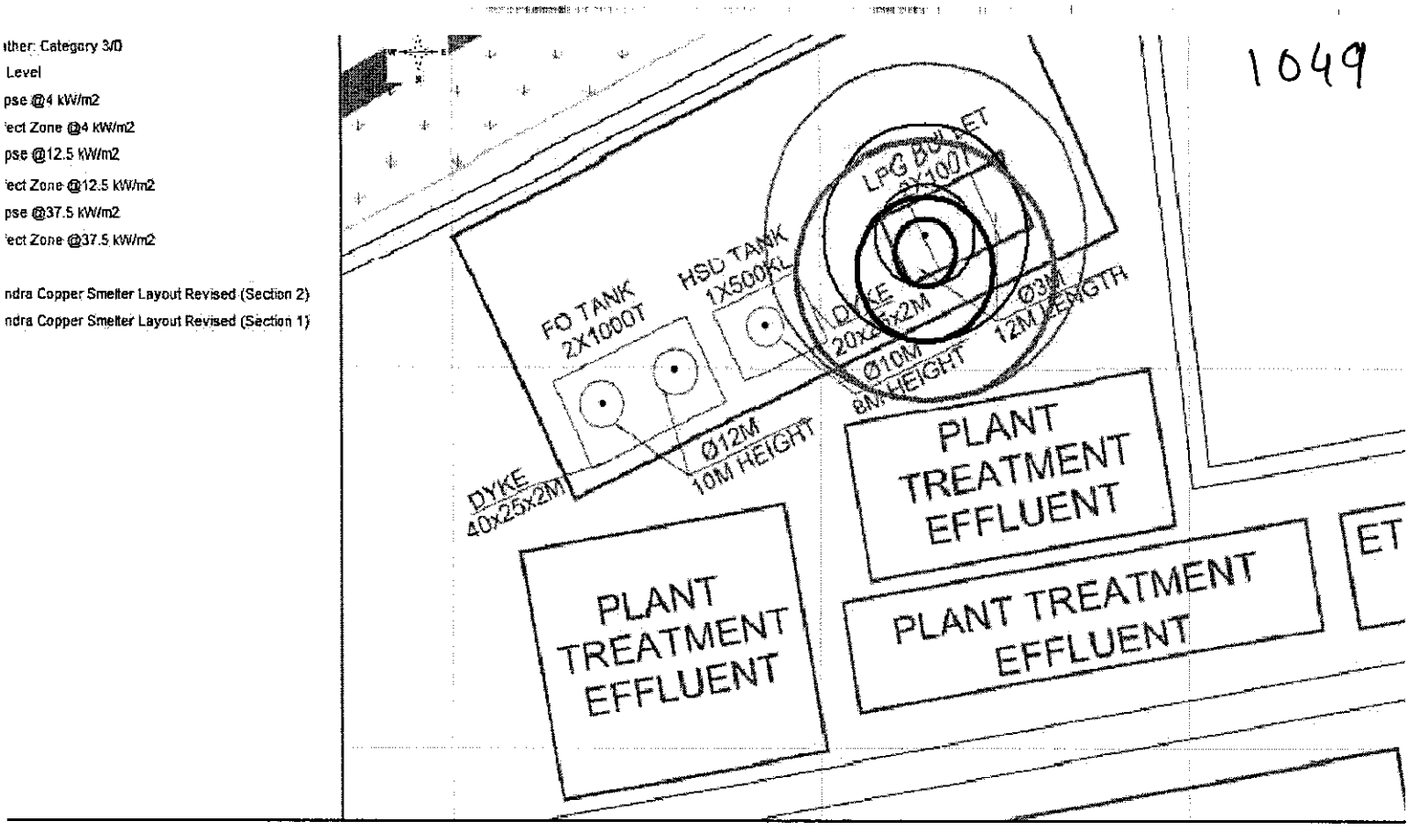
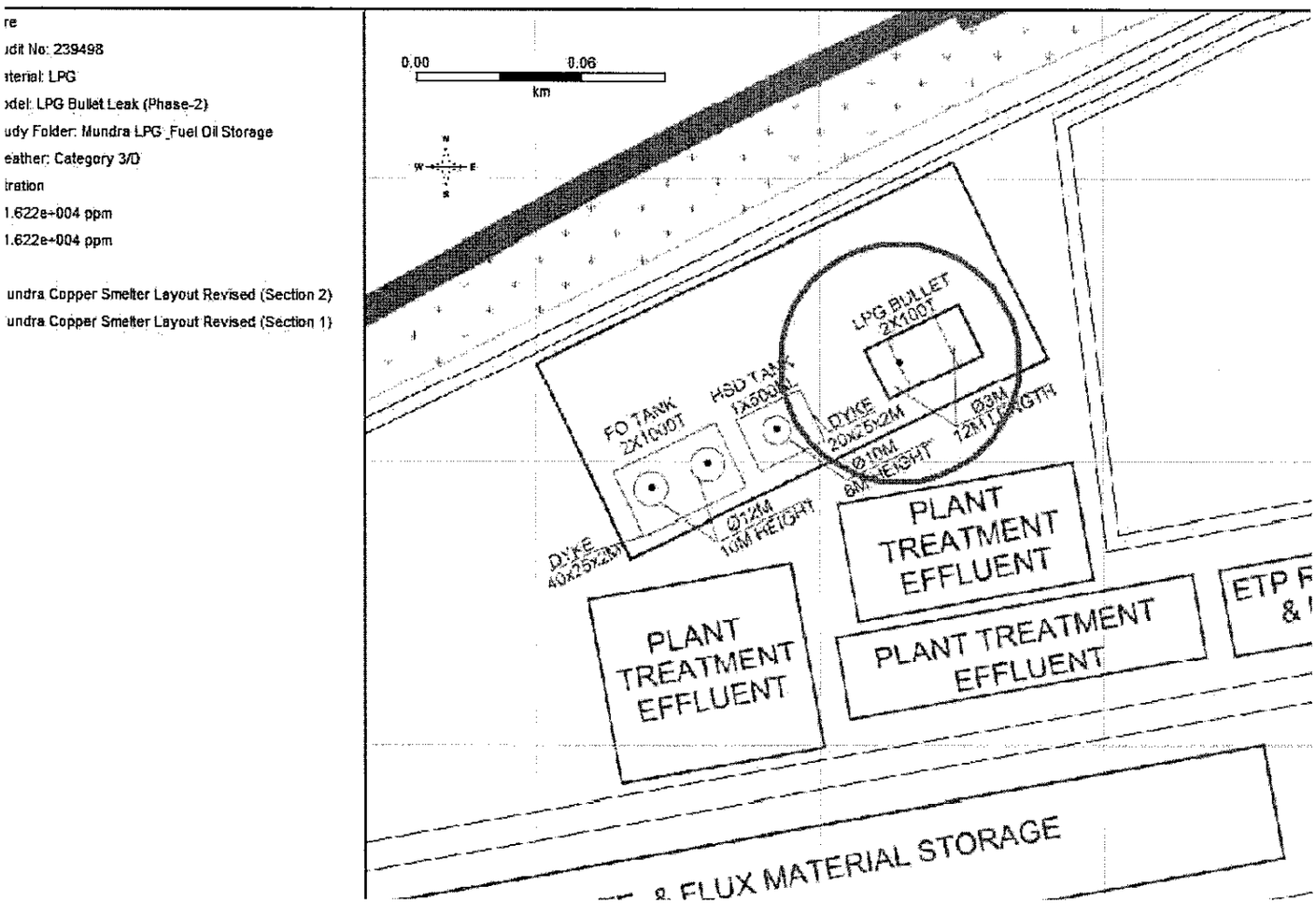


FIGURE-7.9
PHASE–II: LPG BULLET LIQUID LEAK - POOL FIRE RADIATION INTENSITY



ither: Category 3/D
sures
1050
irst Case @0.02068 bar
irst Case @0.06895 bar
irst Case @0.2068 bar

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ndra Copper Smelter Layout Revised (Section 1)

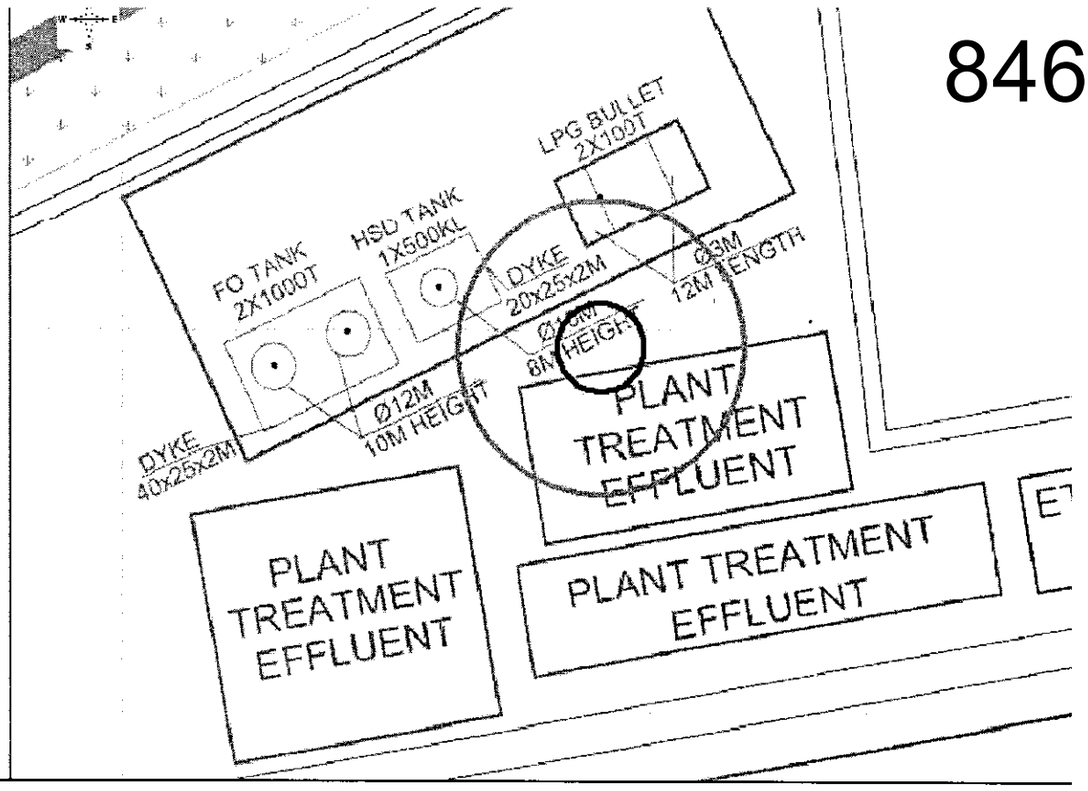
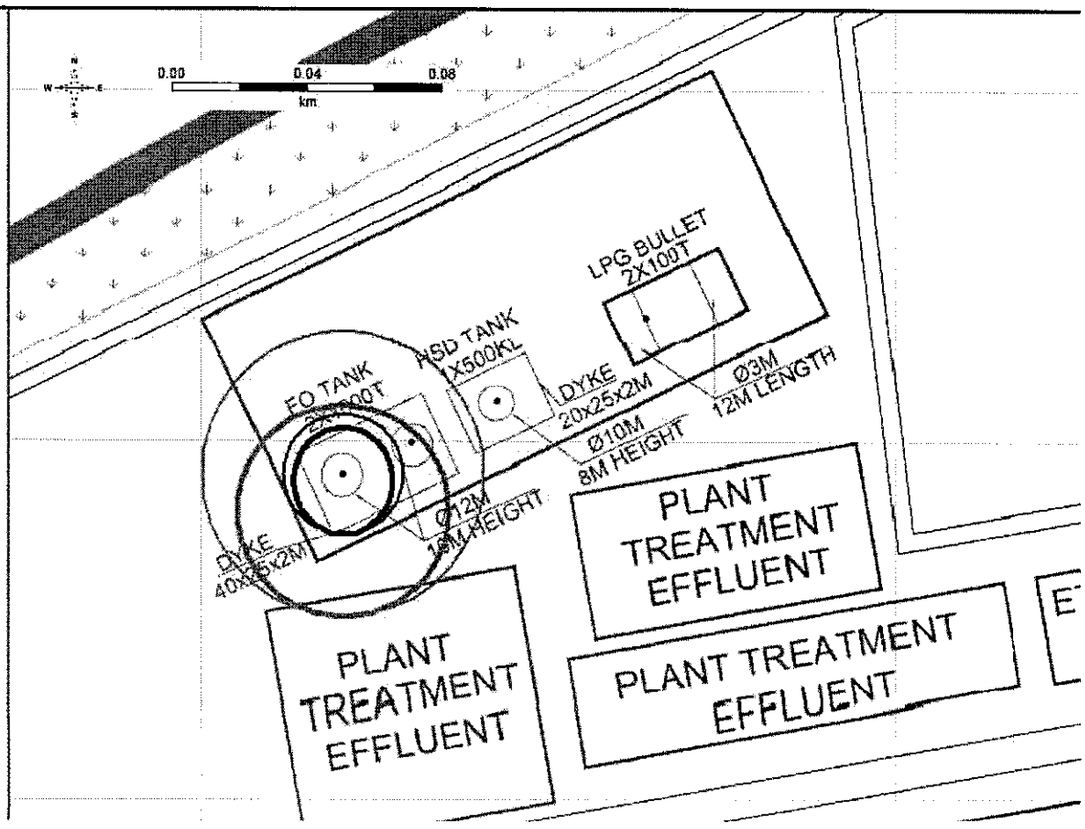


FIGURE-7.11
PHASE–II: LPG BULLET LIQUID LEAK - VAPOUR CLOUD EXPLOSION OVERPRESSURE

Radii for Late Pool Fire
lit No: 239272
erial: FUEL OIL
le): FO Tank 1 (Phase-2) Dyke Fire
dy Folder: Mundra LPG_Fuel Oil Storage
ather: Category 3/D
Level
pse @4 kW/m2
fect Zone @4 kW/m2
pse @12.5 kW/m2
fect Zone @12.5 kW/m2

ndra Copper Smelter Layout Revised (Section 2)
ndra Copper Smelter Layout Revised (Section 1)



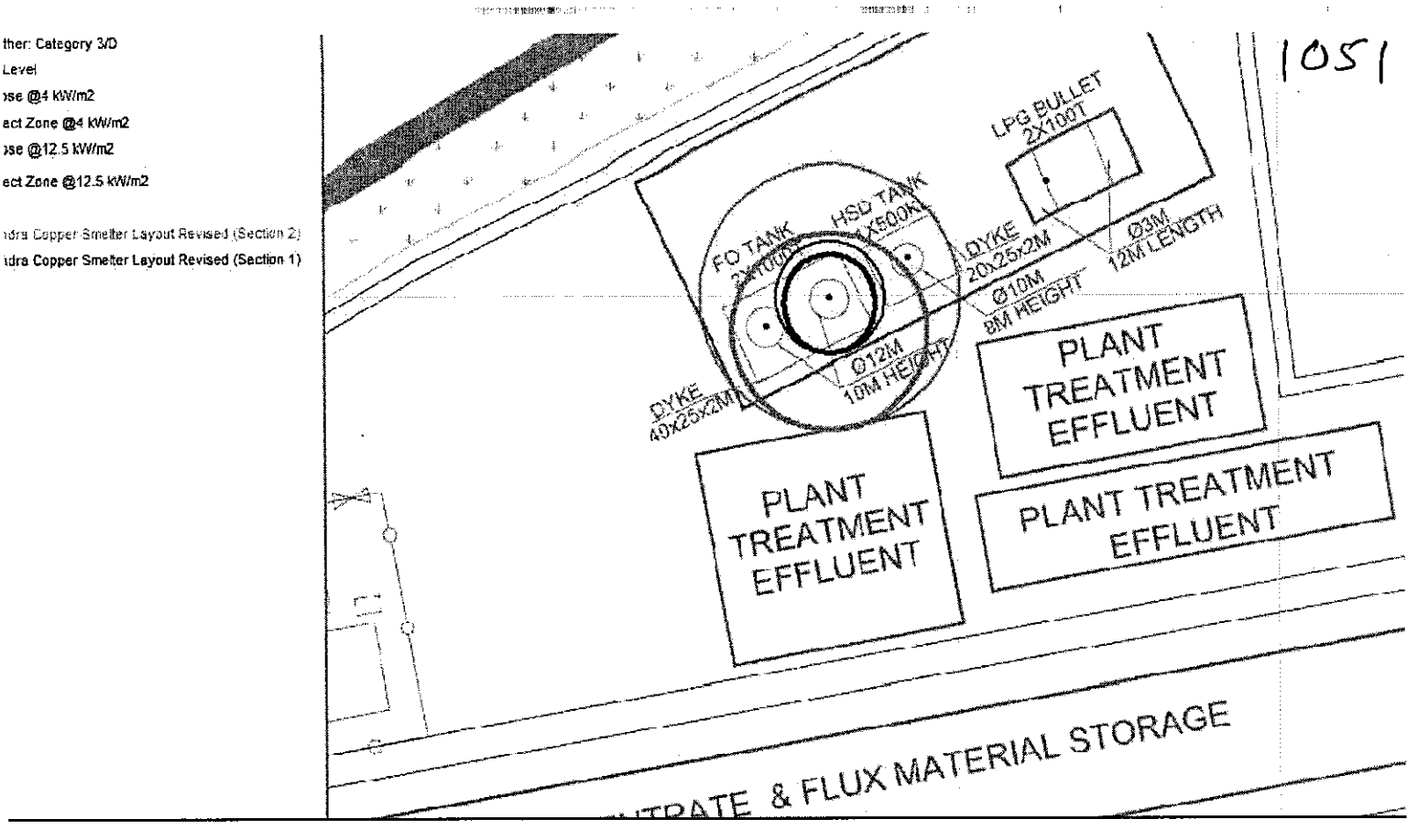
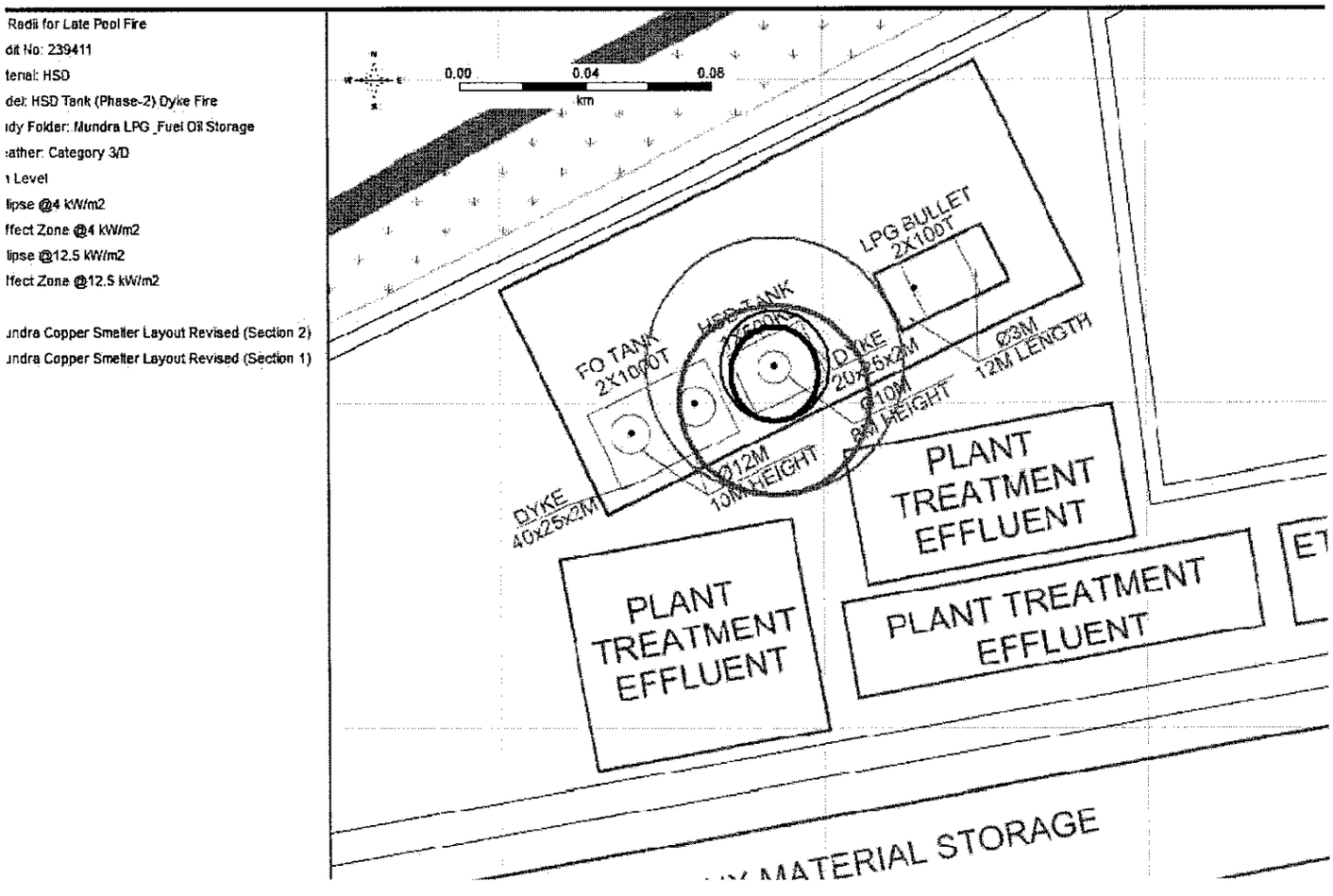


FIGURE-7.13
PHASE–II: FURNACE OIL TANK NO. 2 DYKE FIRE - POOL FIRE RADIATION INTENSITY



Recommendations

(1) LPG Storage System

LPG Storage system shall conform to the requirements of OISD Standard 144 and 158.

Above-ground LPG bullets are susceptible to BLEVE/ fire ball hazard if engulfed in external fire. Therefore, all measures are to be taken to prevent leakage and fire. Large leak of LPG has potential to cause vapour cloud explosion.

Fire protection system shall be provided conforming to the requirement of OISD standards. This includes the following:

- Fire/ gas detectors with alarms
- Fire water storage and distribution system with hydrants, monitors and sprinklers

Each LPG bullet shall have a single nozzle at the bottom for liquid inlet as well as outlet. A remote operated shut off valve (ROSOV) shall be provided on this bottom nozzle at a distance of at least 3 meters from the shadow of the bullet. The ROSOV shall be fire-safe and fail-safe type.

Each LPG bullet shall be provided with at least two independent level indicators and one independent level switch. The ROSOV shall automatically close on actuation of alarm from high level switch.

(2) Furnace Oil & HSD Storage System

The storage tanks are to be provided with fixed foam system. Mobile medium expansion foam generators (2 Nos.) should be available to fight dyke fires.

(3) General

In Phase-1 plot plan, it is recommended to consider shifting the block HSE, first aid and fire station to other area to avoid overpressure damage byvapour cloud explosion in case of large LPG leak.

7.3 Disaster Management Plan (DMP)

7.3.1 Disasters

A disaster is a catastrophic situation in which suddenly, people are plunged into helplessness & suffering and, as a result, need protection, clothing, shelter, medical and social care and other necessities of life.

Disasters can be divided into two main groups. In the first, the disasters are resulting from natural phenomena like earthquakes, volcanic eruptions, storm surges, cyclones, tropical storms, floods, avalanches, landslides, and forest fires. The second group includes disastrous events occasioned by man, or by man's impact upon the environment. Examples are armed conflict, industrial accidents,

radiation accidents, factory fires, explosions and escape of toxic gases or chemical substances, river pollution, mining or other structural collapses, air, sea, rail and road transport accidents and can reach catastrophic dimensions in terms of human loss. The plant design will be done considering seismic zone-V as per IS 1893 (part-I)-latest edition as this is a seismically unstable zone. All the design precautions will be taken to address any seismic tremors.

7.3.2 Objectives of Disaster Management Plan

The disaster management plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the disaster management plan, it should be widely circulated and personnel training through rehearsals/drills.

The disaster management plan shall reflect the probable consequential severalties of the undesired event due to deteriorating conditions or through 'Knock on' effects. Further, the management shall be able to demonstrate that their assessment of the consequences uses good supporting evidence and is based on currently available and reliable information, incident data from internal and external sources and if necessary the reports of outside agencies.

To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a disaster management plan has to be formulated and this planned emergency document is called "Disaster Management Plan".

The objective of the industrial disaster management plan is to make use of the combined resources of the plant and the outside services to achieve the following:

1. Effect the rescue and medical treatment of causalities;
2. Safeguard other people;
3. Minimize damage to property and the environment;
4. Initially contain and ultimately bring the incident under control;
5. Identify any dead;
6. Provide for the needs of relatives;
7. Provide authoritative information to the news media;
8. Secure the safe rehabilitation of affected area; and
9. Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

In effect, it is to optimize operational efficiency to rescue, rehabilitation and render medical help and to restore normalcy. To provide guidance to help stake holders take appropriate action to prevent accidents involving hazardous substances and to mitigate adverse effects of accidents that do nevertheless occur. The disaster management plan is shown in **Figure-7.15** and disaster risk management cycle is shown in **Figure-7.16**.

7.3.3 Emergencies

During operational period many near misses and incidents/ accidents may happen. To help industry the emergencies can be categorized into three broad levels on the basis of seriousness and response requirements, namely:

a) Level-1

- Can be effectively and safely managed, and contained within the site, location or installation by the available resources; and
- Has no impact outside the site, location or installation site of the machineries.

b) Level-2

- Cannot be effectively and safely managed or contained at the location or installation by available resource and additional support is alerted or required;
- Is having or has the potential to have an effect beyond the site, location or installation and where external support of mutual aid partner may be involved; and
- Is likely to be danger to life, environment or to industrial assets or reputation.

c) Level-3

This is an emergency or an incident with off-site impact which could be catastrophic and is likely to affect the population, property and environment inside and outside the installation, and management and control is done by district administration. Although the Level-III emergency falls under the purview of district authority but till they step in, it should be responsibility of the unit to manage the emergency.

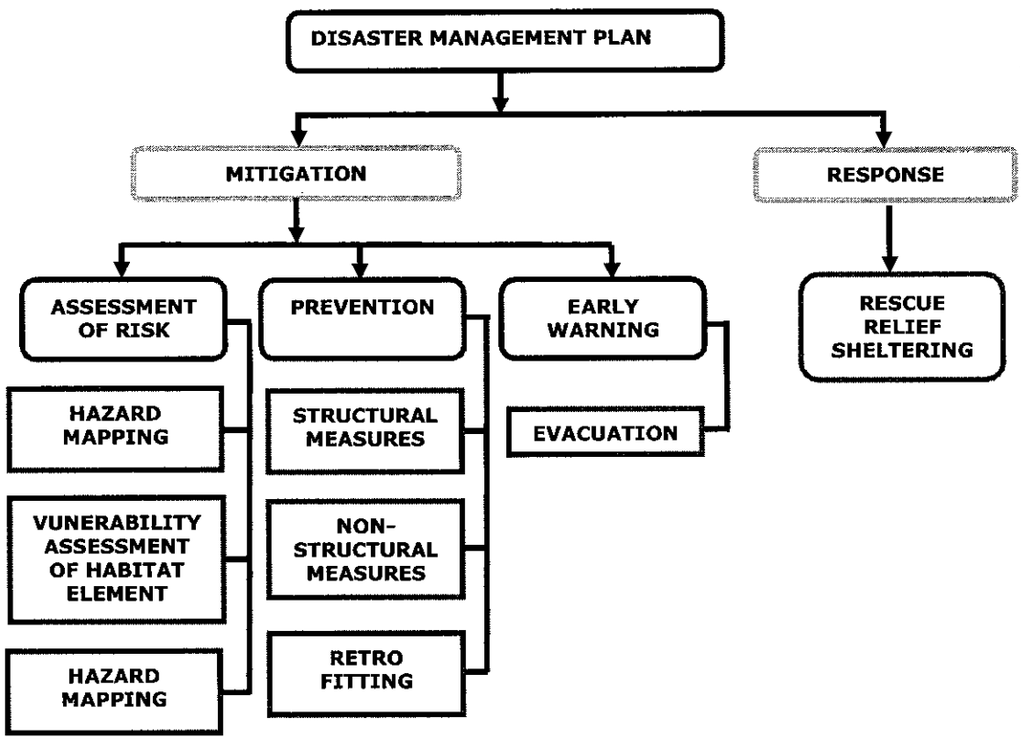


FIGURE-7.15
DISASTER MANAGEMENT PLAN

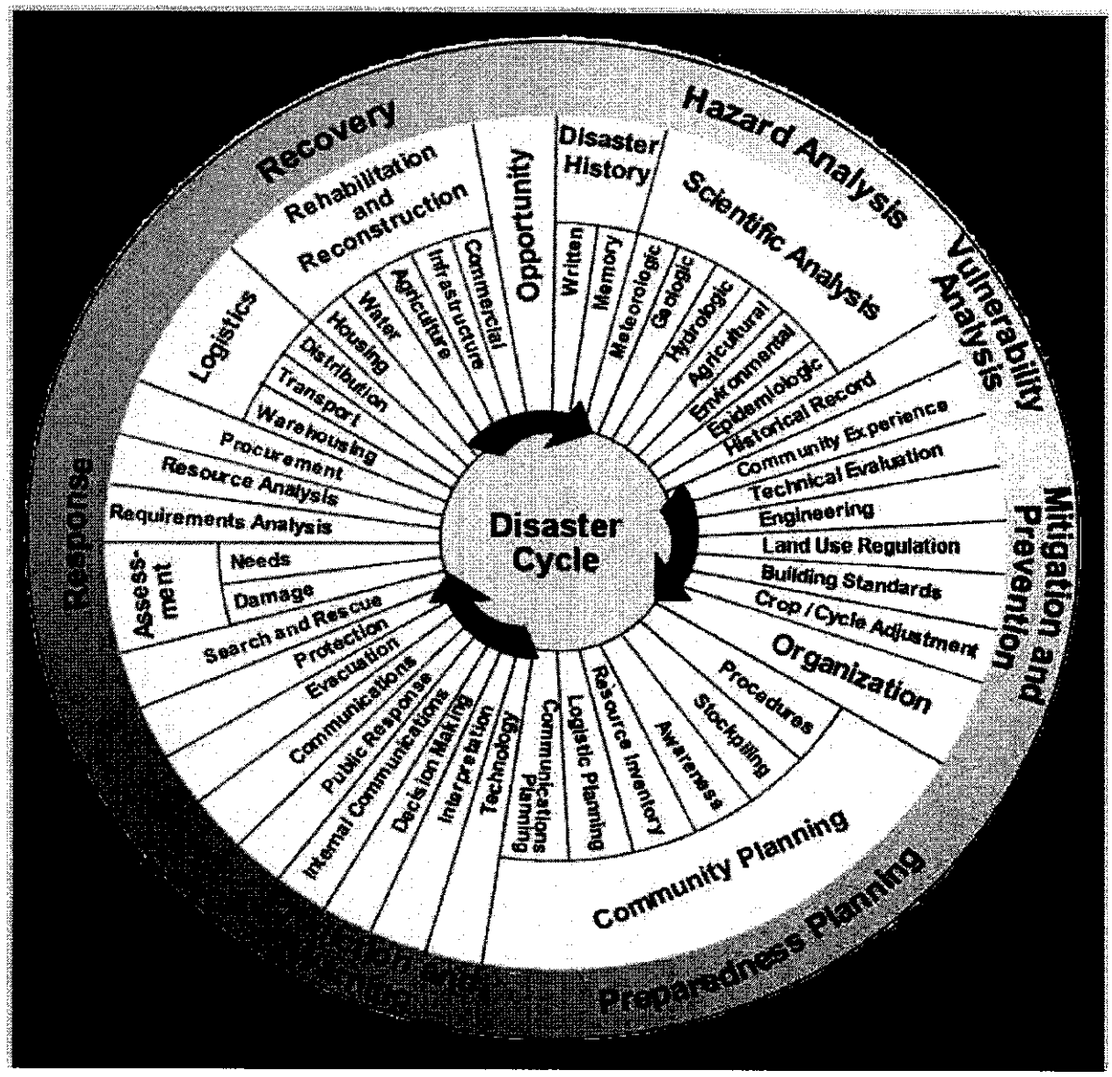


FIGURE-7.16
DISASTER RISK MANAGEMENT CYCLE

7.3.3.1 General and Industrial Emergencies

The emergencies that could be envisaged in the plant and tank farm are as follows:

1. A situation of fire at the tank farm of all storages;
2. Slow isolated fires;
3. Fast spreading fires;
4. Structural failures;
5. Contamination of food/water; and
6. Sabotage/Social disorder.

7.3.3.2 Anticipated Emergency Scenarios

Emergency preparedness and response plan is prepared based on storage facilities, raw materials and products & by products and processes involved. Anticipated emergency situations are given in **Table-7.13.**

TABLE-7.13
ANTICIPATED EMERGENCY SITUATIONS

Sr. No.	*Activity*	Explosion	Fire	Toxic Release	Spill
1	Storage of LPG	-	Fire hazard due to Leakage of LPG	LPG Release	-
2	Storage of FO and HSD	-	Fire hazard due to leakage of oil	-	-
3	Storage of sulphuric acid	-	-	-	Major spills of acid into bund will result in localised formation of acid mist/fumes
4	Storage of phosphoric acid	-	-	-	Major spills of acid in to bund will result in localised formation of acid mist/fumes
5	Transfer of SO_2 gas from smelter to sulphuric acid plant	-	-	Sudden and heavy release of SO_2 gas cloud leads to suffocation	-
6	Escape of fluorine from phosphoric acid plant	-	-	Excessive fluorine release leads to suffocation	-
7	Transformer fire	Explosion of breakers, transformers or capacitor	Possibility of fire due to over heating of transformer oil	Aerosols - smoke and CO	-
8	Fire in cable cellar room	-	Fire	PVC cables emits toxic gases	-
9	Storage of liquid	Explosion	-	-	-

Sr. No.	*Activity*	Explosion	Fire	Toxic Release	Spill
	oxygen	possibility due to poor process control			
10	WHRB	Steam explosion due to poor process control	-	-	-
11	Storage of hazardous waste	-	-	-	Fire & explosion, Land & water contamination
12	Transport of hazardous waste	-	-	-	Spill hazard, Fire & explosion, Land & water contamination
13	Transportation of sulphuric acid and phosphoric acid	-	-	-	Burn injury may occur due to acid splash, tank overflow and acid line leak. Injury may occur while shifting heavy materials. Injury may occur due to tanker movement.
14	WWTP – Sudden release of H_2S	-	-	Excessive H_2S release leads to suffocation	-
15	Over exposure to a source of ionizing radiation	-	-	-	Health Hazard

7.3.4 Onsite Emergency Plan

The preparation of onsite emergency plan is mandatory. The mock drill of the onsite emergency plan shall be conducted at least one in every six months. The main elements of on-site emergency plans are:

- Leadership and administration;
- Role and responsibilities of key personnel;
- Emergency action;
- Light and power;
- Source of energy control;
- Protective and rescue equipment;
- Communication;
- Medical care;
- Mutual aid;
- Public relation;
- Protection of vital records;
- Training; and
- Periodical revision of plan.

The action plan should consist of the following:

- Designated emergency control centre/room; and
- Key personnel.

Facilities to be made available in the emergency control are:

i. Internal and external communication.
ii. Computer and other essential records.
iii. Daily attendance of workmen employed in factory.
iv. Storage of hazardous material records and manufacturing records.
v. Pollution records.
vi. Walky-talky.
vii. Plan of the plant showing:-
    a. Storage area of hazardous materials.
    b. Storage of safety equipments.
    c. Firefighting system and additional source of water.
    d. Site entrance, roadway and emergency exist.
    e. Assembly points.
    f. Truck parking area.
    g. Surrounding location.

viii. Note book, pad and pencil.
ix. List of key personnel with addresses, telephone number etc.

It is recommended to setup an emergency organization headed by senior executive who has control over the affairs of the plant and would be designated as site controller. As per the general organization chart, would be designated as the incident controller. In the case of stores, utilities, open areas, which are not under the control of the production heads, senior executive responsible for maintenance of utilities would be designated as incident controller. All the incident controllers would be reporting to the site controller.

Each incident controller, for himself organizes a team responsible for controlling the incidence with the personnel under his control. Shift In-charge would be the reporting officer, who would bring the incidence to the notice of the incidence controller and site controller.

Emergency coordinators would be appointed who would undertake the responsibilities like fire fighting, rescue, rehabilitation, transport and provide essential and support services. For this purposes, security in-charge, personnel department, essential services personnel would be engaged. All these personnel would be designated as key personnel.

In each shift, electrical supervisor, electrical fitters, pump house In-charge, and other maintenance staff would be drafted for emergency operations. In the event of power or communication system failure, some of the staff members in the office/plant offices would be drafted and their services would be utilized as messengers for quick passing of communications. All these personnel would be declared as essential personnel.

7.3.4.1Emergency Communication

Whoever notices an emergency situation such as fire, growth of fire, leakage etc. would inform his immediate superior and emergency control center. The person on duty in the emergency control centre would appraise the site controller. Site controller verifies the situation from the incident controller of that area or the shift in-charge and takes a decision about an impending onsite emergency. This would be communicated to all the incident controllers, emergency coordinators. Simultaneously, the emergency warning system would be activated on the instructions of the site controller. The onsite emergency plan is shown in **Figure-7.17**.

7.3.4.2 Emergency Responsibilities

The responsibilities of the key personnel are appended below:

➢ *Site Controller*

- On receiving information about emergency he would rush to Emergency Control Center (ECC) and take charge of ECC and the situation;
- Assesses the magnitude of the situation on the advice of incident controller and decides;
- Whether the affected area needs to be evacuated;
- Whether personnel who are at assembly points need to be evacuated;
- Declares emergency and orders for operation of emergency siren;
- Organizes announcement by public address system about location of emergency;
- Assesses which areas are likely to be affected, or need to be evacuated or are to be alerted;
- Maintains a continuous review of possible development and assesses the situation in consultation with incident controller and other key personnel as to whether shutting down the plant or any section of the plant is required and if evacuation of persons is needed;
- Directs personnel for rescue, rehabilitation, transport, fire, brigade, medical and other designated mutual support systems locally available, for meeting emergencies;
- Controls evacuation of affected areas, if the situation is likely to go out of control or effects are likely to go beyond the premises of the factory, informs to district emergency authority, police, hospital and seeks their intervention and help;
- Informs Inspector of Factories, Deputy Chief Inspector of Factories, PCB and other statutory authorities;
- Gives a public statement, if necessary;
- Keeps record of chronological events and prepares an investigation report and preserves evidence; and
- On completion of onsite emergency and restoration of normalcy, declares all clear and orders for all clear warning.

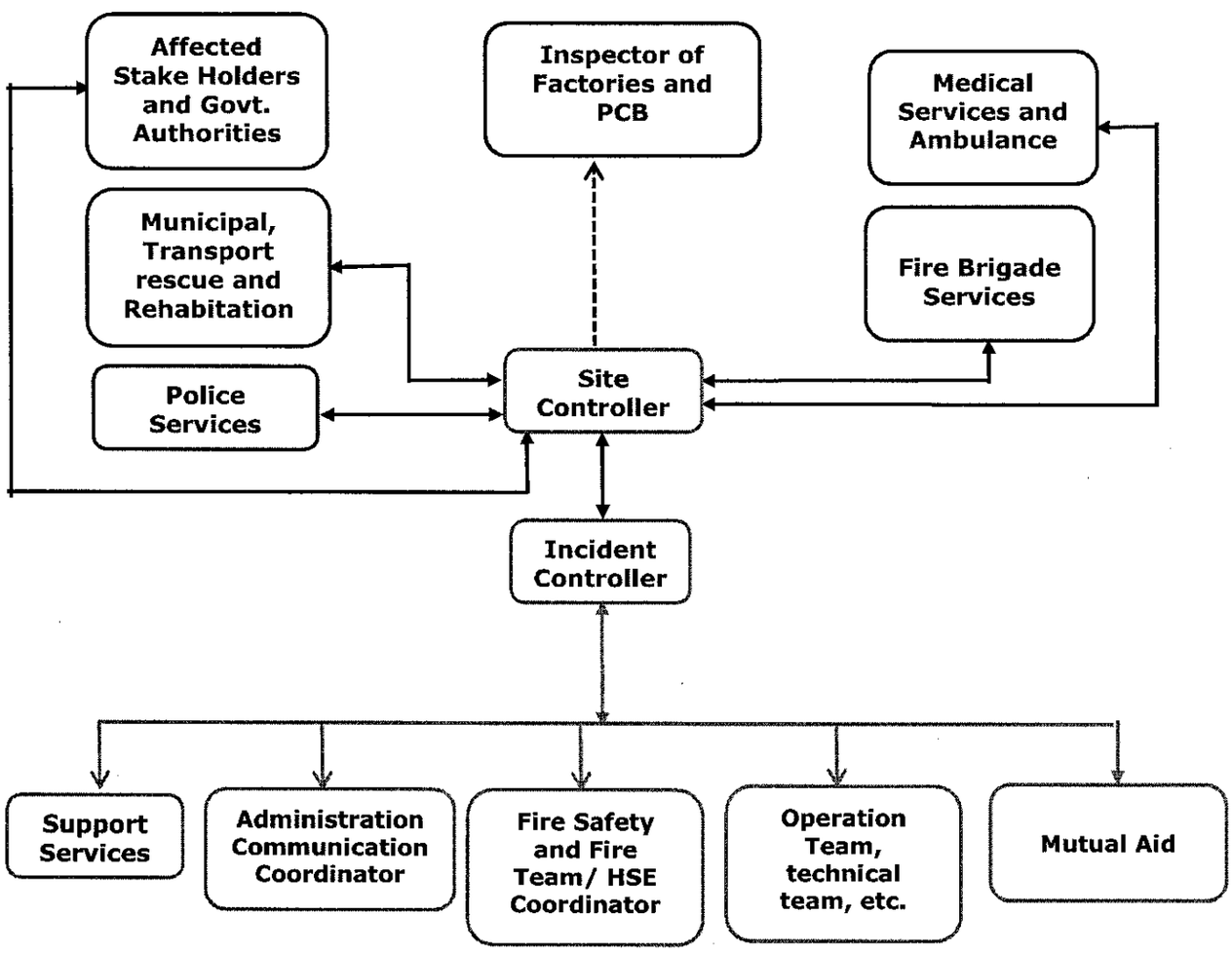


FIGURE-7.17
ONSITE EMERGENCY PLAN

➢ *Incident Controller*

- Assembles the incident control team;
- Directs operations within the affected areas with the priorities for safety to personnel, minimize damage to the plant, property and environment and minimize the loss of materials;
- Directs the shutting down and evacuation of plant and areas likely to be adversely affected by the emergency;
- Ensures that all key personnel help is sought;
- Provides advice and information to the fire and security officer and the local fire services as and when they arrive;
- Ensures that all non-essential workers/staff of the affected areas evacuated to the appropriate assembly points, and the areas are searched for causalities;
- Has regard to the need for preservation of evidence so as to facilitate any inquiry into the causes and circumstances, which caused or escalated the emergency;
- Co-ordinates with emergency services at the site;
- Provides tools and safety equipment to the team members;
- Keeps in touch with the team and advise them regarding the method of control to be used; and
- Keeps the site controller of emergency informed of the progress being made.

➢ *Emergency Coordinator - Rescue, Fire Fighting*

- On knowing about emergency, rushes to Emergency Control Center (ECC);
- Helps the incident controller in containment of the emergency;
- Ensure fire pumps in operating conditions and instructs pump house operator to ready for any emergency with standby arrangement;
- Guides the fire fighting crew i.e. firemen, trained plant personnel and security staff;
- Organizes shifting the fire fighting facilities to the emergency site, if required;
- Takes guidance of the incident controller for fire fighting as well as assesses the requirements of outside help;
- Arranges to control the traffic at the gate and the incident area;
- Directs the security staff to the incident site to take part in the emergency operations under his guidance and supervision;
- Evacuates the people in the plant or in the nearby areas as advised by Site Controller;
- Searches for casualties and arranges proper aid for them;
- Assembles search and evacuation team;
- Arranges for safety equipment for the members of this team;
- Decides which paths the evacuated workers should follow; and
- Maintains law and order in the area, and if necessary seeks the help of police.

➢ *Emergency Coordinator-Medical, Mutual Aid, Rehabilitation, Transport & Communication*

- In the event of failure of electric supply and thereby internal telephone, sets up communication point and establishes contact with the (ECC);
- Organizes medical treatment to the injured and if necessary will shift the injured to nearby hospitals;

- Mobilizes extra medical help from outside, if necessary;
- Keeps a list of qualified first aid providers of the factory and seek their assistance;
- Maintains first aid and medical emergency requirements;
- Makes sure that all safety equipment are made available to the emergency team;
- Assists site controller with necessary data and coordinate the emergency activities;
- Assists site controller in updating emergency plan, organizing mock drills verification of inventory of emergency facilities and furnishing report to the site controller;
- Maintains liaison with civil administration;
- Ensure availability of canteen facilities and maintenance of rehabilitation center;
- He will be in liaison with site controller/incident controller;
- Ensure transportation facility;
- Ensures availability of necessary cash for rescue/rehabilitation and emergency expenditure;
- Controls rehabilitation of affected areas on discontinuation of emergency; and
- Makes available diesel/petrol for transport vehicles engaged in emergency operation.

➢ *Emergency Coordinator - Essential Services*

- He would assist site controller and incident controller;
- Maintains essential services like diesel generator, water, fire water, compressed air/instrument air, power supply for lighting;
- He would plan alternate facilities in the event of power failure, to maintain essential services such as lighting, refrigeration plant etc;
- He would organize separate electrical connections for all utilities and emergency services so that in the event of emergency or fires, essential services and utilities are not affected;
- Gives necessary instructions regarding emergency electrical supply, isolation of certain sections etc. to shift In-charge and electricians; and
- Ensures availability of adequate quantities of protective equipment and other emergency materials, spares etc.

➢ *General Responsibilities of Employees during an Emergency*

During an emergency, especially it becomes more enhanced and pronounced when an emergency warning is raised, the workers if they are in-charge of process equipment should adopt safe and emergency shut down and attend any prescribed duty as essential employee. If no such responsibilities assigned, he should adopt a safe course to assembly point and await instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

7.3.5 Off-Site Emergency Preparedness Plan

Specific information on the incident which has potential to affect areas outside the plant premises need to the informed to the district authorities who will be responsible for preparation and implementation of the off-site disaster plan. The plan would be prepared with the assistance from neighboring industries so that resources can be pooled to face any disaster scenario.

The measures that may be taken into account may embrace the following fields:

- Allocation of duties among the plant fire brigade, city/district fire brigade, police auxiliary forces;
- Co-operation between plant and city fire brigade;
- Setting up of control stations;
- Use of air monitoring vehicles;
- Establishment of danger e.g. determination of extent of a gas cloud;
- Warning of population with sirens, by radio, television or lour speaker;
- Evacuation (only in special cases);
- Setting-up of road-blocks, diversion, direction of traffic;
- Keeping roads clear for operational and rescue vehicles; and
- Arrangement of medical treatment facilities and transport arrangements.

7.3.5.1 Introduction

Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency situation go beyond the plant boundaries, it becomes an off-site emergency. Off-site emergency is essentially the responsibility of the public administration. However, the factory management will provide the public administration with the technical information relating to the nature, quantum and probable consequences on the neighboring population.

The off-site plan in detail will be based on those events, which are most likely to occur, but other less likely events, which have severe consequence will also be considered. Incidents, which have very severe consequences yet have a small probability of occurrence, shall also be considered during the preparation of the plan. However, the key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan.

The roles of the various parties who will be involved in the implementation of an off-site plan are described below. Depending on local arrangements, the responsibility for the off-site plan shall be either rest with the works management or, with the local authority. Either way, the plan shall identify an emergency coordinating officer, who would take the overall command of the off-site activities. As with the on-site plan, an emergency control center shall be setup within which the emergency co-ordinating officer can operate.

An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - in particular whether they shall be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors:

a. In the case of a major fire but without explosion risk (e.g. LPG storage tank), only houses close to the fire are likely to need evacuation, although a severe smoke hazard may require this to be reviewed periodically;

b. If a fire is escalating and in turn threatening a store of hazardous material, it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people shall be advised to stay indoors and shield themselves from the fire. This latter case particularly applies if the installation at risk could produce a fireball with vary severe thermal radiation effects (e.g. LPG storage);

c. For release or potential release of toxic materials, limited evacuation may be appropriate down wind if there is time. The decision would depend partly on the type of housing "at risk". Conventional housing of solid construction with windows closed offers substantial protection from the effects of a toxic cloud, while shanty house, which can exist close to factories, offer little or no protection.

The major difference between releases of toxic and flammable materials is that toxic clouds are generally hazardous down to much lower concentrations and therefore hazardous over greater distances. Also, a toxic cloud drifting at, say 300 m per minute covers a large area of land very quickly. Any consideration of evacuation shall take this into account. Although the plan will have sufficient flexibility built in to cover the consequences of the range of accidents identified for the on-site plan, it will cover in some detail the handling of the emergency to a particular distance from each major hazard works.

7.3.5.2 Aspects Proposed to be Considered in the Off-Site Emergency Plan

Offsite emergency organization chart is shown in **Figure-7.18** and the main aspects, which should be included in the emergency plan are:

- ***Organization***

Detail of command structure, warning systems, implementation procedures, emergency control centers.

Names and appointments of incident controller, site main controller, their deputies and other key personnel.

- ***Communications***

Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

- ***Specialized Knowledge***

Details of specialist bodies, firms and people upon whom it may be necessary to call e.g. those with specialized fuel knowledge, laboratories.

- ***Voluntary Organizations***

Details of organizers, telephone numbers, resources etc.

- ***Fuel Information***

Details of the hazardous substances stored and a summary of the risk associated with them.

- ***Meteorological Information***

Arrangements for obtaining details of weather forecasts and weather conditions prevailing at that time.

- ***Humanitarian Arrangements***

Transport, evacuation centers, emergency feeding, treatment of injured, first aid, ambulances and temporary mortuaries.

- ***Public Information***

Arrangements for:

(a) Dealing with the media press office;
(b) Informing relatives, etc.

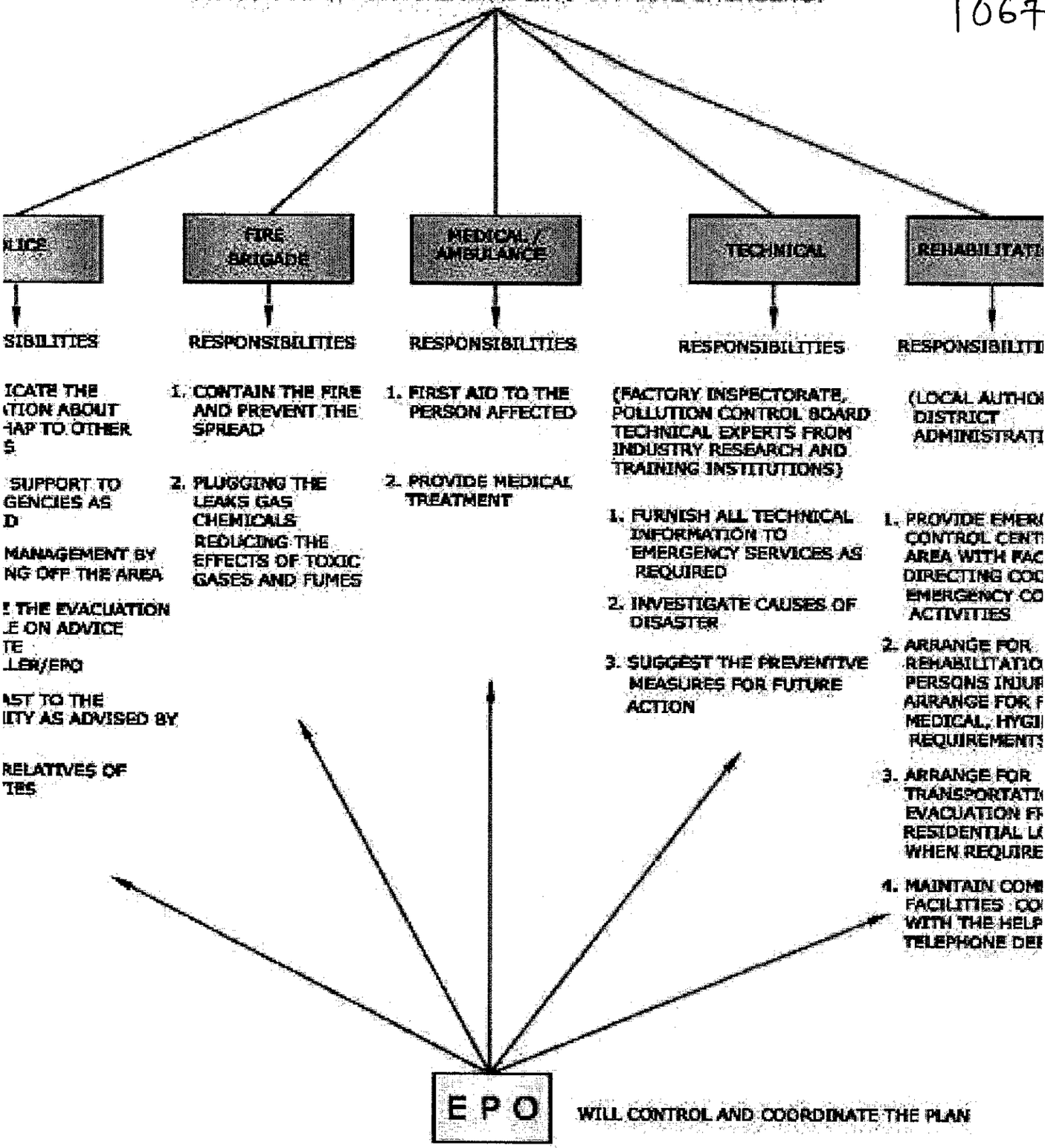
- ***Assessment of Emergency Plan***

Arrangements for:

(a) Collecting information on the causes of the emergency;
(b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

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ACTION PLAN FOR FIRE HANDLING OFF SITE EMERGENCY



7.3.5.3Roles and Responsibilities

- Role of the Emergency Co-ordinating Officer

The various emergency services would be co-ordinated by an Emergency Coordinating Officer (ECO), who will be designated by the district collector. The ECO would liaison closely with the site main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control would be passed to a senior local authority administrator or even an administrator appointed by the central or state government. The ECO will be equipped with address and phone numbers of important agencies.

- Role of the Local Authority

The duty to prepare the off-site plan lies with the local authorities. The Emergency Planning Officer (EPO) appointed should carry out his duty in preparing for a whole range of different emergencies within the local authority area. The EPO should liaison with the plant, to obtain the information to provide the basis for the plan. This liaison should ensure that the plan is continually kept upto date.

It will be the responsibility of the EPO to ensure that all those organizations which will be involved off site in handling the emergency, know of their role and are able to accept it by having for example, sufficient staff and appropriate equipment to cover their particular responsibilities. Rehearsals for off-site plans should be organized by the EPO.

- Role of Police

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements.

Their functions should include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

- Role of Fire Authorities

The control of a fire should be normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer should also have a similar responsibility for other events, such as explosions. Fire authorities in the region should be apprised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They should be involved in on-site emergency rehearsals both as participants and, on occasion, as observers of exercises involving only site personnel.

➢ Role of Health Authorities

Health authorities, including doctors, surgeons, hospitals, ambulances, and so on, should have a vital part to play following a major accident, and they should form an integral part of the emergency plan.

For major fires, injuries should be the result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals.

Major off-site incidents are likely to require medical equipment and facilities additional to those available locally, and a medical "mutual aid" scheme should exist to enable the assistance of neighboring authorities to be obtained in the event of an emergency.

➢ Role of Government Safety Authority

This will be the factory inspectorate available in the region. Inspectors are likely to satisfy themselves that the organization responsible for producing the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies. They may wish to see well documented procedures and evidence of exercise undertaken to test the plan.

In the event of an accident, local arrangements regarding the role of the factory inspector will apply. These may vary from keeping a watching brief to a close involvement in advising on operations.

The action plan suggested for control of the off-site emergencies is given in **Table-7.14.**

TABLE-7.14
OFF-SITE ACTION PLAN

Sr. No.	Action required to be taken to mitigate disaster by aid giving agency	Responsible agencies for taking action	Equipments/material facilities required at site to mitigate emergency
A - 1	Arrangements for evacuation/rescue of persons from zone of influence to predetermined camps	Police Department	Self Breathing apparatus with spare cylinder Chemical gas mask with spare canister Vehicle with PA system Transportation for evacuation of people
2	Caution to public by announcement		
3	Traffic and Mob control by cordoning of the area		
4	Law & order		
5	Request to railway authority for keeping the nearest by railway gate open & to stop the up & down trains at the nearest railway station		
B - 1	Control of fire	District Fire Brigade	Self breathing apparatus with spare cylinders Foam/water fire tenders Gas mask with spare canisters
2	Scrubbing of the flashed off gas cloud with water curtain		
3	To rescue trapped persons		

Sr. No.	Action required to be taken to mitigate disaster by aid giving agency	Responsible agencies for taking action	Equipments/material facilities required at site to mitigate emergency
4	If fire is big, keep surrounding area cool by spraying water		Lime water Neck to toe complete asbestos suit, PVC hand gloves, gumboots, safety goggles Mobile scrubbing system along with suction arrangement.
5	Communication to OSEB to continue or cut off electric supply		
6	Communication to water supply department for supplying water		
C - 1	Medical facilities for affected persons (first aid and treatment)	Hospital and Public Health	Ambulance with onboard resuscitation unit, first aid, stretchers
D - 1	Identification of concentration of gas in zone of influence	Pollution Control Board (OPCB)	Gas detector
E - 1	Removal of debris and damaged structures	Municipal Corporation	Provide bulldozers Provide cranes
F - 1	Monitor the incoming and out going transports	Transport Department	Provide traffic police at site Provide emergency shifting vehicles at site Provide stock of fuel for vehicles
2	Arrange emergency shifting of affected persons and non affected person to specified area		
3	Arrange diesel/petrol for needed vehicles		
G - 1	Give all information related to meteorological aspects for safe handling of affected area for living beings	Meteorological Department	Provide wind direction and velocity instruments with temperature measure Mobile van for meteorological parameter measurements
2	Forecast if any important weather change		
H - 1	Representatives of all departments are in the local crisis group; therefore they are expected to render services available with them. Since it is a group of experts with authority, the mitigating measures can be implemented speedily. The representatives from locals are also there so that communication with local people is easy and quick.	Local Crises Group	Must have all resources at hand, specially disaster management plan and its implementation method. All relevant information related to hazardous industry are generally available with crisis group. News paper editor is a part of the group so that right and timely media release can be done
2	The district emergency or disaster control officer is the president and he is used to mock drill etc. so action can be taken in right direction in time		
I - 1	Collector is the President of District Crisis Group therefore all district infrastructure facilities are diverted to affected zone	District Crisis group	All necessary facilities available at district can be made available at affected zone Control of law and order situation
2	All other functions as mentioned for local crisis group		

7.3.6 District Disaster Management Plan

The DM structure in the state is as per the Gujarat State Disaster Management Act- 2005. Those provisions include designating a Vice Chairman to the GSDMA, constitution of a State Executive Committee, establishment of a District Disaster Management Authority in each district and creation of a District Disaster Response & Mitigation Funds. The state has existing institutional arrangements in place for addressing the roles / responsibilities envisaged through the above provisions and hence does not find it compelling to implement the provisions afresh.

The revenue department of the state is the Nodal Department for controlling, monitoring and directing measures for organizing rescue, relief and rehabilitation. All other concerned line departments should extend full cooperation in all matters pertaining to the response management of the disaster whenever it occurs. The State Emergency Operations Centres (EOC), Emergency Response Centres (ERCs) and other control rooms at the state level as well as district control rooms should be activated with full strength.

Under this State Disaster Management Plan, all disaster specific mechanisms would come under a single umbrella allowing for attending to all kinds of disasters. The existing arrangements therefore will be strengthened by defining this administrative arrangement. This arrangement proposes Chief Secretary as the head supported by the Relief Commissioner through the branch arrangements at the Emergency Operations Centres (EOC), both at State level and at the district levels. There is a formal Incident Response System in the State. The GSDMA Act 2003 empowers Commissioner of Relief to be the Incident Commander in the State and District Collector in the respective districts.

The response to disasters in the district will be organized according to the Incident Command System (ICS) as adopted to conditions in Gujarat State (ICS/GS). The argument for the ICS is that its fundamental elements –unity of command, clarity of objectives and efficient resource use are common to the effective response to any disaster.

In Kutch district, the multi-hazard response plan focused on sector specific action plans unlike the department specific planning approach in the previous plan documents. The disaster response is led by the District Emergency Operation Center (EOC) under the command and control of the district collector. District disaster management organizational structure is shown in **Figure-7.19.**

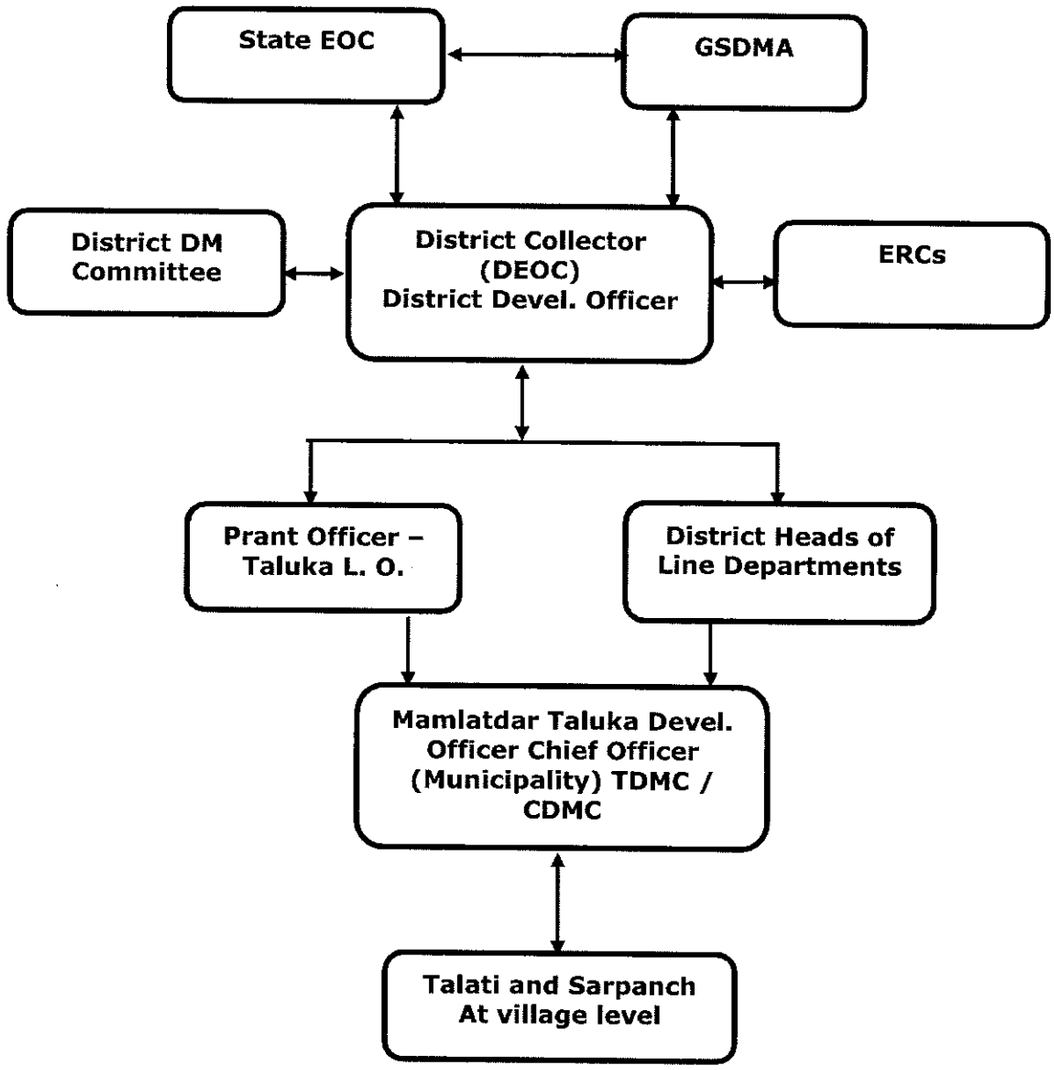


FIGURE-7.19
DISTRICT DISASTER MANAGEMENT ORGANIZATIONAL STRUCTURE

7.3.6.1DDM Roles and Responsibilities

➢ **The Collector**

- Facilitate and, coordinate with, local Government bodies to ensure that pre and post - disaster management activities in the district are carried out.
- Assist community training, awareness programmers and the installation of emergency facilities with the support of local administration, non-governmental organizations, and the private sector.
- Take appropriate actions to smoothen the response and relief activities to minimize the effect of disaster.
- Recommend CoR and State Government for declaration of disaster.

➢ **Local Authority**

- Provide assistance to GSDMA, COR and Collector in disaster management activities.
- Ensure training of its officers and employees and maintenance of resources so as to be readily available for use in the event of a disaster.
- Ensure that all construction projects under it conform to the standards and specifications lay down.
- Each department of the Government in a district shall prepare a disaster management plan for the district. Carry out relief, rehabilitation and reconstruction activities in the affected area within its jurisdiction.

➢ **Private Sector**

- The private sector should ensure their active participation in the pre-disaster activities in alignment with the overall plan developed by the GSDMA or the Collector.
- They should also adhere to the relevant building codes and other specifications, as may be stipulated by relevant local authorities.

➢ **Community Groups and Voluntary Agencies**

- Local community groups and voluntary agencies including NGOs should actively assist in prevention and mitigation activities under the overall direction and supervision of the GSDMA or the Collector.
- They should actively participate in all training activities as may be organized and should familiarize themselves with their role in disaster management.

➢ **Citizen**

It is a duty of every citizen to assist the Collector or such other person entrusted with or engaged in disaster management whenever his aid is demanded generally for the purpose of disaster management.

7.3.6.2ICS Roles and Responsibilities

The basic functional descriptions for key elements in the district Incident command System is described below and the Kutch Incident Command System Organizational Structure is shown in **Figure-7.20.**

➢ **Incident Commander**

Responsible for overall management of an incident based on clearly stated mandate from higher authority and based on focused objectives responding to the immediate impact of the incident.

An Incident Commander, who can be assist by a Dy. Incident Commander, leads the Incident command. In each incident will have as many as many commanders and other staff as there are shifts in the incident operation. Shifts will normally not exceed 12 hours at a time and should be standardized to 8 hours each as soon as possible after the start of the incident.

➢ **Command Staff Units**

A) Safety Unit

Responsible for ensuring the safe accomplishment of all activities undertaken in response to the incident. This task is accomplished through developing incident specific safety guidance documents, reviewing and advising on the safety of plans and monitoring actual operations to ensure safety of personnel and survivors.

B) Protocol and Liaison Unit

Responsible for all official visits as well as liaison between the incident command and organizations providing personnel or material support being used to manage the incident. The first point of contact for NGOs and others coming to the disaster as well as responsible for managing coordination meetings (some of which may actually be held by taskforces or sections).

C) Public Information Unit

Responsible for all media and public information tasks related to the incident. To accomplish its task, the unit can have the following sub units:

- **Public inquiries**: To handle non media requests for information
- **Outgoing public information**: To handle public information dissemination
- **Public opinion feedback**: To collect information from the public (incident survivors and the non-affected)
- **Media center:** To provide a single point of contact for all media involved in the incident.
- **Press release and media access**: Produce all releases and provide a single point of contact to arrange media access to the incident.

- **Monitoring and Feedback:** To monitor media reports and provide feedback to the incident management on coverage of the incident and to also take corrective measures and issue contradictions if required.

➢ **Law and Order Section**

Responsible for assuring the execution of all laws and maintenance of order in the area affected by the incident. The law and order section incorporates law and order task force that may be create to deal with a disaster.

Police Functions: As determined by the normal mandate for and special duties assigned to the police service.

Home Guard: As determined by the normal mandate for and special duties assigned to the home guard.

Volunteers: Supporting police and home guards in non-enforcement tasks, such as patrolling, monitoring and evacuations.

➢ **Operation Section**

Responsible for assuring specific operations according to objectives and plans to address the immediate impacts of the incident. Taskforces under the operation section will deal with specific functional tasks, such as search and rescue, the provision of water or shelter. The composition and size of these taskforces depends on the nature of the incident.

➢ **Planning Section**

Responsible for collecting and analyzing information and developing plans to address the objectives set to address the incident. The overall work of the planning section will include efforts undertaken by any planning and coordination taskforce which is established as part of the response to a disaster. Units under the section include:

1. Assessment and planning;
2. Resources and Requirements;
3. Management information system;
4. Documentation;
5. Demobilization; and
6. Technical specialists.

➢ **Logistic Section**

Responsible for all task and functions related to provision of material and other resources needed for operations and the physical and material support and operation of the incent management team. This section includes transportation taskforce established to support disaster operations. Logistics tasks are through the following units:

1. Storage and supply;

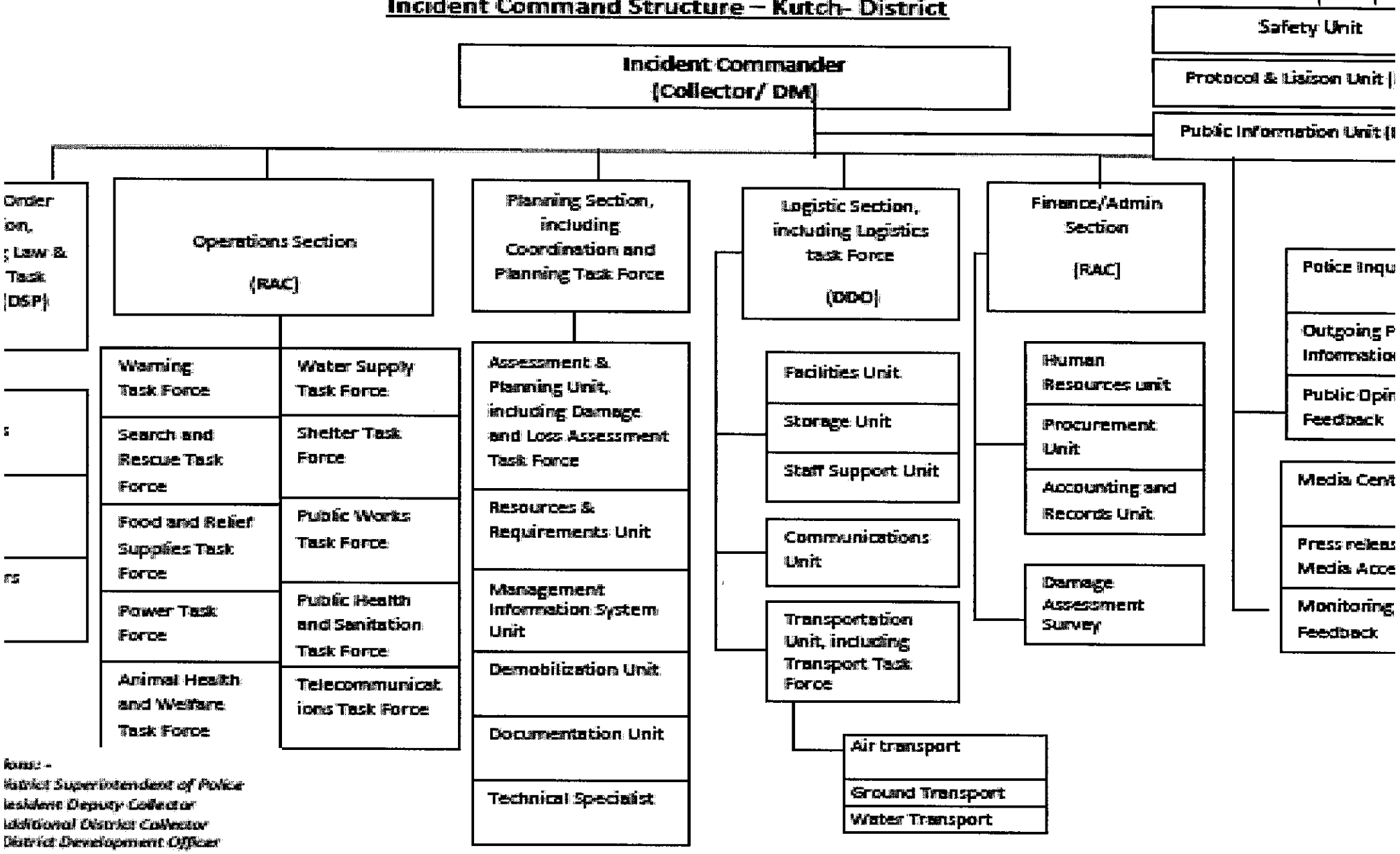
2. Facilities;
3. Staff support;
4. Communications; and
5. Transportation (include ground, air water).

- **Finance and Administration**

Responsible for managing all financial and administrative tasks related to incident field operations. These tasks may, but would not usually include disbursement of financial aid to those affected by an incident. The task of this section are accomplished through following units:

1. Human resources;
2. Procurement; and
3. Accounting and records.

Incident Command Structure – Kutch- District



ions: -
District Superintendent of Police
esident Deputy Collector
ditional District Collector
District Development Officer
istrict Information Officer

The district administration of Kutch has identified 16 expected task forces for key response operation functions that are described below. Additional taskforces can be added under the operations section as needed by the circumstances of a disaster. Each taskforce is led by one organization and supporter by other organizations. Emergency operation taskforce functions is given in **Table-7.15** and the emergency contact numbers is given in **Table-7.16.**

TABLE-7.15
EMERGENCY OPERATION TASKFORCE FUNCTIONS

Sr. No.	Emergency Operation Taskforce	Functions
1	Coordination and Planning	Coordinate early warning, Response & Recovery Operations
2	Administration and Protocol	Support Disaster Operations by efficiently completing the paper work and other Administrative tasks needed to ensure effective and timely relief assistance
3	Warning	Collection and dissemination of warnings of potential disasters
4	Law and Order	Assure the execution of all laws and maintenance of order in the area affected by the incident
5	Search and Rescue (including Evacuation)	Provide human and material resources needed to support local evacuation, search and rescue efforts
6	Public Works	Provide the personnel and resources needed to support local efforts to reestablish normally operating infrastructure
7	Water	Assure the provision of sufficient potable water for human and animal consumption (priority), and water for industrial and agricultural uses as appropriate
8	Food and Relief Supplies	Assure the provision of basic food and other relief needs in the affected communities
9	Power	Provide the resources to reestablish normal power supplies and systems in affected communities
10	Public Health and sanitation (including First aid and all medical care)	Provide personnel and resources to address pressing public health problems and re-establish normal health care systems
11	Animal Health and Welfare	Provision of health and other care to animals affected by a disaster.
12	Shelter	Provide materials and supplies to ensure temporary shelter for disaster-affected populations
13	Logistics	Provide Air, water and Land transport for evacuation and for the storage and delivery of relief supplies in coordination with other task forces and competent authorities
14	Survey (Damage Assessment)	Collect and analysis data on the impact of disaster, develop estimates of resource needs and relief plans, and compile reports on the disaster as required for District and State authorities and other parties as appropriate
15	Telecommunications	Coordinate and assure operation of all communication systems (e.g; Radio, TV, Telephones, Wireless) required to support early warning or post disaster operations
16	Media (Public Information)	Provide liaison with and assistance to print and electronic media on early warning and post-disaster reporting concerning the disaster

TABLE-7.16
DISTRICT INCIDENT COMMAND STRUCTURE-KEY OFFICERS

Sr. No.	Task Force	Taskforce Leader	Supporting Members / Organizations	ICS/GS Section / Unit	Taskforce Operation Room/Contact Number	Taskforce Leader/Contact Number	Taskforce-Alternate Leader /Contact Number
1	Planning and Coordination	Collector/ DM	DDO, DSP, RAC, SDM and Mamlatdar	Planning	Collector office	Collector/ 02832-250020 9978406213	RAC 02832-252704 9978405212
2	Administration & Protocol	RAC	DDO, DSP, RAC and Mamlatdar	Finance & Administration	RAC office	RAC 02832-252704 9978405212	Mamlatdar Disaster Management 02832-250923 02832-224150
3	Damage Assessment/Survey	RAC	DIC, Dy. DDO, Ex. Engr., R&B, DAO, Fisheries	Planning	RAC office	Addl. Collector/ 02832-252704 9978405212	Mam. Disaster Management 02832-250923 02832-224150 9586408593
4	Warning	RAC	RAC, Dy. Mamlatdar, Control Room, District Information Officer (DIO)	Operation	RAC Office	RAC 02832 250650 09978405212	Mam. Disaster Management 02832-250923 02832-224150 09586408593
5	Communications	RAC	Dy. Mamlatdar, Mobile Operators, TV, Radio, Port Office GMB, Police, Forests	Logistics			
6	Media	District Information Officer	Information Department, Print, Media, TV, Journalists, NGOs	Public Information	Information Dept. CR	District Info Officer/ 02832-250954 9825011708	Dy. DIO/ 02832-250954
7	Logistics	DDO	RTO, DSO, FPS, Private & Public sector, Municipal water supply board, Mamlatdar, Dist. Supply Mamlatdar	Logistics	-	-	-
8	Law & Order	DSP	Dy. SP, Home Guards Commandant, NGOs, Para-	Law & Order	Police Control Room (CR)	DSP:- 02832 250444	Dy. SP/ P: 02832 250444

Sr. No.	Task Force	Taskforce Leader	Supporting Members / Organizations	ICS/GS Section / Unit	Taskforce Operation Room/Contact Number	Taskforce Leader/Contact Number	Taskforce-Alternate Leader /Contact Number
			military and Armed Forces			9978405073	F: 02832 250427
9	Search & Rescue	Dy. Collector Civil Defense	Mamlatdar, TDO, Police, Executive Engr., Fire Brigade, RTO, State Transport, Health Deptt.	Operation	Dy. Collector Civil Defense	Chief fire Officer or Deputy Collector (Civil Defense)- 02832230603	District Municipality officer 9909017970
10	Public Works	Ex. Engr. R&B (State)	Irrigation, Ex. Engr., Panchayat, NGOs, Water Supply Board, Municipalities, Home Guards, Police	Operation	R&B-CR	Ex. Engr, R&B/ 02832-251450 9825165818	Dy. Engr. 02832-221103 9601064096
11	Shelter	Dist. Primary Education Officer	School Principal, Teachers, Health, PHC, State Transport, Water Supply, RTO, Mamlatdar, TDO.	Operation	Education. Office-CR	District Primary Edu. Officer/ 02832 250156	Dy.District Primary Edu. Officer 02832-250156
12	Water Supply	Ex. Engr. GWSDB / Ex. Engr. Water Works	Dy. Ex. Engr., Talati, Mamlatdar, TDO, Health, Dy. Engr.	Operation	GWSDB-CR	Ex. Engr. GWSDB/ 02832-221806 99784 06901	Ex. Engr. GWSDB 02832-221806
13	Food & Relief Supplies	Dist. Supply Officer	FPS, PDS, Mamlatdar, NGO, RTO, State Transport, Municipality, DRDA, Police, Home guard	Logistics	DSO-CR & DDO office	District Supply Officer/ 02832-221453 99250 27322	Dy. DDO officer 02832 251125 98798 90124
14	Power	Supt. Engr. GEB	Ex. Engr., Dy. Engr. Technical, GEB, Transport	Operation	GEB-CR	Supt. Engr. GEB/ 02832-25531 9825603183	Ex. Egg. GEB 02832-253752
15	Public Health & sanitation	Chief district health Officer (CDHO)	Supt. Hospital, PHCs, CHCS, Municipality, Fire Brigade, Civil Defense, R&B, NGOs, Doctors, TDO, Mamlatdar	Operation	District Health Centre,	CDHO/ 02832-252207 9909949302	Add. CDHO 02832 252207
16	Animal Health & Welfare	Dy. Director Animal Husbandry	Veterinary Inspector, NGOs	Operations	A & H Office	Dy. Director, A&H/ 02832-221650 9426704429	Ass. Director A & H 02832-221650

7.4 Occupational Health and Safety

For large industries, where multifarious activities are involved during construction, erection, testing, commissioning, operation and maintenance, the men, materials and machines are the basic inputs. Along with the boons, industrialization generally brings several problems like occupational health and safety.

The industrial planner, therefore, has to properly plan and take steps to minimize the impacts of industrialization and to ensure appropriate occupational health and safety including fire plans. All these activities again may be classified under construction and erection, and operation and maintenance.

7.4.1 Occupational Health

Occupational health needs attention both during construction and erection and operation and maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

- **Construction and Erection**

The occupational health problems envisaged at this stage can mainly be due to constructional accident and noise. To overcome these hazards, in addition to arrangements to reduce it within TLV's, necessary protective equipments shall also be supplied to workers.

- **Operation and Maintenance**

The necessary personal protective equipments shall be given to all the workers. The working personnel shall be given the following appropriate personnel protective equipments.

- Industrial safety helmet;
- Crash helmets;
- Face shield with replacement acrylic vision;
- Zero power plain goggles with cut type filters on both ends;
- Zero power goggles with cut type filters on both sides and blue color glasses;
- Welders equipment for eye and face protection;
- Cylindrical type earplug;
- Ear muffs;
- Canister gas mask;
- Self contained breathing apparatus;
- Leather apron;
- Aluminized fiber glass fix proximity suit with hood and gloves;
- Boiler suit;
- Safety belt/line man's safety belt;
- Leather hand gloves;
- Asbestos hand gloves;
- Acid/Alkali proof rubberized hand gloves;
- Canvas cum leather hand gloves with leather palm;
- Lead hand glove;
- Electrically tested electrical resistance hand gloves; and
- Industrial safety shoes with steel toe.

Full-fledged hospital facilities shall be set up for attending emergency arising out of accidents, if any. All working personnel shall be medically examined at least once in every year and at the end of his term of employment. This is in addition to the pre-employment medical examination.

7.4.2 Safety Plan

Safety of both men and materials during construction and operation phases is of concern. Safety plan shall be prepared and implemented in the proposed refinery plant. The preparedness of an industry for the occurrence of possible disasters is known as emergency plan. The disaster in the plant is possible due to collapse of structures and fire/explosion etc.

Keeping in view the safety requirement during construction, operation and maintenance phases, AEL has formulated Environment, Health and Safety Policy for their other industries, the same will be followed for the proposed refinery project. Environment, Health and Safety policy is given in **Figure-7.21.**

7.4.3 Safety Organization

- ***Construction and Erection Phase***

A qualified and experienced safety officer shall be appointed. The responsibilities of the safety officer include identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. He is also responsible to ensure compliance of Safety Rules/ Statutory Provisions.

- ***Operation and Maintenance Phase***

When the construction is completed the posting of safety officers shall be in accordance with the requirement of Factories Act and their duties and responsibilities shall be as defined thereof.

7.4.4 Safety Circle

In order to fully develop the capabilities of the employees in identification of hazardous processes and improving safety and health, safety circles would be constituted in each area of work. The circle would consist of 5-6 employees from that area. The circle normally shall meet periodically on scheduled frequency.

adani

ENVIRONMENT, HEALTH & SAFETY POLICY

We at Adani, strive to make our businesses sustainable, that benefits our customers, our employees, our shareholders and society in general. We believe that in addition to integrated infrastructure business, there is a bottom line in performing our operations according to prescribed standards, specifications and regulations on governance, which are safe in working and environmental friendly for the well-being of the working community.

As a responsible corporate, we at ADANI have a firm conviction that the industrial injuries, occupational hazards as well as safety and environmental incidents are preventable. We recognize and trust people as our most important asset and have commitment to provide safe and healthy work environment impacting not only those, who are working in our industry but also community, which is living in the vicinity.

To achieve this objective, we shall

a. Develop, implement, maintain and sustain EHS Management System across the Group to set up new benchmarks for the respective sector of operations, which superimpose the regulatory and statutory requirements.

b. Verify, audit and periodically review EHS performance and set new targets to revise these benchmarks.

c. Formulate EHS objectives and targets for continual improvement and to have a periodic review for ensuring that these are in conjunction with the individual business and corporate levels.

d. Conduct all our operational activities in such a manner as to avoid harm to employees, contractors, stakeholders and community at large.

e. Inculcate safety & health as a personal value through behavioral intervention and recognize it across levels with continuous correction of unsafe behavior.

f. Provide adequate training and resources so as to bring awareness and ability to carry out work safely.

g. Emphasize responsibility and accountability to all employees and contractor workforce for safe performance on the job and encourage safe behavior off the job.

h. Evolve ways to reduce or eliminate the use or release of toxic and hazardous material and prevent pollution by conserving natural resources; recovering and recycling the raw materials for safe, healthy and clean environment.

GAUTAM S ADANI

Date: 01.01.2016

FIGURE-7.21
HEALTH AND SAFETY POLICY

7.4.5 Safety Training

A full-fledged training center shall be set up at the plant. Safety training shall be regularly imparted by the safety officers with the assistance of faculty members called from professional safety institutions and universities. In addition to regular employees, limited contractor labors are to be provided safety training. To create safety awareness, safety films shall be shown to workers and leaflets are to be distributed. Display boards will be positioned across the plant at the appropriate location giving information about the safety Personal Protective Equipments (PPEs) usage and risk available in the respective areas.

7.4.6 Health and Safety Monitoring Plan

The health of all employees shall be regularly monitored once in a year for early detection of any ailment due to exposure to heat and noise.

Worker's health will be evaluated by pre designed format which includes chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations will be conducted giving the details of the same.

7.4.7 Cost Estimate

For initial and periodical medical checkup of employees, budgetary provision of Rs. 1000/employee/year shall be made. The provision at this stage is being made for 2000 skilled/semiskilled/unskilled workers. Besides this provision, health checkups of local people will also be made. Cost estimate for the employees is given in **Table-7.17**.

TABLE-7.17
MEDICAL CHECKUP COST ESTIMATE

Sr. No.	Particulars	Quantity	Unit	Rate (Rs.)	Amount (Rs. in Lakhs)
1	Yearly medical checkup to plant workers for 30 years. 2000*30= 60,000 man year	60,000	Man year	1000	600

7.5 Sodar Study (Site Specific Inversion Study)

A detailed sodar study was carried out by Dr. B S Gera and his team for generation of site specific inversion/mixing height data. Sodar study report is enclosed in **Annexure-XI.**

SODAR was operated continuously during November - December 2016. Data generation was carried out continuous throughout this period using power backup system.

Analysis of the data obtained during the study period shows that inversion height varies from a minimum of 68 m to maximum of 347 m. The averaged inversion level during stable ABL conditions (1800-0600 hours) is seen to be 202±70 m during the study period.

The hourly averaged mixing height pertaining to unstable ABL during the day time (0900-1700 hours) is seen to vary from a minimum of 509 m to a maximum of 1198 m. The average level is seen to be 840±198 m during the study period.

The maximum of day time mixing height around noon (1200-1400 hours) is seen to be more than 1 km on several days which is fairly good for the winter.

The above generated mixing height data has been used in the air dispersion modelling.

7.6 Social Impact Assessment (SIA) Study

As per the additional ToR No.3: The project proponent should carryout Social Impact Assessment of the project as per the Office Memorandum no. J-11013/25/2014-1A dated 11.08.2014 issued by Ministry regarding guidelines on Environment Sustainability and CSR related issues.

In response to the above TOR, detailed Social Impact Assessment (SIA) study has been carriedout. The study report is enclosed as **Annexure-XII**.

Adani group has been the pioneers in enterprise social responsibility/corporate social responsibility and made significant contributions to improve quality of people's life in all the regions they operate in. In Gujarat, APSEZL and AEL have started key initiatives in support of sustainable development. The CSR activity aims at bettering the socio-economic and cultural status of local people. AEL is strictly committed and is going to implement the proposal to uplift the social infrastructure surrounding the copper refinery plant area. AEL allocated Rs. 40 Crores (0.04% on total project cost Rs. 10000/- Crores) for Corporate Environment Responsibility-CER budget.

Chapter-8
Project Benefits

8.0 PROJECT BENEFITS

The proposed project will result in considerable growth of industrial and commercial activities in the state. The small and medium scale industries may be further developed as downstream industries.

The proposed copper refinery project is one of the important projects which would add significant value to Indian economy. The project will not only help ensuring by becoming self-sufficient in terms of copper and sulphuric acid for India but also drive macro-economic growth.

Further, in operation phase, the proposed project would require significant workforce of non-technical and technical persons, which results in enhancement of employment opportunities and associated development in the region.

The series of benefits that the project would reap, may it be strategic or socio-economic are tabulated below:

8.1 Benefits to India and State of Gujarat

AEL has undertaken a cost benefit analysis to ascertain the benefits that would accrue to India and Gujarat in particular from its proposed copper refinery project. The study results show that the copper project would create substantial amount of tax revenue for India over 25 years of project life.

The copper refinery project venture is expected to employ about 5,000 direct and indirect employees.

8.2 Improvements in the Physical Infrastructure

The beneficial impact of proposed project on the civic amenities will be substantial after the commencement of project activities. The basic requirement of the community needs will be strengthened by extending healthcare, educational facilities to the community, building/strengthening of existing roads in the area. AEL is already providing the above amenities and would further strengthen the activities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of communities.

8.3 Improvement in the Social Infrastructure

AEL believes that an effective growth policy must also take into account the fulfillment of basic needs of the masses, especially of those living in rural areas. AEL has one of the best social infrastructure proposals which are based on the implementation already done by APSEZ and APL at Mundra, in the core area of health, education, sustainable livelihood options & women empowerment, community infrastructure, youth sport & cultural activities, calamity management. AEL is strictly committed and is going to implement the proposal to uplift the social infrastructure in the surroundings of the copper plant area.

8.4 Employment Potential

The impact of the project on the economic aspects can be clearly observed. The proposed project activities will provide employment to persons of different skills and trades. The locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available. Adani skill development centre will be developed and necessary budget will be allotted. The employment potential will ameliorate economic conditions of these families directly and provide employment to many other families indirectly who are involved in business and service oriented activities. In order to increase the potential of the local public, such workshops shall be organized.

The employment of local people in primary and secondary sectors of project shall upgrade the prosperity of the region. This in-turn will improve the socio-economic conditions of the area.

- During construction phase of the project, this project will provide temporary employment to many unskilled and semi-skilled laborers in nearby villages. The proposed project will provide employment to about 2000 – 3000 persons on average per day. This project will also help in generation of indirect employment to those people who render their services for the personnel directly working in the project; and

- During operational phase, considerable number of people will be benefited by provision of various services, such as transportation, technical services, skilled & semi-skilled services and indirectly it will flourish various business activities. The proposed project will provide employment to about 2000 persons direct and 5000 persons indirect employment.

The proposed project women employment will be about 120 persons and proper training will be imparted to the ladies so that their employability will increase.

The trend of out migration for employment, if any, is likely to be reduced due to better economic opportunities available in the area.

8.5 Corporate Social Responsibility (CSR)

Adani group has been the pioneers in enterprise social responsibility/corporate social responsibility and made significant contributions to improve quality of people's life in all the regions they operate in. In Gujarat, APSEZL and AEL have started key initiatives in support of sustainable development. AEL has a separate CSR policy approved by its board of directors and is enclosed as **Annexure-XV.**

The CSR activity aims at bettering the socio-economic and cultural status of local people. The key highlights of some initiatives & activities that AEL is going to undertake at Mundra are:

Sustainable Livelihood Options & Women Empowerment

- Strengthening the community based organizations like self-help groups, farmer federation etc.;

- Capacity building of the underprivileged communities on various market driven skills;
- Establishment of forward & backward market linkages through networking;
- Facilitating the easy reach to the technical institutions for knowledge up gradation; and
- Promotion of livestock health management.

Education Initiatives

- Skill up-gradation through establishment of technical training institution;
- Infrastructural development in the form of school building, teaching & learning equipment and furniture & fixtures etc.;
- Quality teacher support;
- Scholarship for education excellence;
- Promotion of girl child education;
- Incorporation of extra-curricular activities;
- Holistic approach to the education through "Yoga & Art Of Living"; and
- Promotion of functional literacy.

Health Initiatives

- Addressing the mother & child health;
- Support to the nutritional program of mother, child & school goers;
- Control on blindness, malaria, TB, HIV & AIDS, diarrhea etc.;
- Support the district health administration in the community health activities;
- Improvement of villages sanitation through solid-liquid waste management; and
- Knowledge enhancement on preventive health care.

Community Infrastructure & Facilities

- Enhancement of green coverage;
- Protection of wildlife through awareness generation;
- Promotion of renewal energy; and
- Waste management through installation of recycling measures.

Photographs of the CSR activities are shown in **Figure-8.1**. The statement showing the budget expenditure data spent to carry out ESR/CSR activities during the last five years (2011-2016) is given in **Table-8.1** and the budget allocated for the next five years is given in **Table-8.2.**

TABLE-8.1
ESR/CSR BUDGET EXPENDITURE DATA

Sr. No	Year	Expenditure Rs. in Crores
1	2010-11	8.02
2	2011-12	8.58
3	2012-13	14.63
4	2013-14	12.31
5	2014-15	17.48
6	2015-16	10.84
	Total	**71.86**

TABLE-8.2
PROPOSED ESR/CSR BUDGET PLAN

Sr. No.	Key Area Identified for intervention through CSR activities by proposed Copper Refinery Plant	Proposed Expenditure in Project Construction Phase (Rs. in Crores)					Total Proposed Expenditure (Rs. in Crores)
		1st Year	2nd Year	3rd year	4th Year	5th Year	
A	**Education Initiatives**						
	• Supporting in creation of assembly halls, prayer hall, classrooms, computer labs, space for mid-day meal, playground, school walls etc. for government school. • Igniting mind of students through science on wheels, UDAN schemes. • Educational Vocational Guidance Fair (EVGF) for career talk. • Balwadis for the kids of fisher-folk community to provide awareness about education, health, hygiene, and discipline. • Programme for skills improvements of teaching staffs in govt. schools.	1	1	1	1	1	**5**
B	**Community Health Initiatives**						
	• Senior Citizen Health Card Scheme to address the needs of the senior citizens. • Various health camps organization at regular intervals i.e. Gynaecological care, Blood donation, Health awareness programs, HIV/AIDS, Cataract detection. • Provision of Free Mobile Health Care Units (MHCU). • Promotion of awareness of malnutrition and anaemia. • Setting up rural clinics to ensures outreach services.	2	2	2	2	2	**10**
C	**Sustainable Livelihood and Women Empowerment**						
	• Extend assistance to start SHGs to empower women and material and financial support to take up self-employment. • Amenities like equipment support, sanitation facilities, approach roads, fish lending sheds, fisher-folk vasahats (Settlements); training for livelihood, Insurance etc.	1	1	1	1	1	**5**

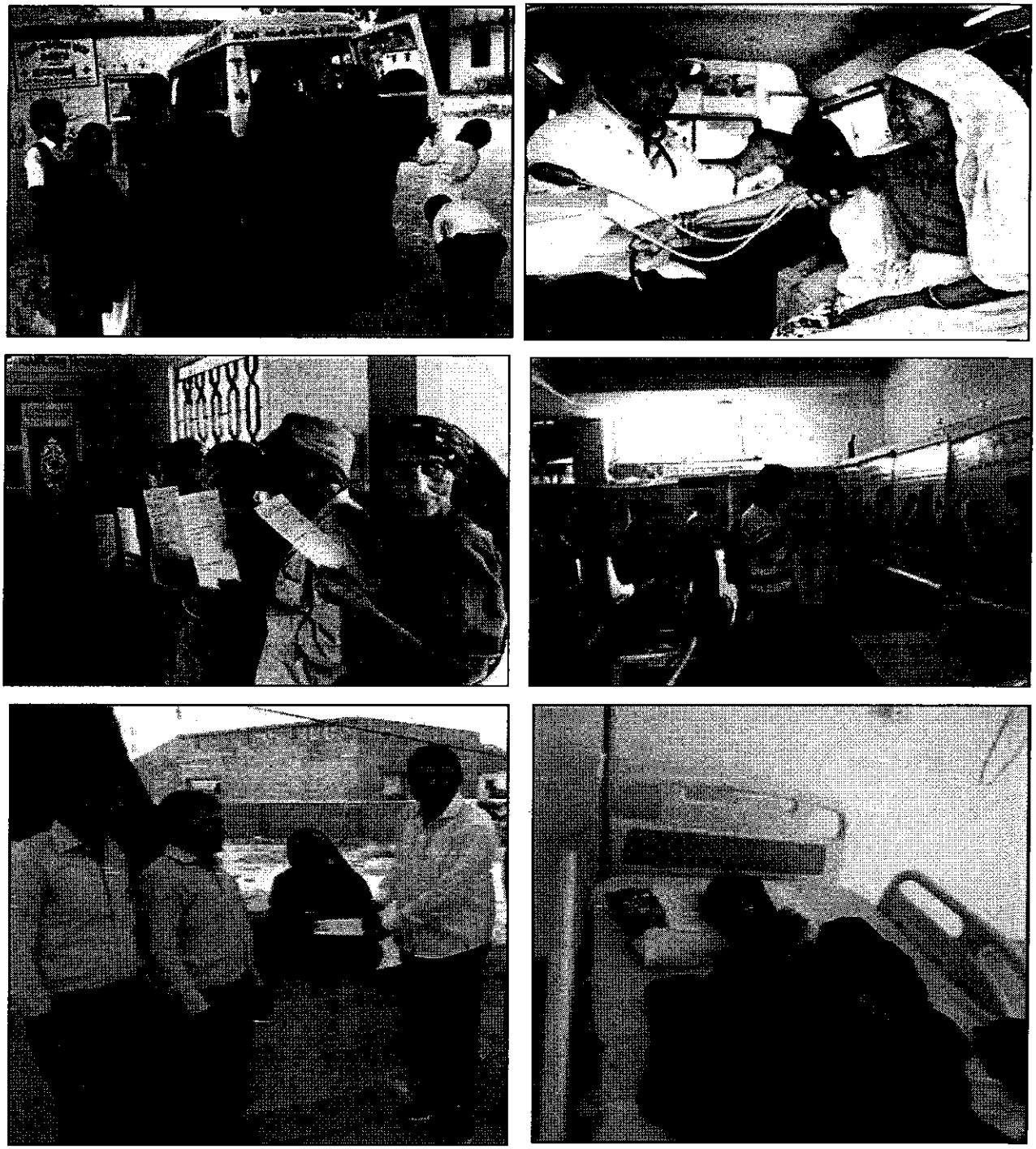
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Sr. No.	Key Area Identified for intervention through CSR activities by proposed Copper Refinery Plant	Proposed Expenditure in Project Construction Phase (Rs. in Crores)					Total Proposed Expenditure (Rs. in Crores)
		1st Year	2nd Year	3rd year	4th Year	5th Year	
	• Skill Development Centre (SDC) to make the youth for achieving their Goals in life by becoming Skilled Professionals. • Provision of fodder support, promote bio-gas installation in agri and animal husbandry based families' households. Construction of cattle sheds, Awareness meetings and exposure visits for animal husbandry. Support for Drip irrigation.						
D	**Community Rural Infrastructure Development**						
	• To provide facility for potable drinking water by providing RO Plants, drinking water supply system, overhead tank and underground pump in villages. • Creation of clean and hygienic environment by proper drainage systems, sewage treatment plants, community led sanitation campaign etc. • Construction of various community centres to facilitate social activities, upgradation of facility at crematoriums, Gaushala, and creation of bus stands etc. • Conservation of water by construction of check dams and pond. • Upgradation of primary health centres, renovation of roads and expansion of roads, construction of toilet facilities etc. • Provision of solar street lighting, green nurturing programs, implementation of swachchh bharat initiatives	4	4	4	4	4	**20**
	Total Expenditure	**8**	**8**	**8**	**8**	**8**	**40**



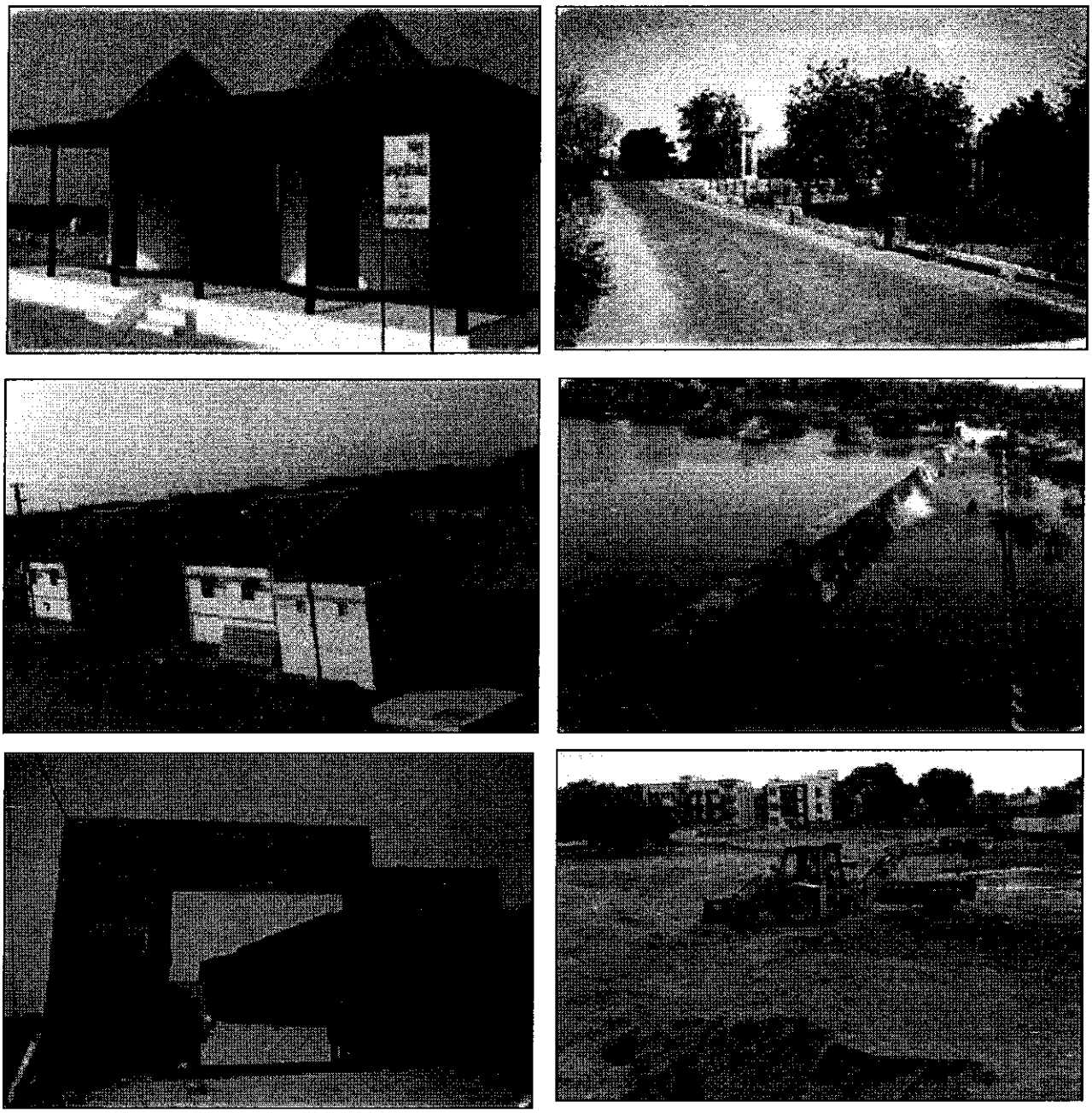
EDUCATION FACILITIES

FIGURE-8.1(A)
CSR PHOTOGRAPHS



HEALTH ACTIVITIES

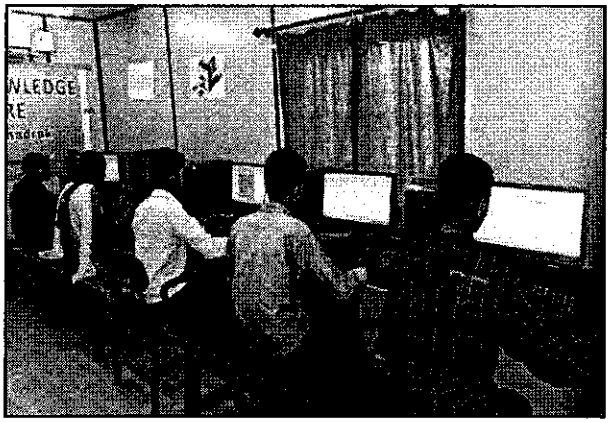
FIGURE-8.1(B)
CSR PHOTOGRAPHS

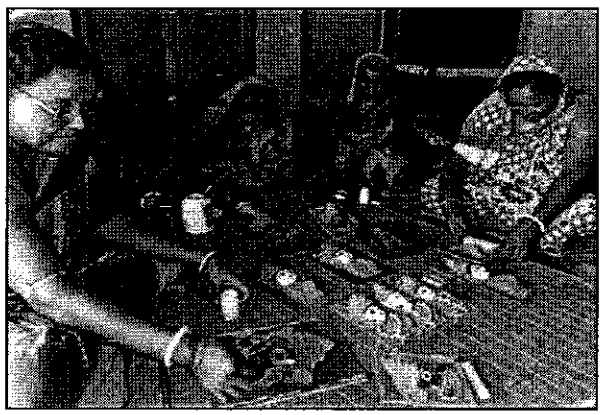


RURAL INFRASTRUCTURE DEVELOPMENT

FIGURE-8.1(C)
CSR PHOTOGRAPHS



SUSTAINABLE LIVELIHOOD DEVELOPMENT

FIGURE-8.1(D)
CSR PHOTOGRAPHS

Chapter-9
Environmental Cost Benefit Analysis

9.0 Environmental Cost Benefit Analysis

The scope of the EIA/EMP has been prescribed vide the Terms of Reference (TOR) issued by MoEF&CC vide Letter No. F F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016 and is enclosed as *Annexure-I.*

As per SO 1533 dated 14th September 2006, the chapter on environmental cost benefit analysis is to be prepared if prescribed at the scoping stage.

This chapter has to be carried out if specifically required as per scoping. As this is not specifically mentioned in TOR, further detail study is not carried out.

Chapter-10
Environment Management Plan

10.0 ENVIRONMENT MANAGEMENT PLAN

Environment Management Plan (EMP) describes various pollution control systems and other measures envisaged for mitigating environmental impacts identified separately for construction and operation phases.

EMP specifies various technological measures for pollution prevention, waste minimisation, attenuation etc. proposed to be undertaken to mitigate the environmental impacts on each sector of environment during each phase of the project, i.e. construction phase and operation phase.

Apart from mitigation measures, EMP also includes institutional set-up for implementation of various measures, greenbelt development plan and environmental monitoring plan.

10.1 Management Plan for Construction Phase

The impacts of construction activities would be temporary and will reduce gradually with the completion of the construction activities. Various mitigation measures proposed to be implemented during construction phase are described in **Table-10.1.**

10.2 Management Plan for Operation Phase

The impacts of operation phase will be long term in nature. **Table-10.2** describes various mitigation measures, proposed to be implemented during operation phase and **Table-10.3** describes the mode of implementation and allocation of human resources for the same.

TABLE-10.1
PROPOSED MITIGATION MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION PHASE

Proposed Mitigation Measures	Responsibility for Implementation	Targets to Achieve	Risks and Consequence of Failure, if any
Air Pollution Control			
Water sprinkling in vulnerable areas	AEL + Contractor	Control of fugitive dust from construction areas	Increase in PM emissions
Proper maintenance of vehicles & construction equipment	AEL + Contractor	Control of CO & NOx emissions	Increase in gaseous pollutant
Transportation of construction material in covered trucks, wherever possible	AEL + Contractor	Control of fugitive dust during transportation	Increase in PM emissions
Noise Pollution Control			
Proper maintenance of vehicles, equipment and machinery	AEL + Contractor	Control of ambient and site noise levels	Increase in noise levels
Provision of accoustic covers/ enclosures on equipment and machinery, wherever possible	AEL + Contractor	Control of ambient and site noise levels	Increase in noise levels
Provision of earmuffs/ earplugs to the workers in high noise areas and enforcement of its use	AEL + Contractor	Protection of workers	Health effects on individual workers
Water Pollution Control			
Channelization and construction of temporary sedimentation tanks for effluents from construction area through network of drains.	AEL + Contractor	Control of suspended solids and oil & grease in effluents from construction area	Increase in total suspended solids and oil & grease in effluents
Socio-Economic Environment			
Provision of environmentally safe camping area for the migrant laborers	AEL + Contractor	To provide clean & healthy living environment to work force	Unhealthy living conditions, spread of diseases
Arrangements for water supply and sanitation	Contractor	To reduce stress on surrounding population	Stress on existing utilities, conflicts with local people
Solid Waste Management			

Proposed Mitigation Measures	Responsibility for Implementation	Targets to Achieve	Risks and Consequence of Failure, if any
Disposal of surplus earth and construction debris	Contractor + AEL	Control of pollution	Air/ water pollution
Reclaiming of un-built area with appropriate vegetation/ land scaping	AEL	Create a good visual environment. Aesthetics improvement.	Unpleasant surroundings

TABLE-10.2
PROPOSED MITIGATION MEASURES TO BE IMPLEMENTED DURING OPERATION PHASE

Mitigation Measures Proposed	Responsibility for Implementation	Targets to Achieve	Risks and Consequence of Failure, if any
Air Environment			
Tail Gas Scrubber	AEL	Treat the gases and mists before venting to the atmosphere	Increase in gaseous emissions
Provision of Online SO_2 analyzer	AEL	Control of SO_2 emissions	Increase in SO_2 emissions
Adequate stack height for all the units	AEL	Wider dispersion of emitted air pollutants	Increase in ground level concentration of pollutants.
Appropriate design of access roads to avoid traffic jams to reduce air pollution	AEL	Control of CO and NOx emissions	Increase in gaseous emissions
Water Environment			
Sewage Treatment Plant	AEL	Removal of suspended solids, oil and grease and organic matter to conform to regulatory standards for discharge of effluents into inland surface waters	Increase in concentration of pollutants especially biological parameters.
Effluent Treatment Plant	AEL	To conform to regulatory standards for discharge of effluents into inland surface waters	Contamination of water
The storm water from the paved and	AEL	Recharge the ground water	Flooding of Plant

Mitigation Measures Proposed	Responsibility for Implementation	Targets to Achieve	Risks and Consequence of Failure, if any
unpaved areas shall be routed to the rainwater harvesting structures		table	
Noise Environment			
Provision of acoustic enclosures/ barriers/ shields to reduce noise	AEL	Attenuation of noise in source receptor pathway	Increase in ambient noise levels
Provision of personal protective equipment like ear plugs and ear muffs	AEL	Protection of sensitive receptor	Health impact on workers in high noise areas
Solid Waste Management			
Domestic solid waste	AEL	Environmentally safe disposal of municipal waste from township	Air and water pollution, spread of disease vectors
Hazardous waste	AEL	Shall be disposed to secured land fill/ recycle through authorized recycles.	Soil contamination
Others			
Afforestation and greenbelt development	AEL	Ecological improvement Attenuation of air pollutants (PM, SO_2 and NOx) and noise in source receptor pathway	Reduction in aesthetics and living space. Higher pollutants in the ambient air.
Disaster management plan	AEL	Safety	Increased risk of fire and explosion

Implementation Schedule of Mitigation Measures

The mitigation measures suggested as above shall be implemented so as to reduce the impact on environment due to the operations of the proposed project. In order to facilitate easy implementation of mitigation measures, the priority of implementation is given in **Table-10.3.**

TABLE-10.3
IMPLEMENTATION SCHEDULE

Sr. No.	Recommendations	Time Requirement	Schedule
1	Air pollution control measures	Before commissioning of respective units	Immediate
2	Water pollution control measures	Before commissioning of the plant	Immediate
3	Noise control measures	Along with the commissioning of the plant	Immediate
4	Ecological preservation and up gradation	Stage wise implementation	Immediate & Progressive

10.3 Institutional Arrangements for Environment Protection and Conservation

Environment Management Cell (EMC) will be headed by a manager and will constitute environmental engineer, safety officer and ecologist/horticulturist. The organizational structure of environment management cell is presented in **Figure-10.1**. The Environment, Health & Safety (EHS) policy is enclosed as **Annexure-XVI**. The list of directors for proposed project is enclosed as **Annexure-XVII**.

The manager (environment) will be responsible for environment management activities in the proposed project. Basically, this department will supervise the monitoring of environmental pollution levels viz. source emission monitoring, ambient air quality, water and effluent quality, noise level either departmentally or by appointing external agencies wherever necessary.

In case the monitored results of environmental pollution found to exceed the allowable limits, the environment management cell will suggest remedial action and get these suggestions implemented through the concerned authorities.

The environment management cell also co-ordinate all the related activities such as collection of statistics of health of workers and population of the region, afforestation and greenbelt development.

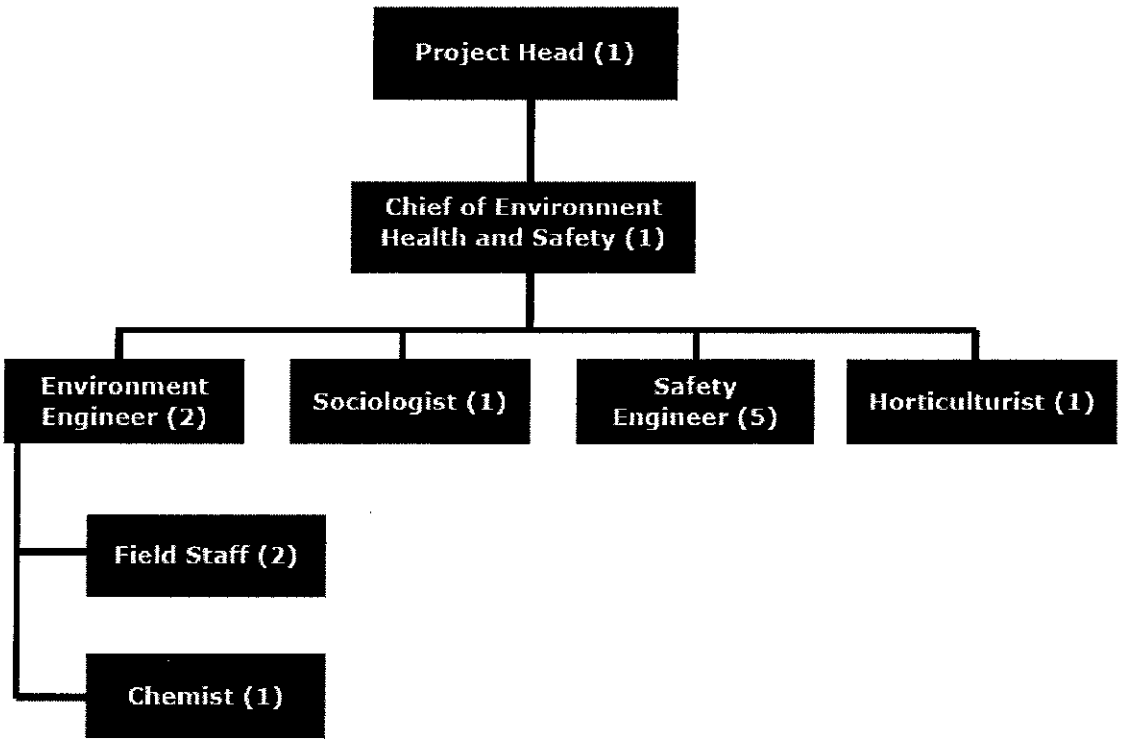


FIGURE-10.1
ORGANIZATIONAL STRUCTURE

Chapter-11
Summary & Conclusion

11.0 SUMMARY & CONCLUSION

M/s. Adani Enterprises Limited (AEL) intends to set up a greenfield copper refinery project at Adani Port Special Economic Zone (APSEZ) land, Mundra taluka, Kutch district, Gujarat state.

The proposed greenfield copper refinery project would require a total land area of 256.58 ha (634 acres) earmarked with state of art environment friendly technology. The estimated cost for the proposed project is about Rs. 10,000 Crores.

11.1 Type of Project

The proposed copper refinery project (phase-I & phase-II) would produce 10 LTPA (1.0 MTPA) of copper cathode; 30 LTPA of sulphuric acid; 5 LTPA of copper wire rod; 96,000 TPM of oxygen plant; 50 TPA of gold; 500 TPA of silver; 5 LTPA of phosphoric acid (as 100% P_2O_5); 30,000 TPA of aluminum fluoride etc. with the state of art environment friendly technology.

It is proposed to adopt pyrosmelting technology and electro refining process to produce copper cathode. The sulphur dioxide generated during the smelting of copper concentrate is converted into sulphuric acid by Double Conversion Double Absorption (DCDA) process. A part of this sulphuric acid is captively utilized for production of phosphoric acid.

The principal raw material for the production of copper metal is copper concentrate blend containing about 25-35% copper, 25-34% sulphur, iron 25-35% and 7-10% moisture. Approximately 3 LTPA copper scrap and electronic scrap is also used as input to proposed copper refinery project and copper scrap melting facility.

The major steps in copper extraction include:

- Blending of different grades of concentrates;
- Smelting of concentrate in smelting furnace to produce an intermediate copper rich product known as "matte" containing 58 - 63% copper;
- Converting of liquid matte to blister copper (98- 99% Cu) in Pierce - Smith converter;
- Fire refining of blister copper to produce anode copper (99.5% Cu) in anode furnace and casting of the anodes; and
- Electrolytic refining of anodes to produce copper cathodes (99.99% Cu).

The major technological units envisaged for the copper refinery project are as given below:

- Raw material handling system;
- Smelting furnace;
- Pierce smith converter;
- Ferro sand cleaning furnace (FSCF);
- Copper scrap melting system;

- Anode furnace & anode casting wheel;
- Off gas handling;
- Sulphuric acid plant;
- Oxygen plant;
- Refinery unit;
- Precious metal recovery plant;
- Continuous cast copper wire rod plant;
- Phosphoric acid plant;
- Aluminum fluoride plant; and
- Effluent treatment plant (ETP).

11.1.1 Environmental Setting of the Site

The proposed project site is located in Siracha and Navinal villages at APSEZ Mundra taluka, Kutch district in the state of Gujarat. The proposed site is well connected by the existing national/state highways and cargo rail link, which is about 2 km away from the Navinal railway station. The nearest airport is at APSEZ, Mundra located at a distance of about 20 km of the project site and another is at Bhuj located at a distance of 50 km from the proposed project site. The nearest railway station is Adipur/Gandhidham, which is about 64 km from project site and nearest town is Mundra which is about 13.9 km from the proposed project site. The national highway NH-8A is passing at about 5 km away from the site. State highway SH-6 is about 0.3 km from the proposed site. The site is well connected with Ahmedabad city located at about 460 km.

11.1.2 Project Features

➢ *Land Requirement*

The total land required for the proposed project (phase-I & pashe-II) is about 256.58 ha (634 acres), out of which 154.19 ha (381 acres) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Memorandum of Understanding (MoU) is in place between Adani Ports & Special Economic Zone Limited (APSEZL) and Adani Enterprises Ltd (AEL) for 154.19 ha (381 acres). Further, forest land of 102.39 ha (253 acres) is also involved which will be converted for industrial use. MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. There is no resettlement and rehabilitation involved in this project.

➢ *Water Source and Requirement*

The requirement of desalinated water for the proposed project has been estimated as 32,800 KLD, which will be sourced from APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL).

➢ *Power Requirement*

The total estimated power requirement for proposed project is 300 MW out of which 40 MW would be generated from internal process steam and balance 260 MW power would be sourced from APSEZ Limited, through M/s. Mundra Utility Private Limited (MUPL).

11.2 Baseline Environmental Status

Baseline environmental status has been established for various environmental attributes within a study area of 10 km radius from the project site. The major environmental disciplines covered in the EIA report includes ambient air quality, water quality, noise, soil, ecology (terrestrial and aquatic), land use, geology, hydrology and demographic & socio-economic conditions.

11.2.1 Soil Characteristics

The soil samples were collected within the study area during post-monsoon and partly winter season of 2016. It has been observed that the pH of the soil in the study area ranged from 7.7 to 8.4. The electrical conductivity was observed to be in the range of 137 to 6,300 µmhos/cm. The nitrogen values range between 4.8 kg/ha to 23.8 kg/ha. The phosphorus values range between 42.2 kg/ha to 154.4 kg/ha. The potassium values range between 178.2 kg/ha to 1,125.3 kg/ha. Soluble chlorides in the region varied from 354.4 mg/kg to 12,400.9 mg/kg. Organic matter concentrations ranged from 0.05% to 0.22%. Organic carbon concentrations ranged from 0.03% to 0.13%.

11.2.2 Climatology and Meteorology

The recorded temperature at site during study period ranges between 9.2°C to 40.6°C and relative humidity ranges in between 47% to 98%. Predominant winds from SSW and SW directions were observed during the study period.

11.2.3 Ambient Air Quality

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at eight locations during post-monsoon and partly winter season of 2016. The $PM_{2.5}$ and PM_{10} are observed to vary from 19.2 µg/m^3 to 43.9 µg/m^3 and 35.2 µg/m^3 to 84.2 µg/m^3 respectively. The SO_2 and NO_2 are observed to vary from 14.8 µg/m^3 to 42.6 µg/m^3 and 13.1 µg/m^3 to 32.8 µg/m^3 respectively. The CO is observed to vary from 262 µg/m^3 to 412 µg/m^3 respectively. The remaining parameters as per 16th Nov, 2009 CPCB Notification are observed to be within permissible limits.

11.2.4 Water Quality

The baseline water quality status in the region is established by collecting water samples in study area.

➢ *Surface Water Quality*

The analysis results indicate that pH is found to be 7.2 to 8.0, which is well within the specified standard 6.5-8.5. The TDS was observed to be 41,645 to 43,572 mg/l. Dissolved oxygen was observed to be 5.6 to 5.9 mg/l. The chlorides and sulphates were found to be 16,078.9 to 20,915.5 mg/l and 2,139.1 to 2,734.0 mg/l respectively. Bacteriological studies reveal the 5 MPN/100ML. The surface water is observed to be brackish in nature.

➢ *Ground Water Quality*

The analysis results indicate that the *pH* ranges in between 7.3 to 7.8. Total hardness was observed to be ranging from 125.0 to 392.0 mg/l. Chlorides were found to be in the range of 282.6 mg/l to 978.4 mg/l. Sulphates were found to be in the range of 27.8 mg/l to 115.4 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging between 1,372 to 2,930 mg/l.

Fluorides were observed to be ranging between 0.9 to 1.5 mg/l and are found to be within the permissible limit. Nitrates are found to be in range of 8.2 to 22.0 mg/l. Bacteriological studies reveal that no coliform bacteria are present in the samples. The heavy metal contents were observed to be well within the limits except few parameters. It can be observed that the ground water quality is influenced by sea water quality possibly due to sea water ingression.

11.2.5 Noise Level Survey

The noise monitoring has been conducted in the study area. Day time, night time noise levels were found to be varying from 48.5 dB(A) to 56.6 dB(A) and 42.3 dB(A) to 48.8 dB(A) respectively in the study area. The noise levels in general were found within the acceptable levels as per standards prescribed by Central Pollution Control Board (CPCB).

11.2.6 Ecological Studies

Flora and fauna studies were conducted during the study period to assess the existing floristic and faunal components in study area. Floral species are mainly dominated by *Prosopis juliflora and Acacia Senegal.* Primary survey and literature survey reveals that there are no wildlife sanctuaries, national parks and biospheres and no migratory paths of birds and animals in 10 km radius study area. The faunal species were categorized as per conservation status of Wildlife Protection Act, 1972 reveals peacock is the only Sch-I species in the study area. Mangroves are predominantly composed of *Avicenna marina*, Species known for its high tolerance of salinity and other environmental stresses.

11.2.7 Demography and Socio-Economic Profile

The information on socio-economic aspects of the study area has been compiled from secondary sources, which mainly include census data of 2011. The salient features of the demography and socio-economic profile are as follows:

- Total population is 60,525;
- The scheduled castes (SC) are 9.72% and scheduled tribes (ST) are 1.29%;
- Overall literacy rate in the study area according to 2011 census is 67.62%, out of which male literacy is 73.42% while female literacy is 26.58%; and
- The percentage of main workers and marginal workers are 90.57% and 9.43% respectively.

11.3 Anticipated Environmental Impacts and Mitigation Measures

The summary of anticipated environmental impacts due to the proposed project during operation phase and mitigation measures are given below:

11.3.1 Air Environment

Sulphur dioxide (SO_2) and particulate matter emissions will be the main pollutants in the copper refinery complex and there will be no major source of NOx emissions. The incremental ground level concentrations due to proposed project have been estimated by dispersion modeling and are observed to be within the National Ambient Air Quality standards (NAAQ's).

Following air pollution control schemes and techniques are suggested which shall be used to minimize and control the emission of air pollutants as well as their effective dispersion into the atmosphere:

- Sulphur Dioxide (SO_2): High efficiency collection and scrubbing system with lime and caustic;
- Fluorine (F): High efficiency collection and scrubbing system with water to produce hydro fluro silicic acid, which will be the input to aluminum fluoride plant; and
- Particulate Matter: Wet scrubbers, cyclones, electrostatic precipitators, bag filters, vacuum trucks, road vacuum sweepers, etc.; based on the application.

The final gaseous emissions from the copper refinery complex would be well within the permissible limits as prescribed by GPCB/CPCB/MoEF&CC.

11.3.2 Water Environment

No ground water is proposed to be extracted for the proposed project. The total water requirement for the project is about 32,800 m^3/day which will be sourced from desalination plant of M/s. APSEZ Ltd, supply through M/s. Mundra Utility Pvt Ltd (MUPL).

The total wastewater generation from the proposed project will be about 5,432 m^3/day. This will be treated in the effluent treatment plant and the treated waste water will be fully utilized within the plant for process, cooling and other purposes. No wastewater will be discharged outside the plant. Hence, there is no impact on the water regime due to the wastewater generated from the plant complex.

Water Pollution Management and Water Conservation Measures:

- Maximum recycling of treated wastewater into process;
- Provision of appropriate treatment facility to treat domestic sewage from plant;
- Utilization of treated domestic wastewater in greenbelt development and dust suppression;
- Provision of separate storm water system to collect and store run-off water during rainy season and utilization of the same in the process; and
- Treatment of storm water to remove contaminants, if any, before discharging into water streams.

11.3.3 Solid Waste Management

The main solid waste envisaged from the proposed project are:

- Copper slag from copper refinery plant;
- Phosphogypsum from phosphoric acid plant;
- Hazardous cake produced from effluent treatment plant; and
- Scrubber cake from fugitive gas handling scrubbers.

Hazardous cake, ETP waste sludge, scrubber cake, spent catalyst and spent resins (from DM, RO & refinery) will be stabilized and stored in secured land fill of 13.35 ha as per guidelines of MoEF&CC/ CPCB/ GPCB. Further, an area of 18.62 ha and 20.63 ha are identified for the intermediate/emergency storage of copper slag and phosphogypsum.

Provision would be made to reclaim the disposed copper slag and phosphogypsum from gypsum pond at a later stage for various utilization ventures.

The used oil, oil sludge, nickel sludge and arsenic bearing sludge (As-Cu precipitate) will be given to authorized recycler.

11.3.4 Noise Environment

The main noise generating sources from the entire project will be blower, crusher, vibrating screen, pumps, compressors etc. The noise levels at the sources for these units will be in the range of 80-90 dB(A).

The predicted noise levels at the project boundaries are estimated through computer based mathematical model. The predicted noise levels at the boundary due to various activities are found ranging in between 40 to 46 dB(A). It is seen from the simulation results that the incremental noise levels will be well within the CPCB standards.

The following control measures will be implemented for the proposed project:

- High noise generating sources shall be insulated adequately by providing suitable enclosures;
- The air compressor, process air blower, pneumatic valves shall be provided with acoustic enclosure;

- All the design/installation precautions as specified by the manufacturers with respect to noise control shall be strictly adhered to;
- Design and layout of building to minimize transmission of noise, segregation of particular items of plant and to avoid reverberant areas;
- The oxygen plant shall be installed in double wall building and no operator shall be working within the building; and
- Other than the regular maintenance of the various equipment, ear plugs/muffs shall be recommended for the personnel working close to the noise generating units.

11.3.5 Biological Environment & Greenbelt Development

The main sources of air pollution from the project will be from the process stacks. The pollutants from the plant include sulphur dioxide and particulate matter. The air dispersion modeling simulations are done to evaluate SO_2 and PM likely to be contributed by the plant. The incremental concentrations were found to be well within the limits as per NAAQ's. Hence, only marginal impact is envisaged due to copper refinery plant on the terrestrial ecology. Hence, no impact is envisaged on the terrestrial ecology of the area.

Further, the unit will be operating on zero discharge process and no perennial nallahs or streams present in the project area, hence no impact on aquatic ecology is envisaged.

Out of the entire area of proposed copper refinery complex, 33% which is around 85.79 ha of land is reserved for greenbelt/ green cover development as per prevailing guidelines from GPCB/CPCB/MoEF&CC.

11.3.6 Socio- Economics

The requirements of skilled/unskilled manpower during operation will be met from nearby villages as far as possible. The project will also help in generation of significant indirect employment. This will be a positive socio-economic development for the region and general upliftment of standard of living in the region.

AEL is strictly committed and is going to implement the proposal to uplift the social infrastructure surroundings the project area. Positive impact is envisaged on the infrastructure of the region.

11.4 Environmental Monitoring Program

The environmental monitoring program is important in terms of evaluating the performance of pollution control equipments installed in the project. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/GPCB. The frequency of air, noise, surface water and ground water sampling and location of sampling will be as per the directives of pollution control board.

The total project cost for the proposed project is about Rs. 10,000 Crores, which may further escalate depending upon the project execution period. Out of this, about Rs. 1044 Crores will be spent on environmental protection.

11.5 Risk Assessment and Disaster Management Plan

Risk assessment has been carried out to quantify the extent of damage and suggest recommendations for safety improvement for the proposed copper refinery project. Risk mitigation measures based on MCA analysis and engineering judgments are incorporated in order to improve overall system safety and mitigate the effects of major accidents.

An effective Disaster Management Plan (DMP) to mitigate the risks involved has been prepared. This plan defines the responsibilities and resources available to respond to the different types of emergencies envisaged. Training exercises will be held to ensure that all personnel are familiar with their responsibilities and that communication links are functioning effectively.

11.6 Project Benefits

AEL has undertaken a cost benefit analysis to ascertain the benefits that would accrue to India and Gujarat in particular from its proposed copper refinery project. The study results show that the copper refinery project would create substantial amount of tax revenue for India over 25 years of project life. The copper refinery project venture is expected to employ about 5,000 direct and indirect employees.

The beneficial impact of proposed project on the civic amenities will be substantial after the commencement of project activities. The basic requirement of the community needs will be strengthened by extending healthcare, educational facilities to the community, building/strengthening of existing roads in the area. AEL is already providing the above amenities and would further strengthen the activities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities.

AEL believes that an effective growth policy must also take into account the fulfillment of basic needs of the masses, especially of those living in rural areas. AEL has one of the best social infrastructure proposals which are based on the implementation already done by APSEZ and APL at Mundra, in the core area of health, education, sustainable livelihood options & women empowerment, community infrastructure, youth sport & cultural activities, calamity management. AEL is strictly committed and is going to implement the proposal to uplift the social infrastructure surroundings the copper refinery project area.

11.7 Conclusions

The proposed copper refinery project of AEL is one of the important projects. AEL believes that the copper refinery project would add significant value to Indian economy. The project will not only help ensuring by becoming self-sufficient in

terms of copper, phosphoric acid and sulphuric acid for India but will also drive macroeconomic growth.

The proposed project would have few adverse impacts on the environment. However, with proper and judicious implementation of the mitigation and environment management measures, the impacts can be minimized and can be maintained well within the permissible limits specified by the regulatory authorities.

Thus, it can be concluded that with the strict implementation of the pollution control and mitigation measures, with proper environment management system in place the proposed project will be beneficial to the society and will contribute to the economic development of the state in particular and the country in general.

Chapter-12
Disclosure of Consultants Engaged

12.0 DISCLOSURE OF CONSULTANTS ENGAGED

12.1 M/s. Vimta Labs Limited-Environment Consultant

M/s. Vimta Labs Limited is a leading multi-disciplinary testing and research laboratory in India. Vimta provides contract research and testing services in the areas of environmental assessment, analytical testing, clinical research, pre-clinical (animal) studies, clinical reference lab services, advanced molecular biology services and research & development studies.

The **Environment Division** has been in the forefront of its vision to provide better environment through guiding and assisting the industry for sustainable development. A stalwart in the mission to protect and preserve the natural resources on earth for future generations, it offers extensive research and consultancy services in the field of environment. With its rich experience, multi-disciplinary expertise and with the support of its state-of the-art analytical equipment, the services offered by the division are wide ranging and encompasses entire gamut of environment management and monitoring services. With its emphasis on quality services over the years, it has evolved itself into a single reference point in India for comprehensive environmental services.

12.1.1 The Quality Policy

- Vimta is committed to good professional practices and quality of operations in its testing, validation and research services;
- Vimta shall ensure customer satisfaction by maintaining independence, impartiality and integrity in its operations;
- Vimta shall provide the services in accordance with national and international norms;
- Vimta shall implement quality systems as per ISO/IEC 17025 and applicable Good Laboratory Practices (GLPs) & Good Clinical Practices (GCPs), to generate technically valid results/data; and
- Vimta shall ensure that all its personnel familiarize with the policies and procedures of the quality system and implement the same in their work.

12.1.2 Major Milestones and Accreditations

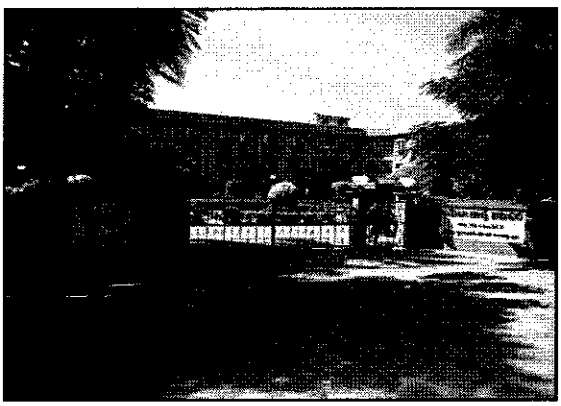
- 1984–Registered with an initial investment of Rs.200,000=00
- 1985–Recognized by ISI (now known as Bureau of Indian Standards)
- 1987–Qualified by the criteria of Ministry of Environment and Forests, India and was notified as one of the first 14 Standard Environmental Laboratories published in the Gazette of India
- 1988–Licensed for carrying out tests on Drugs and Pharmaceuticals
- 1991–Accredited by NCTCF, DST, Government of India (the forerunner of NABL)

- 1995–Accredited by NABL, India under its revised scheme, certified by Standards Australia, Quality Assurance Services as per ISO/IEC Guide 25 and ISO 9002
- 1996–GLP Compliance
- 1998–Accreditation by GOSSTANDART and joint venture for certification of Food Exports with ROSTEST, Russia
- 1998–World Bank Recognition
- 2002–ANVISA Brazil Certification
- 2003–USFDA accepts Vimta Bioequivalence study report. Showcased Vimta at AAPS (USA) and ICSE-CPHI (Germany)
- 2003–Recognized by Saudi Arabian Standards Organization
- 2004–Enters Gulf market-Executes a contract for environmental consultancy in Kuwait
- 2006–Expands its overseas activities. Undertakes environmental assignment in Saudi Arabia
- 2006–Undertakes environmental impact assignment in Tanzania, Africa
- 2008–Has been Pre-Qualified by World Health Organization (WHO)
- 2009–Undertaken environmental impact assessment studies in Cameroon, Africa

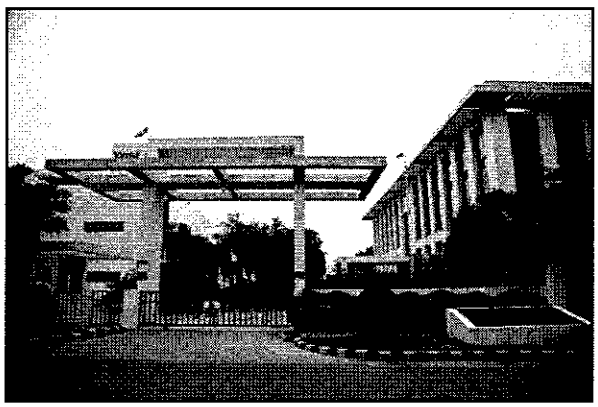
12.1.3 Services Offered

Spread over 70,000 sq.ft lush green garden premises at Cherlapally, Hyderabad (India), the scientifically designed and meticulously groomed infrastructural facility of the Central Laboratory of **VIMTA** has the most sophisticated instruments backed by an excellent team of professionals.

Over 150,000 sq. ft. of world class research laboratory is also under operation at Biotech Park-Genome Valley, Hyderabad (India). Having all the facilities under one roof is perhaps the only one of its kind in South Asia in the contract testing and research sector.



VIMTA Central Laboratory, Cherlapally, Hyderabad



VIMTA Life Sciences, Genome Valley, Hyderabad

Vimta offers services under the following specializations:

- Environment;
- Analytical;
- Clinical Reference Lab;
- Clinical Research;
- Preclinical;
- Molecular Biology; and
- Research and Development.

The environment division of VIMTA Labs Limited (VLL) has its presence all over India and other countries including a strong association with international consultants like Japan Bank for International Cooperation (JBIC), Kennametal Inc.-USA, Rudal Blanchard-UK, E&E Solutions-Japan, NAPESCO & Kuwait National Petroleum Corporation-Kuwait, Marafiq and Haif Consultants-Saudi Arabia and others. Vimta Labs Limited has the following credentials:

- Recognition by BIS, India;
- Recognition by Ministry of Environment, Forest & Climate Change (MOEF&CC), Govt. of India and various State Pollution Control Boards (wherever applicable);
- Accredited by QCI/NABET, New Delhi
- Recognition by Department of Science & Technology, Govt. of India (NABL);
- Recognition by Ministry of Defence, Govt. of India;
- Recognition by APEDA, Ministry of Commerce, Govt. of India;
- Recognition by Saudi Arabia Standard Organization (SASO), Saudi Arabia;
- Recognition from NEMC, Tanzania;
- Accreditation by NCTCF;
- Certification from Standard Australia;
- Recognition from ANVISA Brazil;
- Recognition from USFDA;
- Quality Assurance Services as per ISO/IEC 17025;
- Quality Assurance Services as per ICH Guidelines; and
- Recognition by World Health Organization (WHO).

QCI

National Accreditation Board for Education & Training

NABET

Quality Council of India

CERTIFICATE OF ACCREDITATION

M/s Vimta Labs Limited

142, IDA, Phase – II, Cherlapally, Hyderabad – 500051

is hereby accorded accreditation under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations (Rev. 09, August 2011) for the following scope:

Sl. No.	Name of the Sector	Cat.
1.	Mining of Minerals including Opencast/ Underground mining	A
2.	Offshore and onshore oil and gas exploration, development & production	A
3.	Thermal Power Plants	A
4.	Coal washeries	A
5.	Metallurgical industries (ferrous &non-ferrous) – both primary and secondary	A
6.	Cement Plants	A
7.	Asbestos milling and asbestos based products	A
8.	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	A
9.	Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks/ sanctuaries/ coral reefs /ecologically sensitive areas including LNG terminal	A
10.	Air ports	A
11.	Industrial estates/ parks/ complexes/areas, export processing Zones(EPZs), Special Economic Zones(SEZs), Biotech Parks, Leather Complexes	A
12.	Building and large construction projects including shopping malls, multiplexes, commercial complexes, housing estates, hospitals, institutions	B
13.	Townships and Area development projects	B

Name of approved EIA Coordinators & Functional Area Experts are given in minutes of AC Meeting dated Oct 04, 2013; Oct 15 and Nov 26, 2014 posted on QCI website

Accreditation to the above Sectors is subject to the EIA reports being prepared by the experts (EIA Coordinators & Functional Area Experts) mentioned in the above minutes and compliance to the Terms and Conditions of Accreditation.

Certificate No: NABET/ EIA/ 1316/ RA003 ***Valid up to: Sep. 19, 2016***

C.E.O.

NABET

(Please refer http://nabet.qci.org.in/environment/ for latest status of accreditation)

Note

- ***Subject to continual compliance to NABET Scheme including Surveillance Assessment***
- ***Updated status of accreditation available at www.qcin.org every 5th of the month***

NABET

National Accreditation Board for Education and Training
(Member of Pacific Accreditation Cooperation)

QCI/NABET/EIA/ACO/17/01/0247 January 23, 2017

Vimta Labs Limited
142, IDA, Phase – II, Cherlapally,
Hyderabad – 500051
(Kind Attention: Sh. M. Janardhan)

Sub: Validity of Accreditation as EIA Consultant organisation- Vimta Labs Limited

Dear Madam,

This has reference to the accreditation of your organisation under QCI-NABET EIA Scheme, the validity of M/s Vimta Labs Limited is hereby extended till July 23, 2017 or completion of assessment process, whichever is earlier.

The above extension is subject to the submission of required information/documents related to assessment on time to NABET.

You are requested not to use this letter after expiry of the above stated date.

With best regards,

23/01/2017

A.K Jha
Senior Director | NABET

Quality Council of India

National Accreditation Board for Education & Training

Certificate of Accreditation

Vimta Labs Limited

142,IDA,Phase II,Cherlapally, Hyderabad-500051

are accredited under the QCI-NABET Accreditation Scheme for EIA Consultant Organizations (Version 3) for preparing EIA/EMP reports in the following sectors:

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2	Offshore and onshore oil and gas exploration, development & production	2	1 (b)	A
3	Thermal power plants	4	1 (d)	A
4	Coal washeries	6	2 (a)	A
5	Metallurgical Industries (ferrous & non-ferrous)	8	3(a)	A
6	Cement plants	9	3 (b)	A
7	Asbestos milling and asbestos based products	12	4 (c)	A
8	Synthetic organic chemicals Industry	21	5 (f)	B
9	Oil & gas transportation pipeline	27	6 (a)	A
10	Air ports	29	7 (a)	A
11	Industrial estates/ parks/ complexes/areas, export processing Zones(EPZs), Special Economic Zones(SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
12	Building and construction projects	38	8 (a)	B
13	Townships and Area development projects	39	8 (b)	B

Note: Name of approved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated February 03, 2017 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/17/0285 dated 22 March 2017.The accreditation needs to be renewed before the expiry date by Vimta Labs. Pvt. Ltd., following due process of assessment.

CEO NABET	*Certificate No.*	*Issue Date*	*Expiry Date*
	NABET/EIA/1619/ RA 0043	*Mar. 22, 2017*	*19.05.2019*

For the updated List of Accredited Consultants please refer QCI-NABET website.

NABET is a member of International Accreditation Forum (IAF) and Pacific Accreditation Cooperation (PAC).

National Accreditation Board for Testing and Calibration Laboratories
(A Constituent Board of Quality Council of India)

CERTIFICATE OF ACCREDITATION

VIMTA LABS LTD., LIFE SCIENCES FACILITY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

#5, Alexandria Knowledge Park, Genome Valley, Shameerpet, Hyderabad, Telangana

in the field of

TESTING

Certificate Number TC-5418 *(In lieu of T-0047, T-0032 & T-3349)*

Issue Date 31/03/2017 [redacted] **Valid Until** 30/03/2019

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL

N. Venkateswaran
Program Director

Anil Relia
Chief Executive Officer

12.1.4 Services of Environment Division

Environment essentially being a multi-disciplinary science, the range of services offered by the division are also comprehensive and caters to the needs of industry, pollution control agencies, regulatory authorities and in a larger pursuit of a green globe. The services under environment include:

- Site selection and liability studies;
- Environmental impact assessments;
- Environment management plans;
- Carrying capacity based regional studies;
- Environmental audits;
- Solid and hazardous waste management;
- Risk assessment (MCA, HAZON, HAZOP) & disaster management plans;
- Occupational health and safety, industrial hygiene;
- Environmental monitoring for air, meteorology, water, soil, noise, ecology and socio-economics;
- Industrial emission source monitoring;
- Offshore sampling and analysis of marine water and sediments;
- Marine ecological studies;
- Marine impact assessment;
- Rehabilitation and resettlement studies;
- Forestry and ecological studies;
- Geological and hydro-geological studies;
- Land use/land cover studies based on remote sensing;
- Socio-economic studies;
- Due diligence studies;
- Industrial epidemiological studies;
- Wasteland management studies; and
- Study on bio-indicators.

The services under Environmental Chemistry include:

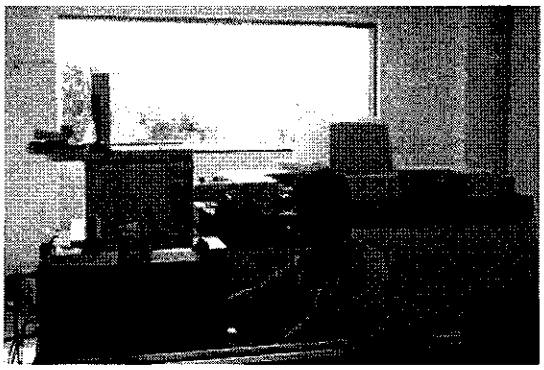
- Analysis of water, wastewater, soil, solid waste, hazardous waste as per international codes;
- Source emissions and work zone air/noise quality monitoring;
- Analysis of SVOCs, VOCs, PAH, BTEX, AOX, PCB's, TCLP metals, TOC etc.;
- Categorization of hazardous waste; and
- Pesticide residue analysis.

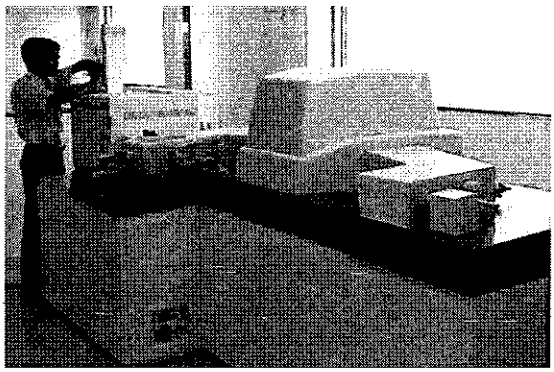
12.1.5 Facilities of Environment Division

Vimta-Environment Division is located in scientifically designed Central Laboratory with the state-of the-art modern facilities to offer vide range of services in indoor and outdoor monitoring and analytical characterization in the field of Environment. Further, it is ably supported by highly skilled and experienced team of professionals in the fields of science, engineering, ecology, meteorology, social planning, geology & hydro-geology and environmental planning.

Besides the regular monitoring equipment such as Respirable Dust Samplers (RDS), automatic weather monitoring stations, stack monitoring kits, personal samplers, noise meters, portable water kits etc, the other major specialized equipment include:

- Monostatic Sodar–Designed by National Physical Laboratory, GOI;
- Integrated Noise Level Meters–Quest, U.S.A;
- Flue Gas Analyzers–Testo, Germany;
- 113-A Gravimetric Dust Sampler-Casella, London;
- ICP AES–Varian, USA;
- Gas Liquid Chromatographs with FID, ECD & pFPD–Varian, USA;
- Gas Chromatograph with Mass Detector–Varian, USA;
- Atomic Absorption Spectrometer [AAS]–Varian, USA;
- PAS-AFC-123 instrument;
- High Performance Liquid Chromatograph (HPLC);
- Laser Particle Size Analyzer;
- Bomb Calorimeter;
- Polarographs;
- X-ray Fluorescent Spectrometer;
- Flame Photometer;
- Carbon Sulphur Analyzer;
- Computerized Fatigue Testing Machine;
- Electronic Universal Testing Machine;
- Fourier Transmission Infrared Spectroscope; and
- Water Flow Current Meter–make Lawrence & Mayo.





HIGH RESOLUTION GAS CHROMATOGRAPHS

12.1.6 Quality Systems

The basic fact that environment division and its supporting site laboratories are accredited by NABL (IS0-17025) and Ministry of Environment and Forests, India and by other international bodies stand testimony to its emphasis on Quality Systems.

12.1.7 Achievements

Being the first laboratory to be recognized under Environment Protection (EP) Act by Government of India (GOI), environment division with its best mind power and industrial knowledge competency that allows it to compare with the best in the business.

- The environment division till date has executed about 650 environmental impact assessment and environment management studies with risk assessment and disaster management plans for various spectrum of industries and obtained statutory approvals;
- Supported by the strong modern laboratory and experienced hands, environment division is well equipped in conducting due diligence, phase-I and phase-II studies;
- Undertaken specialized studies such as regional environmental impact assessment on carrying capacity principle; upper air meteorological studies using monostatic SODAR for major industrial complexes;
- Associated with prestigious studies such as environmental pollution monitoring around Taj Trapezium (India), pre and post satellite launch studies for Indian Space Research Organisation (ISRO) and monitoring for offshore oil & gas exploration for deep-sea water and sediment sampling;
- The services offered include vide spectrum of industries covering power, chemical, cement, mining, steel & alloys, metallurgical, aluminium refining & smelting, dye & intermediates, bulk drugs, pesticides, agro-chemicals, petro-chemicals, refineries, pulp & paper, oil & gas exploration & production, asbestos, infrastructure such as highways, seaports and airports, river valley, foundries etc;
- Undertaken environmental consultancy for pipeline layout and up gradation of API oil-water separators of various crude oil depots and petrol filling stations of Kuwait National Petroleum Corporation, Kuwait;
- Undertaken performance evaluation and capacity expansion of sewage treatment plant and industrial wastewater treatment Plant for Marafiq, Saudi Arabia;
- Undertaken environmental impact assessment studies for pulp and paper mill expansion of Mufindi Paper Mills, Tanzania, Africa; and
- Undertaken environmental impact assessment studies for bauxite mines in Cameroon, Africa for Cameroon Aluminium Limited (CAL).
- Undertaken environmental monitoring & water testing for River Ganga under Clean Ganga Project, Ministry of Water Resources, New Delhi.

The details of the persons involved in the preparation of present EIA/EMP report are presented below:

TABLE-12.1
DETAILS OF PERSONNEL INVOLVED IN CURRENT EIA/EMP STUDY – VIMTA LABS LTD

Sr. No.	Name	Qualification	Position	Contribution	Expertise/Functional Area	Experience
A	**In House Experts**					
1	Mr. M. Janardhan	M.Tech (Env. Engg)	Vice President & Head (Env)	Co-ordination	EIA Co-ordinator and FAE for AP, AQ, NV & SHW	About 25 years of experience in the field of Environmental Management and Environmental Engineering
2	Dr. B. Chandra Sekhar	M.Sc., Ph.D	Associate Vice President	Co-ordination	FAE for AQ	About 17 years of experience in the field of Environmental Management and Modeling
3	Mr. G. V. Raghava Rao	M.Tech (Env)	Manager	Expert	FAE-AP, ISW & MSW	About 17 years of experience in the field of Environmental Management and Environmental Engineering
4	Ms. BH. Durga Bhavani	M. Sc (Env Science), M.Tech	Group Leader	Expert	FAE – WP, AQ, Team Member SHW	About 12 years of experience in the field of Environmental Management and Environmental Chemistry
5	Mr. Venkatesham	M.S.W	Group Leader	Expert	FAE-SE	About 15 years of experience in the field of social Impact Assessment Studies
6	Mr. S. Kishore Kumar	M.Tech (Env)	Group Leader	Expert	FAE – AP, AQ, NV	About 5 years of experience in the field of Environment Management and Engineering
7	Mr. Rajashekar T	M.Sc., Ph.D	Group Leader	Expert	FAE-EB	About 10 years of experience in the field of Terrestrial and Aquatic Ecology
8	Mr. Suryanarayana K	M.Sc., M.Tech	Sr. Env Engineer	Expert	FAE-LU	About 13 years of experience in the field of Environment Management and Engineering
9	Mr. M. Raja Manohar	M.Tech (Env)	Env Engineer	Expert	FAE – AP	About 5 years of experience in the field of Environment Management and Engineering
10	Mr. Ramakrishna Pullipaka	M.Tech (Env)	Env Engineer	Expert	FAE – AP, AQ	About 5 years of experience in the field of Environment Management and Engineering
11	Mr. K. Rajeshwar	MSC. Geology & Hydrogeology	Scientist	Expert	FAE–HG	About 5 years of experience in the field of geology and Hydrogeology
12	Ms. D. Svega	M.Tech (Env)	Env Engineer	Expert	Team Member	About 4 years of experience in the field of Environment Management and Engineering
13	Mr. Ch. Narendra	M.S.W	Scientist	Expert	FAE-SE	About 3 years of experience in the field of Social Impact Assessment Studies
14	Mr. K. S. Vishnu Teja	M.Tech (Env)	Env Engineer	Expert	FAE-WP & FAA-RH	About 4 years of experience in the field of Environment Management and Engineering

Sr. No.	Name	Qualification	Position	Contribution	Expertise/Functional Area	Experience
15	Mr. J. Sunil Kumar	M.Tech (Env)	Env Engineer	Expert	Team Member	About 3 year experience in the field of Environment Management and Engineering
16	Dr. B. Sreekanth	M.Sc., M.Tech., Ph.D	Env Engineer	Expert	FAE-AQ	About 8 years of experience in the field of Environment Engineering and Management
17	Ms. Ashwani	M.S.C	Trainee Scientist	Expert	Team Member	About 1 year of experience in the field of Environmental Management and Environmental Chemistry
18	Ms. Olive Eunice	M.Tech	Trainee Env Engineer	Expert	Team Member	About 1 year of experience in the field of Environment Management and Engineering
19	Mr. P. Niranjan Babu	B.Com	Dy. Manager	Secretarial Support	--	About 26 years of experience in the field of environmental monitoring and secretarial support
20	Mr. P. Krishna	I.T.I (Civil)	Jr. Engineer	Cartography	--	About 16 years of experience in the field of environmental management and civil drawings
21	Mr. J. Rama Krishna	I.T.I (Civil)	Jr. Engineer	Cartography	--	About 15 years of experience in the field of environmental management and civil drawings
B	**Empaneled Experts**					
1	Mr. J. Rajendra Prasad	M.Sc.	Consultant	Expert	FAE-HG & LU	About 16 years of experience in the field of Land use studies, Remote Sensing and Hydrogeology
2	Mr. Rajgopal Krishnan	M. Tech (Chemical Engg)	Consultant	Expert	FAE-RH	About 40 years of experience in the field of Risk and Hazard assessment
3	Dr. Y. Rammohan	M.Sc, PhD	Consultant	Expert	FAE-LU	About 18 years of experience in the field of Land use studies, Remote Sensing and Land cover
4	Mr. Balakrishna Shankarrao Lole	M.Sc. (Ag)	Consultant	Expert	FAE-SC	About 38 years of experience in the field of Soil Conservation

AP - Air Pollution Prevention, Monitoring and Control
AQ - Meteorology, Air Quality Modelling and Prediction
EB - Ecology and Biodiversity
FAE - Functional Area Expert
GEO - Geology
HG – Hydrology, Ground Water & Water Conservation
ISW – Industrial Solid Waste
LU- Land use
MSW – Municipal Solid Waste
NV – Noise and Vibrations
RH – Risk assessment and Hazardous Management
SC- Soil Conservation
SE – Socio-Economics
SHW – Solid and Hazardous Waste Management
WP – Water Pollution Prevention, Control and Prediction of Impacts

PREFACE

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

ENVIRONMENTAL IMPACT ASSESSMENT

FOR
THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

Volume-II
Annexures

For and on behalf of VIMTA Labs Limited

Approved by : **M. Janardhan**

Signed :

Position : **Head & Vice President (Env)**

Date : 6th December, 2018

The report has been prepared inline with the prescribed TORs issued vide letter No.J-11011/113/2016-IA.II(I) dated 21st June 2016 of Ministry of Environment, Forests and Climate Change, New Delhi.

This report has been prepared by **Vimta Labs Limited** with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

ANNEXURES

Volume-II

Sponsor :

adani™

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra, District Kutch, Gujarat

Prepared by :

Vimta
Driven by Quality, Inspired by Science.

Vimta Labs Limited
142, IDA, Phase-II, Cherlapally
Hyderabad–500 051, Telangana State
env@vimta.com, www.vimta.com
(NABL Accredited and ISO 17025 Certified Laboratory, Recognized by MoEF&CC, New Delhi)

December, 2018

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Annexure-I

TOR & its Compliance

F. No. J-11011/113/2016-IA-II.(I)
Government of India
Ministry of Environment & Forests
(IA-II Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi-110 003.
Email: sharath.kr@gov.in

Dated: 24th March , 2017

To
M/s Adani Enterprises Limited,
Sambhaav House,
Judges Bungalow Road, Bodakdev,
Ahmedabad, Gujarat -380015.

CORRIGENDUM

Sub: Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat – regarding corrigendum to ToR

Ref: AEL/Copper/Mundra/MoEFCC/Env/Amd/Feb2017/out-1 dated 21.02.2017

This has reference this Ministrys letter of even No. J-11011/113/2016-IA.II(I) dated 21.06.2016 prescribing ToRs for the above mentioned proposal for preparation of EIA/EMP report under the provisions of Environment Impact Assessment Notification, 2006 as amended.

2. The Ministry of Environment, Forest and Climate Change has examined the request. In partial modification of this Ministry's letter of even no. dated 21.06.2016, the following changes are incorporated in the ToR letter.

For	Read as
Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat	Greenfield Copper Refinery Plant **(1.0 MTPA)** project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat

3.0 All other conditions of the above referred Terms of Reference letter shall remain unchanged

This issues with the approval of competent authority.

24/3/17

(Sharath Kumar Pallerla)
Scientist 'F'

Copy to:-

1. The Secretary, Department of Environment, Government of Gujrat.
2. The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, E-5 Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal – 462016.

F. No. J-11011/113/2016-IA.II(I)
Government of India
Ministry of Environment, Forest and Climate Change
(I.A. Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Aliganj,
New Delhi - 110003
E-mail: satish.garkoti@nic.in
Tel: 011-24695316

Dated: 21st June, 2016

To

M/s Adani Enterprises Limited.
Sambhaav House,
Judges Bungalow Road, Bodakdev ,
Ahmedabad, Gujarat-380015.

Subject: Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat - prescribing of ToRs regarding.

Sir,

This has reference to your online application No. IA/GJ/IND/53004/2016 dated 21st April, 2016 along with the application in prescribed format (Form-I), copy of pre-feasibility report and proposed TORs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at S.No. 3(a), under category 'A' of the Schedule of EIA Notification, 2006 and appraised at the Central level.

2.0 M/s. Adani Enterprises Limited proposes to install a new manufacturing unit for 10 LTPA copper project. It is proposed to set up the plant for Copper Cathode based on Pyrometallurgical process technology and Electro-refining process. The proposed unit will be located at Adani Port Special Economic Zone (APSEZ) land (Siracha and Navinal Villages), Mundra Taluka, Kutch District, Gujarat State. The proponent has provided 3 sites for the project and proposed to set up the plant at Site-II. The land required for the project is 256.58 ha, out of which 154.18 ha is for industrial use and 102.38 ha is forest land. It has been informed that state government has recommended the forest diversion proposal to the Central Government. The proponent has also informed that the merits for selecting Site-II for the project inter-alia include proximity to west port from where major raw material will be imported, major part of land is within the notified SEZ and also the forest land diversion proposal is forwarded by the State government to Central Government. The proposed site lies between 22°48'55.78" N Latitude and 69°34'32.02" E Longitude. There are no national parks/ wildlife sanctuary within 10 km radius. The project area falls under Seismic Zone V. The estimated project cost is Rs. 10,000 Crore and the estimated environment protection cost is Rs. 900 crores. Employment generation from proposed project will be about 2000 direct employment and about 5000 indirect employment. The proposed capacity for different products for new site area as below:

Name of Unit	No. of Units	Capacity of each Unit	Production Capacity
Copper Smelter plant	2	4.5 LTPA	9 LTPA
Copper Refinery plant	2	5.0 LTPA	10 LTPA

Continuous cast copper rod plant	2/3	2.5/ 1.67 LTPA	5 LTPA
Copper scrap melting facility	2	0.5 LTPA	1 LTPA
Sulphuric acid plant	2	15 LTPA	30 LTPA
Phosphoric acid plant	2	2.5 LTPA (100% P_2O_5)	5 LTPA (100% P_2O_5)
Aluminium Fluoride plant	2	15,000 TPA	30,000 TPA
Selenium Recovery plant	2	144 TPA	288 TPA
Precious metal recovery plant (Gold)	2	25 TPA	50 TPA
Precious metal recovery plant (Silver)	2	250 TPA	500 TPA
Oxygen (industrial) Plant (95% Purity)	2	45,000 TPM	90,000 TPM
Waste heat recovery boiler	2	25 MW	50 MW

3.0 The electricity load required is 300 MW, out of this, 40 MW will be generated from internal process steam by waste heat recovery; whereas the remaining 260 MW power will be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd. Company has also proposed to install 6 DG Set of 1200 - 2000 KVA Each, as a backup facility.

4.0 Proposed raw material requirement for project are Copper concentrate and Rock phosphate. Requirement would be fulfilled by importing as well as from domestic market. Fuel consumption will be mainly Furnace Oil, LPG/NG and Coal for process requirement. Water Consumption for the proposed project will be 32,800 KLD desalinated water and waste water generation will be nil outside the project boundary. Domestic waste water will be treated through Sewage treatment plant and industrial waste water generated will be treated in the Effluent Treatment Plant & through reverse Osmosis plant and reused in the process. ETP Sludge shall be disposed as per applicable hazardous waste management rules.

5.0 The above proposal was considered by the Expert Appraisal Committee (Industry) during its 6th meeting held on 3rd – 4th May, 2016 for prescribing TORs for undertaking detailed EIA/EMP study.

6.0 Based on the information furnished and presentation made by the project proponent, the Committee recommended prescribing following specific TORs for undertaking detailed EIA and EMP study in addition to the generic TOR enclosed at **Annexure I read with additional TORs at Annexure-2.**

i. The Public Hearing for the project should be conducted by Gujarat Pollution Control Board
ii. The issues raised during public hearing and commitment of the project proponent on the same along with time bound action plan to implement the commitment and financial allocation thereto should be clearly provided.
iii. The project proponent should carry out social impact assessment of the project as per the Office Memorandum No. J-11013/25/2014-IA.I dated 11.08.2014 issued by the Ministry regarding guidelines on Environment Sustainability and CSR related issues. The social impact assessment study so carried out should form part of EIA and EMP report.
iv. Plan for management of Arsenic bearing sludge should be submitted.

v. Hazardous management plan for handling of all hazardous material including minerals, products and waste, like H_2SO_4 and Arsenic sludge should be prepared by the project proponent and submitted.

7.0 The undersigned is directed to inform that the Ministry of Environment, Forest and Climate Change (MoEFCC) after accepting the recommendation of the EAC (Industry), hereby decided to accord ToRs for the above project.

8.0 It is requested that the draft EIA Report may be prepared in accordance with the above mentioned specific TORs and enclosed generic TORs and additional TORs and thereafter further necessary action including conduct of public consultation may be taken (if required) for obtaining Environment Clearance in accordance with the procedure prescribed under the EIA Notification, 2006 as amended.

9.0 The TORs are valid for a period of three years from today i.e 21.06.2016 and will expire on 20.06.2019. However, this period could be further extended by a maximum period of one year provided an application is made by the project proponent at least three months before the expiry of the validity period, together with updated Form-I, based on proper justification.

21/06/2016

(Dr. Satish C. Garkoti)
Scientist 'F'

Copy to:-

1. The Secretary, Department of Environment, Government of Gujrat.
2. The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, E-5 Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal – 462016.

(Dr. Satish C. Garkoti)
Scientist 'F'

ANNEXURE –I

GENERIC TERMS OF REFERENCE (TOR) IN RESPECT OF INDUSTRY SECTOR

1. Executive Summary
2. Introduction
   - i. Details of the EIA Consultant including NABET accreditation
   - ii. Information about the project proponent
   - iii. Importance and benefits of the project

3. Project Description
   - i. Cost of project and time of completion.
   - ii. Products with capacities for the proposed project.
   - iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
   - iv. List of raw materials required and their source along with mode of transportation.
   - v. Other chemicals and materials required with quantities and storage capacities
   - vi. Details of Emission, effluents, hazardous waste generation and their management.
   - vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
   - viii. Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided
   - ix. Hazard identification and details of proposed safety systems.
   - x. Expansion/modernization proposals:
     - a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report.
     - b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

4. Site Details

   - i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
   - ii. A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)
   - iii. Co-ordinates (lat-long) of all four corners of the site.
   - iv. Google map-Earth downloaded of the project site.

v. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

vi. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.

vii. Landuse break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)

viii. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area

ix. Geological features and Geo-hydrological status of the study area shall be included.

x. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)

xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.

xii. R&R details in respect of land in line with state Government policy

5. **Forest and wildlife related issues (if applicable):**

i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable).

ii. Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (*in case of projects involving forest land more than 40 ha).*

iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.

iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.

v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.

vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife

6. **Environmental Status**

i. Determination of atmospheric inversion level at the project site and site-specific micro-metebrological data using temperature, relative humidity, hourly wind speed and direction and rainfall.

ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with – min.,

ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.

x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.

xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.

xii. Action plan for post-project environmental monitoring shall be submitted.

xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.

8. Occupational health

i. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.

iii. Annual report of heath status of workers with special reference to Occupational Health and Safety.

iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

9. Corporate Environment Policy

i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.

ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.

iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.

iv. Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

iv. Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.

v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC.

vi. Ground water monitoring at minimum at 8 locations shall be included.

vii. Noise levels monitoring at 8 locations within the study area.

viii. Soil Characteristic as per CPCB guidelines.

ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.

x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.

xi. Socio-economic status of the study area.

7. Impact Assessment and Environment Management Plan

i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.

ii. Water Quality modelling – in case, if the effluent is proposed to be discharged in to the local drain, then Water Quality Modelling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain.

iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.

iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.

v. Details of stack emission and action plan for control of emissions to meet standards.

vi. Measures for fugitive emission control

vii. Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.

viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.

10. Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.

11. Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

12. 'A tabular chart with index for point wise compliance of above TORs.

13. The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports along with Public Hearing Proceedings (wherever stipulated).

The following general points shall be noted:

i. All documents shall be properly indexed, page numbered.
ii. Period/date of data collection shall be clearly indicated.
iii. Authenticated English translation of all material in Regional languages shall be provided.
iv. The letter/application for environmental clearance shall quote the MOEF file No. and also attach a copy of the letter.
v. The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report.
vi. The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report
vii. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MOEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry shall also be followed.
viii. The consultants involved in the preparation of EIA-EMP report after accreditation with Quality Council of India (QCI) /National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA-EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIA-EMP Report as well as on the cover of the Hard Copy of the Presentation material for EC presentation.
ix. TORs' prescribed by the Expert Appraisal Committee (Industry) shall be considered for preparation of EIA-EMP report for the project in addition to all the relevant information as per the 'Generic Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006. Where the documents provided are in a language other than English, an English translation shall be provided. The draft EIA-EMP report shall be submitted to the State Pollution Control Board of the concerned State for conduct of Public Hearing. The SPCB shall conduct the Public Hearing/public consultation, district-wise, as per the provisions of EIA notification, 2006. The Public Hearing shall be chaired by an Officer not below the rank of Additional District Magistrate. The issues raised in the Public Hearing and during the consultation process and the commitments made by the project proponent on the same shall be

x. included separately in EIA-EMP Report in a separate chapter and summarised in a tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the Ministry for obtaining environmental clearance.

METALLURGICAL INDUSTRY (FERROUS AND NON-FERROUS)

1. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (material and energy balance).
2. Emission from sulphuric acid plant and sulphur muck management.
3. Details on installation of Continuous Emission Monitoring System with recording with proper calibration system
4. Details on toxic metals including fluoride emissions
5. Details on stack height.
6. Details on ash disposal and management
7. Complete process flow diagram describing process of lead/zinc/copper/ aluminium, *etc.*
8. Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation
9. Details on Holding and de-gassing of molten metal from primary and secondary aluminum, materials pre-treatment, and from melting and smelting of secondary aluminium
10. Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
11. Trace metals in waste material especially slag.
12. Plan for trace metal recovery
13. Trace metals in water

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Format for Executive Summary

Executive summary of the report in about 8-10 pages incorporating the following:

i. Project name and location (Village, Dist, State, Industrial Estate (if applicable)
ii. Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC.
iii. Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)
iv. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
v. Measures for mitigating the impact on the environment and mode of discharge or disposal.
vi. Capital cost of the project, estimated time of completion
vii. Site selected for the project – Nature of land – Agricultural (single/double crop), barren, Govt/private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note – in case of industrial estate this information may not be necessary)
viii. Baseline environmental data – air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
ix. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
x. Likely impact of the project on air, water, land, flora-fauna and nearby population
xi. Emergency preparedness plan in case of natural or in plant emergencies
xii. Issues raised during public hearing (if applicable) and response given
xiii. CSR plan with proposed expenditure.
xiv. Occupational Health Measures
xv. Post project monitoring plan

ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
A	**Specific TOR**	
i	The Public Hearing for the project should be conducted by Gujarat Pollution Control Board	Public hearing for the proposed project was conducted by Gujarat Pollution Control Board on 29th April, 2017 at Community Premises Centre (Samajwadi), opposite Tunda Primary School, Tunda village, Mundra Taluk, Kutch district in the presence of Resident Additional Collector/Additional District Magistrate.
ii	The issues raised During public hearing and commitment of the project proponent on the same along with time bound action plan to implement the commitment and financial allocation there to should be clearly provided.	The public hearing comments along with time bound action plan and financial allocation is given in Section-7.1 of Chapter-7.
iii	The project proponent should carry out social impact assessment study as per the OM No.J-11013/25/2014-IA.I dated 11-08-2014 issued by the Ministry regarding the guidelines on Environmental Sustainability and CSR related issue. The SIA study so carried out should from part of EIA and EMP report.	The social impact assessment study was conducted and same report is given as Annexure-XII of the EIA Report.
iv	Plan for management of Arsenic bearing sludge should be submitted.	The Arsenic bearing sludge will be recycled within the system and balance of any will be given to authorized recyclers. Hazardous and non-hazardous waste generation, mode of disposal and waste characterisation are given in Section-2.4.3 of Chapter-2. The impacts on waste generation and management details are given in Section-4.2.5 of Chapter-4.
v	Hazardous management plan for handling of all hazardous material including minerals, products and waste, like H_2SO_4 and Arsenic sludge should be prepared by the project proponent and submitted.	
B	**Generic TOR**	
1	**Executive Summary**	The executive summary is enclosed in EIA report
2	**Introduction**	
	i. Details of the EIA Consultant including NABET accreditation	Vimta Labs Limited, a NABET accredited EIA consultant and NABL approved laboratory has been assigned the task for carrying out EIA studies.
	ii. Information about the project proponent	M/s. Adani Enterprises Limited. The details are given in Section-1.2 of Chapter-1.
	iii. Importance and benefits of the project	Details are given in Section-1.3.2 of Chapter-1.
3	**Project Description**	
	i. Cost of project and time of completion.	The total cost for the proposed project is estimated as Rs.10,000 Crores. Implementation schedule for copper project post all relevant approvals and consents will be 36 months.
	ii. Products with capacities for the proposed project	The proposed production details are given in Table-2.2 of Chapter-2.
	iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.	The proposed project is a green field project. Hence, it is not applicable.
	iv. List of raw materials required and their source along with mode of transportation.	The details of raw material requirement and source for the proposed project are given in Table-2.4 of Chapter-2.

ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
	v. Other chemicals and materials required with quantities and storage capacities	The fuel consumption quantity and source are given in Table-2.6 of Chapter-2.
	vi. Details of Emission, effluents, hazardous waste generation and their management.	Details of air emissions, wastewater generation and solid waste generation is given in Section-2.4 of Chapter-2.
	vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)	The total water requirement for the project is about 32,800 KLD (32.8 MLD). The total estimated power requirement for proposed project is 300 MW out of which 40 MW would be generated from internal process steam and balance 260 MW power would be sourced from APSEZ Ltd. The water and power will be sourced from APSEZ Limited, through M/s. Mundra Utility Private Limited (MUPL). Water balance diagram for phase-I & II are shown in Figure-2.2(A) & 2.2(B) of Chapter-2. During construction phase, about 2000-3000 persons on average per day are required and during the operation phase about 2000 direct employment and about 5000 indirect employment would be generated.
	viii. Process description along with major equipment's and machineries, process flow sheet (quantitative) from raw material to products to be provided	Process description is given in Section-2.3 of Chapter-2.
	ix. Hazard identification and details of proposed safety systems.	Hazard identification has been carried out for the entire plant. Details are given in Table-7.6 of Chapter-7.
	X. Expansion/modernization proposals: a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report. b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be	Proposed project is a green field project. Hence, it is not applicable.

ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

<table>
<tr><th>Sr. No.</th><th>Terms of Reference (TOR)</th><th>Compliance</th></tr>
<tr><td></td><td>provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.</td><td></td></tr>
<tr><td>4</td><td>Site Details</td><td></td></tr>
<tr><td></td><td>i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.</td><td>The proposed project is located in Siracha and Navinal Villages at APSEZ Mundra Taluka, Kutch District in the state of Gujarat. Analysis of alternative sites is discussed in Chapter-5.</td></tr>
<tr><td></td><td>ii. A topo sheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)</td><td>Toposheet showing the 10 km radius study area map on 1:50,000 scale is shown in Figure-1.2 of Chapter-1.</td></tr>
<tr><td></td><td>iii. Co-ordinates (lat-long) of all four corners of the site.</td><td><table><tr><th>Corner Point</th><th>Latitude</th><th>Longitude</th></tr><tr><td>A</td><td>22°48'55.40"N</td><td>69°33'34.74"E</td></tr><tr><td>B</td><td>22°49'44.92"N</td><td>69°34'13.74"E</td></tr><tr><td>C</td><td>22°50'1.88"N</td><td>69°34'59.78"E</td></tr><tr><td>D</td><td>22°48'57.23"N</td><td>69°35'8.42"E</td></tr><tr><td>E</td><td>22°48'13.26"N</td><td>69°34'35.43"E</td></tr></table></td></tr>
<tr><td></td><td>iv. Google map-Earth downloaded of the project site.</td><td>Google imagery showing the 10 km radius study area map is shown in Figure-1.3 of Chapter-1.</td></tr>
<tr><td></td><td>v. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.</td><td>Overall plant layout is shown in Figure-2.1 of Chapter-2.</td></tr>
<tr><td></td><td>vi. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.</td><td>The proposed site photographs are shown in Figure-1.4 of Chapter-1.</td></tr>
<tr><td></td><td>vii. Land use break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)</td><td>The total land required for the proposed project is about 256.58 ha (634 acres), in which 154.18 ha (381 acres) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Further, forest land of 102.38 ha (253 acres) is also involved which will be converted for industrial use. Necessary Forest Clearance (stage-I) has also been obtained vide letter 8-04/2016-FC dated 16th November, 2018.</td></tr>
<tr><td></td><td>viii. A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of the study area</td><td>• Adani Power (Mundra) Limited (Adjacent, W)
• Coastal Gujarat Power Limited (2.0 km, W)
Land use details of study area is given in Scetion-3.3 of Chapter-3.</td></tr>
<tr><td></td><td>ix. Geological features and Geo-hydrological status of the study area shall be included.</td><td>Geological and hydrogeological features are described in Section-3.2 of Chapter-3.</td></tr>
<tr><td></td><td>x. Details of Drainage of the project up to 5 km radius of study area. If the site</td><td>No major river exists within 1 km from the project site. However, Dhaneswari river passes through the</td></tr>
</table>

ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
	is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)	project site which will be suitably trained.
	xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	The 381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company). Balance 253 acres is forest land for which Stage-I forest clearance has been obtained vide letter No.8-04/2016-FC dated 16th November,2018.
	xii. R&R details in respect of land in line with state Government policy	There is no Resettlement and Rehabilitation involved in the project.
5	**Forest and wildlife related issues (if applicable)**	
	i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable).	Forest land of 102.38 ha (253 acres) is also involved which will be converted for industrial use. MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. The stage-I Forest Clearance (FC) is enclosed as Annexure-V of EIA Report.
	ii. Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).	Land use map based on 5 m resolution showing the forest land is shown in Figure-3.3.2 of Chapter-3.
	iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted	MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. The stage-I Forest Clearance (FC) is enclosed as Annexure-V of the EIA Report.
	iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.	There are no National Parks, Sanctuaries, Biosphere Reserves within 10 km radius study area. Toposheet showing the 10 km radius study area map on 1:50,000 scale is shown in Figure-1.2 of Chapter-1.
	v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.	As per the primary data collected and also from the secondary data sources, Peacock belongs to Schedule-I as per Wildlife Protection Act, 1972. Conservation plan is provided in Section-3.9.9 of Chapter-3.
	vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife.	Not applicable

ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
6	**Environmental Status**	
	i. Determination of atmospheric inversion level at the project site and site-specific micrometeorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.	Site specific atmospheric inversion level study has been carried out by using Sodar. The study report is enclosed as Annexure-XI of the EIA Report. The site-specific micro-meteorological data using temperature, relative humidity, wind speed and direction and rainfall details are given Section-3.5 of Chapter-3.
	ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.	Ambient air quality was monitored during post monsoon and partly winter season of 2016 (October-December, 2016). Details are given in Section-3.6 of Chapter-3.
	iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with - min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.	Raw data of all AAQ measurement for three months is enclosed as Annexure-IX of the EIA Report.
	iv. Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.	Surface water quality has been analysed and the results are given in Table-3.7.2 of Chapter-3.
	v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC.	Dhaneshwari river also referred as Danesri Nadi (as per Topo sheet no: F42 J9 & 10). Dhaneshwari, a seasonal river which flows in the western part of the proposed site. The river will not be diverted but suitably trained along the boundary. The flow of the river will be maintained, as shown in the Plant Layout in Figure-2.1 of EIA Report. There are no other rivers nearby the proposed plant site.
	vi. Ground water monitoring at minimum at 8 locations shall be included.	Ground water quality in the study area has been analysed and the results are given in section-3.7 of Chapter-3.
	vii. Noise levels monitoring at 8 locations within the study area.	Noise levels were monitored at 8 locations and the details are given in section-3.8 of Chapter-3.
	viii. Soil Characteristic as per CPCB guidelines.	Soil analysis was carried out at 8 locations and the details along with results are given in section-3.4 of Chapter-3.
	ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.	Traffic studies have been conducted to know the prevailing traffic volumes in the area, details are given in Setion-3.11 of Chapter-3. It is estimated that the number of additional trucks due to the proposed project is about 700 trucks per day.
	x. Detailed description of flora and fauna	Ecological studies within the study area has been

ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
	(terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.	carried out and the details are described in Section-3.9 of Chapter-3.
	xi. Socio-economic status of the study area.	Details of socio-economic status of the study area is discussed in Section-3.10 of Chapter-3.
7	**Impact Assessment and Environment Management Plan**	
	i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.	For prediction of maximum Ground Level Concentrations (GLC's), the air dispersion modelling software (AERMOD version 7.1.0) was used. Details are given in Section-4.2.2 of Chapter-4.
	ii. Water Quality modelling – in case, if the effluent is proposed to be discharged into the local drain, then Water Quality Modelling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain.	Not applicable as the unit will be operating on zero discharge process.
	iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail cum road transport or conveyor-cum-rail transport shall be examined.	The major raw material i.e. copper concentrate will be received at Adani west port and will be transported to the plant through pipe conveyor. Impact of traffic on air quality is addressed in Section-4.2.3 of Chapter-4.
	iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under EP Rules.	Wastewater generation, treatment and its management are given in section-2.4.2 of Chapter-2.
	v. Details of stack emission and action plan for control of emissions to meet standards.	Details of stack emissions are given in Table-2.6 of Chapter-2.

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TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
	vi. Measures for fugitive emission control	Fugitive emission control measures are given in section-4.2.2.1 of Chapter-4.
	vii. Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste-minimization, recycle/ reuse/ recover techniques, Energy conservation, and natural resource conservation.	Details are given in Section-2.4.3 of Chapter-2.
	viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.	Not applicable as there will not be any generation of fly ash due to the proposed plant.
	ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.	About 85.79 ha (212 acres) is allotted for greenbelt/green cover development. Details are given in Section-4.3 of Chapter-4.
	x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.	Rainwater harvesting structures will be provided to recharge the groundwater resources in the region. Details are given in section-4.2.4.4 of Chapter-4.
	xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.	The total cost for the proposed project is estimated as Rs.10,000 Crores. The total capital cost for environmental protection is about Rs. 1044 Crores. The recurring cost/ annum for environmental protection is about Rs. 5 Crores.
	xii. Action plan for post-project environmental monitoring shall be submitted.	Details are given in Chapter-6.
	xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan	Details are given in Section-7.3 of Chapter-7.
8	**Occupational health**	
	i. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of	Detail are given in Section-7.4 of Chapter-7.

ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
	the workers can be preserved	
	ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre-placement and periodical examinations give the details of the same. Details regarding last month analysed data of abovementioned parameters as per age, sex, duration of exposure and department wise.	
	iii. Annual report of health status of workers with special reference to Occupational Health and Safety.	
	iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.	
9	**Corporate Environment Policy**	
	i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	The Corporate Environment Policy and the list of Board of Directors is enclosed in Annexure-XVI of the EIA Report.
	ii. Does the Environment Policy prescribe for standard operating process /procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.	
	iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.	
	iv. Does the company have system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report	
10	Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.	All infrastructure facilities such as sanitation, fuel, restroom etc. will be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.
11	Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the	Nil

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ANNEXURE-I(A)
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference (TOR)	Compliance
	Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.	
C	**Additional TOR**	
1	Complete process flow diagram describing each unit, its process and operations long with material and energy inputs & outputs (material and energy balance)	Process flow diagram, details of material and energy balance are given in Figure-2.4 to Figure-2.6.
2	Emission from sulphuric acid plant and sulphur muck management	Details of stack emissions for proposed plant are given in Section-2.4 of Chapter-2.
3	Details on installation of continuous emission monitoring system with recording with proper calibration system	Continuous emission monitoring system with recording with proper calibration system will be provided in the proposed plant. The details of emission monitoring system installation is given in the Table-6.4 of Chapter-6.
4	Details on toxic metals including fluoride emissions	The gas clearing systems is given in Section-2.3.9 of Chpater-2.
5	Details on stack height	Details of stack for proposed plant is given in Table-2.7 of Chapter-2.
6	Details on ash disposal and management	There will be no ash generation in the proposed project.
7	Complete process flow diagram describing process of lead/zinc/copper/aluminium etc.	The process flow diagram is shown in Figure-2.3 of Chapter-2.
8	Details on smelting, thermal refining, melting, slag fuming and Waelz kiln operation	The process description in detail is given in Section-2.3 of Chapter-2.
9	Details on Holding and de-gassing of molten metal and smelting of secondary aluminium, materials pre-treatment, and from melting and smelting of secondary aluminium	The secondary off gas will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO_2 before it is discharged to the atmosphere. The process flow diagram of smelter furnace is shown in Figure-2.8 of Chapter-2.
10	Details on toxic metal content in the waste material and its composition and end use (particular of slag)	The process flow diagram of slag cleaning furnace flow sheet is shown in Figure-2.11 and precious metal recovery plant is shown in Figure-2.18 of Chapter-2. The waste generation, mode of disposal and waste characterisation are given in Section-2.4.3 of Chapter-2. The impacts on waste generation and management details are given in Section-4.2.5 of Chapter-4.
11	Trace metals in waste material especially slag	
12	Plan for trace metal recovery	
13	Trace metals in water	

Annexure-II

Methodology for Sampling and Analysis

ANNEXURE-II
METHODOLOGY ADOPTED FOR SAMPLING AND ANALYSIS

1.0 Meteorology

The methodology adopted for monitoring surface observations is as per the standard norms laid down by Bureau of Indian Standards (IS:8829) and India Meteorological Department (IMD).

1.1 Methodology of Data Generation

The Central Monitoring Station (CMS) equipped with continuous monitoring equipment was installed at site at a height of about 10 m above ground level to record wind speed, direction, relative humidity and temperature. The meteorological monitoring station was located in such a way that it is free from any obstructions and as per the guidelines specified under IS:8829. Cloud cover was recorded by visual observation. Rainfall was monitored by rain gauge.

The continuous recording meteorological instrument of Dynalab, Pune (Model No.WDL1002) has been used for recording the met data. The sensitivity of the equipment is as given below Table.

SENSITIVITY OF METEOROLOGY MONITORING STATION

Sr. No.	Sensor	Sensitivity
1	Wind speed Sensor	± 0.02 m/s
2	Wind direction Sensor	± 3 degrees
3	Temperature Sensor	± 0.2°C

Hourly maximum, minimum and average values of wind speed, direction and temperature were recorded continuously with continuous monitoring equipment. All the sensors were connected to filter and then logged on to datalogger. The readings were recorded in a memory module, which was attached to datalogger. The memory module was downloaded in computer through Dynalab software. The storage capacity of memory module was 256 KB. Data was downloaded every fortnight into the computer. The data was recorded continuously. The recovery of data was about 98%. The rest of 2 % data gaps were filled by referring to IMD data and daily weather reports in the local newspapers. However, Relative Humidity and Rainfall were recorded manually.

1.2 Ambient Air Quality

The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB), IS: 5184 and American Public Health Association (APHA).

The techniques used for ambient air quality monitoring and minimum detectable level are given in below Table.

ANNEXURE-II
METHODOLOGY ADOPTED FOR SAMPLING AND ANALYSIS

TECHNIQUES USED FOR AMBIENT AIR QUALITY MONITORING

Sr. No.	Parameter	Technique	Technical Protocol	Minimum Detectable Limit ($\mu g/m^3$)
1	$PM_{2.5}$	Fine Dust Sampler (Gravimetric method)	IS-5182 (Part-IV)	1.0
2	PM_{10}	Fine Dust Sampler (Gravimetric method)	IS-5182 (Part-IV)	5.0
3	Sulphur Dioxide	Modified West and Gaeke	IS-5182 (Part-II)	4.0
4	Nitrogen Oxide	Jacob & Hochheiser	IS-5182 (Part-VI)	10.0
5	Carbon monoxide	FID technique (Gas chromatography)	IS-5182(Part-X)	50
6	Ozone	UV-Vis Spectroscopic Analysis	ASTM-D	2.0
7	Ammonia	UV-Vis Spectrophotometry	ASTM-D	20.0
8	Benzene	GC-MS/GC	IS-5182	0.001
9	Benzo (O) Pyrene	GC-MS/GC	IS-5182	0.01 ng/m^3
10	Arsenic	GC-MS/GC	IS-5182	0.001
11	Nickel	GC-MS/GC	IS-5182	0.001
12	Lead	GC-MS/GC	IS-5182	0.001

1.3 Water Analysis

Samples for chemical analysis were collected in polyethylene carboys. Samples collected for metal content were acidified with 1 ml HNO_3. Samples for bacteriological analysis were collected in sterilized glass bottles. Selected physico-chemical and bacteriological parameters have been analyzed for projecting the existing water quality status in the study area. Parameters like temperature, Dissolved Oxygen (DO) and pH were analyzed at the time of sample collection.

The methodology for sample collection and preservation techniques was followed as per the Standard Operating Procedures (SOP) mentioned in below Table.

STANDARD OPERATING PROCEDURES (SOP) FOR WATER AND WASTEWATER SAMPLING

Parameter	Sample Collect ion	Sample Size	Storage/ Preservation
pH	Grab sampling Plastic /glass container	50 ml	On site analysis
Electrical Conductivity	Grab sampling Plastic /glass container	50 ml	On site parameter
Total suspended solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
Total Dissolved Solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
BOD	Grab sampling Plastic /glass container	500 ml	Refrigeration, 48 hrs
Hardness	Grab sampling Plastic /glass container	100 ml	Add HNO_3 to pH<2, refrigeration; 6 months
Chlorides	Grab sampling Plastic /glass container	50 ml	Not required; 28 days
Sulphates	Grab sampling Plastic /glass container	100 ml	Refrigeration; 28 days
Sodium, Potassium	Plastic container	100 ml	Not required; 6 months
Nitrates	Plastic containers	100 ml	Refrigeration; 48 hrs
Fluorides	Plastic containers only	100 ml	Not required; 28 days

ANNEXURE-II
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Parameter	Sample Collect ion	Sample Size	Storage/ Preservation
Alkalinity	Plastic/ glass containers	100 ml	Refrigeration; 14 days
Ammonia	Plastic/ glass containers	100 ml	Add H_2SO_4 to pH>2, refrigeration, 28 days
Hexavalent Chromium, Cr^{+6}	Plastic/ Glass rinse with 1+1 HNO_3	100 ml	Grab sample; refrigeration; 24 hrs
Heavy Metals (Hg, Cd, Cr, Cu, Fe, Zn, Pb etc.)	Plastic/ Glass rinse with 1+1 HNO_3	500 ml	Filter, add HNO_3 to pH>2; Grab sample; 6 months

Source: Standard Methods for the Examination of Water and Wastewater, Published By APHA, AWWA, WEF 19th Edition, 1995

1.3.1 Analytical Techniques

The analytical techniques used for water and wastewater analysis is given in below Table.

ANALYTICAL TECHNIQUES
FOR WATER AND WASTEWATER ANALYSIS

Parameter	Method
pH	APHA-4500-H^+
Colour	APHA-2120 C
Odour	IS: 3025, Part-4
Temperature	APHA-2550 B
Dissolved Oxygen	APHA-4500 O
BOD	APHA-5210 B
Electrical conductivity	APHA-2510 B
Turbidity	APHA-2130 B
Chlorides	APHA-4500 Cl^-
Fluorides	APHA-4500 F^-
Total dissolved solids	APHA-2540 C
Total suspended solids	APHA-2540 D
Total hardness	APHA-2340 C
Sulphates	APHA-4500 SO_4^{-2}
Arsenic	APHA-3120 B/ APHA-3114 B/ APHA-3500 As
Calcium	APHA-3120 B/ APHA-3500 Ca
Magnesium	APHA-3120 B/ APHA-3500 Mg
Sodium	APHA-3120 B/ APHA-3500 Na
Potassium	APHA-3120 B/ APHA-3500 K
Manganese	APHA-3120 B/ APHA-3500 Mn
Mercury	APHA-3112 B/ APHA-3500 Hg
Selenium	APHA-3120 B/ APHA-3114 B/ APHA-3500 Se
Lead	APHA-3120 B/ APHA-3500 Pb
Copper	APHA-3120 B/ APHA-3500 Cu
Cadmium	APHA-3120 B/ APHA-3500 Cd
Iron	APHA-3120 B/ APHA-3500 Fe
Zinc	APHA-3120 B/ APHA-3500 Zn
Boron	APHA-4500 B
Coliform organisms	APHA-9215 D
Alkalinity	APHA-2320 B

ANNEXURE-II
METHODOLOGY ADOPTED FOR SAMPLING AND ANALYSIS

1.4 Soil Quality

At each location, soil samples were collected from three different depths viz. 30 cm, 60 cm and 90 cm below the surface and are homogenized. This is in line with IS: 2720 & Methods of Soil Analysis, Part-1, 2nd edition, 1986 of (American Society for Agronomy and Soil Science Society of America). The homogenized samples were analyzed for physical and chemical characteristics. The soil samples were collected and analyzed once in each season.

The samples have been analyzed as per the established scientific methods for physico-chemical parameters. The heavy metals have been analyzed by using Atomic Absorption Spectrophotometer and Inductive Coupled Plasma Analyzer.

The methodology adopted for each parameter is described in below Table.

ANALYTICAL TECHNIQUES FOR SOIL ANALYSIS

Parameter	Method (ASTM number)
Grain size distribution	Sieve analysis (D 422 – 63)
Textural classification	Chart developed by Public Roads Administration
Infiltration capacity	Infiltrometer
Bulk density	Sand replacement, core cutter
Porosity	Void ratio
Sodium absorption ratio	Flame colourimetric (D 1428-82)
PH	pH meter (D 1293-84)
Electrical conductivity	Conductivity meter (D 1125-82)
Nitrogen	Kjeldahl distillation (D 3590-84)
Phosphorus	Molybdenum blue, colourimetric (D 515-82)
Potassium	Flame photometric (D 1428-82)
Copper	AAS (D 1688-84)
Iron	AAS (D 1068-84)
Zinc	AAS (D 1691-84)
Boron	Surcumin, colourimetric (D 3082-79)
Chlorides	Argentometric (D 512-81 Rev 85)
Fluorides	Fusion followed by distillation and estimation by Ion selective electrod.

1.5 Noise Levels

1.5.1 Method of Monitoring

Noise level monitoring was carried out continuously for 24-hours with one hour interval starting at 0030 hrs to 0030 hrs next day. The noise levels were monitored on working days only and Saturdays, Sundays and public holidays were not monitored. During each hour L_{eq} were directly computed by the instrument based on the sound pressure levels. Lday (Ld), Lnight (Ln) and Ldn values were computed using corresponding hourly Leq of day and night respectively. Monitoring was carried out at 'A' response and fast mode.

Parameters Measured During Monitoring

For noise levels measured over a given period of time interval, it is possible to describe important features of noise using statistical quantities. This is calculated using the percent of the time certain noise levels exceeds the time interval. The

ANNEXURE-II
METHODOLOGY ADOPTED FOR SAMPLING AND ANALYSIS

notation for the statistical quantities of noise levels is described below:

- Hourly L_{eq} values have been computed by integrating sound level meter.
- L_{day}: As per the CPCB guidelines the day time limit is between 07:00 hours to 22.00 hours as outlined in Ministry of Environment and Forest Notification S.O. 123 (E) dated 14/02/2000.
- L_{night}: As per the CPCB guidelines the night time limit is between 22:00 hours to 07.00 hours as outlined in Ministry of Environment and Forest Notification S.O. 123 (E) dated 14/02/2000.

A rating developed by Environmental Protection Agency, (US-EPA) for specification of community noise from all the sources is the Day-Night Sound Level, (L_{dn}).

L_{dn}: It is similar to a 24 hr equivalent sound level except that during night time period (10 PM to 07 AM) a 10 dB (A) weighting penalty is added to the instantaneous sound level before computing the 24 hr average. This nighttime penalty is added to account for the fact that noise during night when people usually sleep is judged as more annoying than the same noise during the daytime.

The L_{dn} for a given location in a community may be calculated from the hourly L_{eq}'s, by the following equation.

$$L_{dn} = 10Log \frac{[\sum_{i=1}^{15} 10^{(L_{eq}i/10)} + \sum_{i=1}^{9} 10^{(L_{eq}i+10/10)}]}{24}$$

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Annexure-III
SEZ Notification

रजिस्ट्री सं० डी० एल०-33004/99

REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित

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वाणिज्य एवं उद्योग मंत्रालय

(वाणिज्य विभाग)

अधिसूचना

नई दिल्ली, 21 सितम्बर, 2016

का.आ. 3029(अ).—यत:, केन्द्र सरकार ने भारत सरकार, वाणिज्य एवं उद्योग मंत्रालय (वाणिज्य विभाग) की निम्नलिखित अधिसूचनाओं के तहत गुजरात राज्य के मुंद्रा में विशेष आर्थिक जोन मै. मुंद्रा पोर्ट एण्ड स्पेशल इकोनोमिक जोन लिमिटेड के नाम में अधिसूचित/अनधिसूचित किए थे, अर्थात्:-

(1) सं. का.आ. 1365 (अ) दिनांक 27 मई, 2009;

(2) सं. का.आ. 583 (अ) दिनांक 26 मार्च, 2012;

(3) सं. का.आ. 1443 (अ) दिनांक 31 मई, 2013;

(4) सं. का.आ. 3379 (अ) दिनांक 11 दिसंबर, 2015;

और यत:, दिनांक 27 मार्च, 2012 के अनुमोदन पत्र सं. एफ.1/15/2011-एसईजेड के अनुसार उल्लिखित एसईजेड के नाम को मै. मुंद्रा पोर्ट एण्ड स्पेशल इकोनोमिक जोन लिमिटेड से बदल कर मै. अदानी पोर्ट्स एंड स्पेशल इकोनोमिक जोन लिमिटेड कर दिया था;

और यत: केन्द्र सरकार ने पूर्ववर्ती पैराग्राफ में उल्लिखित तथा इस अधिसूचना के साथ संलग्न का.आ. सं. 1365 (अ) दिनांक 27 मई, 2009; का.आ. सं. 583 (अ) दिनांक 26 मार्च, 2012; का.आ. सं. 1443 (अ) दिनांक 31 मई, 2013; का.आ. सं 3379 (अ) दिनांक 11 दिसंबर, 2015; द्वारा अधिसूचित समस्त विशेष आर्थिक जोनों को प्रशासनिक सुविधा के लिए और विकासकर्ताओं के अधिकारों, दायित्वों और वित्तीय लाभों को प्रभावित किए बिना समेकित करने का निर्णय लिया है;

अत: अब विशेष आर्थिक जोन नियम, 2006 के नियम 8 के साथ पठित विशेष आर्थिक जोन अधिनियम, 2005 (2005 का 28) (जिसे एतद्पश्चात उक्त अधिनियम कहा गया है) की धारा 4 की उप-धारा (1) के द्वितीय परन्तुक द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और प्रथम पैराग्राफ में उल्लिखित अधिसूचना सं. का.आ. 1365 (अ) दिनांक 27 मई, 2009; का.आ.सं. 583 (अ) दिनांक 26 मार्च, 2012; सं. का.आ. 1443 (अ) दिनांक 31 मई, 2013; का.आ.सं. 3379 (अ) दिनांक 11 दिसंबर, 2015 के अधिक्रमण में, ऐसे अधिक्रमण से पूर्व किए गए कार्यों या किए जाने के लिए विलोपित कार्यों को छोड कर, केन्द्र सरकार इस बात से संतुष्ट होने के बाद उक्त अधिनियम की धारा 3 की उपधारा (8) के अंतर्गत अपेक्षाएं और अन्य संबंधित अपेक्षाएं पूरी हो गई हैं, एतद्वारा प्रथम पैराग्राफ में उल्लिखित अधिसूचनाओं में वर्णित विशेष आर्थिक जोनों के समेकित करती है और निम्नलिखित क्षेत्र को विशेष आर्थिक जोन के रूप में पुन: अधिसूचित करती है जिसमें निम्नलिखित तालिका में उल्लिखित सर्वेक्षण संख्या तथा क्षेत्र शामिल हैं, अर्थात:-

तालिका

अ (बहु उत्पाद)				
क्र. सं	गाँव/क्षेत्र का नाम	तालुका	सर्वेक्षण सं./विवरण	क्षेत्र हैक्ट. में
1	धुब्र	मुद्रां	उत्तर: नवीनल क्रीक दक्षिण : जी एम बी-जी ए पी एल भूमि पूर्व: जी एम बी-जी ए पी एल भूमि पश्चिम: 175 एकड़ भूमि	121-40-43
2.	धुब्र	मुद्रां	उत्तर : जी एम बी – जी ए पी एल भूमि एवं जी ए पी एल रोड दक्षिण :जी एम बी – जी ए पी एल भूमि पूर्व: 300 एकड़ भूमि पश्चिम: 325 एकड भूमि	70-81-92
3	धुब्र	मुद्रां	उत्तर :जी एम बी – जी ए पी एल भूमि एवं जी ए पी एल रोड. दक्षिण :जी एम बी – जी ए पी एल भूमि पूर्व: जी ए पी एल रोड एवं 175 एकड़ भूमि पश्चिम: जी एम बी - जी ए पी एल भूमि	131-52-13
4	नवीनल द्वीप भूमि	मुद्रां	उत्तर : नवीनल क्रीक एवं जी एम बी-जी ए पी एल भूमि दक्षिण : कच्छ की खाडी. पूर्व : जी ए पी एल रोड. एवं 325 एकड़ एसीएल भूमि पश्चिम : क्रीक एवं वन क्षेत्र	406-29-97
			उत्तर : वन भूमि	

5	नवीनल द्वीप भूमि	मुद्रां	दक्षिण : नवीनल क्रीक पूर्व : जी ए पी एल रोड. पश्चिम: वन भूमि	80-93-62
6	मुद्रां एवं पुरानी भारत नमक एवं रसायन लि. की भूमि	मुद्रां	उत्तर: ध्रूव ग्राम की क्र.स. 169 का ट्रेवर्स लैंड और मुद्रां ग्राम की क्रं.स. 141 का ट्रेवर्स लैंड दक्षिण: बोचा क्रीक एवं पुराना मुद्रां पतन पूर्व: पुराना मुद्रां पोर्ट रोड. पश्चिम: नवीनल क्रीक एवं जी ए पी एल रोड	320-75-02
7	ध्रुव	मुद्रां	169	150-54-13
8	मुद्रां	मुद्रां	141 पार्ट, 141 पार्ट	71-44-64
9	बरोई	मुद्रां	207, 207 पार्ट	39-87-12
10	गोवरसामा	मुद्रां	27, 28/2, 28/3, 28/4, 28/5, 28/6, 28/7, 33/1, 33/2, 33/3, 33/4, 33/5, 34/2, 34/3, 34/4, 34/5, 34/6, 34/7, 34/8, 34/9 पार्ट, 34/9 पार्ट, 34/10, 34/11, 52/8, 52 पार्ट, 28/1, 52 पार्ट, 52 पार्ट (पुराना)	43-75-61
11	शेकादिया	मुद्रां	81/1, 81/2,120/1	04-04-68
12	लूनी	मुद्रां	162, 163 पार्ट, 165/1, 165/2, 166, 167 पार्ट, 168, 169 पार्ट, 177/2, 235 पार्ट, 237/1, 237/2, 258, 238, 239/1 पार्ट, 243 पार्ट, 244, 245/2, 245/1, 246 पार्ट, 247 पार्ट, 248 पार्ट, 254/2 पार्ट, 256/1 पार्ट, 257, 259, 262, 263, 264, 265, 266, 267/1, 267/2, 274/2, 277 पार्ट, 278/1, 278/2, 279 पार्ट, 280, 281, 282, 342 पार्ट, 342 पार्ट, 236, 468 पार्ट, 468 पार्ट, 468 पार्ट	183-68-47

13	वडाला	मुद्रां	120 पार्ट, 177/1, 177/2, 178, 179 पार्ट, 180/1, 180/2, 180/3, 181, 184, 185 पार्ट, 185 पार्ट, 186 पार्ट, 187, 188/1, 189/1, 189/2, 190/1, 190/2, 191, 192, 193, 195 पार्ट, 196/1, 196/2, 197/1, 197/2, 197/3, 197/4, 198, 199 पार्ट, 200, 243/2, 244/2, 245/1पार्ट, 245/1 पार्ट, 245/2, 251/2 पार्ट, 254, 255/1, 255/2 पार्ट, 256 पार्ट, 257, 258/1, 259,260/1, 260/2, 261/1, 261/2, 262, 263/1 पार्ट, 264/1, 264/2, 264/3, 404, 405, 406/1 पार्ट, 406/2 पार्ट, 406/3, 406/4, 423/2, 424, 425/1, 425/2,	138-02-66
			425/3 पार्ट, 431 पार्ट, 432/1 पार्ट, 432/2, 432/3, 433, 434, 435 पार्ट, 446 पार्ट, 447, 448, 449/1, 449/2, 450 पार्ट, 465 पार्ट, 467 पार्ट, 468 पार्ट, 469 पार्ट, 470 पार्ट, 478 पार्ट, 526/1, 527 पार्ट, 528/1, 528/2, 529 पार्ट, 530, 533, 534 पार्ट, 376, 466 पार्ट, 472, 202, 466 पार्ट	
14	पावादियारा	मुद्रां	10/1 पार्ट, 11, 12/3, 12/4, 12/5, 12/6, 13/1, 13/2, 13/3, 14/1 पार्ट, 15, 16 पार्ट, 30, 32/1 पार्ट, 39 पार्ट, 41, 42/1, 42/2, 43/1, 43/2, 44 पार्ट, 17 पार्ट, 29, 31/1, 31/2	26-22-33
15	भरूडिया	मुद्रां	168 पार्ट, 173/1, 173/2, 174 पार्ट, 176, 177 पार्ट, 210, 211 पार्ट, 212, 214, 217 पार्ट, 217 पार्ट, 178 पार्ट	27-01-25

16	भद्रेश्वरा	मुद्रां	54 पार्ट, 55 पार्ट, 57, 60, 153/1, 154/2, 63/1 पार्ट, 63/2 पार्ट, 82/1, 82/3, 84/1, 85/1 पार्ट, 85/2, 86/1, 89 पार्ट, 90, 96 पार्ट, 97 पार्ट, 98 पार्ट, 99, 102/1 पार्ट, 125/1, 151/2, 130/1, 131/1, 132/2, 132/3, 133, 134/2, 137/2 पार्ट, 137/3, 138, 139, 140, 152/1, 152/2, 153/2, 153/3, 153/4, 157/1, 157/3, 86/2, 88, 95, 100, 134/1(137/3), 137/1, 84/2, 130/3, 143/4, 144, 145, असर्वेक्षित भूमि of 25 एकड.	119-23-93
17	बीतावलाडिया (अतमनो वास)	अंजार	255 पार्ट, 260/1, 263, 264 पार्ट, 284/1 पार्ट, 284/2, 285 पार्ट, 289 पार्ट, 290, 291 पार्ट, 292/1, 292/2, 293/1 पार्ट, 294 पार्ट, 297/1 पार्ट, 295 पार्ट, 298/1, 298/2, 302 पार्ट, 304 पार्ट, 299 पार्ट, 300 पार्ट, 301, 306/1 पार्ट, 308 पार्ट, 309 पार्ट, 309 पार्ट, 312 पार्ट, 292/3, 345, 347, 334, 342, 346	61-24-85
18	बीतावलाडिया (उगमनोवास)	अंजार	5/1 पार्ट, 6 पार्ट, 8 पार्ट, 9 पार्ट, 9 पार्ट, 10 पार्ट, 11/1 पार्ट, 11/2 पार्ट, 11/3, 18/1 पार्ट, 18/2 पार्ट, 18/3, 19, 21, 22/2 पार्ट, 22/3, 22/4, 22/5, 23 पार्ट, 55 पार्ट, 184/1 पार्ट, 184/2 पार्ट, 186 पार्ट, 187/1 पार्ट, 220, 221 पार्ट, 222, 223 पार्ट, 224 पार्ट, 225 पार्ट, 225 पार्ट, 338, 401पार्ट, 401 पार्ट, 7, 43, 220, 405 पार्ट, 20,	61-60-25

			असर्वेक्षित भूमि of 10 एकड	
19	कुम्भरिया	अंजार	101 पार्ट, 102, 103, 104, 105 पार्ट, 112 पार्ट, 113, 114 पार्ट, 115, 116, 117, 118, 119, 120 पार्ट, 266 पार्ट, 123, 147, 148 पार्ट, 149 पार्ट, 157, 158, 159/1 पार्ट, 159/2 पार्ट, 160 पार्ट, 161 पार्ट, 162 पार्ट, 163 पार्ट, 164 पार्ट, 169 पार्ट, 171, 172, 174 पार्ट, 251 पार्ट, 252 पार्ट, 253 पार्ट, 254, 255, 256, 257, 258, 259 पार्ट, 265 पार्ट, 267 पार्ट, 270 पार्ट, 268, 269, 271, 274 पार्ट, 275 पार्ट, 276 पार्ट, 152, 111, 136	67-70-31
20	देवलिया	अंजार	4, 8/1, 9, 10, 11/1, 11/2, 45 पार्ट, 46 पार्ट, 47, 48, 49/1, 49/2, 335 पार्ट, 335 पार्ट, 338/1, 338/2, 338/3 पार्ट, 340 पार्ट, 341 पार्ट, 342/1, 342/2, 348/2 पार्ट, 384/2, 342/3, 343, 344, 346, 347, 348/1 पार्ट, 349, 350, 351, 352 पार्ट, 353 पार्ट, 354 पार्ट, 355, 356, 357, 358/1, 358/2, 358/3, 359, 360, 361, 362, 363, 364, 365, 367 पार्ट, 369/2 पार्ट, 369/3, 370 पार्ट, 384/4 पार्ट, 387 पार्ट, 395/1 पार्ट, 397 पार्ट, 398, 399, 400, 403, 404 पार्ट, 405 पार्ट, 489 पार्ट, 401, 489 पार्ट	169-42-98
21	शिनोई	अंजार	514	3-37-91
			717/1 पार्ट, 717/2 पार्ट, 718 पार्ट, 723, 724, 725 पार्ट, 728,	

22	अंजार-एसआईएम	अंजार	734 पार्ट, 735 पार्ट, 736, 737 पार्ट, 738 पार्ट, 761, 762 पार्ट, 867, 868/1 पार्ट, 868/2, 869 पार्ट, 870 पार्ट, 872 पार्ट, 873 पार्ट, 874/1 पार्ट, 875/1, 875/2, 875/3, 875/4 पार्ट, 984 पार्ट, 722/4, 727, 866, 984 पार्ट, 1026, 1058, 1005 पार्ट, 1024 पार्ट, 1025, 1026, 1027, 1010, 1005 पार्ट, 1024 पार्ट	89-14-11
23	मेघपार-कुंभर्डी	अंजार	43 पार्ट, 51/2, 52 पार्ट, 57/1 पार्ट, 63 पार्ट, 68 पार्ट, 69/1 पार्ट, 69/2 पार्ट, 70/1 पार्ट, 70/3 पार्ट, 122/2, 124/1 पार्ट, 124/2 पार्ट, 124/3 पार्ट, 124/4, 140/1 पार्ट, 140/2, 141 पार्ट, 142/4, 163 पार्ट	18-67-60
24	मुद्रां पत्तन (जी ए पी एल) पत्तन सीमा	-	निम्नलिखित वर्तमान अधिसूचनाओं के अनुसार: (i) सीमाशुल्क आयुक्त का कार्यालय, गुजरात, अहमदाबाद द्वारा जारी दिनांक 23.09.1999 की सं.17/99-सी.सी (ii) पत्तन एवं यातायात विभाग, गुजरात सरकार द्वारा जी दिनांक 11.12.2008 की सं. पी/टी/2008/69/डब्ल्यू के एस/432007/जी/ 488/जी एच/1 (iii) सीमाशुल्क आयुक्त (नि.) का कार्यालय, जामनगर द्वारा जारी दिनांक 7 मार्च, 2003 की सं. 03/2003 (iv) सीमाशुल्क आयुक्त (नि.) का कार्यालय, जामनगर द्वारा जारी दिनांक 20 मई, 2003 की सं. 03/2003	
25	मुद्रां	मुद्रां	141 पाइकी	251-43-08
26	मुद्रां	मुद्रां	141 पाइकी	74-61-45
27	ध्रुब्र	मुद्रां	169 पार्ट	105-01-93
28	ध्रुब्र	मुद्रां	169 पार्ट	16-18-80

29	धुब्र	मुद्रां	169/पी1/पी1/पी3	14-16-41
30	धुब्र	मुद्रां	असर्वेक्षित भूमि	28-93-61
31	जारपारा	मुद्रां	689/7	41-92-69
32	जारपारा	मुद्रां	689/29	48-42-72
33	जारपारा	मुद्रां	689/30	24-31-16
34	जारपारा	मुद्रां	689/36	63-70-79
35	जारपारा	मुद्रां	689/47	21-04-38
36	जारपारा	मुद्रां	689/48	74-46-25
37	जारपारा	मुद्रां	689/49	70-51-68
38	जारपारा	मुद्रां	689/50	41-65-27
39	जारपारा	मुद्रां	689/52	16-19-08
40	जारपारा	मुद्रां	असर्वेक्षित भूमि	269-03-89
41	जारपारा	मुद्रां	689/पी92/पी2/पी2	87-20-05
42	नवीनल	मुद्रां	55/1	1-22-42
43	नवीनल	मुद्रां	56/2	0-23-27
44	नवीनल	मुद्रां	64/1	0-98-14
45	नवीनल	मुद्रां	102/1	2-30-67
46	नवीनल	मुद्रां	102/2	1-11-29
47	नवीनल	मुद्रां	110/3	0-84-98
48	नवीनल	मुद्रां	115/3	1-02-18
49	नवीनल	मुद्रां	130	3-24-76
50	नवीनल	मुद्रां	223/पार्ट	134-29-94
51	नवीनल	मुद्रां	असर्वेक्षित भूमि	58-22-79
52	नवीनल	मुद्रां	224 & 225 पार्ट	93-48-29
53	सिरचा	मुद्रां	120	2-12-46
54	सिरचा	मुद्रां	121/1	1-16-35
55	सिरचा	मुद्रां	121/3	1-04-21
56	सिरचा	मुद्रां	121/4	1-95-26
57	सिरचा	मुद्रां	125/1	1-74-02
58	सिरचा	मुद्रां	131	2-54-95

59	सिरचा	मुद्रां	295 पार्ट	103-67-08
60	सिरचा	मुद्रां	124	1-86-16
61	सिरचा	मुद्रां	125/2	1-60-86
62	सिरचा	मुद्रां	126	2-22-58
63	सिरचा	मुद्रां	129	5-62-52
64	सिरचा	मुद्रां	135	2-60-01
65	सिरचा	मुद्रां	137	1-63-90
66	सिरचा	मुद्रां	138/1	3-65-23
67	सिरचा	मुद्रां	140	4-24-92
68	सिरचा	मुद्रां	141	2-24-60
69	सिरचा	मुद्रां	142	2-68-11
70	सिरचा	मुद्रां	143	4-14-81
71	सिरचा	मुद्रां	144/1	3-83-44
72	सिरचा	मुद्रां	144/2	1-39-62
73	सिरचा	मुद्रां	147	2-92-39
74	सिरचा	मुद्रां	असर्वेक्षित भूमि	64-72-85
75	सिरचा	मुद्रां	295/पी6/पी3	73-35-18
76	टुंडा	मुद्रां	180/पी	77-52-50
77	टुंडा	मुद्रां	असर्वेक्षित भूमि	506-94-82
78	मुद्रां	मुद्रां	141 पाइकी	607-05-00
79	मुद्रां	मुद्रां	141 पाइकी	84-17-55
80	मुद्रां	मुद्रां	जी एम बी/जी ए पी एल भूमि (ओल्ड भारत साल्ट लैंड)	382-95-00
81	टुंडा	मुद्रां	180 पाइकी	231-60-98
82	सिरचा	मुद्रां	295/1 पाइकी	62-27-12
83	बरोई	मुद्रां	238 पी	20-23-50
84	बरोई	मुद्रां	207 पी	21-70-16
85	गोवरसमा	मुद्रां	52 पी	189-25-95
86	गोवरसमा	मुद्रां	53 पी	27-01-51
	कुल योग अ			**6456.3349** हेक्टेयर
	ब (एफ टी डब्लू जेड)			
87	ध्रुव्र	-	169/36	168.41

	कुल योग ब	**168.41** हेक्टेयर

स (नया बहुउत्पाद)			
88	मुद्रां वन	असर्वेक्षित भूमि	1228.00.00
89	मुद्रां वन	असर्वेक्षित भूमि	227.00.00
90	मुद्रां वन	असर्वेक्षित भूमि	385.00.00
	सिरचा	असर्वेक्षित भूमि	1.59.37
	नवीनल	असर्वेक्षित भूमि	6.99.95
91	जारपारा	असर्वेक्षित भूमि	2.86.92
	जारपारा	689/पी92/पी2	5.07.11
		कुल योग स	**1856.53.35**
	कुल योग (अ+ब+स)		**8481.2784** हेक्टेयर

[फा. सं. एफ. 1/12/2016-एसईजेड]

आलोक वर्धन चतुर्वेदी, अपर सचिव

MINISTRY OF COMMERCE AND INDUSTRY

(Department of Commerce)

NOTIFICATION

New Delhi, the 21st September, 2016

S.O. 3029(E).—WHEREAS, the Central Government had notified/de-notified the Special Economic Zone named M/s. Mundra Port and Special Economic Zone Limited at Mundra in the State of Gujarat under the following notifications of the Government of India in the Ministry of Commerce and Industry (Ministry of Commerce), namely:-

(1) S.O. number 1365 (E) dated 27th May, 2009;

(2) S.O. number 583 (E) dated 26th March, 2012;

(3) S.O. number 1443 (E) dated 31st May, 2013;

(4) S.O. number 3379 (E) dated 11th December, 2015;

AND, WHEREAS, the name of the SEZ was changed from M/s. Mundra Port and Special Economic Zone Limited (MPSEZL) to M/s. Adani Ports and Special Economic Zone Limited vide approval letter No. F.1/15/2011-SEZ dated 27th March, 2012;

AND, WHEREAS, the Central Government has decided to consolidate all the Special Economic Zones notified vide S.O. number 1365 (E) dated 27th May, 2009; S.O. number 583 (E) dated 26th March, 2012; S.O. number 1443 (E) dated 31st May, 2013; S.O. number 3379 (E) dated 11th December, 2015 referred in preceding paragraph for administrative convenience and without affecting rights obligations and fiscal benefits of the Developer(s);

NOW, THEREFORE, the Central Government, in exercise of the powers conferred by second proviso to sub-section (1) of section 4 of the Special Economic Zones Act, 2005 (28 of 2005) (hereinafter referred to as the said Act, read with rule 8 of the Special Economic Zones Rules, 2006, and in supersession of the notification number S.O. number 1365 (E) dated 27th May, 2009; S.O. number 583 (E) dated 26th March, 2012; S.O. number 1443 (E) dated 31st May, 2013; S.O. number 3379 (E) dated 11th December, 2015, referred to the first paragraph, except as respects things done or omitted to be done for such supersession, the Central Government on being satisfied that the requirements under sub-section (8) of section 3 of the said Act and other related requirements are fulfilled, hereby consolidates the Special Economic Zones mentioned in the notifications referred to the first paragraph, and re-notifies following areas comprising following survey numbers given in the table below as a Special Economic Zone, namely:

TABLE

A (Multi Product)				
Sl. No.	**Name of Village/Area**	**Taluka**	**Survey No./Details**	**Area in Hectares**
1.	Dhrub	Mundra	North: Navinal Creek South : GMB-GAPL land East: GMB-GAPL land West: 175 acre Land	121-40-43
2.	Dhrub	Mundra	North : GMB – GAPL Land and GAPL Road South :GMB – GAPL Land	70-81-92
			East: 300 Acre Land West: 325 Acre Land	
3.	Dhrub	Mundra	North :GMB – GAPL Land and GAPL Road South :GMB – GAPL Land East: GAPL Road and 175 Acre Land West: GMB - GAPL Land	131-52-13
4.	Navinal Island Land	Mundra	North : Navinal Creek and GMB-GAPL land South : Gulf of Kutch East : GAPL road and 325 acres ACL land West : Creek and Forest Area	406-29-97
5.	Navinal Island Land	Mundra	North : Forest Land South : Navinal Creek East : GAPL Road West : Forest Land	80-93-62
6.	Mundra and Old Bharat Salt and Chemical Ltd. Land	Mundra	North: Traverse Land S.No. 169 of Village – Dhrub and Traverse land S. No. 141 of Village – Mundra South: Bocha Creek & Old Mundra Port East: Old Mundra Port Road West: Navinal Creek and GAPL Road	320-75-02
7.	Dhrub	Mundra	169	150-54-13
8.	Mundra	Mundra	141 part, 141 Part	71-44-64
9.	Baroi	Mundra	207, 207 Part	39-87-12
10.	Govarsama	Mundra	27, 28/2, 28/3, 28/4, 28/5,	43-75-61

			28/6, 28/7, 33/1, 33/2, 33/3, 33/4, 33/5, 34/2, 34/3, 34/4, 34/5, 34/6, 34/7, 34/8, 34/9 Part, 34/9 Part, 34/10, 34/11, 52/8, 52 Part, 28/1, 52 Part, 52 Part (old)	
11.	Shekhadiya	Mundra	81/1, 81/2, 120/1	04-04-68
12.	Luni	Mundra	162, 163 Part, 165/1, 165/2, 166, 167 Part, 168, 169 Part, 177/2, 235 Part, 237/1, 237/2, 258, 238, 239/1 Part, 243 Part, 244, 245/2, 245/1, 246 Part, 247 Part, 248 Part, 254/2 Part, 256/1 Part, 257, 259, 262, 263, 264, 265, 266, 267/1, 267/2, 274/2, 277 Part, 278/1, 278/2, 279 Part, 280, 281, 282, 342 Part, 342 Part, 236, 468 Part, 468 Part, 468 Part	183-68-47
13.	Vadala	Mundra	120 Part, 177/1, 177/2, 178, 179 Part, 180/1, 180/2, 180/3, 181, 184, 185 Part, 185 Part, 186 Part, 187, 188/1, 189/1, 189/2, 190/1, 190/2, 191, 192, 193, 195 Part, 196/1, 196/2, 197/1, 197/2, 197/3, 197/4, 198, 199 Part, 200, 243/2, 244/2, 245/1 Part, 245/1 Part, 245/2, 251/2 Part, 254, 255/1, 255/2 Part, 256 Part, 257, 258/1, 259, 260/1, 260/2, 261/1, 261/2, 262, 263/1 Part, 264/1, 264/2, 264/3, 404, 405, 406/1 Part, 406/2 Part, 406/3, 406/4,	138-02-66
			423/2, 424, 425/1, 425/2, 425/3 Part, 431 Part, 432/1 Part, 432/2, 432/3, 433, 434, 435 Part, 446 Part, 447, 448, 449/1, 449/2, 450 Part, 465 Part, 467 Part, 468 Part, 469 Part, 470 Part, 478 Part, 526/1, 527 Part, 528/1, 528/2, 529 Part, 530, 533, 534 Part, 376, 466 Part, 472, 202, 466 Part	
14.	Pavadiyara	Mundra	10/1 Part, 11, 12/3, 12/4, 12/5, 12/6, 13/1, 13/2, 13/3, 14/1 Part, 15, 16 Part, 30, 32/1 Part, 39 Part, 41, 42/1, 42/2, 43/1, 43/2, 44 Part, 17 Part, 29, 31/1, 31/2	26-22-33
15.	Bharudia	Mundra	168 Part, 173/1, 173/2, 174 Part, 176, 177 Part, 210, 211	27-01-25

			Part, 212, 214, 217 Part, 217 Part, 178 Part	
16.	Bhadreshwar	Mundra	54 Part, 55 Part, 57, 60, 153/1, 154/2, 63/1 Part, 63/2 Part, 82/1, 82/3, 84/1, 85/1 Part, 85/2, 86/1, 89 Part, 90, 96 Part, 97 Part, 98 Part, 99, 102/1 Part, 125/1, 151/2, 130/1, 131/1, 132/2,132/3,133,134/2, 137/2 Part, 137/3, 138, 139, 140,152/1,152/2,153/2, 153/3, 153/4, 157/1, 157/3, 86/2, 88, 95, 100, 134/1(137/3), 137/1, 84/2, 130/3, 143/4, 144, 145, Unsurveyed Land of 25 acres	119-23-93
17.	Bitawaladia (Athamnowas)	Anjar	255 Part, 260/1, 263, 264 Part, 284/1 Part, 284/2, 285 Part, 289	61-24-85
			Part, 290, 291 Part, 292/1, 292/2, 293/1 Part, 294 Part, 297/1 Part, 295 Part, 298/1, 298/2, 302 Part, 304 Part, 299 Part, 300 Part, 301, 306/1 Part, 308 Part, 309 Part, 309 Part, 312 Part, 292/3, 345, 347, 334, 342, 346	
18.	Bitawaladia (Ugamanowa)	Anjar	5/1 Part, 6 Part, 8 Part, 9 Part, 9 Part, 10 Part, 11/1 Part, 11/2 Part, 11/3, 18/1 Part, 18/2 Part, 18/3, 19, 21, 22/2 Part, 22/3, 22/4, 22/5, 23 Part, 55 Part, 184/1 Part, 184/2 Part, 186 Part, 187/1 Part, 220, 221 Part, 222, 223 Part, 224 Part, 225 Part, 225 Part, 338, 401 Part, 401Part, 7, 43, 220, 405 Part, 20, Unsurveyed land of 10 acres	61-60-25
19.	Kumbharia	Anjar	101 Part, 102, 103, 104, 105 Part, 112 Part, 113, 114 Part, 115, 116, 117, 118, 119, 120 Part, 266 Part, 123, 147, 148 Part, 149 Part, 157, 158, 159/1 Part, 159/2 Part, 160 Part, 161 Part, 162 Part, 163 Part, 164 Part, 169 Part, 171, 172, 174 Part, 251 Part, 252 Part, 253 Part, 254, 255, 256, 257, 258, 259 Part, 265 Part, 267 Part, 270 Part, 268, 269, 271, 274 Part, 275 Part, 276 Part, 152, 111, 136	67-70-31
20.	Devalia	Anjar	4, 8/1, 9, 10, 11/1, 11/2, 45 Part, 46 Part, 47, 48, 49/1, 49/2, 335 Part, 335 Part, 338/1,	169-42-98

			338/2, 338/3 Part, 340 Part, 341 Part, 342/1, 342/2, 348/2 Part, 384/2, 342/3, 343, 344, 346, 347, 348/1 Part, 349, 350, 351, 352 Part, 353 Part, 354 Part, 355, 356, 357, 358/1, 358/2, 358/3, 359, 360, 361, 362, 363, 364, 365, 367 Part, 369/2 Part, 369/3, 370 Part, 384/4 Part, 387 Part, 395/1 Part, 397 Part, 398, 399, 400, 403, 404 Part, 405 Part, 489 Part, 401, 489 Part	
21.	Shynoi	Anjar	514	3-37-91
22.	Anjar SIM	Anjar	717/1 Part, 717/2 Part, 718 Part, 723, 724, 725 Part, 728, 734 Part, 735 Part, 736, 737 Part, 738 Part, 761, 762 Part, 867, 868/1 Part, 868/2, 869 Part, 870 Part, 872 Part, 873 Part, 874/1 Part, 875/1, 875/2, 875/3, 875/4 Part, 984 Part, 722/4, 727, 866, 984 Part, 1026, 1058, 1005 Part, 1024 Part, 1025, 1026, 1027, 1010, 1005 Part, 1024 Part	89-14-11
23.	Meghpar – Kumbhardi	Anjar	43 Part, 51/2, 52 Part, 57/1 Part, 63 Part, 68 Part, 69/1 Part, 69/2 Part, 70/1 Part, 70/3 Part, 122/2, 124/1 Part, 124/2 Part, 124/3 Part, 124/4, 140/1 Part, 140/2, 141 Part, 142/4, 163 Part	18-67-60
24.	Mundra Port (GAPL) Port Limits	-	As per following existing notifications: (i) No. 17/99-CC dated 23- 09-1999 issued by the Office of the Commissioner of Customs, Gujarat, Ahmedabad (v) No. PT/2008/69/WKS/432007/ G/488/ GH/1 dated 11- 12-2008 issued by Ports and Transport Department, Government of Gujarat. (vi) No. 03/2003 dated 7th March 2003 issued by the Office of the Commissioner of Customs (Prev.), Jamnagar. (vii) No. 09/2003 dated 20th May 2003 issued by the Office of the Commissioner of Customs (Prev.), Jamnagar.	--
25.	Mundra	Mundra	141 Paiki	251-43-08
26.	Mundra	Mundra	141 Paiki	74-61-45
27.	Dhrub	Mundra	169 Part	105-01-93

28.	Dhrub	Mundra	169 Part	16-18-80
29.	Dhrub	Mundra	169/P51/P1/P3	14-16-41
30.	Dhrub	Mundra	Unsurveyed Land	28-93-61
31.	Zarpara	Mundra	689/7	41-92-69
32.	Zarpara	Mundra	689/29	48-42-72
33.	Zarpara	Mundra	689/30	24-31-16
34.	Zarpara	Mundra	689/36	63-70-79
35.	Zarpara	Mundra	689/47	21-04-38
36.	Zarpara	Mundra	689/48	74-46-25
37.	Zarpara	Mundra	689/49	70-51-68
38.	Zarpara	Mundra	689/50	41-65-27
39.	Zarpara	Mundra	689/52	16-19-08
40.	Zarpara	Mundra	Unsurveyed Land	269-03-89
41.	Zarpara	Mundra	689/P92/P2/P2	87-20-05
42.	Navinal	Mundra	55/1	1-22-42
43.	Navinal	Mundra	56/2	0-23-27
44.	Navinal	Mundra	64/1	0-98-14
45.	Navinal	Mundra	102/1	2-30-67
46.	Navinal	Mundra	102/2	1-11-29
47.	Navinal	Mundra	110/3	0-84-98
48.	Navinal	Mundra	115/3	1-02-18
49.	Navinal	Mundra	130	3-24-76
50.	Navinal	Mundra	223/part	134-29-94
51.	Navinal	Mundra	Unsurveyed Land	58-22-79
52.	Navinal	Mundra	224 & 225 Part	93-48-29
53.	Siracha	Mundra	120	2-12-46
54.	Siracha	Mundra	121/1	1-16-35
55.	Siracha	Mundra	121/3	1-04-21
56.	Siracha	Mundra	121/4	1-95-26
57.	Siracha	Mundra	125/1	1-74-02
58.	Siracha	Mundra	131	2-54-95
59.	Siracha	Mundra	295 Part	103-67-08
60.	Siracha	Mundra	124	1-86-16
61.	Siracha	Mundra	125/2	1-60-86
62.	Siracha	Mundra	126	2-22-58
63.	Siracha	Mundra	129	5-62-52
64.	Siracha	Mundra	135	2-60-01
65.	Siracha	Mundra	137	1-63-90
66.	Siracha	Mundra	138/1	3-65-23
67.	Siracha	Mundra	140	4-24-92
68.	Siracha	Mundra	141	2-24-60
69.	Siracha	Mundra	142	2-68-11
70.	Siracha	Mundra	143	4-14-81
71.	Siracha	Mundra	144/1	3-83-44
72.	Siracha	Mundra	144/2	1-39-62
73.	Siracha	Mundra	147	2-92-39

74.	Siracha	Mundra	Unsurveyed Land	64-72-85
75.	Siracha	Mundra	295/P6/P3	73-35-18
76.	Tunda	Mundra	180/P	77-52-50
77.	Tunda	Mundra	Unsurveyed Land	506-94-82
78.	Mundra	Mundra	141 Paiki	607-05-00
79.	Mundra	Mundra	141 Paiki	84-17-55
80.	Mundra	Mundra	GMB/GAPL Land (Old Bharat Salt Land)	382-95-00
81.	Tunda	Mundra	180 Paiki	231-60-98
82.	Siracha	Mundra	295/1 Paiki	62-27-12
83.	Baroi	Mundra	238 P	20-23-50
84.	Baroi	Mundra	207 P	21-70-16
85.	Govarsama	Mundra	52 P	189-25-95
86.	Govarsama	Mundra	53 P	27-01-51
	Total of A			**6456.3349 Ha**

B (FTWZ)				
87.	Dhrub	-	169/36	168.41
	Total of B			**168.41 ha**

C (New Multi Product)			
88.	Mundra Forest	Unsurveyed Land	1228.00.00
89.	Mundra Forest	Unsurveyed Land	227.00.00
90.	Mundra Forest	Unsurveyed Land	385.00.00
	Siracha	Unsurveyed Land	1.59.37
	Navinal	Unsurveyed Land	6.99.95
91.	Zarpara	Unsurveyed Land	2.86.92
	Zarpara	689/P92/P2	5.07.11
		Total of C	**1856.53.35**
	Total area of (A+B+C)		**8481.2784**

[F. No. F.1/12/2016-SEZ]

ALOK VARDHAN CHATURVEDI, Addl. Secy.

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HARINDRA KUMAR Digitally signed by HARINDRA KUMAR Date: 2016.09.23 11:48:01 +05'30'

Annexure-IV
Land Allotment Letter

1184

ANNEXURE-IV
LAND ALLOTTMENT LETTER

adani

Ref: APSEZ/GEN/ST/2016/07 Date: 15.04.2016

To
Adani Enterprises Limited
Adani House
Mithakhali Six Road, Navrangpura,
Ahmedabad -380009
Gujarat, India

Subject – Land requirement for proposed Copper Smelter project.
Reference: Your request for about 650 acres of land for the proposed Copper Smelter project.

Dear Sir/s,

With above reference, we would like to convey that Adani Ports and Special Economic Zone Ltd. (APSEZL) has planned SEZ over land near Siracha and Navinal villages. . This land include part of land has been applied by APSEZL for industrial/infrastructure purpose.

The proposal for subject land (part) is under consideration by the state government. Once necessary clearance has been obtained, approximately 600 to 700 acres of land depending on final requirement of proposed Copper Smelter project after detail engineering will be allotted to AEL for the proposed Copper Smelter project.

Thanking You,

Yours faithfully,
For, Adani Ports and Special Economic Zone Ltd.

Amit Uplenchwar
President- SEZ

Adani Ports and Special Economic Zone Ltd
Adani House
Nr Mithakhali Circle, Navrangpura
Ahmedabad 380 009
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 79 2656 5555
Fax +91 79 2555 5500
info@adani.com
www.adani.com

Registered Office: Adani House, Nr Mithakhali Circle, Navrangpura, Ahmedabad 380 009, Gujarat, India

ANNEXURE-IV
LAND ALLOTTMENT LETTER

MEMORANDUM OF UNDERSTANDING (MOU)

THIS MOU is entered on this 05th day of December Month, 2018 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

and **Adani Port & SEZ Ltd,** a Company registered under the Company's Act 2013 and having its registered office at 1st Floor, Infrastructure House, Nr. Adani House, Navrangpura, Ahmedabad (hereinafter referred to as **"APSEZ"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL & APSEZ may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up an integrated copper smelting & refinery complex at Mundra, Gujarat (hereinafter referred to as **"Plant"**) with an annual production capacity of 10,00,000 TPA.

Since, APSEZ is already having the land, power & water availability in the proposed area, AEL would like to utilize these resources for its Plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 APSEZ will make available to AEL 634 acres of land on long term lease basis. The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

2.0 APSEZ will make available to AEL 300 MW of power & 32,800 m3/day of desalinated water for the Plant operations. The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to respective senior management of each Party, who in turn will work out an amicable settlement.

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ANNEXURE-IV
LAND ALLOTTMENT LETTER

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

Validity:

This MoU shall remain valid until execution of the Definitive Agreements to this effect.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: P A Durgaprasad

Name: PRASAD SURYARAO

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature:

Name: RAVI TAPARIA

For APSEZ

Signed and delivered by the

Signature:

Name: Jai Mukherjee

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.

Witness:

Signature:

Name: Anil Naik

Annexure-V
Forest Clearance (Stage-I)

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ANNEXURE-V
FOREST CLEARANCE (FC)

F. No. 8-04/2016-FC
Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)
****

Indira Paryavaran Bhawan
Aliganj, Jorbagh Road
New Delhi – 110 003
Dated: 16th November, 2018

To,

The Principal Secretary (Forests),
Department of Forests & Environment,
Government of Gujarat,
Gandhi Nagar.

Sub: Diversion of 1576.81 ha Reserved Forest Land in favour of Adani Ports and Special Economic Zone Ltd. (APSEZL) for the development of Special Economic Zone (SEZ) and Industrial Park at Village – Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Tehsil Mundra, under Forest Division and District Kutch, Gujarat (Online Proposal No. FP/GJ/IND/17613/2004):- Reg.

Sir,

I am directed to refer to the APCCF (Land Management) and Nodal Officer, (FCA), Govt. of Gujarat letter No. FCA-1014/10-11/14/S.F-66/F dated 21.01.2016 for seeking prior approval of Central Government under Section-2 of the Forest (Conservation) Act, 1980. The proposal has been examined by the Forest Advisory Committee (FAC) constituted by the Central Government under Section-3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government of Gujarat and on the basis of the recommendations of the Forest Advisory Committee (FAC), the Central Government hereby agrees to accord *"in-principle"* approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 1576.81 ha Reserved Forest Land in favour of Adani Ports and Special Economic Zone Ltd. (APSEZL) for the development of Special Economic Zone (SEZ) and Industrial Park at Village – Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Tehsil Mundra, under Forest Division and District Kutch, Gujarat, subject to the following conditions:-

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) *The entire forest area being diverted, should not be cleared off the vegetation in one go after diversion. The UA may clear vegetation for the purpose of basic/essential infrastructure to be developed in the SEZ. Thereafter, as and when a specific project / industry is to come up in the SEZ, the corresponding area shall be marked on the ground and cleared off vegetation. Till then the remaining areas shall be maintained as green cover. It shall be ensured that the lease agreement is made within six months of such clearing. A detailed land use for the marked area, on which clearing of vegetation is proposed shall be submitted to the Regional Office of MoEF&CC before start of work on the area, for information. The Regional Office of MoEF&CC shall ensure that the user agency carries out the work which is in conformity with the broad land use submitted by it. It shall be ensured that minimum number of trees are cleared. The user agency shall explore the possibility of trees of 10 cm dia at breast height and above, proposed for felling/clearing are translocated to suitable location within or outside the SEZ in consultation with State Forest department;*

ANNEXURE-V
FOREST CLEARANCE (FC)

(iii) Felling of tress on the forest land being diverted shall be reduced to the bare minimum and the trees should be felled under strict supervision of the State Forest Department;

(iv) *The diverted forest land shall not be proposed to be utilized for Golf Course, Beach Resort, Park or Residential purposes, or any other activity prohibited by FCA 1980, FC Rules and/or guidelines made there under*

(v) *The diverted forest land shall not be used for the construction/expansion of any private Aerodrome. The forest land may be considered, in future on merits, in case of commercial Airport is developed with the approval of DGCA.*

(vi) *The detailed existing land use with maps of all forest land 2008.41 ha (1840ha + 168.41 ha) for which the approval was granted vide letter dated 30.09.2009 and details of complete land use including forest land for the existing private Aerodrome and power plants within the SEZ may be provided for information;*

(vii) *Forest areas proposed within of Mundra survey no. 141/P, Baroi survey no. 207/P, Goversanu survey no. 52/P, Luni survey no. 468/P and Bhadreswar survey no. 733/P are having sea front. 100mt shelter beli/green belt in above villages be included in the Master plan of the SEZ, excluding stretches where use of water front is inevitable;*

(viii) *All the conditions as recommended by the Chief Wildlife Warden shall be complied with the User Agency;*

(ix) *The State Government shall clarify whether any non-forest land situated in and around the SEZ but not forming part of the SEZ at present, can be acquired by/allotted to the APSEZ before Stage-II approval;*

(x) *If 683 ha land of GMB or any other non-forest land is allotted for this SEZ, then the equivalent forest land shall be reduced from the forest land diverted/being diverted for the SEZ;*

(xi) *The State Government and the UA shall make effort to include 122 ha of non-forest land in village Jarapara in the SEZ. Accordingly, it is recommended that 122 ha of forest land in Bhadreswar Block shall be maintained as green belt at the cost of UA;*

(xii) *State government will provide details of lease period, terms and conditions on which the forest land is proposed to be diverted in favour of the Use Agency;*

(xiii) *All other conditions imposed in the approval granted for diversion of 2008.41 ha (1840ha + 168.41 ha) forest land on 30.09.2009 shall be complied;*

(xiv) *Only site-specific activities, permissible under the Rules and guidelines framed under the FC Act, shall be taken up in the forest land to be diverted;*

(xv) *The recommendation of the FAC is subject to the condition that in case of conflicts, the provisions of FC Act, 1980, shall prevail over those of SEZ Act 2005;*

(xvi) *All other conditions/recommendations made by FAC on this proposal in its meeting on 25.01.2018, not in conflict with the recommendation of FAC on 20.09.2018 shall remain unchanged.*

(xvii) *The User agency shall identify suitable land for Compensatory Afforestation over double the forest area being diverted. The land shall be mutated in the name of State Forest Department before the Stage-II approval;*

(xviii) *The User Agency shall deposit in the designated account the estimated amount towards compensatory afforestation to be carrying out by the State Forest Department;*

(xix) The Compensatory Afforestation shall be done over double non-forest land (NFL) i.e *3154 ha* to the forest area proposed to be diverted, as per the recommendation of Government of Gujarat, vide its GR No. FCA-1013/11-10/SF-24/F, dt 12.06.2015. The Compensatory Afforestation shall be done within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved plan in consultation with the State Forest Department at the cost of the User Agency. CA at rate of 1000 saplings per hectares shall be planted over *3154.00* ha.

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ANNEXURE-V
FOREST CLEARANCE (FC)

(31,54,000 plants). If this is not possible to plant these many seedlings in the identified NFL, the balance seedlings will be planted in degraded forest land as per the prescriptions of the Working Plan at the cost of the User agency. In such case CA cost will be revised and duly approved by competent authority and will be deposited online in the Adhoc-CAMPA account of the state concerned;

(xx) The User agency shall identify and mutate in the name of State Forest Department of Government of Gujarat, 3154 ha of suitable non-forest land for CA adjacent to notified Forest for raising Compensatory Afforestation (CA) shall be notified as reserved Forest under Section-4 or Protected Forest under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act. The Nodal officer must report compliance within a period of 6 month from the date of grant of final approval and send a copy of the notification declaring the non-forest land under Section 4 or Section 29 of the Indian Forest Act, 1927, or under the relevant section of the local Forest Act as the case may be, to this Ministry for information and record;

(xxi) The State Government shall submit a certificate, that site for CA is suitable and free from all encroachments and other encumbrances, under the signature not below the rank of Nodal Officer (FCA) in the State Government;

(xxii) The land identified for the purpose of CA shall be clearly depicted on a Survey of India toposheet of 1:50,000 scale;

(xxiii) *The Compensatory Afforestation land shall be surveyed at the cost of User Agency and the User Agency shall erect pillars and barbed wire fencing or trench under the consultation of CCF, Kutch Circle;*

(xxiv) The User Agency shall deposit the cost of raising and maintaining the compensatory afforestation at the current wage rate in the account of Adhoc-CAMPA of the state concerned through online e-portal only. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years;

(xxv) The User Agency shall provide additionally 25% of the CA cost towards Soil and Moisture Conservation measures in the proposed CA area as per site requirement and the said amount shall be deposit in the account of Adhoc-CAMPA of the state concerned through online e-portal only;

(xxvi) The User Agency shall deposit, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC dated 05.02.2009. The requisite funds shall be deposited in the account of Adhoc-CAMPA of the state concerned through online e-portal only;

(xxvii) At the time of payment on the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(xxviii) The user agency should ensure that the compensatory levies (CA cost, NPV etc.) are deposited through challan generated online on web portal and deposited in appropriate bank online only. Amount deposited through other modes will not be accepted as compliance of Stage-I clearance;

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ANNEXURE-V
FOREST CLEARANCE (FC)

(xxix) The forest clearance will be for a period co-terminus with the lease period specified in the lease agreement. The State Government will submit the lease agreement documents specified in the lease agreement;

(xxx) The User agency shall obtain the Environment Clearance as per the provisions of the Environment (Protection) Act, 1986, if required;

(xxxi) *Complete compliance of CRZ regulations shall be ensured;*

(xxxii) Layout plan of the proposal shall not be changed without the prior approval of the Central Government;

(xxxiii) The User Agency will abide by the applicable recommendations of the State Government including State Forest/Wildlife Departments;

(xxxiv) State Government shall complete settlement of rights, in terms of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in its letter No. 11-9/1998-FC (pt.) dated 03.08.2009 read with 05.07.2013 in support thereof;

(xxxv) The user agency shall provide alternate fuels (LPG) to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(xxxvi) Boundary of the forest land proposed to be diverted shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing, distance from pillar to pillar and GPS co-ordinates;

(xxxvii) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

(xxxviii) The user agency shall submit the annual self-compliance report in respect of the above conditions to the State Government, concerned Regional Office and this Ministry by the end of March of every year regularly; and

(xxxix) The user agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations, Guidelines, relevant Hon'ble Court Order (s) and National Green Tribunal (NGT) Order(s), if any, pertaining to this project for the time being in force, as applicable to the project.

3. After receipt of the report on compliance to the conditions stipulated in the paragraph-2 above, from the State Government of Gujarat, Final/Stage-II approval for diversion of the proposed forest land under Section-2 of the Forest (Conservation) Act, 1980 will be issued by this Ministry. Diversion of the proposed forest land to the user agency shall not be effected by the State Government of Gujarat, till Final/Stage-II approval is issued by this Ministry.

Yours faithfully,

16/11/2018

(Shrawan Kumar Verma)
Dy. Inspector General of Forests (FC)

Copy to:-
1. The PCCF, Govt. of Gujarat, Gandhinagar.
2. The Addl. PCCF (Central), Regional Office (Western Zone), Bhopal.

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ANNEXURE-V
FOREST CLEARANCE (FC)

3. The Nodal Officer FCA, 1980, Forest Department O/o PCCF, Govt. of Gujarat, Gandhinagar.
4. User Agency.
5. Monitoring Cell, FC Division, MoEF & CC, New Delhi, for uploading.
6. Guard File.

16/11/2018

(Shashwan Kumar Verma)
Dy. Inspector General of Forests (FC)

Annexure-VI
Water Allotment Letter

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ANNEXURE-VI
WATER SUPPLY LETTER

adani

Ref: APSEZ/GEN/ST/2016/10 Date: 16th April 2016

To

Adani Enterprises Limited
Adani House
Mithakhali Six Road, Navrangpura,
Ahmedabad -380009
Gujarat, India

Subject – Water requirement for Adani Enterprises Ltd's (AEL) 10LTPA Copper Smelter Plant at Mundra APSEZ.

Reference: Your request for supply of about 32,800 m^3/Day of raw water for the Copper Smelter Plant at Mundra APSEZ

Dear Sir,

With above reference, we would like to convey that M/s. Adani Ports and Special Economic Zone Ltd, (APSEZL) principally agree to supply required quantity (~ 1,000 m^3/Day during project construction and ~ 32,800 m^3/Day for the plant operations) and quality of water for your proposed Copper Smelter Plant at Mundra APSEZ.

Once necessary clearances/ approvals are obtained by M/s. AEL from concerned authorities, APSEZL will provide necessary support. Augmentation of the existing infrastructure, if required will be taken up by M/s. APSEZL on mutually agreed terms & conditions, with necessary permission and clearance from concerned authorities.

Water will be supplied at standard terms and conditions of M/s. Adani Ports and Special Economic Zone Ltd, (APSEZL) as per tariff fixed by M/s. APSEZL.

Thanking You,

Yours Faithfully
For Adani Ports and Special Economic Zone Ltd.

Amit Uplenchwar
President - SEZ

Adani Ports and Special Economic Zone Ltd
Adani House
Nr Mithakhali Circle, Navrangpura
Ahmedabad 380 009
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 79 2656 5555
Fax +91 79 2555 5500
info@adani.com
www.adani.com

Registered Office: Adani House, Nr Mithakhali Circle, Navrangpura, Ahmedabad 380 009, Gujarat, India

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ANNEXURE-VI
WATER SUPPLY LETTER

MEMORANDUM OF UNDERSTANDING (MOU)

THIS MOU is entered on this 05th day of December Month, 2018 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

and **Adani Port & SEZ Ltd,** a Company registered under the Company's Act 2013 and having its registered office at 1st Floor, Infrastructure House, Nr. Adani House, Navrangpura, Ahmedabad (hereinafter referred to as **"APSEZ"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL & APSEZ may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up an integrated copper smelting & refinery complex at Mundra, Gujarat (hereinafter referred to as **"Plant"**) with an annual production capacity of 10,00,000 TPA.

Since, APSEZ is already having the land, power & water availability in the proposed area, AEL would like to utilize these resources for its Plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 APSEZ will make available to AEL 634 acres of land on long term lease basis. The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

2.0 APSEZ will make available to AEL 300 MW of power & 32,800 m3/day of desalinated water for the Plant operations. The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to respective senior management of each Party, who in turn will work out an amicable settlement.

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ANNEXURE-VI
WATER SUPPLY LETTER

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

Validity:

This MoU shall remain valid until execution of the Definitive Agreements to this effect.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: P.A. Suryarao

Name: PRASAD SURYARAO

Witness:

Signature: Rajpara

Name: RAVI TAPARIA

ADANI ENTERPRISES LTD. AHMEDABAD

For APSEZ

Signed and delivered by the

Signature:

Name: Jai [illegible]

Witness:

Signature:

Name: Anil Nair

Annexure-VII

Power Allotment Letter

1198

ANNEXURE-VII
POWER SUPPLY LETTER

adani

Ref: APSEZ/GEN/ST/2016/08

Date: 16th April 2016

To

Adani Enterprises Limited
Adani House
Mithakhali Six Road, Navrangpura,
Ahmedabad -380009
Gujarat, India

Subject – Power requirement for Adani Enterprises Ltd's (AEL) 10LTPA Copper Smelter Plant at Mundra APSEZ.

Reference: Your request for supply of 300 MW of Power for the Copper Smelter Plant at Mundra APSEZ

Dear Sir,

With above reference, we would like to convey that M/s. Adani Ports and Special Economic Zone Ltd, (APSEZL) principally agree to supply required quantity (~ 20 MW during project construction and ~ 300 MW for the plant operations) and quality of power (Uninterrupted) for your proposed Copper Smelter Plant at Mundra APSEZ.

Once necessary clearances/ approvals are obtained by M/s. AEL from concerned authorities, APSEZL will provide necessary support. Augmentation of the existing infrastructure, if required will be taken up by M/s. APSEZL on mutually agreed terms & conditions, with necessary permission and clearance from concerned authorities.

Power will be provided as per Electricity Act, 2003 and relevant Gujarat Electricity Regulatory Board (GERC) regulations.

Thanking You.

Yours Faithfully
For Adani Ports and Special Economic Zone Ltd,

Amit Uplenchwar
President - SEZ

Adani Ports and Special Economic Zone Ltd
Adani House
Nr Mithakhali Circle, Navrangpura
Ahmedabad 380 009
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 79 2656 5555
Fax +91 79 2555 5500
info@adani.com
www.adani.com

Registered Office: Adani House, Nr Mithakhali Circle, Navrangpura, Ahmedabad 380 009, Gujarat, India

ANNEXURE-VII
POWER SUPPLY LETTER

MEMORANDUM OF UNDERSTANDING (MOU)

THIS MOU is entered on this 05th day of December Month, 2018 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART,**

and Adani Port & SEZ Ltd, a Company registered under the Company's Act 2013 and having its registered office at 1st Floor, Infrastructure House, Nr. Adani House, Navrangpura, Ahmedabad (hereinafter referred to as **"APSEZ"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART,**

Both AEL & APSEZ may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up an integrated copper smelting & refinery complex at Mundra, Gujarat (hereinafter referred to as **"Plant"**) with an annual production capacity of 10,00,000 TPA.

Since, APSEZ is already having the land, power & water availability in the proposed area, AEL would like to utilize these resources for its Plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 APSEZ will make available to AEL 634 acres of land on long term lease basis. The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

2.0 APSEZ will make available to AEL 300 MW of power & 32,800 m3/day of desalinated water for the Plant operations. The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to respective senior management of each Party, who in turn will work out an amicable settlement.

1200

ANNEXURE-VII
POWER SUPPLY LETTER

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

Validity:

This MoU shall remain valid until execution of the Definitive Agreements to this effect.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: P A Durgarao

Name: PRASAD SURYARAO

Witness:

Signature:

Name: RAVI TAPARIA

ADANI ENTERPRISES LTD. AHMEDABAD

For APSEZ

Signed and delivered by the

Signature:

Name: Jai Bhuvad

Witness:

Signature:

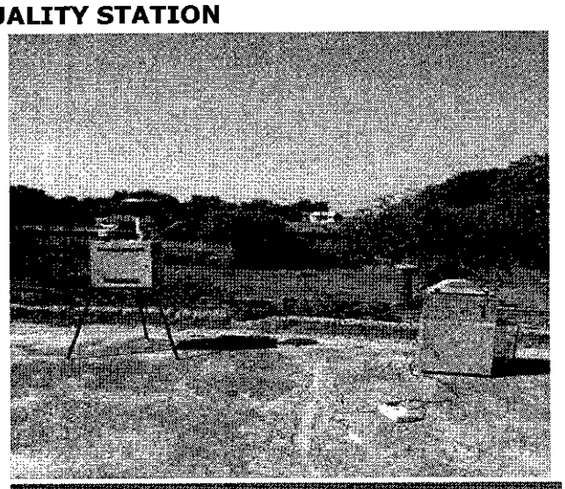
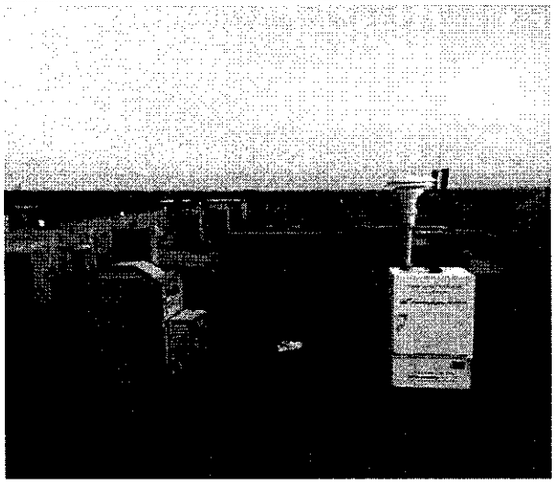
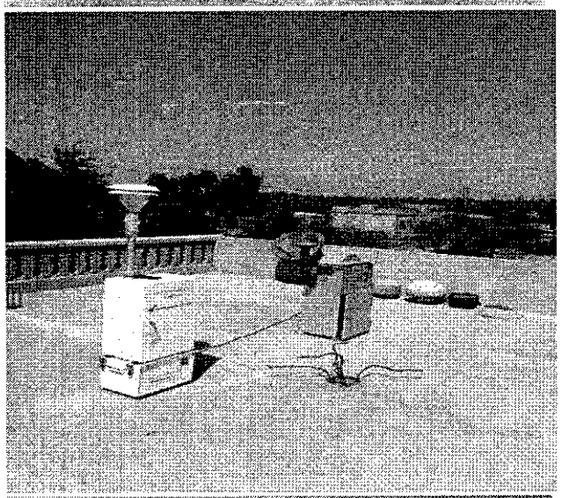
Name: Anil Nair

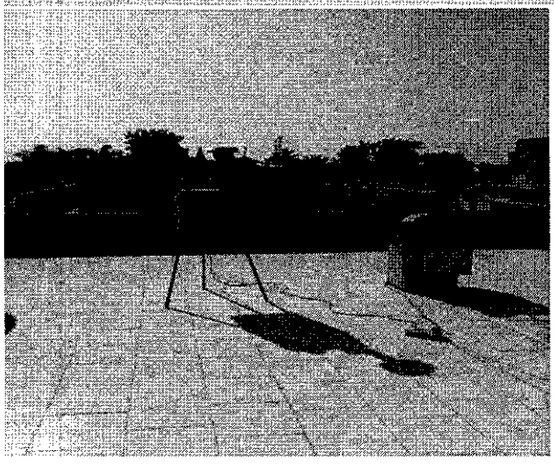
Annexure-VIII
Monitoring Photographes

1202

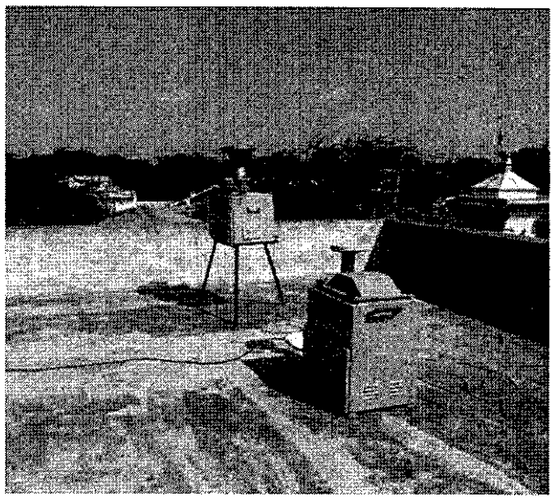
ANNEXURE-VIII
MONITORING STATIONS AND SAMPLING PHOTOGRAPHS

AMBIENT AIR QUALITY STATION

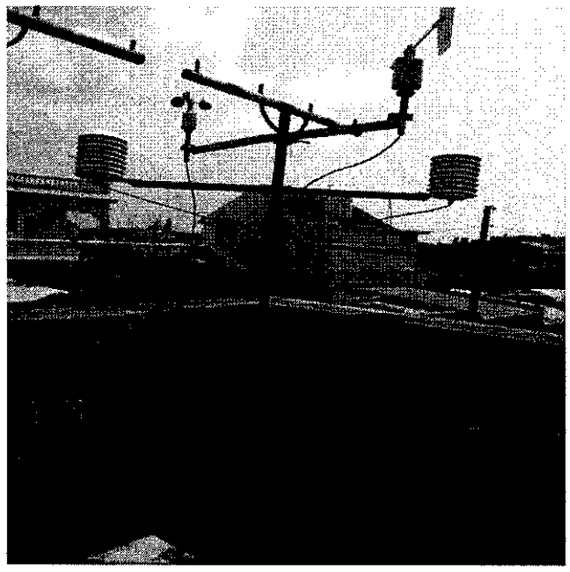


ANNEXURE-VIII
MONITORING STATIONS AND SAMPLING PHOTOGRAPHS



METEOROLOGY STATION

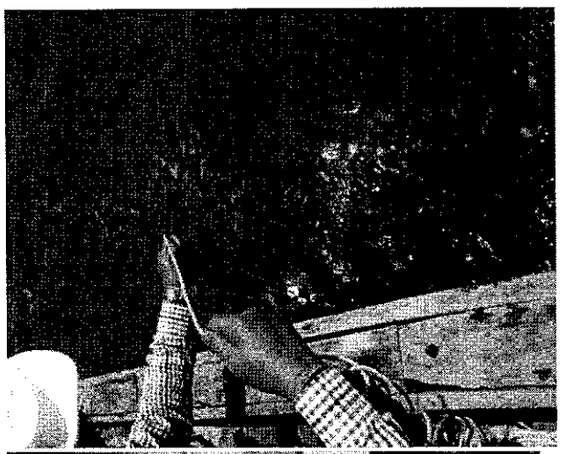




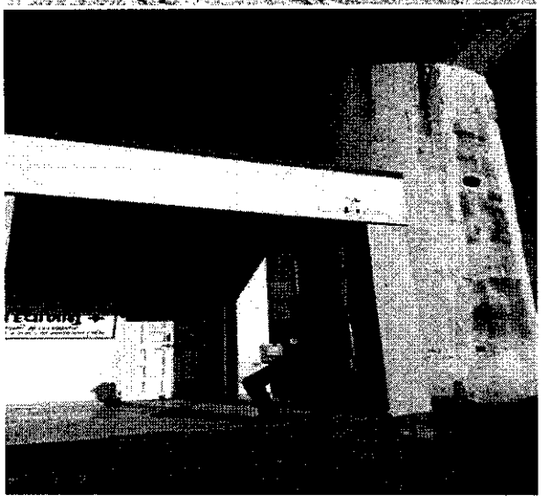
1204

ANNEXURE-VIII
MONITORING STATIONS AND SAMPLING PHOTOGRAPHS

WATER SAMPLING LOCATIONS








ANNEXURE-VIII
MONITORING STATIONS AND SAMPLING PHOTOGRAPHS





SOIL SAMPLING LOCATIONS









1206

ANNEXURE-VIII
MONITORING STATIONS AND SAMPLING PHOTOGRAPHS

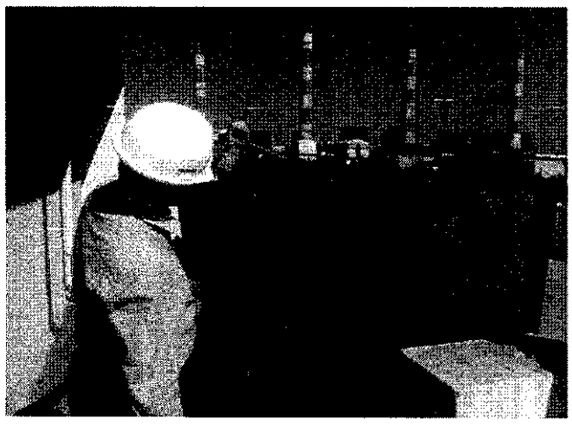








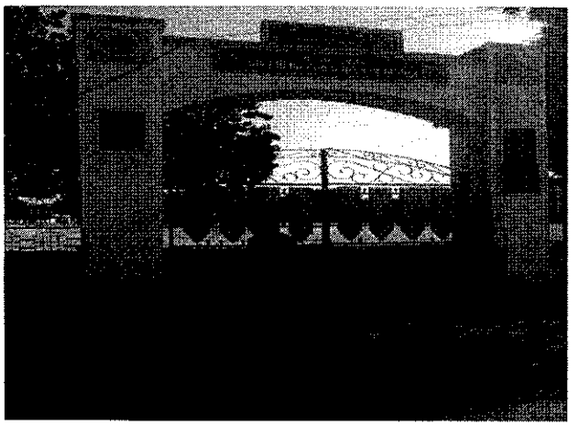
NOISE READING LOCATIONS



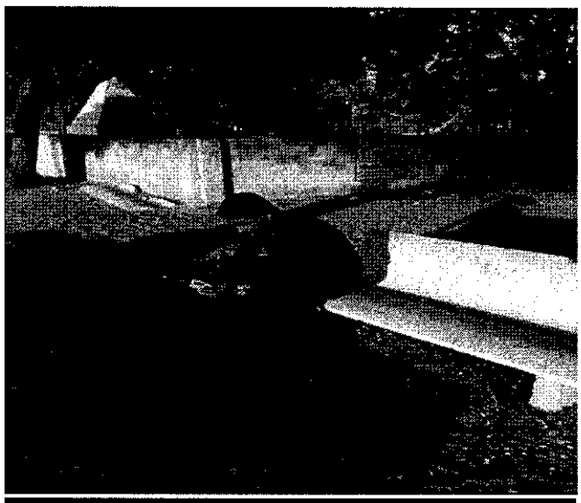


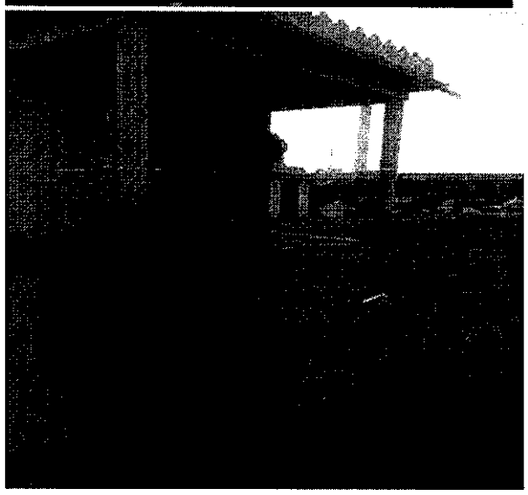
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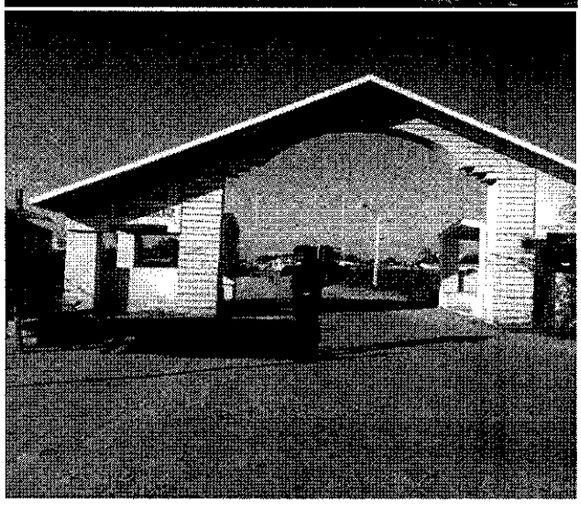
ANNEXURE-VIII
MONITORING STATIONS AND SAMPLING PHOTOGRAPHS













ANNEXURE-IX
AMBIENT AIR QUALITY

1028

Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
03.10.2016	26	41.1	18.5	13.5	360.9	380.7	342.9	4.7	6.5	4.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.10.2016	27.8	43.9	17.2	15.3	367.2	377.1	345.6	4.4	6	4.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.10.2016	28.9	47.3	28.3	17.4	364.5	378.9	342	4.8	5.9	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.10.2016	30.5	49.8	29.9	18.4	342	377.1	343.8	6.3	6.2	4.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
17.10.2016	24.7	46.8	29.6	18.2	315.9	379.8	363.6	4.7	5.8	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.10.2016	23	49.8	24.3	15	321.3	375.3	355.5	4.2	6.2	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
24.10.2016	28.7	46.9	28.2	17.4	317.7	377.1	357.3	4.5	5.6	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.10.2016	31	48.7	25.6	15.8	342.9	370.8	342.9	4.4	6	4.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.11.2016	32.2	50.5	31.6	20.2	342	368.1	349.2	4.8	5.9	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.11.2016	28.6	53.8	29.5	18.2	361.8	383.4	337.5	5.3	5.9	5.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.11.2016	36.7	57.7	32	19.7	362.7	380.7	341.1	5.2	6.4	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.11.2016	32.8	49.7	29.7	20.3	366.3	371.7	352.8	4.8	6	5.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.11.2016	31.4	47.5	27.4	16.9	354.6	362.7	341.1	4.5	6.2	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.11.2016	31.7	48.1	29.8	18.3	363.6	369.9	350.1	4.6	6.3	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.11.2016	31.4	47.5	27.4	16.9	354.6	362.7	341.1	4.5	6.2	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.11.2016	34.2	50.05	26.7	16.4	332.1	382.5	342	4.1	6	4.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	33.7	49.2	28.2	17.4	368.1	380.7	351	4.7	6.7	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.11.2016	34.2	50.05	28.7	19.8	351.9	381.6	362.7	5.1	5.9	5.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	38.2	54	28.6	22.5	352.8	380.7	348.3	5.6	5.7	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.12.2016	41.3	58.9	29.9	23.7	342	380.7	362.7	4.8	6	4.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
06.12.2016	37.2	62.5	27.7	21.8	360	375.3	360	4.7	6.5	4.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
07.12.2016	33.2	57.4	29.4	22.1	370.8	379.8	358.2	4.3	6.2	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.12.2016	36.1	55.3	32.1	19.8	371.7	381.6	351.9	5.9	6.7	5.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.12.2016	32.6	48.5	29.4	18.1	348.3	369.9	342.9	5.6	5.9	5.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
20.12.2016	34.8	46.8	26.9	16.6	340.2	377.1	337.5	5.7	6.4	5.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.12.2016	36.6	48.3	28.9	17.8	332.1	382.5	342	4.1	6	4.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
27.12.2016	38.4	50.75	32.1	19.8	361.8	380.7	341.1	4.5	6.3	4.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.12.2016	39.7	54.6	26.9	16.6	385	400	342	4.8	6.7	4.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**23.0**	**41.1**	**17.2**	**13.5**	**316**			**3.8**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**41.3**	**62.5**	**32.1**	**23.7**	**400**			**6.7**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**32.7**	**50.6**	**28.0**	**18.4**	**359**			**5.2**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**40.4**	**60.6**	**32.1**	**23.1**	**384**			**6.7**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

997

1209

ANNEXURE-IX
AMBIENT AIR QUALITY

AAQ-3 Bhuipar Mota																
Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
03.10.2016	23.2	42.1	17.6	17.4	316	364	308	4.5	5.7	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.10.2016	20.1	40.5	16.3	19.4	318.4	354.4	312	4.3	5.3	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.10.2016	22.4	39.7	26.9	25	312	363.2	303.2	4.2	5.6	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.10.2016	19.2	42.1	28.4	26.4	315.2	364.8	307.2	5.1	5.9	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
17.10.2016	26.1	46.3	28.2	26.2	309.6	352	301.6	4.6	5.7	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.10.2016	25.2	41.2	23.1	21.5	304.8	344	296.8	4.2	5.8	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
24.10.2016	25.9	39.6	26.8	24.9	301.6	343.2	292	4.1	5.1	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.10.2016	27.2	43.3	24.3	22.6	307.2	354.4	296.8	4.4	6.2	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.11.2016	26.3	62	30	27.9	320	359.2	311.2	4.5	6.5	3.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.11.2016	28.3	60	28	26.1	324.8	366.4	267.2	4.5	5.7	3.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.11.2016	26	63.9	30.4	28.3	317.6	365.6	306.4	4.5	6.2	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.11.2016	29.9	68.5	28.2	26.2	331.2	350.4	273.6	4.7	5.9	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.11.2016	33.4	75.2	26.1	24.2	327.2	344.8	264.8	4.4	6.2	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.11.2016	35.7	73.1	28.3	26.3	336.8	360.8	261.6	4.4	6.1	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.11.2016	35.2	68.9	26.1	24.2	323.2	328.8	311.2	4.6	6.3	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.11.2016	37.5	64.5	25.3	23.5	315.2	322.4	303.2	4.5	6.2	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	34.2	52.8	26.8	24.9	340	343.2	276.8	4.4	6.5	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.11.2016	37.1	59.4	27.3	25.4	352.8	355.2	309.6	4.5	6.2	3.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	35.7	54.3	27.2	25.3	336.8	366.4	319.2	4.7	5.9	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.12.2016	24.1	46.9	28.4	26.4	332.8	356	322.4	4.9	6.2	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
06.12.2016	31.7	47.3	26.3	24.5	334.4	362.4	319.2	4.4	6.1	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
07.12.2016	29.6	43.1	27.9	26	328.8	348.8	315.2	3.6	5.1	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.12.2016	29.3	40.6	30.5	28.4	334.4	363.2	324.8	5.3	6	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.12.2016	28.9	47.8	27.9	26	338.4	366.4	315.2	4.7	5.9	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
20.12.2016	24.5	42.8	25.6	23.8	332	354.4	319.2	5.5	6.2	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.12.2016	28.7	43.4	27.4	25.5	329.6	352.8	320	4.1	6	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
27.12.2016	26.4	45.2	30.9	28.7	333.6	361.6	324.8	4.1	5.7	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.12.2016	25.4	42.1	28.4	26.4	335.2	360.8	321.6	4.5	6.2	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**19.2**	**39.6**	**16.3**	**17.4**	**262**			**3.1**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**37.5**	**75.2**	**30.9**	**28.7**	**366**			**6.5**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**28.5**	**51.3**	**26.7**	**25.1**	**328**			**4.7**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**37.3**	**74.1**	**30.7**	**28.5**	**366**			**6.4**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

ANNEXURE-IX
AMBIENT AIR QUALITY

Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
07.10.2016	26.3	48.6	23.1	16.5	307	337	272	4.8	5.9	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.10.2016	24.7	46.5	22.9	16.4	298	339	284	5.2	5.3	4.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.10.2016	28.8	47.4	19	13.7	302	342	280	5	6.1	5.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.10.2016	25.9	46.5	19.1	13.6	298	340	266	5	5.8	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.10.2016	26.4	48.5	23.3	16.6	299	337	284	5.2	5.9	4.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.10.2016	25.9	46.6	23	16.6	295	342	269	5.4	6.2	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.10.2016	29.1	42.3	20.4	14.5	299	346	274	4.3	6	5.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.10.2016	26.5	40.2	18.9	13.1	273	349	272	4.6	5.9	4.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.11.2016	27.3	38.3	17.5	15.2	286	340	268	5.2	5.4	4.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
05.11.2016	26.7	37.1	19.1	17.2	272	345	300	5.7	5.9	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
11.11.2016	27.9	50.3	22.3	17	289	340	264	5.4	5.2	4.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.11.2016	29.1	46.6	23	15.5	273	335	288	4.6	6.3	5.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.11.2016	29.6	52.9	23.1	17.6	286	336	291	5	5.3	4.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
19.11.2016	25.7	53.8	24.9	18.2	282	309	265	4.5	5	4.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.11.2016	26.4	46.6	23	16.6	295	342	269	5.4	6.2	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
26.11.2016	29.7	41.4	19.3	13.9	300	338	286	6	6.2	5.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.11.2016	26.2	44.1	18	15	286	337	283	5.5	5.6	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	27.4	46	22.9	16.2	303	335	279	5.5	5.8	4.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
01.12.2016	28.3	48	23.3	16.6	300	338	286	6	6.2	5.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	30.2	51.8	23.9	17.2	323	346	288	5.4	5.7	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.12.2016	31.5	54.2	23.6	16.9	327	356	293	5.3	6.3	5.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.12.2016	30.1	49	23.4	16.6	342	350	282	5.5	6	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.12.2016	29.4	46.2	19.8	14.2	363	356	321	5.3	5.9	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.12.2016	28.5	41.3	19.5	13.7	349	370	321	5.2	5.6	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.12.2016	26.2	38.4	23.8	16.9	322	351	307	5.4	5.9	4.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.12.2016	27.9	37.8	20.1	14.6	343	347	286	5	6.2	5.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.12.2016	25.9	52.4	22.8	14.3	329	342	267	5.2	6.4	5.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.12.2016	28.2	54.2	24.4	17.6	319	340	277	5	5.7	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**24.7**	**37.1**	**17.5**	**13.1**	**264**			**4.3**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**31.5**	**54.2**	**24.9**	**18.2**	**370**			**6.4**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**27.7**	**46.3**	**21.7**	**15.8**	**310**			**5.3**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**30.8**	**54.2**	**24.6**	**17.9**	**358**			**6.3**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

Annexure-IX
Ambient Air Quality Levels

ANNEXURE-IX
AMBIENT AIR QUALITY

1211

Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
03.10.2016	25.6	40.1	21.5	16.8	373	334	310	4.3	5.2	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.10.2016	27.8	43.2	19.5	14.3	348	348	315	4.5	5.4	3.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.10.2016	30	39.4	15.72	19.2	311	351	322	4.7	4.9	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.10.2016	31.3	38.3	16.56	20.2	379	365	334	4.1	4.5	4.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
17.10.2016	31.6	36.9	16.44	20.1	373	362	330	4.2	5.1	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.10.2016	29.1	35.2	19.4	16.5	375	372	340	4.7	5.5	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
24.10.2016	27.3	41.6	15.6	19.1	330	365	334	4.5	5	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.10.2016	28.9	43.4	17.8	17.3	341	384	353	4.1	5.4	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.11.2016	28.6	45.8	15.54	22.2	373	392	361	3.9	5.3	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.11.2016	29.3	46.8	16.32	25.3	363	386	378	3.8	4.6	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.11.2016	31.7	50.8	17.16	26.9	324	389	359	4.6	4.7	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.11.2016	29.6	47.4	16.14	27.3	312	379	369	4.6	5.4	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.11.2016	32.3	51.7	15.18	18.6	309	378	370	4.3	5.7	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.11.2016	28	44.8	16.5	20.2	296	380	370	4.5	4.7	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.11.2016	35.3	56.5	15.18	18.6	398	372	335	5.8	6.6	4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.11.2016	37.1	59.4	14.76	20.3	396	370	336	4.4	6.4	4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	35.7	62.4	15.6	19.1	302	365	334	4.2	4.6	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.11.2016	36.1	64.8	15.9	19.4	378	349	318	4.4	5	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	37.8	60.4	15.84	22.1	388	376	345	3.9	5.4	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.12.2016	35.5	61.5	16.56	24.3	346	361	330	4.6	5.2	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
06.12.2016	32.5	52	15.36	27.7	330	370	339	4.2	4.3	3.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
07.12.2016	33.6	53.8	16.62	25.6	369	392	360	4.3	4.7	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.12.2016	32.4	62.8	17.22	21.7	350	385	353	4.5	5.4	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.12.2016	35.6	59.5	16.26	19.9	375	350	316	4	4.7	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
20.12.2016	35	56	14.88	18.2	392	382	349	4.3	5	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.12.2016	34.7	55.6	15.96	19.5	374	362	330	3.8	4.3	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
27.12.2016	34.2	54.7	16.86	21.7	373	360	318	4.7	5.5	4.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.12.2016	35.3	56.4	14.88	18.2	379	351	323	4.3	4.2	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**25.6**	**35.2**	**14.8**	**14.3**	**296**			**3.3**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**37.8**	**64.8**	**21.5**	**27.7**	**398**			**6.6**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**32.2**	**50.8**	**16.5**	**20.7**	**355**			**4.4**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**37.4**	**63.7**	**20.4**	**27.5**	**393**			**6.0**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

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ANNEXURE-IX
AMBIENT AIR QUALITY

AAQ-5 Wandh																
Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
07.10.2016	27.3	38.7	17.6	16.8	354	399	339	4.6	5.3	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.10.2016	25.9	37.6	15.4	17.7	355	397	341	5	4.9	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.10.2016	30.9	42.4	18.5	20.1	356	392	336	5	5	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.10.2016	32.2	45.9	23.8	21.3	349	386	334	4.9	4.5	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.10.2016	32.5	47.7	28.7	21.1	340	381	327	4.6	4.5	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.10.2016	29.9	50.8	26.6	17.3	343	384	325	4.6	5.4	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.10.2016	28.1	63.7	27.3	20.1	355	397	344	4.3	5	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.10.2016	25.4	62.9	24.8	18.2	353	390	338	4.5	4.9	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.11.2016	29.4	58.3	27.2	23.3	348	382	328	5	5.4	2.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
05.11.2016	30.1	55.4	28.6	26.6	352	389	337	4.7	5.1	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
11.11.2016	32.6	60.2	30.1	27.6	339	380	326	4.9	5	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.11.2016	30.5	54.3	28.2	25.3	350	393	332	4.6	5	3.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.11.2016	33.3	58	26.6	19.5	345	385	334	4.3	4.7	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
19.11.2016	28.8	61	28.9	21.2	368	407	352	4.7	4.1	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.11.2016	36.3	64	26.6	19.5	408	412	332	4.7	6.9	3.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
26.11.2016	38.2	70.1	25.8	18.9	370	373	372	4.8	6.6	4.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.11.2016	36.7	69.2	27.3	20.1	344	388	330	4.1	4.6	4.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	37.1	64.1	27.8	20.4	345	381	331	4.5	4.7	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
01.12.2016	38.9	60.9	27.7	23.2	358	402	340	4.3	5.1	4.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	39.5	66.2	29	25.5	348	383	329	5	4.9	4.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.12.2016	33.4	59.7	26.8	27.8	354	399	339	5.1	5.1	3.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.12.2016	34.6	63.8	28.7	26.9	312	348	301	4.1	4.6	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.12.2016	40.8	67.1	29.5	22.8	323	354	306	4.7	4.3	2.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.12.2016	38.9	70.4	28.5	20.9	304	335	292	4.6	5.2	2.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.12.2016	37.3	77.1	26.1	19.1	315	352	303	4.3	4.7	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.12.2016	35.7	76.1	28	20.5	294	325	303	4.9	4.9	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.12.2016	35.1	70.5	29.5	22.8	337	377	320	4.6	5.5	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.12.2016	36.3	67	26.1	19.1	362	299	300	5	5.4	3.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**25.4**	**37.6**	**15.4**	**16.8**	**292**			**2.5**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**40.8**	**77.1**	**30.1**	**27.8**	**412**			**6.9**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**33.4**	**60.1**	**26.4**	**21.6**	**351**			**4.4**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**40.1**	**76.6**	**29.8**	**27.7**	**407**			**5.9**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

ANNEXURE-IX
AMBIENT AIR QUALITY

1213

AAQ-6 Kandagara																
Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
07.10.2016	21.9	51.6	23.8	17.1	323	360	309	4.5	5.7	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.10.2016	20.1	70.2	24.6	18.1	307	348	294	5	4.7	3.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.10.2016	23	53.8	27.8	20.5	324	367	311	4.6	5.3	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.10.2016	24.4	56.8	25.3	19.3	327	369	313	5	4.6	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.10.2016	27.3	54.6	20.8	17.4	339	383	319	4.4	5	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.10.2016	26.5	52.8	20.3	15.9	338	376	322	5	4.7	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.10.2016	32.8	65.6	21	20.5	335	373	320	4.5	5.1	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.10.2016	31.5	63	19	18.6	313	354	300	5	5.3	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.11.2016	30.4	60.6	25.8	23.8	338	382	319	4.7	4.7	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
05.11.2016	35.4	70.8	25	27.1	302	339	280	4.4	5.4	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
11.11.2016	34	68	26.1	24.5	358	399	341	4.1	5	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.11.2016	29.3	75.8	22.2	25.8	326	371	311	4.6	5.7	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.11.2016	32.2	80.5	20.3	19.9	344	383	328	5	4.9	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
19.11.2016	34.2	81.9	21	21.6	311	350	293	4.7	5.1	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.11.2016	30	60	17.9	19.9	385	406	366	4.7	6.5	4.6						
26.11.2016	34.2	63.8	19.5	19.3	392	402	369	4.5	6.1	4.3						
28.11.2016	39.8	69.6	25.2	20.5	313	347	295	4.5	5.4	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	33.9	75.6	28.4	20.8	333	378	317	3.5	5.8	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
01.12.2016	42.7	80.2	29.7	23.7	306	345	294	4.5	5.1	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	36.2	82.5	31.7	26	336	372	316	3.4	5.4	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.12.2016	36.8	64.4	27.2	26.7	329	367	314	3.2	4.7	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.12.2016	39.7	69.4	25	27.4	332	376	318	4.3	5.7	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.12.2016	42.7	74.8	24.7	23.3	303	343	291	3.8	5.1	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.12.2016	40.6	71.2	22.8	21.3	361	409	340	3	5.4	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.12.2016	38.2	67	19.8	19.5	343	387	331	4.1	4.5	2.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.12.2016	39.4	68.8	22.2	20.9	342	381	326	3.7	4.8	3.6	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.12.2016	35	75.4	20.3	23.3	354	389	350	4.2	5	4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.12.2016	33	71	21.8	19.5	334	382	328	5.2	4.4	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**20.1**	**51.6**	**17.9**	**15.9**	**280**			**2.7**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**42.7**	**82.5**	**31.7**	**27.4**	**409**			**6.5**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**33.0**	**67.8**	**23.5**	**21.5**	**342**			**4.3**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**42.7**	**82.2**	**30.6**	**27.2**	**404**			**5.9**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

1003

1214

ANNEXURE-IX
AMBIENT AIR QUALITY

AAQ-7 Siracha																
Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
07.10.2016	30.7	38.7	21.2	26.9	299.7	344.4	331.2	5.4	6.4	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.10.2016	28.8	52.7	24.5	26.6	318.6	359.7	302.3	5.7	5.8	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.10.2016	27.3	40.4	26.7	27.4	323	369.3	307.6	5.5	6.6	5.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.10.2016	25.7	42.5	23.9	28.1	345.4	389.5	327.1	5.5	6.2	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.10.2016	23.2	40.9	20.3	22.4	314.7	363.6	308.1	5.7	6.4	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.10.2016	24.8	39.6	18.3	22	312	357.8	292.2	5.9	6.7	5.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.10.2016	26.9	49.1	19.2	22.7	322	363.6	305.4	5.4	6.5	5.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.10.2016	25.6	47.2	22.2	24.2	330.1	379.9	314.7	5.1	6.4	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.11.2016	31.6	45.5	24.7	26.3	314.4	360.7	294.5	5.7	5.9	4.7	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
05.11.2016	30.2	53.2	27.8	28.7	311.4	355.9	299.4	6.2	6.4	5.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
11.11.2016	31.9	51	30.1	28.3	323.5	364.5	306.5	5.9	5.7	4.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.11.2016	33.8	56.9	31.6	26.3	326.5	377	309.6	5	6.7	5.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.11.2016	31.2	64.1	28.9	23.1	331.9	374.1	314.4	5.4	5.8	4.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
19.11.2016	38.6	61.3	26.5	21.3	335.1	384.7	313.7	5	5.5	4.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.11.2016	34	64.8	20.2	19.4	332	376.3	318.3	3.9	5.2	2.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
26.11.2016	33.3	63.3	17.8	18.2	303.2	342.7	291	3.5	4.7	3.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.11.2016	36.6	64.9	19.3	27.4	345.4	387.6	321.7	6	6.1	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	34.8	62.3	21.2	27	322.4	372.2	305.8	6	6.3	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
01.12.2016	37.6	60.2	20.9	26.5	328.8	376	313.1	6.5	6.7	5.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	33.8	62.4	20.3	27.4	337.8	378.9	314.7	5.9	6.2	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.12.2016	39.4	48.3	23.1	28.1	319.5	360.7	303.1	5.7	6.8	5.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.12.2016	34.6	52.1	20.4	26	319.4	367.4	304.5	6	6.5	5.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.12.2016	36.7	56	18.3	25.8	326.9	376	311.6	5.7	6.4	5.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.12.2016	37.8	53.3	19	26.2	330.9	379.9	309.9	5.7	6.1	4.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.12.2016	39.3	50.2	23.7	25.9	319.7	365.5	307.3	5.9	6.4	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.12.2016	38	51.7	18.7	24.4	336.1	378.9	318.4	5.4	6.7	5.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.12.2016	39.8	56.5	17.9	21	344.6	383	313	5.7	6.4	5.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.12.2016	38.7	53.3	17.5	18.9	352.3	386.9	332.2	5.5	6.1	5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**23.2**	**38.7**	**17.5**	**18.2**	**291**			**2.8**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**39.8**	**64.9**	**31.6**	**28.7**	**390**			**6.8**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**33.0**	**52.9**	**22.3**	**24.9**	**336**			**5.5**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**39.6**	**64.8**	**30.8**	**28.5**	**387**			**6.7**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

ANNEXURE-IX
AMBIENT AIR QUALITY

1215

Date of Monitoring	PM2.5	PM10	SO2	NOx	CO			O3			Pb	NH3	C6H6	BaP	As	Ni
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	ng/m3	µg/m3	ng/m3	ng/m3	ng/m3	ng/m3
03.10.2016	41.2	47.4	33.5	27.8	319	310	349	4.1	4.7	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
04.10.2016	39.4	46.7	30.8	28.1	322	324	333	3.7	4.6	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
12.10.2016	37.9	50.4	27.2	30	315	332	329	4.3	4.4	2.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.10.2016	38.1	52.6	28	27.6	318	349	336	4.1	5	3.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
17.10.2016	40.6	53.1	32.3	25.5	313	327	338	4.1	4.7	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
18.10.2016	39	59.4	30.8	22.1	308	322	327	3.2	4.3	3.2	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
24.10.2016	38.5	62.3	32.8	23.6	305	327	335	3.5	3.9	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
25.10.2016	37.9	59.9	37	27.1	310	342	337	4.2	4.6	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.11.2016	37.1	64.7	38.7	27.8	323	325	332	4.3	5	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.11.2016	40.2	63.5	40.5	28.9	328	320	349	4	5.1	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
08.11.2016	37.5	64.6	42.6	27.4	321	328	336	4.4	4.4	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
09.11.2016	38.5	67.8	36.3	27.7	335	339	325	4.1	4.8	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
15.11.2016	37.1	77.8	40.2	27	330	337	327	3.8	5.2	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
16.11.2016	38.1	75	36.3	28.3	340	346	336	4.3	3.8	4.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
22.11.2016	39	76.4	41.4	32.8	326	339	342	4.3	3.9	2.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
23.11.2016	41.4	75.8	37.8	30.7	318	308	332	5.3	4.6	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
29.11.2016	42.7	74.6	40.8	28.7	343	349	329	3.8	4.1	3.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
30.11.2016	43.9	77.1	26.8	27.8	347	335	328	3.9	4.6	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
02.12.2016	40.6	84	28.5	27.6	340	338	336	3.6	4.8	2.8	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
03.12.2016	39.4	71	27.2	26.5	336	341	333	4.1	4.8	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
06.12.2016	38.5	73.5	35	27.4	338	325	340	4.2	5.3	2.9	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
07.12.2016	37.5	84.2	32	26.5	332	331	341	3.7	4.9	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
13.12.2016	33.1	81.3	32	28.7	338	338	336	4.1	4.3	3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
14.12.2016	30.5	76.4	35	26.8	342	342	338	4.1	5	4.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
20.12.2016	42.4	75.8	34.5	27.6	335	329	340	4.3	4.6	3.3	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
21.12.2016	43.9	74.6	32.5	26.5	333	341	347	3.8	4.9	3.4	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
27.12.2016	40.4	77.1	30.5	25.2	337	345	344	4	5	3.5	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
28.12.2016	38.1	80.7	32.8	27.1	339	348	346	5.2	5.3	3.1	<0.05	<20.0	<1.0	<1.0	<0.2	<0.1
MIN	**30.5**	**46.7**	**26.8**	**22.1**	**305**			**2.4**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
MAX	**43.9**	**84.2**	**42.6**	**32.8**	**349**			**5.3**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
Average	**39.0**	**68.8**	**34.1**	**27.5**	**333**			**4.0**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**
98 % tile	**43.9**	**84.1**	**42.0**	**31.7**	**349**			**5.3**			**<0.05**	**<20.0**	**<1.0**	**<1.0**	**<0.2**	**<0.1**

Annexure-X
Demographic Details

ANNEXURE-X
DEMOGRAPHIC DETAILS

DEMOGRAPHIC DETAILS of GREEFIELD COPPER REFINERY of M/s ADANI ENTERPRISES AT ADANI PORT SPECIAL ECONOMIC ZONE @ SHIRACHA AND NAVINAL VILLAGES of MUNDRA TALUK, KACHCHH DISTRICT of GUJARAT STATE, INDIA																		
Sr No	**Villages between 0 to 3 Kms Radius**	**Taluka**	**Total Households**	**Male Population**	**Female Population**	**Total Population**	**Male :Population 0 to 6 years**	**Female Population 0 to 6 years**	**Total Population 0 to 6 years**	**SC Population**	**ST Population**	**Total Literates above 7 yrs**	**Male literates**	**Female Literates**	**Total Workers**	**Total Main Workers**	**Marginal Workers**	**Non-Workers**
1	Shiracha	Mundra	429	1171	708	1879	121	127	248	323	11	1298	924	374	873	854	19	1006
2	Navinal	Mundra	602	2406	694	3100	114	100	214	261	0	2387	2003	384	2125	2116	9	975
3	Tunda	Mundra	3134	11261	1210	12471	234	207	441	109	7	10135	9605	530	11096	10203	893	1375
	Sub Total		**4165**	**14838**	**2612**	**17450**	**469**	**434**	**903**	**693**	**18**	**13820**	**12532**	**1288**	**14094**	**13173**	**921**	**3356**
3 to 7 Kms Radius																		
4	Kandagara Mota	Mundra	1015	2729	1732	4461	271	257	528	356	113	3128	2157	971	2374	2139	235	2087
5	Khakhar Moti	Mundra	436	1101	1038	2139	171	156	327	395	114	1337	758	579	807	701	106	1332
6	Moti Bhujpar	Mundra	1979	4777	4501	9278	729	769	1498	1196	106	6015	3442	2573	3254	3035	219	6024
7	Nani Bhujpar	Mundra	210	551	505	1056	114	98	212	298	9	601	365	236	355	353	2	701
	Sub Total		**3640**	**9158**	**7776**	**16934**	**1285**	**1280**	**2565**	**2245**	**342**	**11081**	**6722**	**4359**	**6790**	**6228**	**562**	**10144**
7 to 10 Kms Radius																		
8	Deshalpar	Mundra	584	1350	1261	2611	177	183	360	444	232	1609	935	674	923	747	176	1688
9	Borana	Mundra	79	185	192	377	30	35	65	5	0	219	130	89	117	116	1	260
10	Pratappar (1)	Mundra	48	136	132	268	21	23	44	26	0	158	92	66	74	74	0	194
11	Jarpara	Mundra	1506	3872	3480	7352	617	606	1223	830	6	4092	2565	1527	3314	2782	532	4038
12	Dhrab	Mundra	629	2031	1250	3281	250	230	480	146	27	2050	1465	585	1521	1507	14	1760
13	Mota Bhadiya	Mandvi	624	1669	1615	3284	288	263	551	493	0	1867	1084	783	1597	1015	582	1687
14	Tragadi	Mandvi	216	636	602	1238	99	88	187	0	0	573	336	237	582	450	132	656
15	Nana Bhadiya	Mandvi	1011	3805	513	4318	72	72	144	395	0	3177	2900	277	3662	3620	42	656
16	Nani Khakhar	Mandvi	691	1758	1654	3412	236	201	437	606	154	2280	1287	993	1438	1183	255	1974
	Sub Total		**5388**	**15442**	**10699**	**26141**	**1790**	**1701**	**3491**	**2945**	**419**	**16025**	**10794**	**5231**	**13228**	**11494**	**1734**	**12913**
Grand Total			**13193**	**39438**	**21087**	**60525**	**3544**	**3415**	**6959**	**5883**	**779**	**40926**	**30048**	**10878**	**34112**	**30895**	**3217**	**26413**
SOURCE: CENSUS of INDIA 2011																		

Annexure-XI

Sodar Study Report

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1.0 INTRODUCTION

The lower part of the atmosphere, called Atmospheric Boundary Layer (ABL), around us is the domain of life and all human activities. As such emissions and dispersion of pollutants are confined within it. The relative dominance between the two decides the quality of air that we breathe. The continuing Increase of urbanization and industrialization is loading emissions beyond dispersion capabilities of the atmosphere and thereby deteriorating the air quality. Therefore, it is essential to maintain air quality for healthier living. In this context, it is important to understand that pollution loading (emissions) is man made while dispersion of pollutants (ventilation) is governed by naturally occurring atmospheric processes which are not in our control. In fact, the Mother Nature has gifted us with meteorological mechanisms which generate atmospheric processes which, in turn, act as natural means for dispersion of pollutants. These processes provide ventilation to the emissions and natural maintenance of air quality for healthy living. Therefore, unless atmospheric ventilation capability or the pollutants carrying capacity at any site supports the increasing load of emissions, the air quality will go from bad to worse with the growth of industry in that region.

However, the economic interests of the country encourage both the growth of industry etc and the healthy environment. Therefore, In order to strike a balance between the two (industrliasation and air quality management), it is essential to understand and study the working mechanism of atmospheric dispersion processes and use the knowledge to plan strategies of quality management. In this context, interaction of incoming solar radiation and the earth provides basic driving force to generate meteorological mechanisms which control atmospheric stability and thereby act natural means of ventilation for pollutants.

The processes such as radiational cooling of ground after sunset lead to stable ABL conditions, characterized by ground based temperature inversion, and lead to trapping / or accumulation of pollutant. On the other hand processes favoring unstable ABL conditions such as solar heating of the ground after sunrise or strong surface winds provide natural dispersion or ventilation of the pollutants. These processes (stable and unstable ABL) are known to occur alternatively on diurnal scale in accordance with the occurrence of day and night after sunrise and sunset. Thus, the accumulation of pollutants during the night time stable ABL is taken care of in a natural way by the atmospheric ventilation resulting from thermal buoyancy of air due to solar heating of ground during the following day. Pollution problems emerge when the accumulation dominates over the ventilation factor. Such conditions do occur when the local or synoptic weather conditions such as cold winter, dense fog etc. support persistence of inversions for longer periods. Furthermore, as these processes(stable or inversion and unstable ABL) are manifestations of solar heating and nocturnal cooling of the ground, the characteristics of these processes are site specific and show characteristic diurnal and seasonal variations depending upon the underlying topographical features and prevailing local and synoptic weather conditions. Thus, for an effective environment management, it is essential to have an account of said site specific air pollution meteorological aspects for EIA examination and regulation of

pollution concerned activities in accordance with the ventilation or cleaning capacity of the atmosphere in a natural way.

In pursuit of the same, carrying out studies for Environment Impact Assessment (EIA) in respect of setting up new industries, expansion of existing industries, site selection for industrial zone etc. is recommended by the environment protection agencies world wide. In view of the growing industrialization etc., strict environmental laws have been enforced for protection of the environment. In several cases it is now mandatory to seek environmental clearance for specific industries, from the official agencies such as Central / State Pollution Control Boards.

When it comes to undertaking EIA, site specific local study of air pollution meteorological parameters and the characteristics of atmospheric processes/ stability (inversion /mixing height) which govern air quality form vital input parameters of consideration in dispersion modeling for EIA. These parameters are indicators of prevailing ABL stability. The inversion/mixing height practically define the vertical height limit for accumulation and mixing of pollutants. As such it is popularly known as atmospheric inversion/mixing height of pollutants in air pollution meteorological terms.

These needed input parameters for dispersion modeling, are conventionally derived indirectly through radio-sonde temperature profiles pertaining to nearby IMD station and are not the true representations of the site under consideration. With the emergence of sodar technology, it is now possible to have on site real time data of inversion/mixing height needed for EIA.

Although there are several remote sensing and in-situ conventional techniques, with relative merits and demerits which are used to study inversion/mixing height. However, Sodar is considered as the proven meritorious and economical choice, worldwide accepted and recommended by the environment protection agencies (EPA) , including CPCB in India, as air quality meteorological tool to provide site specific continuous data in real time.

Furthermore, longer period Sodar observations have found potential application in air pollution meteorology. It makes possible to define meteorological conditions (ground based elevated inversion layer) responsible for pollution accumulation near the ground. This is a knowledge which is very useful in interpretation of pollution measurement data and particularly so in recognizing the responsibility for pollution episodes (growing emission or meteorology).

In view of above considerations, the CPCB guide lines for air quality dispersion modeling recommended the use of site specific Sodar derived mixing / inversion height data for EIA. In pursuit of the same, Sodar studies of inversion / mixing height have been undertaken by **Vimta Labs Ltd.** for the project site at located at Mundra, District Kutch, Gujarat (India). Study is undertaken for air quality modeling for the proposed Adani Copper Project.

The continuous Sodar data recorded during the period 24th November 2016 to 23rd December 2016 has been utilized to evaluate hourly averaged mixing /inversion height and presented in this report.

2.0 SCOPE OR PRESENT WORK

The present work is focused at site specific Sodar study of the hourly averaged inversion level and mixing height characteristics at Mundra, District Kutch, Gujarat (India).

The work includes site noise survey, site selection for sodar installation, sodar installation, operation, data collection and data processing for inversion studies. Accordingly, Sodar study based on continuous observations pertaining to the study period (24th November 2016 to 23rd December 2016) has been carried out. The observations are analyzed to deliver required information on hourly averaged inversion level / mixing height at Mundra, District Kutch, Gujarat (India).

3.0 SITE LOCATION

The Sodar observational site was located at Mundra, District Kutch, Gujarat (India) (22°49'22"N & 69°33'10"E) is shown in **Figure-1**.

Kutch is virtually an island, as it is surrounded by the Arabian Sea in the west and the Gulf of Kutch in south. The Kutch peninsula is an example of active fold and thrust tectonism. In Central Kutch there are four major East-West hill ranges characterized by fault propagation folds with steeply dipping northern limbs and gently dipping southern limbs. From the gradual increasing dimension of the linear chain of hillocks towards the West along the Kutch mainland fault and the epicenter of the earthquake of 2001 lying at the Eastern extreme of Kutch mainland fault.

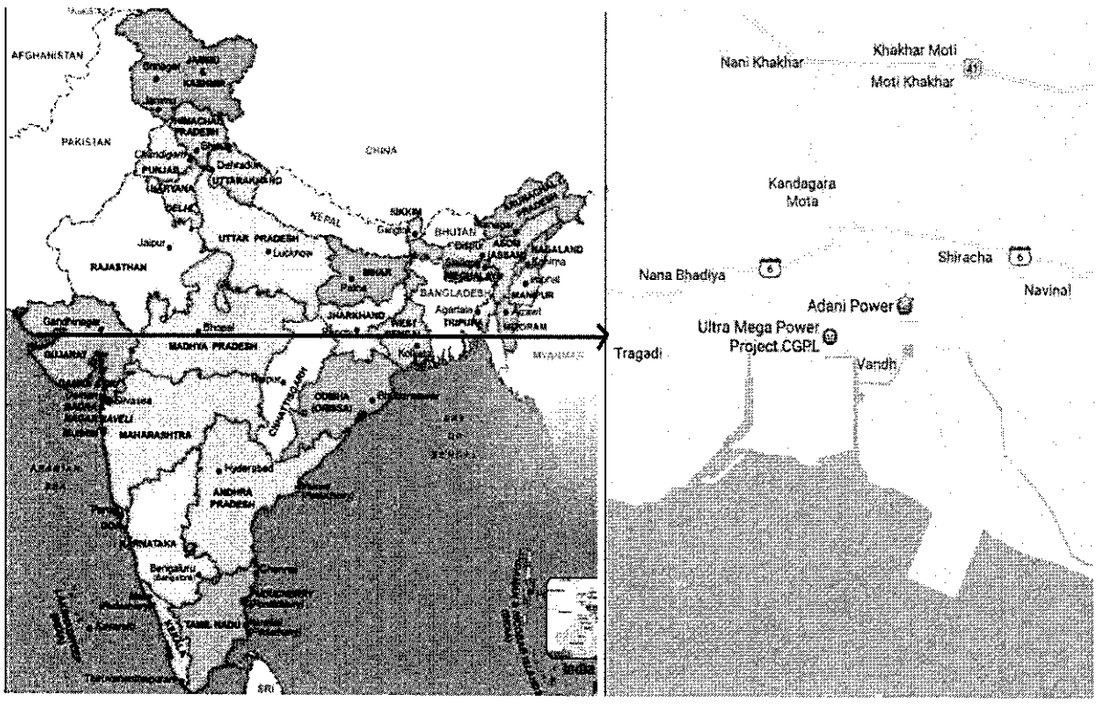


FIGURE-1
MAP SHOWING LOCATION OF SODAR SITE AT MUNDRA, DISTRICT KUTCH, GUJARAT

4.0 SIGNIFICANCE OF SITE SPECIFIC MIXING HEIGHT

The most important significance of mixing height is that it is a single parameter that describes the combined or the integrated effect of several meteorological parameters, which govern the dispersion capabilities of the atmosphere. It defines the ventilation coefficient or the dimensions of the maximum room size offered by nature through interaction or energy exchange between the prevailing meteorological conditions and the under lying topographical features for a particular given site. It practically limits the vertical height up to which pollutants released near the ground can reach or get mixed up along with vertical air currents caused by the turbulence process generated due to free or forced thermal convection. Thus, for given horizontal wind speed, mixing height is an indicator of the mixing volume available for accumulation of pollutants or pollution concentration or in other words mixing height is an indicator of the air quality. Since mixing height is governed by prevailing meteorological conditions, variation in any one of the meteorological parameters such as incoming solar energy due to cloud cover or declination of Sun during course of the day, wind speed, humidity, rain fall etc., causes change in the horizontal or vertical dimension of mixing room size and thereby concentration of pollutants present in the available mixing volume. Therefore, for a given site, mixing height exhibits a typical pattern of diurnal variation trend in accordance with solar heating of the ground starting from sunrise to sun set during the course of the day. Accordingly, under normal clear weather conditions at any site, the maximum mixing height or the best dispersion condition during the day is available around noon when the heat flux near the surface of earth is maximum. Since in actual conditions, synoptic weather conditions such as rain, fog, snow fall, frontal system, etc do modify the local prevailing meteorological condition and accordingly induce short term or long term changes in the normal mixing height variation trends. Thus any meaningful real time dispersion model for now casting or forecasting of air quality calls for real time site specific mixing / inversion height.

It may be pointed out that mixing height is the net result of warming of the earth surface and thus it incorporates in itself the effect of prevailing meteorological conditions and underlying topographical features. Therefore, the effects of sunshine, cloud cover, wind, earth's surface conditions, albedo etc., are embedded in the site specific mixing / inversion height.

4.1 Critical Study Period - Winter (why?)

Mixing / inversion height follows diurnal and seasonal changes related to various cycles of meteorological parameters. Therefore, study for air pollution climatology, for EIA, calls for continuous monitoring of mixing height on round the cloak basis. However, in view of the time constraints involved in prior EIA for setting up an industry, a quick assessment can be taken up via studying the worst scenario period. In this context, winter period is considered as the worst and critical period of the year. During winter, the ground temperature is minimum due to the lowest solar inclination and the duration of sunshine is also the least. Frequently, persistence of inversion is observed for days in succession. Under such situations, mixing height during the day gets significantly curtailed and thereby it offers poor or the worst natural dispersion conditions. Therefore, an effective and rapid EIA

calls for considerations of critical winter period study of mixing / inversion height that ensures satisfactory scenario for the rest of seasonal periods. Thus, winter period is considered as the critical period for studies of air pollution meteorology. However, for comprehensive EIA, continuous studies for a year long period covering all the four seasons are desirable.

In the other situation, it is important to note that since mixing height is associated with ground temperature, it is maximum in local summer. It offers the best dilution to all the pollutants emitted in the atmosphere and the atmospheric carrying capacities are much higher during hot summer than in any other period of the year. However, in local winter, as earth receives solar energy for a limited period and that too at an inclination, the strength of vertical currents is the lowest. Moreover, the radiative cooling of the earth's surface during night is also stronger, which in turn leads to the formation of stronger surface based inversions. Such circumstances result in the poor dispersion conditions and reduced mixing height which may lead to air pollution meteorological hazards, particularly during persistence of dense fog. Thus winter offers worst scenario to study air pollution meteorology with reference to EIA. It is extremely important that both the stability classes and the mixing height are determined accurately for the purpose of assessing the air-pollution dispersion in the atmosphere.

4.2 Sodar Merits for Studying Inversion / Mixing Height

As compared to other conventional techniques Sodar enjoys the credit of useful economical choice with merits of providing site specific continuous data in real time. In fact, the essential progress in ABL research has been brought about by Sodar. It has made possible to define (visualize) meteorological conditions (ground-based inversion layer plus low wind speed) responsible for pollution accumulation near the ground. This knowledge is useful in interpretation of pollution data, recognition of the responsibility for pollution episodes (growing emission or meteorology?) and in pollution forecast. With growing progress in acceptability of Sodar in the air-pollution meteorology, it is becoming an essential integral component of all atmospheric measurements programs all over the world. Sodar systems are progressively used for quantitative and qualitative profile information on the atmospheric structure parameters. The Sodar data allows for deeper investigation and understanding of air pollution characteristics, especially during the transitional periods of the day. The results, reported from the world over, indicate that there is good correlation between the pollutants concentrations and the mixing height especially during pollution episode days. Furthermore, it is indicated that there is a strong dependence between the rate of increase of the mixing height and the concentration levels in the early morning hours as well as during the Atmospheric Boundary Layer (ABL) collapse in the afternoon. These results are of importance for urban air pollution modeling, which has recently attracted the attention of many research groups.

5.0 SODAR TECHNOLOGY

5.1 Operational Principle

Sodar is exactly similar to radar, except that instead of radio waves employed in radar, it employs sound / acoustic waves to interrogate the medium. Therefore it is named SODAR (Sound Detection & Ranging) or AcDAR (Acoustic Detection & Ranging). In this technique, a powerful packet of sound waves (sound burst) is transmitted vertically up into the atmosphere. These sound waves get scattered in all the directions by the temperature and wind fluctuations occurring along the path of propagation in the atmosphere. Theoretical considerations (not discussed here) reveal that the back-scattered energy contains information about thermal turbulence. Therefore, the backscattered component is picked up to derive information about prevailing turbulence or the thermal structure of the atmosphere as shown in Figure.2. A back scattering or monostatic Sodar (with co-located transmitter and receiver) is used to capture back-scattered acoustic signals. The received signal is suitably processed to get desired online information about prevailing meteorological phenomenon and online / offline information about the atmospheric inversion / mixing height levels.

The basic data format is the facsimile representation of dynamics of ABL thermal structures in real time a facsimile display is a real time 3-Dimensional display of the intensity of the turbulence associated with scattering media at various heights / altitudes. It describes dynamics of the prevailing atmospheric meteorological processes. The atmosphere is scanned after every 6 seconds to get probing range right from surface up to an altitude of 1 km. The data is sampled at a range resolution of 1m and plotted in color intensity mode. The different colors indicate the intensity of the scattering medium (turbulence).The echogram structural details are used to derive information about inversion / mixing height. They also deliver information about the onset / dissipation time of the occurrence of atmospheric phenomenon in addition to the duration and height at which it originated. The data can be utilized in variety of applications.

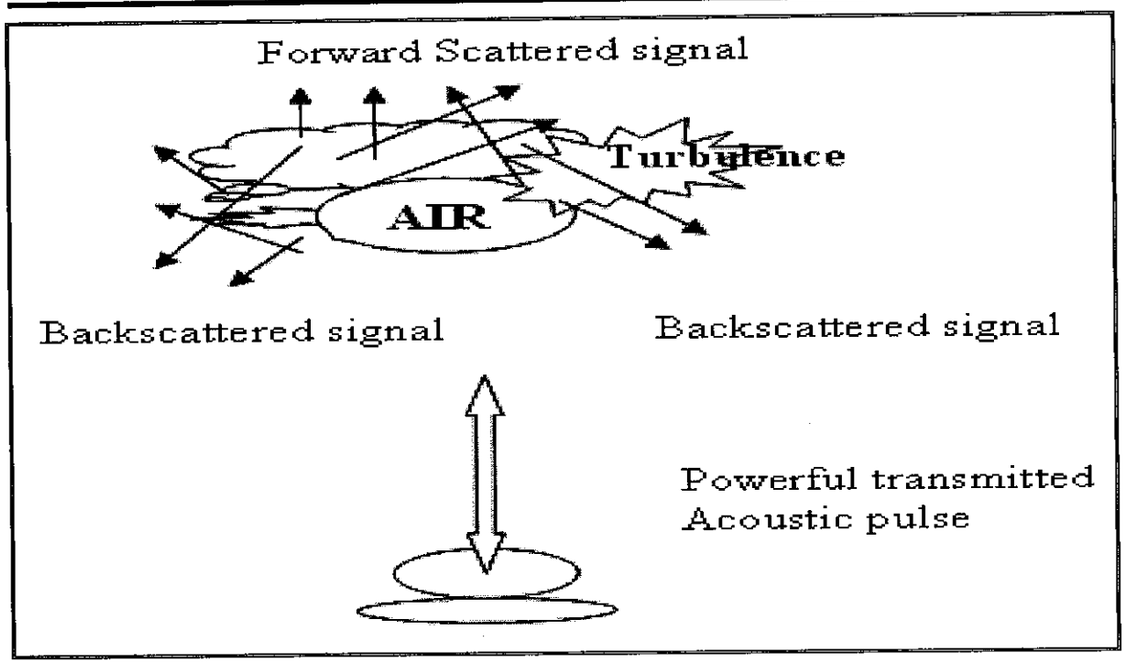


FIGURE-2
SCATTERING OF SOUND FROM AIR IN-HOMOGENEITIES

In a Sodar, the back -scattered part is picked up and amplified to present facsimile pictures of the atmosphere.

5.2 System Description

The block diagram of the mono-static Sodar showing the operation logics and sub-system assemblies is shown in **Figure-3**.

The basic system consists of the following three parts:

i) Antenna assembly and acoustic shield: Its purpose is to direct the energy into the atmosphere and receive back the scattered signals.
ii) The system electronics: Its role is to produce a powerful acoustical pulse for transmission and conditioning of the received signals for further processing to produce a facsimile display or Sodar echograms of ABL thermal structures. An IBM compatible PC is part of system electronics which performs several control functions for the entire system operation and data handling.
iii) Operational software: Its role is to control various operations automatically and through user-friendly software, present data in a user-friendly format.

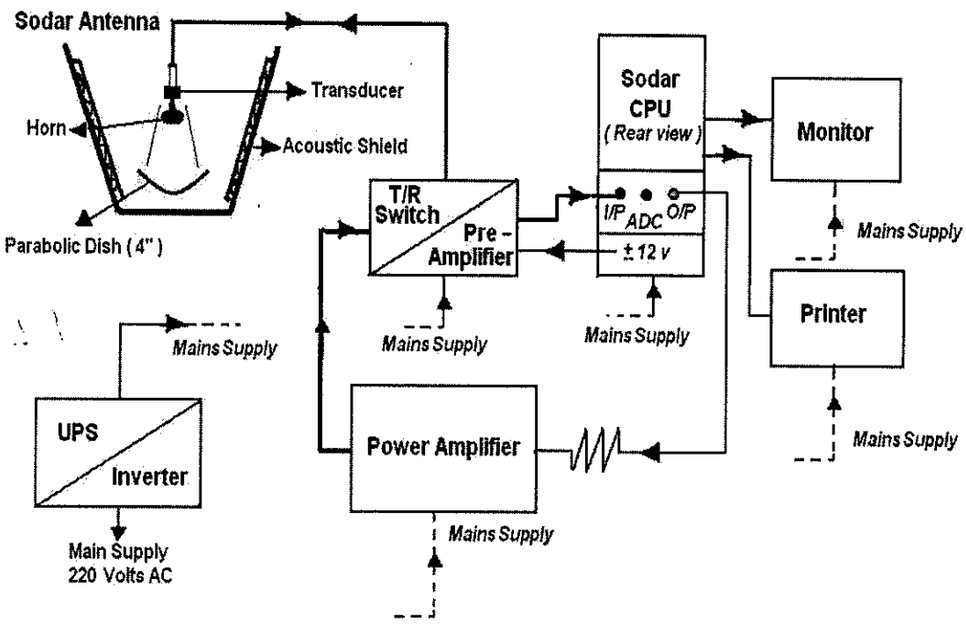


FIGURE-3
BLOCK DIAGRAM OF SODAR

5.3 System Operation

Once the system is switched on, the actual acoustic sounder operation begins at the PC level. Several input operational parameters are selected depending upon the desired application. Particularly, the selectable dead time and the pulse repetition time (between two pulses) are entered through the software. With start of data acquisition, first, the data file name is created in which the received signal will be stored. The PC also provides the burst of desired frequency and duration for transmission during acoustic sounder operation. This output from the computer system is suitably amplified by a power - amplifier and is transmitted through an audio transducer The transducer fitted at the focus of 4 feet parabolic dish (Figure 4), transmits as well as receives the scattered signals. The received signals are suitably conditioned and amplified by a pre-amplifier which is kept very close to the antenna. These signals are further filtered through a band pass filter to suppress the environmental noise. These analog signals are digitized by an ADC card and the digital signal is then processed, recorded and saved / stored in a file. The PC gives the time-height record of the atmospheric structure moving through the antenna beam. The signal amplitude is depicted as a color picture on the video screen. Integration of data scan by scan produces a real time facsimile display on the monitoring screen of PC. It can be printed using any standard printer.

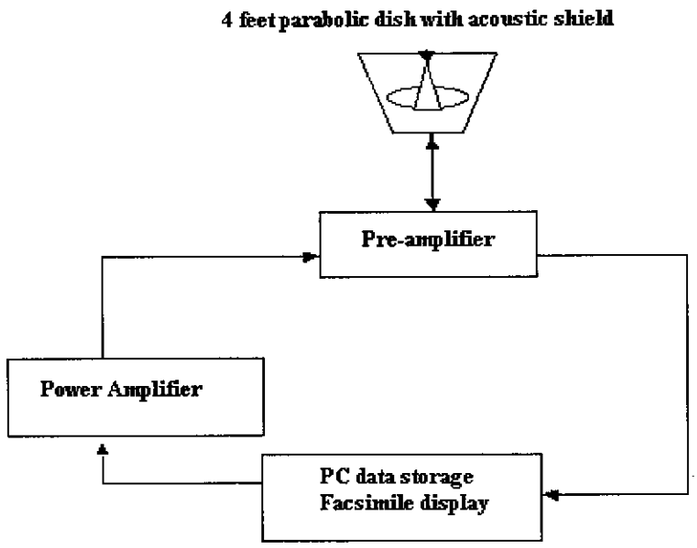


FIGURE-4

BASIC SYSTEM ASSEMBLIES FOR A SODAR

5.4 Technical Specification

The technical specifications of the Sodar system used are listed in **Table-1.**

TABLE-1
SODAR SPECIFICATIONS

Transmit power	Pulsed 100 W
Transmit antenna	4 feet parabolic dish enclosed in an acoustic shield
Transmit frequency	2000 Hz sine wave
Transmit duration	100 m sec
Receiver bandwidth	± 50 Hz
Range resolution	17 m
Probing Range	1 km
Signal display	Color facsimile
Signal printing	Standard Inkjet/ laser Printer
System operation	Nonstop
System software	User-friendly

6.0 DATA FORMAT, NOMENCLATURE & DETERMINATION OF INVERSION / MIXING HEIGHT

The basic data format is the facsimile chart giving three dimensional display of the intensity of atmospheric echoes from various heights in real time. Basically, data comprises of two types of echoes: thermal echoes and shear echoes. Thermal echoes indicating ***thermal convection*** are associated with solar heating of the ground during the day time and the shear echoes representing

stable ABL or ***inversion*** associated with radiational cooling of the ground during night time.

6.1 Thermal Echoes

In the case of thermal convection, during sunny periods (around noon hours), the earth's surface is most heated due to direct solar radiation falling on the earth. With the result, the air close to earth becomes much warmer than the air aloft and thus it rises due to buoyancy. When this parcel of air rises, it expands and interacts with the background air all around its periphery. Thus, as it moves up, it becomes smaller and smaller in its original diameter and on Sodar, a cone shape structure with broad base and tapered column is formed. This typical structure, shown in Fig. 5, is commonly known as ***thermal plumes.*** The thermal plumes induce convective air currents which cause vertical mixing and all the pollutants near the surface of earth are carried up by these vertical currents in the air. Thus, the pollution density on the surface of earth gets reduced. Such thermals can be easily identified through pattern recognition and represent unstable atmosphere. Under thermal convection, the surface air temperature is much higher than the temperature of air aloft up to certain height, later on there is adiabatic fall of temperature.



FIGURE-5
THERMAL PLUMES (ON SODAR) REPRESENTING FREE CONVECTION IN ABL

6.2 Shear Echoes

In the evening, close to sun set, there is no heating of the surface of earth and earth losses its heat energy due to the radiative cooling. Thus a stage reaches when the temperature of air becomes homogenous. The ABL comes in near neutral state and it shows no signature or blank trace on Sodar facsimile chart, showing neutral stability or absence of turbulence in ABL.

With the progress of time after sunset, earth starts losing heat and becomes cooler than the air above it. This results in increase of temperature with height and temperature profile is inverse of what it was previously during solar heating of the ground. As a result, the air-mass close to the surface of earth cools off rapidly. This cool air being heavier than the over lying warmer air can not rise up and it rests, as stable air mass, on the ground surface. This part of the atmospheric layer which is warmer than underlying earth surface but cooler than over lying air mass is known as inversion layer within which the

temperature increases with height or the temperature profile is inverse of day time temperature profile. Hence the name temperature inversion is acquired. On Sodar record it looks as thick band of layer with flat or spiky top and is called *ground based inversion* is shown in **Figure-6**.

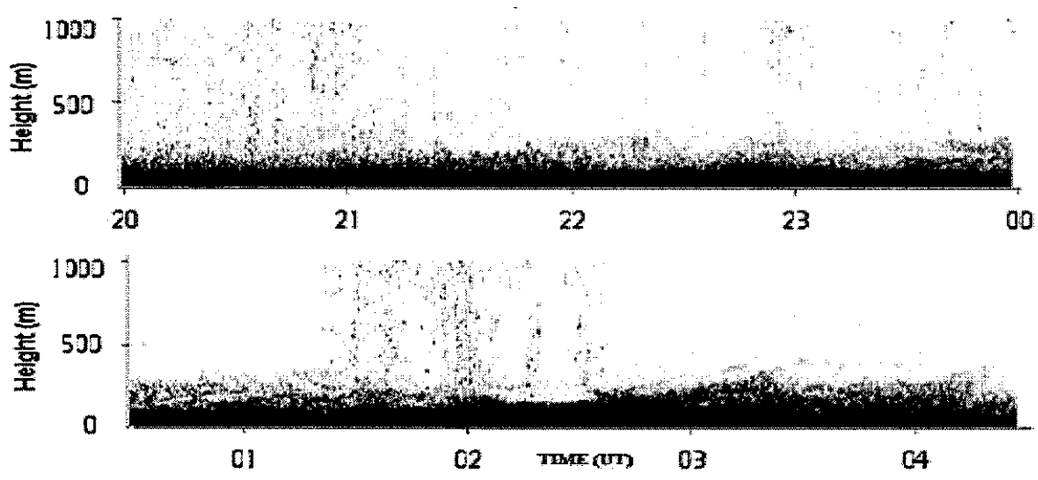


FIGURE-6
SODAR ECHOGRAM OF SURFACE BASED INVERSION DYNAMICS

At times elevated layers in addition to ground based inversion are formed due to wind shear, advection of warm air over the colder region, subsidence associated with frontal passage etc. These inversions lead to suppression of the vertical mixing and thereby leading to the enhancement of pollution below the inversion layer.

6.3 Determination of Inversion / Mixing Height

Sodar structural details of inversion are used to derive online information on nocturnal inversion level of stable ABL and mixing depth of thermal convective unstable ABL during day time solar heating of the ground. In case of Stable ABL, top of the ground based inversion layer gives a fairly good estimate of the inversion level for practical applications in dispersion modeling. This information about inversion level is available with every scan of 6 seconds during Sodar operation. However, hourly averaged value of inversion level, which is indeed required for practical application, can be read directly online from the Sodar facsimile records or can be computed (Offline) through software capabilities using stored digital data files.

In case of thermally convective unstable ABL, mixing height is determined through empirical relationship (Singal et. al., 1982) which is based on Sodar recorded height of the thermal plumes. The relationship: [mixing height = 4.25 x (thermal plume height) +95]: is the result of the R&D efforts of National Physical Laboratory, New Delhi-110012. It may be mentioned that the said

relationship is the out come of detailed year long correlation studies of simultaneous observations made by Sodar and conventional radio sonde at IMD observatory located at Aya Nagar, Delhi. Since Sodar observations are manifestation of the net upward turbulent heat flux taking into account the effect of topographical features, the relationship is said to be embedded with topographical influence on mixing height and is useful for application for different sites. In pursuit of the same the relationship has been re-verified to hold good even for hilly terrain (Singal, 1998). Therefore, the said relationship has been used in the present work to compute mixing height for unstable ABL during the day time solar heating periods.

6.4 Site Survey and Sodar Installation Criterion

Acoustic Sounder (Sodar) installation needs a site survey and noise spectrum study at site before installation. The noise sources near the operational site would certainly affect Sodar performance, as extremely weak signals scattered from higher altitudes may get marked by the noise. Therefore, on site survey noise spectrum is essential before installation to decide the Sodar operational frequency. It needs to ensure that there is no strong noise at the operational frequency. If required, the operational frequency can be changed to avoid the background noise at a particular frequency. In unavoidable circumstances, specially designed acoustic shield may also be used to protect the antenna from surrounding noise.

7.0 MAINTENANCE OF EQUIPMENT

The equipment is basically computer controlled and as such runs trouble free. Once put in operation, system runs automatically and takes care of data saving on power failures and restarts automatically when the power is resumed. As such no special maintenance is required unless there are computer related problems such as frequent power failure, power back up, computer hang up etc. The virus through internet may pose problems. Therefore, use of internet on Sodar PC is not recommended unless essential. One needs to check at times that system is sounding or listen to the sound burst that ensures that system operation is in order. However, certain safety measure points would further ensure proper functioning of the equipment. The points are:

i) Keep antenna clean and wash it with simple water (if required).
ii) Keep computer virus free, as viruses can seriously degrade system performance.
iii) Switch off equipment during rain as no useful data is obtained due to heavy rain noise.
iv) Maintain proper ground or earth in the supply line. If ground is improper, it will allow system to pick up spurious noise and system performance is seriously affected. This part is normally taken care off during installation.

8.0 SODAR APPLICATIONS

Sodar is useful meteorological tool for practical applications in communication, aviation and air pollution. Sodar is being used world wide for low level wind

shear detection at the air ports and as an aid to provide useful air pollution meteorological data needed for dispersion modeling in EIA. Besides Sodar data can be used in variety of ways depending upon the required application such as boundary layer research, analysis of air quality measurements, fixation of stack height, industrial sitting, now-casting / short range forecasting of environmental pollution hazards, EIA etc.

Some of the data application areas, wherein Sodar has proven excellence, are the following:

i) Mixing height characterization.
ii) Ground / elevated Inversions levels and their dynamics.
iii) Gravity waves characterization.
iv) Determination of ABL stability class.
v) Fronts dynamics.
vi) Subsidence characterization.
vii) Sea and land breeze circulation.
viii) Thermal Internal Boundary Layer (TIBL) characterization for coastal pollution management.

9.0 Results and Discussion

From stability class A to F. The occurrence of strong stability condition (stability F) is seen during the post midnight to early morning hours (00-04 hours) during the present study. This indicates inversions gradients to be fairly strong during this period. The various characteristic thermal structures of ABL such as thermal plumes, ground based inversion, elevated inversions, eroding inversion which are normally observed at any site have been also observed at the present site of Mundra, District Kutch, Gujarat (India) is shown in **Figure-7.**

Visual examination of Sodar Echogram details has revealed the occurrence of a widely varying simple to complex meteorological condition with respect to air quality. Inversion stratification and spiky inversion layer associated to wind shear is seen on several days during the observational days. The free thermally convective ABL is seen to be largely influenced by the prevailing wind/ incursion of sea breeze during day time. As a result diffused thermal plume structure is observed on Sodar echograms.

The data pertaining to the observation period (24th November 2016 to 23rd December 2016) has been analyzed for hourly averaged inversion/mixing height values in the interest of air quality dispersion modeling for the site under consideration. The data has been analyzed to know minimum, maximum and average value of stable/unstable ABL.

The analysis of echograms has revealed that onset of inversion formation begins around 1700 hours in the evening during the winter period. This time varies with season and prevailing weather conditions. It marks change of atmospheric stability from unstable to stable ABL.

The break of inversion (fumigation) is seen to start at around 0800 hours in the morning and lasts for about couple of hours. In general, the complete changeover of stability, from stable to unstable ABL takes place by 0930 hours. The fumigation period varies in accordance with prevailing weather conditions and season. The situations of prolonged fumigation are adverse conditions for air pollution dispersion point of view. Such situations are not seen during the present study period. The study of onset and break up of inversion timings reveals availability of a good atmospheric ventilation period of about 7.5 hours (0930-1700 hours) during winter at Mundra. Further, The ABL stability is seen to vary.

The hourly averaged values of nocturnal inversion level and the day time mixing height have been computed based on the observed Sodar structural details on the facsimile records. The day wise averaged hourly data for each observational day is given in the data Table 2. The data pertaining to nocturnal stable ABL (inversion level), day time unstable ABL and fumigation periods is highlighted in different colors. The data marked in red color pertains to day time unstable thermally convective mixing height while data marked in black refers to night time stable ABL (inversion level). The fumigation period, representing inversion breakup after sunrise, is indicated through blue color in the data table.

The examination of data in the table shows variability of inversion/ mixing height in different hours on different days. This variability from hour to hour is associated with variations in the local micrometeorological conditions such as prevailing wind speed, wind direction, cloud cover, sunshine, humidity, incursion of mountain wind, land-sea breeze etc. Sudden increase in the inversion level is generally associated with the variation in the vertical component of increase in the wind speed. Vertical wind component induces mechanical mixing in the stable air mass of inversion and thereby increases the height of inversion level. Therefore, high values of inversion level in certain hours are presumed to be associated with higher wind speed or change in some other meteorological parameter causing increase in the vertical transfer of momentum during those hours. At times increased winds due to coastal fronts, particularly in coastal regions, contribute significantly in inducing upward transfer of momentum flux, causing mechanical mixing of air mass in the ground inversion and thereby lead to increase of inversion height.

The inversion build up is known to starts shortly after sun set due to nocturnal cooling of the ground. The inversion height increases in accordance with increased cooling of the ground with passage of time. Under calm and clear sky conditions it (inversion) attains maximum height during the period of maximum cooling (0300-0500 hours) at night. Therefore, at times the data pertaining to 0300-0500 hours can be analyzed to broadly know the variational trends in the maximum of the monthly averaged height of inversion level.

Further, as per EIA dispersion modeling requirements, the entire data has been analyzed to know hourly averaged inversion/mixing height and is presented in tabular form. Besides the observational data pertaining to the stable boundary layer (inversion) and confined well within periods of inversion formation after

sunset and prior to onset of inversion breakup after sunrise (1800 hours to 0600 hours) has been analyzed to know the maximum, minimum, mean and the probable occurrence of inversion height during the observational period.

The overall observational analysis shows that during the observational, period (24 November, 2016 to 23 December, 2016) the ABL is seen to remain stable during the period 1800-0600 hour and unstable ABL is confined to the period between 0900 hours to 1700 hours. The remaining hours are seen to exhibit transitional phases of stable ABL to unstable ABL in the morning (breaking inversion) and reverse unstable to stable ABL (inversion formation) in the evening.

The height of stable ABL (inversion) is seen to vary from a minimum of 68m to a maximum of 347m during the observational period (1800 hours to 0600 hours). However, the monthly average inversion level is seen to be 202±70 m during the entire study period.

Relative distribution of inversion height in **Figure-7** shows the occurrence probability of 18% for the inversion height to be within 100 to 150m and 23% probability for the inversion height to be within 150 to 200m. The probability for higher height gets progressively reduced. The probability of about 10% only is seen for the inversion being more than 300m.

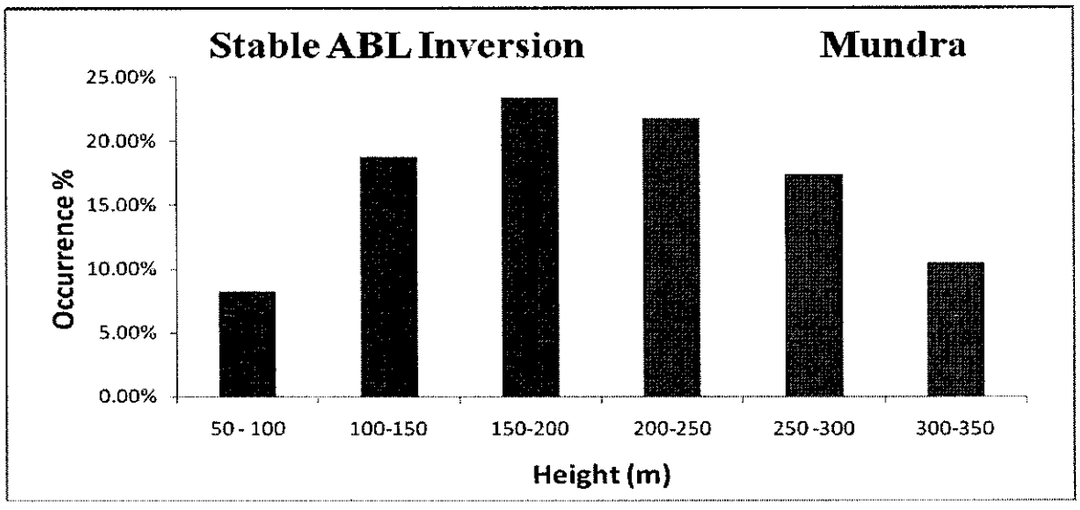


FIGURE-7
RELATIVE OCCURRENCE OF STABLE ABL (INVERSION) HEIGHT AT MUNDRA

The analysis of cumulative occurrence in **Figure-8** shows a probability of 91% for inversion height to be upto 150m, 73% upto 200m, and for 10% of the time it is more than 300m.

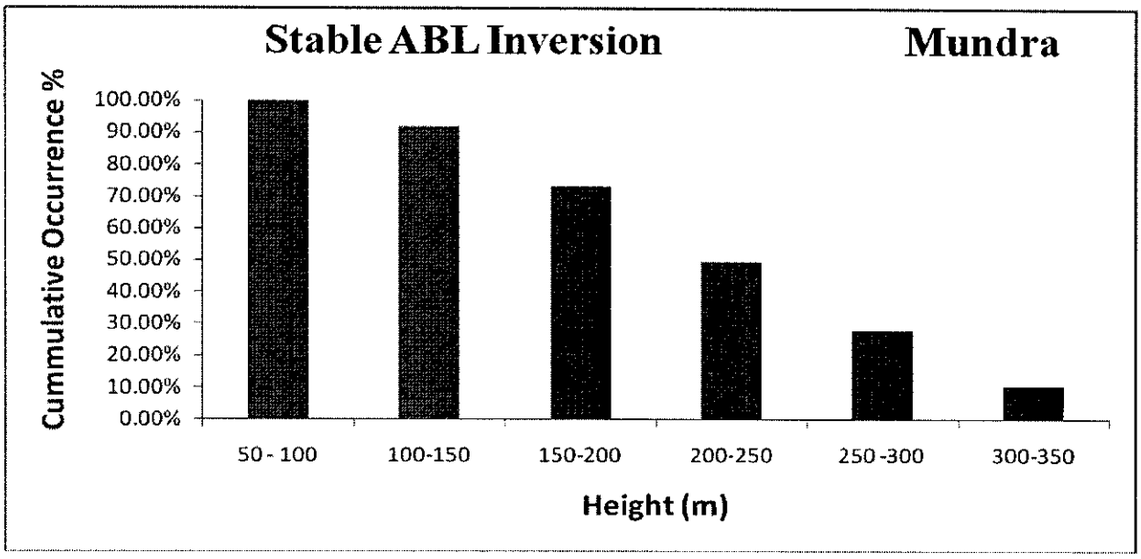


FIGURE-8
CUMULATIVE OCCURRENCE PROBABILITY OF INVERSION HEIGHT AT MUNDRA

Similar analysis of day time unstable ABL shows that the height of unstable ABL (free thermal convection) during course of the day (0900-1700 hours) is seen to vary from a minimum of 509m to maximum of 1198m during the observational period. However, the average mixing height is seen to be 840±198m during the entire study period.

Relative distribution of convective mixing height in **Figure-9** shows a probability of 24% for height to be within 600 to 800m and 37% probability for the mixing height to be within 800 to 1000m. The occurrence for mixing height to be more than 1000m is seen to be about 24%.

The cumulative occurrence probability in Figure-10 shows a probability of 87% for the mixing height to upto 800m and 62% probability for mixing height upto 1000m. The probability for the height to be more than 1200m is seen for about 24% of the observational period.

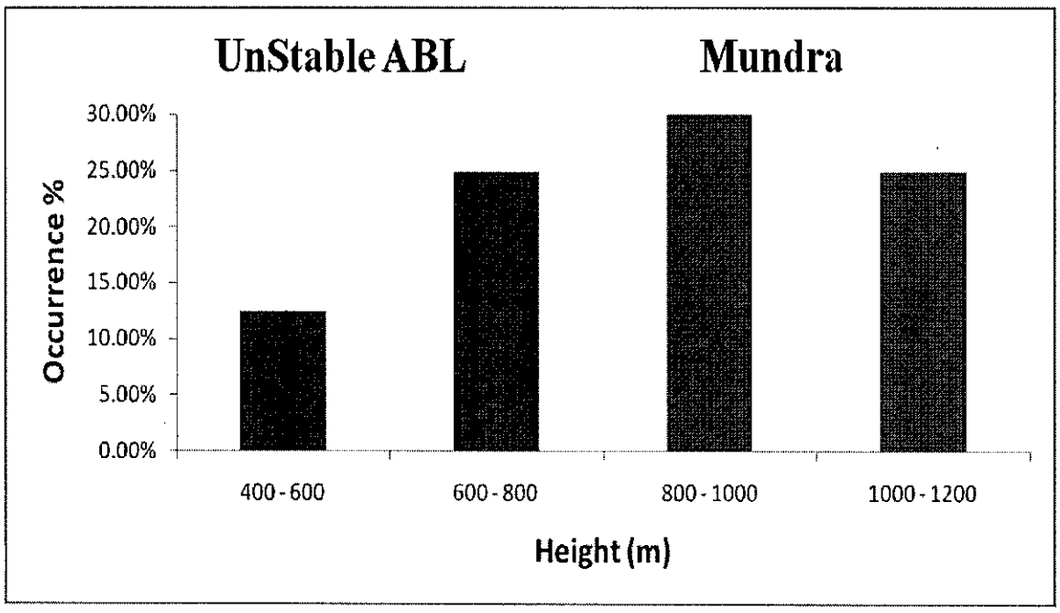


FIGURE-9
RELATIVE OCCURRENCE OF UNSTABLE ABL MIXING HEIGHT (M) AT MUNDRA

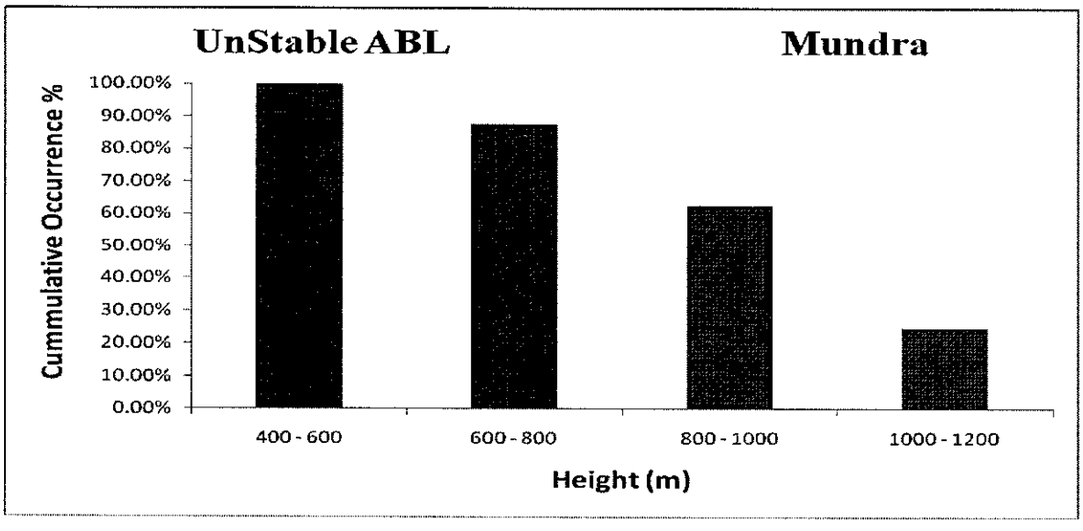


FIGURE-10
CUMULATIVE OCCURRENCE OF UNSTABLE ABL MIXING HEIGHT (M) AT MUNDRA

The results of hourly maximum, minimum and averaged values of inversion/mixing heights pertaining to stable, unstable ABL are summarized below:

TABLE-2
STABLE (INVERSION)/UNSTABLE ABLMIXING HEIGHT (M) DURING WINTER (24 NOVEMBER 2016 – 23 DECEMBER 2016) AT MUNDRA.

ABL	Maximum	Minimum	Average	Standard Deviation
Stable (1800-0600 hours)	347	68	202	±70
Unstable (0900-1700 hours)	1198	509	840	±198

The diurnal variation of ABL mixing height in **Figure-11** further shows that maximum of inversion height is in seen during periods of maximum ground cooling (0300-0500 hours) while maximum of day time maximum mixing height is observed around noon hours (1200-1400 hours) when the ground temperature is also maximum. These observations support the concept of the meteorological considerations that maximum inversion height and mixing heights are observed during periods of maximum cooling and heating of the ground.

Besides fore going analysis, elevated capping inversion layers associated with thermal internal boundary layer and incursion of land-sea breeze and waves are also seen during the observation period. Low lying elevated capping layer limits the vertical mixing height to its own height of occurrence and at times pose environmental hazards for air pollution. Such observations are normally typical of winter fog weather or typical of coastal sites. Such layers, if seen to occur frequently do need a separate focused studies at least for the whole year and preferably over for several years. These are beyond the scope of present study and as such are not discussed here.

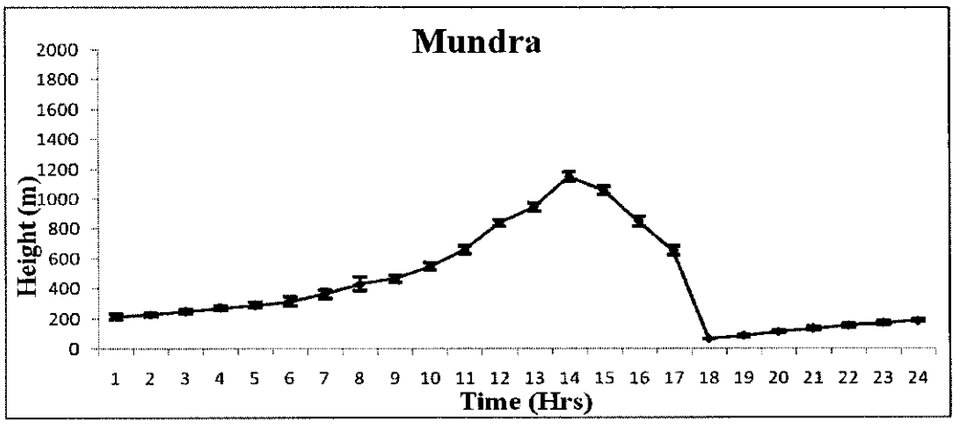


FIGURE-11
DIURNAL VARIATION OF ABL MIXING HEIGHT AT MUNDRA

10.0 Concluding Remarks

Site specific Sodar study, at Mundra, District Kutch (India) for one month winter period of (24 November, 2016 to 23 December 2016) has been successfully completed.

Analysis of the data obtained during *the study period* shows that inversion height varies from a minimum of 68m to maximum of 347m during the study period. The averaged inversion level considering stable ABL conditions (1800-0600 hours) is seen to be 202±70m during the study period.

The hourly averaged mixing height pertaining to unstable ABL during the day time (0900-1700 hours) is seen to vary from a minimum of 509m to a maximum of 1198m. The average level is seen to be 840±198m during the study period.

The maximum day time mixing height, around noon (1200-1400 hours) is seen to be more than 1 Km on several days which is fairly good for the winter.

Besides above, fumigation periods is seen to be more than an hour.

Further detailed comprehensive analysis, covering a year long seasonal sodar study is suggested to investigate the occurrence characteristics of ground/ elevated inversion/ mixing height, fumigation, thermal internal boundary layer etc.

11.0 Some Definitions

Lapse Rate

The rate of which the environmental temperature falls with height is known as Lapse rate. The dry adiabatic lapse rate is 9.8 °K/Km. The atmosphere is termed as stable, unstable and neutral according as the prevailing lapse rate is less than, more than or equal to the adiabatic lapse rate.

Inversion

Atmospheric layer in which temperature increases with height is known as inversion. The inversion may be ground based or elevated depending on the meteorological conditions. The atmosphere under inversion conditions is stable and resists vertical motion or suppresses the prevailing turbulence.

Mixing Height

It is the height of the atmosphere above the earth's surface to which released air pollutants will extend primarily through the action of atmospheric turbulence.

Atmospheric Boundary Layer (ABL)

It is a part of the lower atmosphere (troposphere) which is influenced by the presence of the earth and responds to cooling and heating of the earth. Boundary layer developed during night time stable atmospheric conditions is known as nocturnal stable boundary layer (NSBL).

12.0 References

1. Assessment of impact to air environment: Guidelines for conducting air quality monitoring, CPCB, Program Objective Series, PROBES/70/1997-98, 1998.
2. Singal, S.P. and Gera, B.S. (1982), "Acoustic remote sensing of the boundary layer", Proc. Ind. Acad. Sci. (Engg. Sec.) Vol 5 No. 2 pp 131-157.
3. Singal, S.P and Kumar, S (1998), "Sodar studies of air pollution associated meteorological parameters in the Hills of Assam, India", Proc. 9th International symp. On ISARS, 302-305.

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Annexure-XII
Social Impact Assessment Report

1.0 INTRODUCTION

As per Environmental Impact Assessment (EIA) Notification dated 14th September, 2006, proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity.

The application No: IA/GJ/IND/53004/2016 for prior EC (Form-1 and Pre-Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April 2016 and same was reviewed by the Expert Appraisal Committee (Industry-I) held during 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. TOR has been issued by MoEF&CC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016.

With a view to assess the environmental impacts arising due to the proposed Greenfield Copper Refinery Project, **M/s. Adani Enterprises Limited (AEL)** has retained the services of NABET accredited EIA Consultant **M/s. Vimta Labs Limited (VLL)**, Hyderabad to prepare EIA report for various environmental components including air, noise, water, land and biological components along with parameters of human interest which may be affected and to prepare an Environment Management Plan (EMP) for mitigating possible adverse impacts and the Social Impact Assessment (SIA) study so carried out should form part of EIA and EMP report.

The public hearing for the proposed project was conducted by Gujarat Pollution Control Board (GPCB) on 29th April 2017 at Community Premises Centre (Samajvadi), opposite Tundra primary school, Tundra village, Mundra taluk, Kutch district, Gujarat, in the presence of Resident Additional Collector/Additional District Magistrate as per the Environmental Impact Assessment Notification dated 14th September, 2006. Based on the proceedings of the public hearing, the draft EIA and EMP report has been updated and finalized report is submitted for consideration for environmental clearance to the MoEF, New Delhi.

The proposed project will be completed within 36 months from the start of the construction activity at project site. The project construction start date will be decided after obtaining all the statutory clearances and tie up of the finance for the project. After receiving Environment Clearance from MOEF&CC, the necessary clearances such as Consent to Establishment (CTE) and Consent to Operate (CTO) from GPCB shall be obtained.

1.1 Need for the Social Impact Assessment (SIA) Study

As per the TOR point 6(III), the project proponent should carry out Social Impact Assessment (SIA) of the project as per the Office Memorandum no J-11013/25/2014-1A.I dated 11.08.2014 issued by the Ministry regarding

guidelines on Environment Sustainability and CSR related issues. The social impact assessment study so carried out should form part of EIA and EMP report;

Generic TOR point 4 (XI): Status of acquisition of Land. If acquisition is not complete stage of the acquisition process and expected time of complete possession of the land;

Generic TOR point 4 (XII): R&R details in respect of land in line with state Government policy;

Generic TOR point 6 (XI): Socio- Economic status of the study area;

General point (X): Include separately in EIA-EMP report in a separate chapter and summarized in a tabular chart with financial budget (capital and revenue) along with time schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the ministry for obtaining environmental clearance; and

Format for executive summary (XIII) CSR plan with proposed expenditure.

The proposed project site is located in Siracha and Navinal villages at APSEZ Mundra taluka, Kutch district in the state of Gujarat. The total area earmarked for the proposed project is 256.58 ha (634 acres), in which 154.19 ha (381 acres) of land belongs to APSEZ area and 102.39 ha (253 acres) of land belongs to forest area for promoting industrial development.

Adani group have been pioneers in corporate social responsibility and made significant contributions to improve quality of people's life in all the regions they operate in. In Gujarat, APSEZL and AEL have started key initiatives in support of sustainable development. The CSR activity aims at bettering the socio-economic and cultural status of local people. Presently, AEL has invested about Rs. 71.86 Crores in community initiatives for the last year (2010-2016) budget.

- **Community Relations**

The comprehensive aim of the Company is to enhance the living conditions of the communities in which operations are based. CSR activities by always gives prime importance to inclusive growth and equitable development of the community.

- **CSR Philosophy of the Company**

The CSR agenda is planned in consultation with the community through a systematic independent need based assessment, as well as through a Participatory Rural Appraisal (PRA). The inputs are then taken from an Advisory Committee, eminent personalities from the field and senior members from the CSR guiding wing of the company. The CSR agenda is subsequently deliberated upon and after careful consideration, then processed by good leadership. CSR initiatives of the company are also aligned with Sustainable Development Goals (SDGs).

AEL has formed a separate team of committed professionals under the CSR wing to propose, enact and to implement the growth oriented programmes in communities with their support and participation. Further to enable holistic development, the CSR team is working on a number of issues in each community and evaluation of the implemented CSR programmes have been undertaken simultaneously.

The CSR activity aims at bettering the socio-economic and cultural status of local people. The key highlights of some initiatives & activities that AEL is going to undertake at Mundra are:

Sustainable Livelihood Options & Women Empowerment

- Strengthening the community based organizations like self-help groups, farmer federation etc.;
- Capacity building of the underprivileged communities on various market driven skills;
- Establishment of forward & backward market linkages through networking;
- Facilitating the easy reach to the technical institutions for knowledge up gradation; and
- Promotion of livestock health management.

Education Initiatives

- Skill up-gradation through establishment of technical training institution;
- Infrastructural development in the form of school building, teaching & learning equipment and furniture & fixtures etc.;
- Quality teacher support;
- Scholarship for education excellence;
- Promotion of girl child education;
- Incorporation of extra-curricular activities;
- Holistic approach to the education through "Yoga & Art Of Living"; and
- Promotion of functional literacy.

Health Initiatives

- Addressing the mother & child health;
- Support to the nutritional program of mother, child & school goers;
- Control on blindness, malaria, T.B., HIV & AIDS, diarrhea etc.;
- Support the district health administration in the community health activities;
- Improvement of villages sanitation through solid-liquid waste management; and
- Knowledge enhancement on preventive health care.

Community Infrastructure & Facilities

- Enhancement of green coverage;
- Protection of wildlife through awareness generation;
- Promotion of renewal energy; and
- Waste management through installation of recycling measures.

The CSR activities are being executed in the villages falling under the following Grama Panchayat limits:

Sr. No.	Name of Village		Village Code	Name Panchayat
	2011 Census	General		
1	Tunda	Tunda & Vandh	507325	Tunda Juth
2	Shiracha	Shiracha	507326	Shiracha
3	Navinal	Navinal	507344	Navinal
4	Deshalpar	Deshalpar	507322	Deshalpar
5	Khakhar Moti	Moti Khakhar	507323	Khakhar Moti
6	Kandagara Mota	Mota Kandgra	507324	Kandgra Mota
7	Nani Bhujpar	Nana Bhujpar	507343	Mota Bhujpur Juth
8	Moti Bhujpar	Mota Bhujpar	507327	
9	Pratappar	Pratappar	507341	
10	Jarpara	Jarpara	507345	Jarpara
11	Borana	Borana	507340	Nana Kapaya
12	Dhrab	Dhrab	507346	Dhrab
13	Nani Khakhar	Nani Khakhar	507274	Nani Khakhar
14	Nana Bhadiya	Nana Bhadiya	507275	Nana Bhadiya
15	Mota Bhadiya	Mota Bhadiya	507285	Mota Bhadiya
16	Tragadi	Tragadi	507286	Tragadi

2.0 METHODOLOGICAL APPROACH OF THE STUDY

This part mainly deals with different methods and techniques which are adopted in carrying the study project. Further, it also reveals the gist of information about techniques and methods of the research plan right from beginning to the end.

- **Title of the Study**

Social Impact Assessment (SIA) for the proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone Land in villages Siracha and Navinal, Tehsil, Mundra, district Kutch, Gujarat.

- **Objectives of the Study**

The major objective of the study is to understand the socio-economic situation of the respondents within the project area and making a social impact assessment. Further the concentration of the study is based on following specific objectives such as:

1. To study the socio-demographic and economic background of the study population;
2. To understand the educational and health status of the respondents;
3. To study the conditions of employability and livelihood of the respondents;
4. To make an attempt to understand the resource assessment of the household of the respondents;
5. To assess the needs and priorities of the population, resided in the study area;
6. To reveal the information about the existing CSR activities from the respondents; and

7. To suggest remedies and measures for inclusion of all the stakeholders in the developmental spectrum of the setting.

- **Significance of the Study**

Copper application areas cover wide varieties of different disciplines like architectural, electrical, automotive, tube, pipe, fuel gas, industrial, marine and machine products which gives a great demand.

Copper is a strategic metal for development of industry in India. It is considered to be the third most important industrial metal next only to iron and aluminium. Combination of its excellent properties such as high electrical and thermal conductivity, high strength, malleability, easy workability, corrosion resistance and its ability to produce alloys with other metals in an attractive range of colours has made copper a strategic metal for the engineering industry. Specific applications of copper include power cables and wires, jelly filled cables, building wires, air conditioning and refrigeration tubing, telecom, power, construction, transportation, handicrafts, engineering, consumer durable, defence etc.

With Indian economy poised for growth, development in infrastructure and power sector will lead to demand of copper. Dedicated focus by Government of India and various state governments under "Make in India" is an additional driver for growth story of Indian manufacturing, which will further propel the requirement of copper within the country. Prior to setting up of the Greenfield copper refinery project at Mundra by the Company (M/s. Adani Enterprises Limited), the country is a net importer of Copper. Post setting up of the copper refinery plant by the Company, the country will be able to earn valuable foreign exchange and hence improves the Current Account Deficit. AEL proposes Greenfield copper refinery plant (1.0 MTPA), So the attempt has been made by the study agency to thoroughly understand the social, economic, geo-environmental situation in the opinion of respondents, thus making an attempt to propose the different kinds of need based programmes which can help in the development of the project affected population. Further, the study results are going to be used for the action planning of Corporate Social Responsibility (CSR) activities according to the need and priorities of the project area and also the study findings will be utilized in the direction of reducing socio-environmental and economic burdens. Hence, it is required to objectively assess the developmental needs of the local communities and to conduct a socio-economic baseline survey. The outcome of the socio economic assessment would serve as inputs in preparing a Corporate Social Responsibility (CSR) plan for the local population.

- **Nature and Scope of the Study**

The current study is predominantly dependent on the field experience, observation and opinion survey from the study area. The social experts and field investigators team has given opportunity to the concerned respondents to express both the advantage and disadvantage they have anticipated during the construction and operation of the copper refinery plant. Further, it is the duty of the company to consider general population view on developmental initiatives

before putting things into practice. The nature of the study is mainly sample based socio-economic assessment survey. Here each village, communities and random households are considered as the respondent therefore each response which was revealed by the respondent are unique in nature where the values of variables are representing the views of the group of family members. Hence, the study agency has taken keen interest to choose the population in all the stages beginning from the study till finalization of the study report. The present study will be of great help in understanding the socio-economic conditions of the population staying in the surroundings of copper refinery plant and other companies. In addition the study tries to assess the needs of the population in the study area. Lastly the findings of the study are beneficial for the future prospectus and policy making.

- **Focused Group Discussion (FGD)**

Focused Group Discussion (FGD) with village opinion leaders was undertaken to understand the overall scenario of the villages, including the aspirations and desires of the community. An effort was made to cover participants across caste, gender, income and age, so as to get a comprehensive and complete photograph of the area. In the FGD, major issues pertaining to health, nutrition, hygiene, livelihood, income generating activities, access to safe drinking water, education, road connectivity, banking facilities, health facilities, transport facilities, Drainage facilities, and infrastructure etc. were covered.

- **Survey of Village Infrastructure**

Visits were conducted to the Self-Help Groups, schools, anganwadi centers and health sub-centers in the project affected villages to collect detailed information about physical as well as social infrastructure, major areas of intervention required, and to identify specific resource gap prevalent in the institutions of these villages.

- **Public Consultation**

Community consultation is an internationally and nationally proved and implemented practice to build a rapport with host community i.e. the people who are to be affected by the project. This eventually acts as a deterrent towards the development of the project. Therefore, it is absolutely necessary to have consultation with the various stakeholders and project study area people from the planning stage of the project. Community consultation was carried out in this project to the extent possible in order to minimize probable adverse impact of the project on the project study area people which is useful during the stage of data analysis. The Community Consultation process was carried out with the following objectives:

- To ensure enhanced public cooperation due to creation of awareness about purpose and benefits of the project;
- The discussion with the community was through Participatory Rural Appraisal and Focus Group Discussion (FGD) techniques;

- To solicit the views of affected communities/ individuals on social, economic and environment components and the significance of impacts; and
- To serve as an important tool for collecting information about the natural and the human environments, much of which would never be accessible through more traditional approaches of data collection.

- **Technique used for Community Consultation**

Public Consultation and Disclosure was done in three villages Navinal, Shiracha and Tunda taking into account state and central guidelines. In line with those guidelines notice of disclosure meetings was put on the notice board of the Panchayat buildings and prominent places where people can meet like on the main tree trunk in the village. Moreover for this purpose Sarpanch was informed about the consultation process and permission was sought from each village. The project area people were informed while doing door to door survey to gather in a place decided mainly by the Sarpanch for consultation venue. Technique used for public consultation are discussed below:

- **Questionnaire Survey:** One to One Consultation.
- **Transect Walk:** Along the project boundary with professional from multidisciplinary team;
- **Group Consultations:** Social and gender group wise consultation;
- **On-site Rapid Consultation:** Interaction with village elders, sarpanch, community leaders;
- **PRA Technique:** Participatory Technique of appraisal for identification of problem and potential of project; and
- Communities meeting are playing a key role in consultation.

Level 1-Interaction with Community Groups: The interaction with community groups were conducted in three villages within the project site. The location wise consultations are presented in **Table–1.**

TABLE-1
LOCATION WISE COMMUNITY CONSULTATION

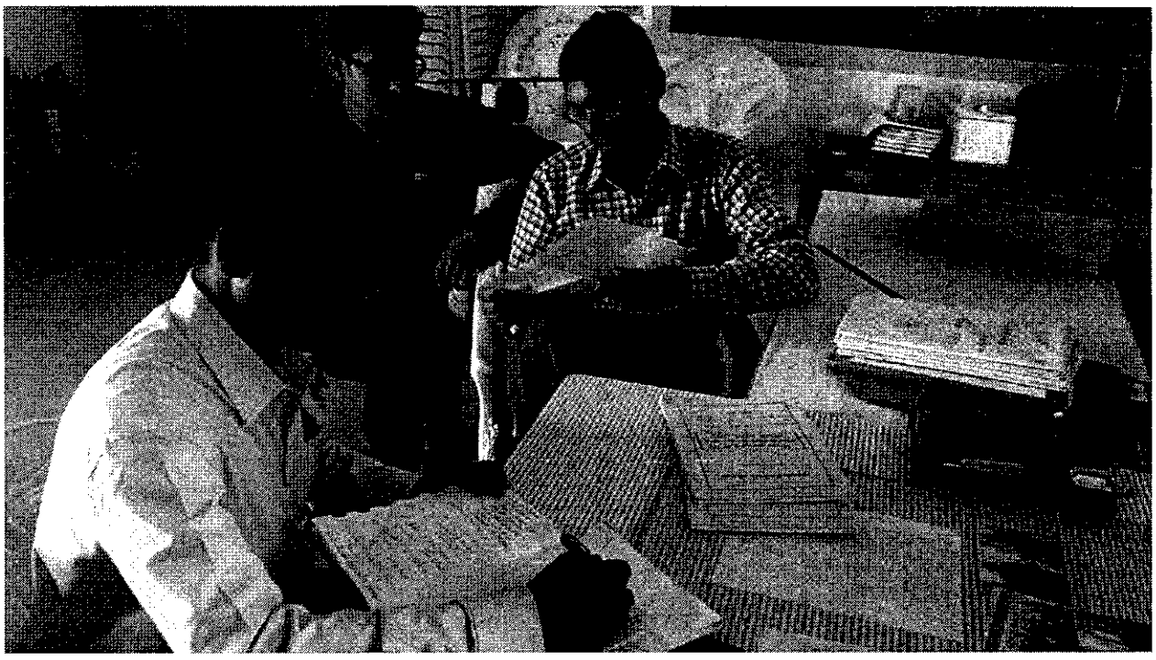
Sr. No.	Name of Village	Date of Consultation	No. of Person	Group Composition
1	Tragadi	11/07/2017	27	Village Sarpanch, Panchayat Members & Villagers, Agricultural & Non-agricultural Labourers, people of the village, Near Cement factory workers.

The focus group discussion in Tradadi village) is shown in **Photograph-1.**



PHOTOGRAPH-1
FOCUS GROUP DISCUSSION IN TRAGADI VILLAGE

Level 2- On-Site Rapid Consultation- On-site rapid consultation was also conducted at Kutch district villages locations throughout the study area villages. The discussions were conducted with the community groups (women and vulnerable groups) in an informal manner. The general conversation and discussion evolved around their social and cultural practices. The basic objective of this type of interaction was to develop a perspective on the quality of life of the people and their general practices. The interaction with asst incharge of Nana Badiya Govt. primary school is shown in **Photograph-2.**



PHOTOGRAPH-2
ON-SITE RAPID CONSULTATION IN NANA BADIYA VILLAGE

- **Analysis of Data**

The following procedure was adopted for the content analysis of the qualitative data.

- Separating: The responses to a particular question were listed to obtain the range of responses for all open-ended questions. The responses that were considered irrelevant under a specific question were moved under the appropriate question for analysis. During this process, important statements were extracted for use in the report as reference material;

- Screening: In the final screening, for every open-ended question, responses were coded according to the domains. Some responses could be placed under more than one domain as a range of views were stated in a single sentence. After scrutiny, the responses found to be irrelevant were discarded; and

- Summarizing: Similar information sought from different stakeholders was triangulated to arrive at a conclusion. The results were then summarized for each issue separately.

- **Study Design**

The design used for the present study is descriptive in nature. The study agency aims to present the information of the study area as it is and in a describing manner, with no intervention made by the project proponent. Hence, the applied design is descriptive design which is apt for the present study. Descriptive research is a study designed to represent the participants in an accurate way. The three main ways to collect this information are: Observational, defined as a method of viewing and recording the participants. Case study, defined as questionnaire interview study of an individual or group of individuals. The sample questionnaire is given in **Annexure-1**, village profile is given in **Annexure-2**.

- **Sample Size and Technique**

With the help of officially published statistical data from Gujarat and Census of India 2011 data, the research agency has chosen sixteen (16) villages on sample basis which comes under the study area. Out of these villages equal importance has been given to choose the sample size in proportionate to the size of household and population size in each village on the basis of proportionate random sampling design. From the sixteen villages the research agency has officially identified thirteen thousand one hundred ninety three (13193) households in which some of the villages have large population as well as households and in other villages both population and households are scattered. Further, the study agency has randomly selected the proportionate number of villages at the rate of five percent (5%) of the total number of villages. With the help of percentage criteria the research agency had chosen 5 selected villages. Out of 16 villages 12 villages are falling Mundra Tahsil and 4 villages are falling in Mandvi tehsil Kutch district of Gujarat state. The village wise population details are given in **Table-2.**

TABLE-2
VILLAGE WISE POPULATION DETAILS

Sr. No.	Name of Village	No. of HHs	Total Male	Total Female	Total Population	SC Population	ST Population	Total Literates	Total Workers	Non Workers
0-3 km Mundra tehsil, Kutch district, Gujarat										
1	Tunda	3134	11261	1210	12471	109	7	10135	11096	1375
2	Shiracha	429	1171	708	1879	323	11	1298	873	1006
3	Navinal	602	2406	694	3100	261	0	2387	2125	975
	Sub Total	**4165**	**14838**	**2612**	**17450**	**693**	**18**	**13820**	**14094**	**3356**
3-7 km Mundra tehsil, Kutch district, Gujarat										
4	Deshalpar	584	1350	1261	2611	444	232	1609	923	1688
5	Khakhar Moti	436	1101	1038	2139	395	114	1337	807	1332
6	Kandagara Mota	1015	2729	1732	4461	356	113	3128	2374	2087
7	Nani Bhujpar	210	551	505	1056	298	9	601	355	701
8	Jarpara	1506	3872	3480	7352	830	6	4092	3314	4038
	Sub Total	**3751**	**9603**	**8016**	**17619**	**2323**	**474**	**10767**	**7773**	**9846**
7-10 km Mundra tehsil, Kutch district, Gujarat										
9	Moti Bhujpar	1979	4777	4501	9278	1196	106	6015	3254	6024
10	Borana	79	185	192	377	5	0	219	117	260
11	Pratappar (1)	48	136	132	268	26	0	158	74	194
12	Dhrab	629	2031	1250	3281	146	27	2050	1521	1760
Mandvi tehsil, Kutch district, Gujarat										
13	Nani Khakhar	691	1758	1654	3412	606	154	2280	1438	1974
14	Nana Bhadiya	1011	3805	513	4318	395	0	3177	3662	656
15	Mota Bhadiya	624	1669	1615	3284	493	0	1867	1597	1687
16	Tragadi	216	636	602	1238	0	0	573	582	656
	Sub Total	**5277**	**14997**	**10459**	**25456**	**2867**	**287**	**16339**	**12245**	**13211**
	Grand Total	**13193**	**39438**	**21087**	**60525**	**5883**	**779**	**40926**	**34112**	**26413**
Source: Census of India 2011										

- **Tools of Data Collection**

The study is mainly dependent on field data which is considered as first hand or primary information. Hence, it is very essential to seek the information from the respondents for formulating further programs and activities on the basis of their needs. The research agency has utilized the structured interview schedule as tool according to the objectives. Further, the interview schedule had been classified under different sub-parts such as socio-demographic and economic details, household details, educational and health status, information on employability and livelihood, environmental issues and finally existing CSR activities along with the need assessment as the major areas of the interview schedule. The schedule also provided enormous space for the field investigators to record their observations in the process of data collection hence giving a wider scope for qualitative data analysis.

- **Sources of Data Collection**

In any empirical research study it may not be possible to bring all the needed information together with the help of either primary or secondary information itself. Hence, the study agency has inculcated both the primary as well as the secondary sources for the preparation of final research report. But, the study was predominated in terms of empirical in its nature and the primary source has been largely materialized throughout the research and the secondary information has also been used according to the need and relevance of the study. The tools which are used for the collection of primary information were self-structured interview schedule, participatory observation methods, Focus Group Discussion (FGD) and the field experiences of the investigators. In secondary data different sources such as e-sources, census data, district gazetteers and other text books were used for preparation of the report.

- **Ground Truth Collection**

The available secondary data, census of India 2011, land use and demography published data was available from April 2014. As a part in primary survey detailed field observations and investigations were carried out and the differences from secondary data to present conditions of villages of study area is verified for ground truth collection. Both topographic sheets and satellite imagery were taken for field verification and a transverse plan using existing road network was made to cover as many representative sample areas as possible to observe the broad land use features and to adjust the sample areas according to field conditions. As per village administrative atlas Gujarat 2011 census, the villages more than 50% covered 9 to 10 km of the study area the total village land was considered in secondary data, the water bodies' stream/river/tank/reservoir lands were not in counted in secondary data land use classification. So there is difference in primary and secondary land use data. The village wise land use classification is very useful to conduct CSR activities in the project study area. Detailed field observations and investigations were carried out and noted the land use features on the study area. The village wise revenue data was verified with village revenue officers (VROs).

3.0 ANALYSIS AND INTERPRETATION OF DATA

The empirical information collected from the study area was systematically edited and verified on day to day basis then the information was coded, classified and entered into the excel sheets. Further data was compiled into tables by using the excel software in simple percentile manner so as to be understood by the readers easily. The analyzed data were interpreted in accordance to the objectives of the study and inferences were drawn to reach the logical conclusion.

Land Use Studies

Studies on land use aspects of eco-system play important roles for identifying sensitive issues, if any, and taking appropriate actions for maintaining the ecological balance in the development of the region.

Objectives

The objectives of land use studies are:

- To determine the present land use pattern;
- To analyze the impacts on land use due to plant activities in the study area; and
- To give recommendations for optimizing the future land use pattern vis-a-vis growth of plant activities in the study area and its associated impact

Methodology

For the study of land use, literature review of various secondary sources such as District Census Handbooks, regional maps regarding topography, zoning settlement, industry, forest etc., were taken. The data was collected from various sources like district census handbook, revenue records, state and central government offices and Survey of India (SOI) topographic sheets and also through primary field surveys.

Land use Based on Secondary Data

Based on the census report, 10 km radial distance around this copper refinery plant boundary has been considered in the study. These areas were studied in detail to get the idea of land use pattern in the study area. The land use census data 2011 is presented in **Table-3.** The village wise land use data is presented in **Annexure-3**.

TABLE-3
LAND USE PATTERN IN THE STUDY AREA

Sr. No.	Particulars of Land use (in Hectares)	0-3 km	3-7 km	7-10 km	0-10 km	(%)
1	Forest Area	0.00	35.64	58.76	94.40	0.38
2	**Land under Cultivation**					
	a) Irrigation Land	132.05	1691.22	945.63	2768.90	11.17
	b) Un Irrigated Land	1509.84	3301.63	5191.63	10003.10	40.34

Sr. No.	Particulars of Land use (in Hectares)	0-3 km	3-7 km	7-10 km	0-10 km	(%)
	c) Land Under Miscellaneous Tree Crops etc. Area	0.00	0.00	12.27	12.27	0.05
3	**Area not Available for Cultivation**					
	a)Area under Non-Agricultural Uses	1266.10	733.60	816.46	2816.16	11.36
	b)Barren & Un-cultivable Land Area	660.15	1412.87	3085.23	5158.25	20.80
	c)Permanent Pastures and Other Grazing Land Area	444.03	673.79	434.58	1552.40	6.26
4	Fallows Land other than Current Fallows Area	0.00	216.23	193.07	409.30	1.65
5	Current Fallows Area	0.00	0.00	0.00	0.00	0.00
6	Cultivable Waste Land Area	17.10	1832.78	133.99	1983.87	8.00
Total Geographical Area		**4029.27**	**9897.76**	**10871.62**	**24798.65**	**100.00**

Source: Census of India -2011

- ***Forest Land***

  Forest land means land of any description falling with in any area and includes unclassified forests, un-demarcated forests, existing or deemed forests, protected forests, reserved forests, sanctuaries and national parks. The revenue forest land under the study area consists 94.40 ha (0.38%) of the total geographic area.

- ***Land under Cultivation***

  Altogether 12,784.27 ha cultivable land (irrigated, un-irrigated and land under miscellaneous tree crops etc.) was observed in the study area. The irrigated land admeasures to about 2768.90 ha in the study area which works out to be 11.17% of total study area. The un-irrigated land admeasures about 10003.10 ha and works out to about 40.34 % of the total study area. Land under miscellaneous tree crops area admeasures to about 12.27 ha and works out 0.05% of the total study area.

- ***Land not available for Cultivation***

  The land not available for cultivation is 38.42% of the total study area, which includes area of land with scrub, land without scrub, permanent pastures, quarry, mining area, rocky/ stony and barren area.

- ***Cultivable Waste Land***

  All lands available for cultivation whether not taken up for cultivation or taken up for cultivation once but not cultivated during the current year and the last five years or more in succession for one reason or the other. Such lands may be either wholly or partly covered with shrubs and jungles, which are not put to any use. Land once cultivated but not cultivated for five years in succession are also included in this category. The study area comprises about 8.00 % cultivable wastelands.

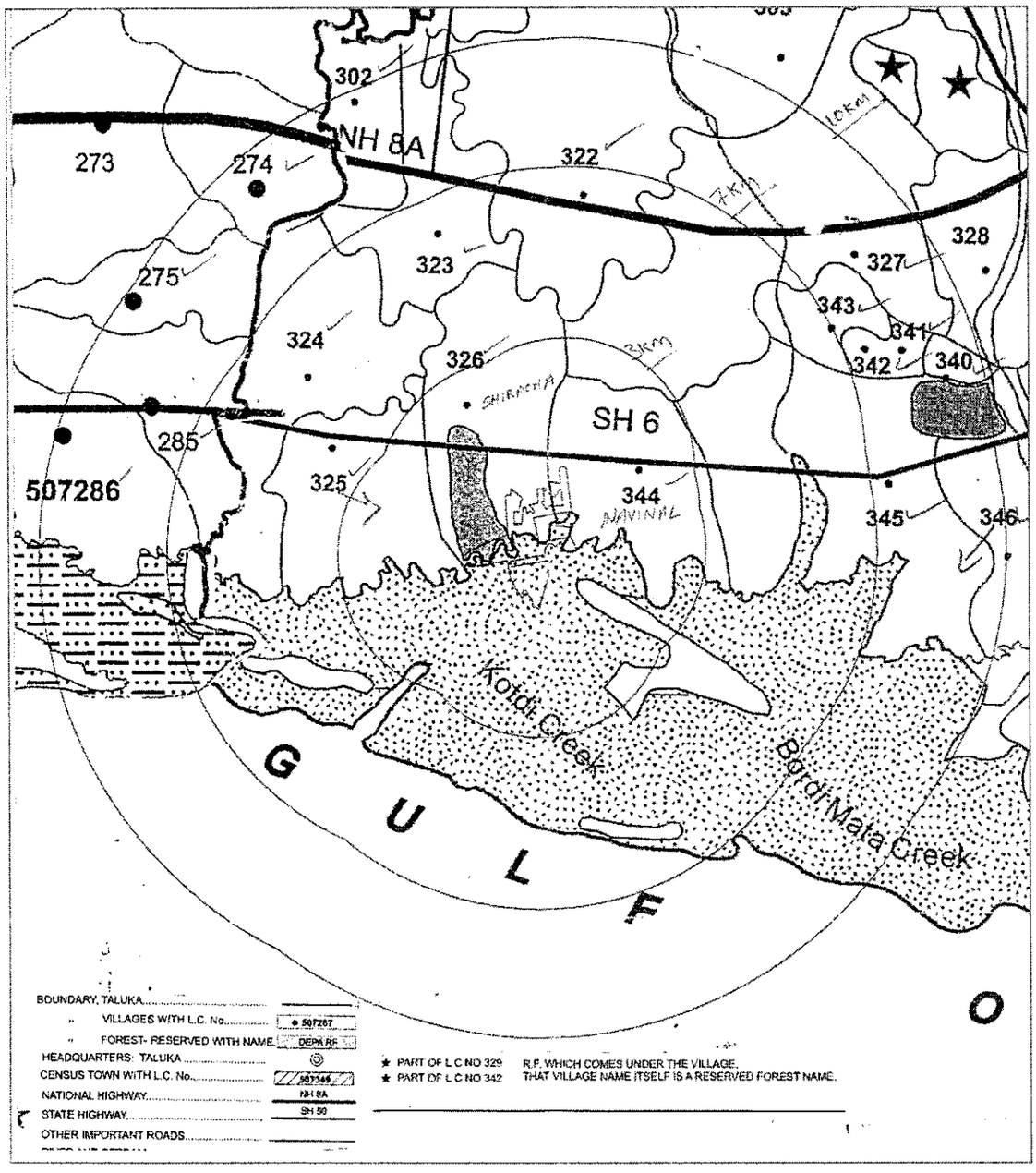


FIGURE-1
VILLAGE ADMINISTRATIVE MAP

- ***Fallows Land other than Current Fallows Land***

  This includes all land which was taken up for cultivation but is temporarily out of Cultivation for a period of not less than one year and not more than five years. The fallows land is 1.65% in the study area.

- ***Sea Area***

  As per the survey of India topographic sheets and village administrative atlas Gujarat More than 25% of the study area is Arabian Sea (Gulf of Kutch).

The land use break up based on satellite imagery data is given in **Table-4.**

TABLE-4
LANDUSE BREAK UP BASED ON IRS RS-2 LISS IV FX DATA

Sr. No.	Level I	Level II	Area (Hectares)	Area (%)
1.0	**Built-up Land**		**2,103.27**	**5.08**
1.1		Settlements	593.00	1.43
1.2		Industry/Institutional Land	1,417.96	3.43
1.3		New Development/Layout	92.31	0.22
2.0	**Forest**		**837.62**	**2.02**
2.1		Deciduous/Tropical Forest	378.40	0.91
2.2		Degraded Scrub	29.98	0.07
2.3		Forest Blank	402.24	0.97
2.4		Forest Plantation - In/Outside Forest	27.00	0.07
3.0	**Agricultural Land**		**15,484.69**	**37.41**
3.1		Plantation	1,505.14	3.64
3.2		Double Crop/Irrigated Land	4,059.16	9.81
3.3		Other Agriculture Land	7,634.76	18.44
3.4		Fallow Land	2,285.63	5.52
4.0	**Waste Land**		**5,620.36**	**13.58**
4.1		Land with Scrub	4,719.45	11.40
4.2		Land without Scrub	728.80	1.76
4.3		Rocky/Stony/Barren Land	91.72	0.22
4.4		Quarry/Mining Land/Dumps	80.39	0.19
5.0	**Water Body**		**9,366.30**	**22.63**
5.1		Stream/River/Tank/Reservoir/Pond/Lake	1,156.92	2.79
5.3		Creek	466.62	1.13
5.4		Bay (Gulf of Kuchchh)	7,742.76	18.71
6.0	**Wetland**		**4,469.36**	**10.80**
6.1		Mudflat/tidal flat	3,217.62	7.78
6.2		Mangrove	1,251.74	3.02
7.0	**Others**		**3,512.17**	**8.48**
7.1		Reclaimed/Level Raised Land	2,870.68	6.94
7.3		Salt Pans	266.27	0.64
7.4		Salt Pans (Abandoned)	105.15	0.25
7.5		Sandy Area	270.07	0.65
Total			**41,393.77**	**100.00**

Source: Satellite Imagery

Demography and Socio-Economics

The demographic and socio- economic conditions prevailing in the proposed copper refinery project of study area at Siracha and Navinal villages in Mundra tehsil and Mandvi tehsil in Kutch district of Gujarat" is analyzed. The socio-economic data forms the basis for developing a suitable enterprise social responsibility plan to address the needs of the population.

The project proponent is committed to take up the socio-economic development initiatives not only to minimize the negative impact on the population and also to improve the socio-economic status of population living in the block of the area as its sustained effort as part of corporate social responsibility.

Review of Demographic and Socio-Economic Profile-2011

The village wise demographic data of 16 villages falling within the study area as per the 2011 census is given in **Annexure-4**. Some of the area is creek area along with sea in the study area. The salient features of the demographic and socio-economic conditions are analyzed and described in the following sections.

Demography

Distribution of Population

As per 2011 census, the study area consisted of 60,525 persons inhabited in study area. The distribution of population in the study area is shown in **Table-5.**

TABLE-5
DISTRIBUTION OF POPULATION

Particulars	0-3 km	3-7 km	7-10 km	0-10 km
No. of Households	4165	3751	5277	13,193
Male Population	14838	9603	14997	39,438
Female Population	2612	8016	10459	21,087
Total Population	17450	17619	25456	60,525
Male Population (0-6 years)	469	1350	1725	3544
Female Population (0-6 years)	434	1300	1681	3415
Total Population (0-6 years)	903	2650	3406	6959
% of 0-6 years population	5.17	15.04	13.38	11.50
Average Household Size	4.19	4.70	4.82	4.59
% of males to the total population	85.03	54.50	58.91	65.16
% of females to the total population	14.97	45.50	41.09	34.84
Sex Ratio (no of females per 1000 males)	176	835	697	535
Child Sex Ratio (no of females per 1000 males (0-6 years)	925	963	974	964
Density	433	178	234	244

Source: Census of India 2011

- **Average Household Size**

The study area has a household size of 4.59 as per 2011 census.

Sex Ratio

The configuration of male and female indicates that the males constitute to about 65.16% and females to 34.84% of the total population as per 2011 census records. The study area on an average has 535 females per 1000 males as per 2011 census reports. In comparison to the district sex ratio (Kutch 908) the study area has recorded lowest sex ratio. The reason for lowest sex ratio is the study area is male migrants are more in the study area, who came for employment. The work participation rate in the study area 0-3 km is 80.77% which is more than the district (Kutch district work participation rate 37.1%).

Child Sex Ratio

The study area child sex ratio is 964 females for 1000 males in the study area. In comparison adult sex ratio to child sex ratio is more in the study area.

Social Structure

In the study area, as per 2011 census, 9.72% of the population belongs to Scheduled Castes (SC) and 1.29% to Scheduled Tribes (ST). Overall the data of social stratification reveals that the SC and ST % to population is more than 11%. In comparison to the study area proportion of SC population is less than in the district (Kutch district proportion of SC population 12.4%, proportion of ST population 1.2%)

The SC and ST community are marginalized and they are at considered at low level of social strata and calls for a special attention in Social Impact Management Plan for improving their socio-economic status apart from preservation and protection of their art, culture and traditional rights of livelihood.

The distribution of population by social structure is shown in **Table-6.**

TABLE-6
DISTRIBUTION OF POPULATION BY SOCIAL STRUCTURE

Particulars	0-3 km	3-7 km	7-10 km	0-10 km
Schedule caste population	693	2323	2867	5883
Schedule Tribes population	18	474	287	779
Schedule caste (SC) population % to the total population	3.97	13.18	11.26	9.72
Schedule Tribes (ST) population % to the total population	0.10	2.69	1.13	1.29
Total SC and ST population	711	2797	3154	6662
% To the total SC and ST population	4.07	15.87	12.39	11.01
Total population	17450	17619	25456	60525

Source: Census of India 2011

Literacy Levels

The data of study area reveals that literacy rate of 76.40% as per 2011 census, which is found to be more than the district rate of literacy (Kutch 60.9%). The distribution of literate and literacy rate in the study area is given in **Table-7.**

TABLE-7
DISTRIBUTION OF LITERATE AND LITERACY RATES

Particulars	0-3 km	3-7 km	7-10 km	0-10 km
Male Population	14838	9603	14997	39438
Female Population	2612	8016	10459	21087
Total Population	17450	17619	25456	60525
Male Population (0-6 years)	469	1350	1725	3544
Female Population (0-6 years)	434	1300	1681	3415
Total Population (0-6 years)	903	2650	3406	6959
Total Population above 7 years	16547	14969	22050	53566
Male literates (7+ years)	12532	6780	10736	30048
Female literates (7+ Years)	1288	3987	5603	10878
Total literates (7+ Years)	13820	10767	16339	40926
Male literacy rate (%) to the total literates	90.68	62.97	65.71	73.42
Female literacy rate (%) to the total literates	9.32	37.03	34.29	26.58
Average Male Literacy to the total population (%)	75.74	45.29	48.69	56.10
Average female Literacy to the total population (%)	7.78	26.64	25.41	20.31
Total Literacy rate (%) to the total population	83.52	71.93	74.10	76.40

Source: Census of India 2011

The percentage of male literates to the total literates of the study area works out to be 73.42%. The percentage of female literates to the total literates, which is an important indicator for social change, is observed to be 26.58% in the study area as per 2011 census records.

Occupational Structure

The occupational structure of residents of work participation rate in the study area is studied with reference to main workers, marginal workers and non-workers. The main workers include 10 categories of workers defined by the Census Department consisting of cultivators, agricultural laborers, those engaged in live-stock, forestry, fishing, mining and quarrying; manufacturing, processing and repairs in household industry; and other than household industry, construction, trade and commerce, transport and communication and other services.

The marginal workers are those workers engaged in some work for a period of less than six months during the reference year prior to the census survey. The non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beggars, vagrants etc.; institutional inmates or all other non-workers who do not fall under the above categories.

Total work participation in the project study areas is 56.36% and the non-workers constitute 43.64% of the total population respectively. The work participation rate in the study area is more than the district (Kutch district work participation rate 37.1%). The main workers to the total workers are 90.57% and the marginal workers constitute to 9.43% to the total workers. The occupational structure of the study area is shown in **Table-8.**

TABLE-8
OCCUPATIONAL STRUCTURE

Particulars	0-3 km	3-7 km	7-10 km	0-10 km
Total Population	17450	17619	25456	60525
Total workers	14094	7773	12245	34112
Total main workers	13173	6722	11000	30895
Total Marginal workers	921	1051	1245	3217
Total Non-workers	3356	9846	13211	26413
Work participation rate (%)	80.77	44.12	48.10	56.36
% of main workers to total workers	93.47	86.48	89.83	90.57
% of marginal workers to total workers	6.53	13.52	10.17	9.43
% of non-workers to total population	19.23	55.88	51.90	43.64

Source: Census of India 2011

TABLE-8 (A)
OCCUPATIONAL STRUCTURE

Particulars' of Work Participation	0-3 km	3-7 km	7-10 km	0-10 km	Percentage %
Total workers	14094	7773	12245	34112	100
Main workers Total	13173	6722	11000	30895	100
Main workers Cultivators	169	1592	1468	3229	10.45
Main workers Agricultural Laborers	156	1584	1894	3634	11.76
Main workers Household Industry Workers	16	22	159	197	0.64
Main workers Other Workers	12832	3524	7479	23835	77.15
Marginal workers Total	921	1051	1245	3217	100
Marginal workers Cultivators	0	53	288	341	10.60
Marginal workers Agricultural Laborers	10	562	398	970	30.15
Marginal workers Household Industry Workers	1	20	135	156	4.85
Marginal workers Other Workers	910	416	424	1750	54.40
Marginal workers Other Workers 3 - 6 months Total	764	938	1104	2806	100
Marginal workers Cultivators 3 - 6 months	0	43	229	272	9.69
Marginal workers Agricultural Laborers 3 - 6 months	5	547	350	902	32.15
Marginal workers Household Industry Workers 3 - 6 months	1	19	126	146	5.20
Marginal workers Other Workers 3 to 6 months	758	329	399	1486	52.96
Marginal workers Other Workers 0-3 months Total	157	113	141	411	100
Marginal workers Cultivators 0-3 months	0	10	59	69	16.79
Marginal workers Agricultural Laborers 0-3 months	5	15	48	68	16.55
Marginal workers Household Industry Workers 0-3 months	0	1	9	10	2.43
Marginal workers Other Workers 0-3 months	152	87	25	264	64.23

Main Workers: As per Census of India, all persons engaged in 'work' defined as participation in any economically productive activity with or without compensation, wages or profit are workers. Those workers who had worked for the major part of the reference period (i.e. 6 months or more) are termed as Main Workers.

Marginal Workers: Marginal workers were those who worked any time at all in the year preceding the enumeration but did not work for a major part of the year, i.e., those who worked for less than 183 days (or six months).

Cultivators: A person is classified as cultivator if he or she is engaged in cultivation of land owned or held from Government or held from private persons or institutions for payment in money, kind or share. Cultivation includes effective supervision or direction in cultivation. A person who has given out her/his land to another person or persons or institution(s) for cultivation for money, kind or share of crop and who does not even supervise or direct cultivation of land, is not treated as cultivator. Similarly, a person working on another person's land for wages in cash or kind or a combination of both (agricultural labourer) is not treated as cultivator. Cultivation involves ploughing, sowing, harvesting and production of cereals and millet crops such as wheat, paddy, jowar, bajra, ragi, etc., and other crops such as sugarcane, tobacco, ground-nuts, tapioca, etc., and pulses, raw jute and kindred fibre crop, cotton, cinchona and other medicinal plants, fruit growing, vegetable growing or keeping orchards or groves, etc. Cultivation does not include the following plantation crops - tea, coffee, rubber, coconut and betel-nuts (areca).

Agricultural Laborers: A person who works on another person's land for wages in money or kind or share is regarded as an agricultural labourer. She or he has no risk in the cultivation, but merely works on another person's land for wages. An agricultural labourer has no right of lease or contract on land on which She/he works.

Household Industry Workers: Household Industry is defined as an industry conducted by one or more members of the household at home or within the village in rural areas and only within the precincts of the house where the household lives in urban areas. The larger proportion of workers in the household industry consists of members of the household. The industry is not run on the scale of a registered factory which would qualify or has to be registered under the Indian Factories Act. The main criterion of a Household industry even in urban areas is the participation of one or more members of a household. Even if the industry is not actually located at home in rural areas there is a greater possibility of the members of the household participating even if it is located anywhere within the village limits. In the urban areas, where organized industry takes greater prominence, the household industry is confined to the precincts of the house where the participants live. In urban areas, even if the members of the household run an industry by themselves but at a place away from the precincts of their home, it is not considered as a Household Industry. It should be located within the precincts of the house where the members live in the case of urban areas. Household Industry relates to production, processing, servicing, repairing or making and selling (but not merely selling) of goods. It does not include professions such as a Pleader, Doctor, Musician, Dancer, Waterman, Astrologer, Dhobi, Barber, etc., or merely trade or business, even if such professions, trade or services are run at home by members of the household. Some of the typical industries that can be conducted on a household industry basis are:Foodstuffs : such as production of floor, fisher folk, milking or dehusking of paddy, grinding

of herbs, production of pickles, preservation of meat etc. Beverages: such as manufacture of country liquor, ice cream, soda water etc., Tobacco Products : such as bidi, cigars, textile cotton, Jute, Wool or Silk, Manufacture of Wood and Wood Products, Paper and Paper Products, Leather and Leather Products, Petroleum and Coal Products : such as making foot wear from torn tyres and other rubber footwear, Chemical and Chemical Products :such as manufacture of toys, paints, colours, matches, fireworks, perfumes, ink etc., Service and Repairing of Transport Equipments : such as cycle, rickshaw, boat or animal driven carts etc.

Other Workers: The type of workers that come under this category of 'OW' include all government servants, municipal employees, teachers, factory workers, mining, plantation workers, those engaged in trade, commerce, business, transport, banking, construction, political or social work, priests, entertainment artists, etc. In effect, all those workers other than cultivators or agricultural labourers or household industry workers, are 'Other Workers'.

The study area main workers classification is 11.76% of agricultural laborers, 77.15% of other workers, 10.45% of cultivators and 0.64% of household industry workers. The Other Workers is predominant population and Agricultural Laborers are second dominant population. It was observed in primary survey 77.15% of other workers are mostly employed in study area power plants, factories as a factory workers, port, and plantation workers, those engaged in trade, commerce, business and transport.

The study area marginal workers classification is 32.15% of agricultural laborers, 52.96% of Other Workers, 9.69% of Cultivators and 5.20% of Household Industry Workers. The agricultural laborer is predominant population and other workers are second dominant population. It was observed in primary survey 16.55% of other workers are mostly employed in study area power plants as a factory workers, port, plantation workers, those engaged in trade, commerce, business and transport.

The infrastructure and amenities of the proposed Copper Refinery Project Study Area

The infrastructure and amenities of the proposed copper smelter project study area Mundra, Mandvi tehsils in Kutch district of Gujarat" is analyzed. It is observed that infrastructure facilities like education, communication and electrical facilities are moderate and health care and drinking water facilities are poor in the project study area.

A review of infrastructure facilities available in the area has been done based on primary survey available secondary data published in Kutch district primary census abstract, 16 villages are considered for data analysis and assessment within the study area.

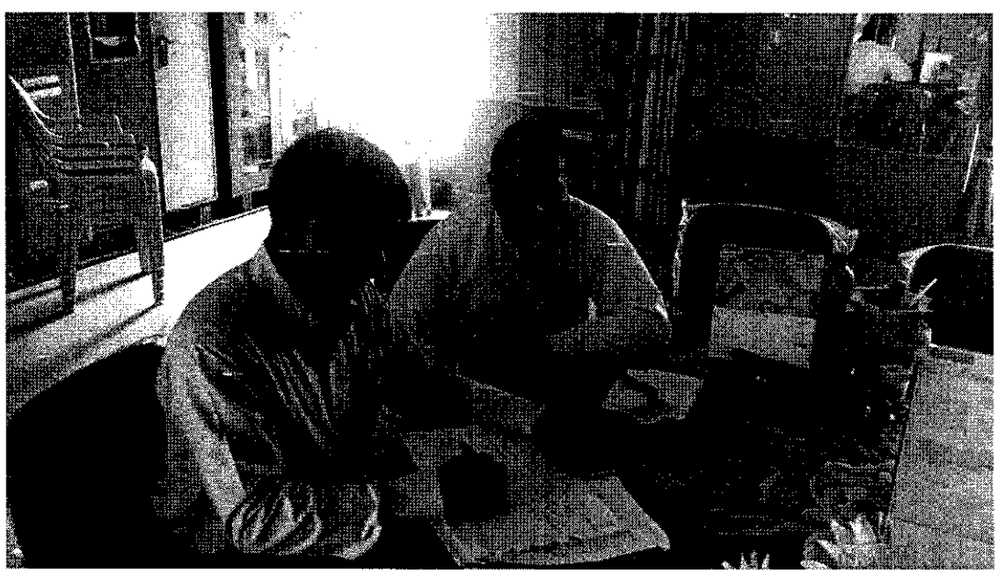
Educational Facilities

The educational facilities are found to be moderate in the proposed copper refinery project study area. There are 39 government primary schools, 05 government secondary schools, 01 private secondary school, 01 government senior secondary school, 01 private senior secondary school are available. There are no private primary schools, government middle schools, private middle schools, government and private arts and science degree colleges, government and private engineering collages in the study area. The available educational facilities in the study area are given in **Table-9** and **Annexure.5.**

TABLE-9
EDUCATIONAL FACILITIES IN THE STUDY AREA

Sr. No.	Institution	0-3 km	3-7 km	7-10 km	0-10 km
1	Govt. Primary School (Numbers)	4	14	21	39
2	Private Primary School (Numbers)	0	0	0	0
3	Govt. Middle School (Numbers)	0	0	0	0
4	Private Middle School (Numbers)	0	0	0	0
5	Govt Secondary School (Numbers)	1	3	1	5
6	Private Secondary School (Numbers)	0	0	1	1
7	Govt Senior Secondary School (Numbers)	0	0	1	1
8	Private Senior Secondary School (Numbers)	0	0	1	1
9	Govt Arts and Science Degree College (Numbers)	0	0	0	0
10	Private Arts and Science Degree College (Numbers)	0	0	0	0
11	Govt Engineering College (Numbers)	0	0	0	0
12	Private Engineering College (Numbers)	0	0	0	0

Source: Census of India 2011



PHOTOGRAPH-3
INTERACTION WITH HEAD MASTER AT KHAKHAR MOTI GOVT MIDDLE SCHOOL MUNDRA TALUK

Health Facilities in the Study Area

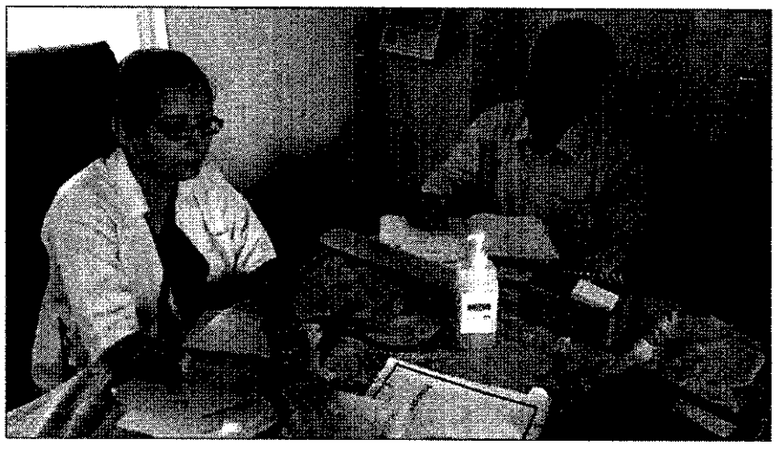
The national norm for population coverage per sub-center is 3000 for tribal areas and 5,000 for plain areas. Similarly, it is recommended to have a Primary Health Centre (PHCs) for population of 20,000 to 30,000 and CHC (community Health Center) for population in the range 80,000 to 1, 20,000. The number of PHCs served by a CHC is yet another indicator by which the physical accessibility can be judged. As per national norms, 1 PHCs should be served by one CHC.

The types of health facilities available in the study area include, 01 primary health center, 05 primary health sub centers, 03 Maternity and child welfare center, 01 dispensary are available overall 16 villages in the study area. The community health centers, TB clinics, allopathic hospitals, hospital alternative medicine, veterinary hospitals, mobile health clinic and family welfare centers, community health centers are nil as per census 2011, the health facilities are found to be poor in the study area. The available Health facilities in the study area are given in **Table-10** and **Annexure-6**.

TABLE- 10
HEALTH FACILITIES IN THE RURAL VILLAGES OF THE STUDY AREA

Sr. No	Institution	0-3 km	3-7 km	7-10 km	0-10 km
1	Community Health Centre (Numbers	0	0	0	0
2	Primary Health Centre (Numbers)	0	0	1	1
3	Primary Health Sub Centre (Numbers)	0	3	2	5
4	Maternity And Child Welfare Centre (Numbers)	0	2	1	3
5	TB Clinic (Numbers)	0	0	0	0
6	Hospital Allopathic (Numbers)	0	0	0	0
7	Hospital Alternative Medicine (Numbers)	0	0	0	0
8	Dispensary (Numbers)	0	1	0	1
9	Veterinary Hospital (Numbers)	0	0	0	0
10	Mobile Health Clinic (Numbers)	0	0	0	0
11	Family Welfare Centre (Numbers)	0	0	0	0

Source: Census of India 2011



PHOTOGRAPH-4
INTERACTION WITH DR. JAHNAVI BAMS AT PHC KANDAGARAMOTA

Drinking Water Facility in the Study Area

One of the most important factors responsible for the emergence of a settlement is availability of water. Many water sources such as wells, tube well, tank etc. are available in rural areas. In the villages under study, the main source of water is tank, followed by tap. The water from the ponds is generally not used by the villagers except for bathing animals.

Major source of water in the study area are un-treated tap water and tube wells/borehole.

16 villages are covered in the total Study area; the drinking water facilities are found to be poor in the proposed copper smelter project area. Tap-water treated source is not available in the study area as per the census 2011. All villages are having untreated sources, 05 villages are having covered well sources, 13 villages are having tube wells/borehole sources, 06 villages are having Tank/Pond/Lake sources, 01village is having river/canal source. The list of village wise available drinking water sources in the study area is given in **Table-11** and **Annexure7.**

TABLE-11
DRINKING WATER FACILITY IN THE RURAL VILLAGES OF THE STUDY AREA

Sr. No	Source of Drinking Water source (Availability of number of villages)	0-3 km	3-7 km	7-10 km	0-10 km
1	Tap Water-Treated	0	0	0	0
2	Tap Water Untreated	3	5	8	16
3	Covered Well	1	2	2	5
4	Uncovered Well	0	0	0	0
5	Hand Pump	0	0	0	0
6	Tube Wells/Borehole	3	5	5	13
7	Spring	0	0	0	0
8	River/Canal	0	1	0	1
9	Tank/Pond/Lake	0	2	4	6
10	Others	0	0	1	1

Source: Census of India 2011

Communication and Transport

Transport is an important part of India's economy but it is poor in comparison with international standards. Since the economic liberalization of the 1990s, infrastructure development has progressed rapidly; today there is a variety of modes of transport by land, water and air. However, India's relatively low GDP per capita has meant that access to transport has not been uniform. Public transport remains the primary mode of transport for most of the livelihood India. Buses take up over 90% of public transport in Indian cities and serve as a cheap and convenient mode of transport for all classes of society. Services are mostly run by state government owned transport corporations. Taxis can either be hailed or hired from taxi-stands. Indian Railways provides an important mode of transport in India, transporting over 18 million passengers and more than 2 million tonnes of freight daily across one of the largest and busiest rail networks in the world.

In the study area 16 villages, 11 villages are having are having sub post office services, all villages are having land line facilities, 14 villages are having Public Call Office /Mobile (PCO), all villages are having mobile phone network courage, all villages are having Internet Cafes / Common Service Centre (CSC). O1 village is having private courier facility, all villages are having Government bus service facilities, 06 villages are having private bus facilities services, 08 villages are having auto/ modified auto services, 08 villages are having taxi services and 04 villages are having van services. Post office services and rail service facilities are not available in the Study area as per 2011 census. The list of communication infrastructure details in Study area is given in **Table-12** and **Annexure-8.**

TABLE-12
COMMUNICATION INFRASTUCTURE ON THE STUDY AREA

Sr. No	Communication Infrastructure (Availability in number of villages)	0-3 km	3-7 km	7-10 km	0-10 km
1	Post Office	0	0	0	0
2	Sub Post Office	2	4	5	11
3	Telephone (landlines)	3	5	8	16
4	Public Call Office /Mobile (PCO)	3	5	6	14
5	Mobile Phone Coverage	3	5	8	16
6	Internet Cafes / Common Service Centre (CSC)	3	5	8	16
7	Private Courier Facility	0	1	0	1
8	Public Bus Service	3	5	8	16
9	Private Bus Service	0	2	4	6
10	Railway Station	0	0	0	0
11	Auto/Modified Autos	2	1	5	8
12	Taxi	1	4	3	8
13	Vans	0	2	2	4

Source: Census of India 2011

Electrification in Rural Area

The power supply in the study area is considered be good because power supply for all uses is available in the study area. All villages are having power supply for domestic use, agriculture use and commercial use. All villages are having power supply for all uses. Electricity was supplied for domestic, agricultural, commercial and public lighting purposes. The list of power supply details are given in **Table-13** and **Annexure-9.**

TABLE-13
AVAILABILITY OF POWER SUPPLY IN THE STUDY AREA

Sr. No	Availability of Power Supply in the Study Area	0-3 km	3-7 km	7-10 km	0-10 km
1	Power Supply For Domestic Use	3	5	8	16
2	Power Supply For Agriculture Use	3	5	8	16
3	Power Supply For Commercial Use	3	5	8	16
4	Power Supply For All Users	3	5	8	16

Source: Census of India 2011

Drainage System

Removing storm water and household wastewater (sometimes called "sullage") is an important environmental health intervention for reducing disease. Poorly drained storm water forms stagnant pools that provide breeding sites for disease vectors. Because of this, some diseases are more common in the wet season than the dry season. Household wastewater may also contain pathogens that can pollute groundwater sources, increasing the risk of diseases such as lymphatic filariasis. Poor drainage can lead to flooding, resulting in property loss, and people may even be forced to move to escape floodwaters. Flooding may also damage water supply infrastructure and contaminate domestic water sources.

Individual health and hygiene is largely dependent on adequate availability of drinking water and proper sanitation. There is, therefore, a direct relationship between water, sanitation and health. Consumption of unsafe drinking water, improper disposal of human excreta, improper environmental sanitation and lack of personal and food hygiene have been major causes of many diseases in developing countries. India is no exception to this. Prevailing High Infant Mortality Rate is also largely attributed to poor sanitation. It was in this context that the Central Rural Sanitation Programme (CRSP) was launched in 1986 primarily with the objective of improving the quality of life of the rural people and also to provide privacy and dignity to women. The study area all villages are not covered in Total Sanitation Campaign (TSC). As per primary survey 04 villages are having closed drainage facilities, 05 villages are having open drainage facilities, Nani Khakhar village is covered with uncovered open pacca drainage, Mota Bhadiya, Tragadi and Nana Bhadiya villages are covered open kaccha drainage facilities, Kandagara Mota, Moti Bhujpar, Jarpara villages from Mundra tehsil and Mota Bhadiya, Tragadi, Nana Bhadiya, Nani Khakhar villages from Mandvi tehsil are having Drain water is discharged directly into water bodies or to sewar plant. The available Drainage facilities in the study area is given in **Table-14** and **Annexure-10.**

TABLE- 14
AVAILABLE DRAINAGE FACILITATES IN THE STUDY AREA

Sr. No	Available Drainage Facilitates in the Study Area	0-3 km	3-7 km	7-10 km	0-10 km
1	Closed Drainage	1	2	1	4
2	Open Drainage	0	0	5	5
3	No Drainage	2	2	3	7
4	Open Pucca Drainage Covered with Tiles Slabs	0	0	0	0
5	Open Pucca Drainage Uncovered	0	0	1	1
6	Open Kuccha Drainage	0	0	3	3
7	Whether Drain water is discharged directly into water bodies or to sewar plant	0	2	5	7
8	Is the Area Covered under Total Sanitation Campaign (TSC)?	0	0	0	0

Source: Census of India 2011

Socio-Economic Status of Fisherman Families in the Study Area

Fisher folk depend on the sea for their very existence; Fishing is their traditional and often the only livelihood occupation. Fisher folk usually venture out into the sea with boats for around 8 months in a year to carry out fishing activities. For remaining 4 months during the monsoon, fishing is prohibited. So fisher man community seeks employment as unskilled labourers during these monsoon months.

Adani Foundation had initiated various schemes for fisherman related to Education, Health, Sustainable Livelihood and Basic infrastructure facilities:

1. VIDYA DEEP YOJANA: Balwadi for the kids of fishermen communities were built to inculcate a sense of awareness health, hygiene, cleanliness, discipline, regularity and importance of education at an early age for the children and among the parents, more than 144 children availed benefits from balwadis every year.
2. MACHHIMAR SADHAN SAHAY YOJANA: Fishing material support was provided by Adani Foundation at Mundra as per the requests of Pagadiya fishermen. According to their needs total 71 fishing nets were provided. Fish market has been designed to hold 40 platforms made for selling purpose, 6 big shops with shed and one sanitation room with toilet facilities. The idea is to provide an appropriate space for sale of fish which will eventually result in fetching of a good price for the fishes
3. MACHHIMAR AWAS YOJANA: A project titled 'Home Sweet Home' made possible appropriate shelters for the fishermen who reside near the coastline all year round except the rainy season. Shelters, equipped with basic facilities of a toilet and pure drinking water have been constructed for living while fishing and to provide a healthy and hygienic residence.
4. BANDAR VISTAR YOJANA: Juna Bandar, Luni Bandar and Bavadi Bandar: Approximately 38559 Sq. m. sand filling of which 18159 sq. m.at Old Bandar 20400 sq. m. at Luni Bandar and was carried out so that fishermen at vasahat have facilities for a smooth routine life
5. SUGHAD YOJANA: Approximately 8 toilets were constructed for cleanliness and sanitation of the fishermen community, especially women. This also helped create awareness related to health and hygiene
6. MACHHIMAR SHUDHH JAL YOJANA: Water tank platforms have been constructed and tanks have been set up in order to provide clean potable drinking water to the community
7. MACHHIMAR AROGYA YOJANA: Mobile Health Care Unit -the mobile dispensaries run by the Foundation since 2009 is available near the coast where the fishermen can avail the facilities as and when needed. Total 10382 fishermen benefitted by Mobile Dispensary this year.
8. Health Card for Senior Citizen Project: This project is for senior citizen popularly known as Vadil Swasthya Yojana and till date 216 senior citizens from Fisher folk community are enrolled in the scheme and getting cash less medical services upto Rs.50,000 for three years. Besides this, follow ups with the card holders is a regular activity.

9. MACHHIMAR AKSHAY KIRAN YOJANA: 79 Solar Light facilities have been installed at fishermen residences on the coast to provide lighting facilities at night.
10. MACHHIMAR SUGAM PATH YOJANA: To facilitate travel route, approach roads were constructed. GSB road, earthen road, metal road etc., were provided and a 13.7 Km approach road was constructed
11. MACHHIMAR AJIVIKA UPARJAN YOJANA: Mangrove plantation was introduced as an alternative source for generating income. Technical assistance was provided by Horticulture Dept. of APSEZ and 100 hectares were given for plantation and more than 100 fishermen families were benefitted.
12. MACHHIMAR KAUSHALYA VARDHAN YOJANA: With the Objectives to empower technical skill in Fisherman and to resolve employment issues in off season of Fisherman community various training programmes for youth were started.

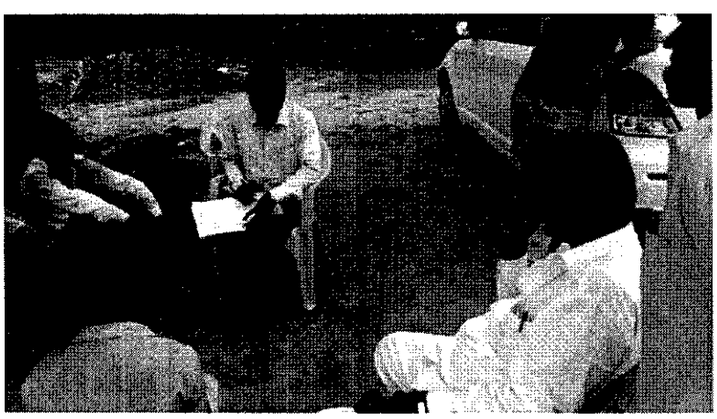
Marine Fishing and Landing Centers in the Study Area

As per 2010 Marine fisheries Census, Gujarat, 6 villages are falling within the study area. Navinal, Jarpara and Dharab villages are from Munda tehsil, Nana Bhadiya, Mota Bhadiya and Tragadi villages are from Mandvi tehsil in Kutch district, Gujarat in **Table-15.**

TABLE-15
LIST OF MARINE FISHING VILLAGES/ FISH LANDING CENTRES IN THE STUDY AREA

Sr. No.	List of Marine Fishing Villages and Landing Centers	Name of the Panchyat	Name of the Tehsil
1	Navinal	Navinal	Mundra
2	Jarpara	Jarpara	Mundra
3	Dhrab	Dhrab	Mundra
4	Nana Bhadiya	Nana Bhadiya	Mandvi
5	Mota Bhadiya	Mota Bhadiya	Mandvi
6	Tragadi	Tragadi	Mandvi

Source: Marine Fisheries Census 2010 Gujarat



PHOTOGRAPH-6
INTERACTIONS WITH FISHERMEN AT TRAGADI VILLAGE OF MANDAVI TALUK

There were 476 traditional fishermen families in the study area with a population of 3065. The maximum number of families was in Mota Bhadiya village (210), the fisherman villages on an average has 843 females per 1000 males in the study area. In Tragadi village 683 females per 1000 males in as per 2010 marine fisheries census, Gujarat. Out of 476 fisherman families, 143 fisherman families are below poverty line (BPL). The average household size of study area is 6.44%, Tragadi village is 7.14% and Nana Bhadiya is 4.10%. The demographic details of the marine fishing villages in the study area are given in **Table-16**.

TABLE-16
LIST OF MARINE FISHING VILLAGES AND POPULATION DETAILS OF THE STUDY AREA

Sr. No.	Village Name	Name of the Panchyat	Name of the Tahsil	Fishermen Families	Traditional Fishermen Families	BPL Families	Fisher Folk Population
1	Navinal	Navinal	Mundra	22	22	0	121
2	Jarpara	Jarpara	Mundra	37	37	0	192
3	Dhrab	Dhrab	Mundra	45	45	18	318
4	Nana Bhadiya	Nana Bhadiya	Mandvi	75	75	55	331
5	Mota Bhadiya	Mota Bhadiya	Mandvi	210	210	47	1482
6	Tragadi	Tragadi	Mandvi	87	87	23	621
	Grand Total			**476**	**476**	**143**	**3065**

Source: Marine Fisheries Census 2010 Gujarat

Sr. No.	Village Name	Population		Children		Children		Average Household size	Sex Ratio
		Male	Female	Male up to 5 years	Male above 5 years	Female up to 5 years	Female above 5 years		
1	Navinal	36	34	18	10	6	17	5.5	891
2	Jarpara	68	61	6	27	3	27	5.19	901
3	Dhrab	84	84	46	37	43	24	7.07	904
4	Nana Bhadiya	111	97	31	37	24	31	4.41	849
5	Mota Bhadiya	375	341	177	231	131	227	7.06	893
6	Tragadi	211	158	71	87	38	56	7.14	683
Total		**885**	**775**	**349**	**429**	**245**	**382**	**6.44**	**843**

Source: Marine Fisheries Census 2010 Gujarat

In Gujarat, 44% of fisher folk (excluding children below 5 years) were educated with different levels of education. About 23% of the fisher folk had primary level of education, 19% had secondary level, 2% had above secondary level and the rest 56 % of the population was unschooled. In comparison with state the fisherman literacy rate, villages under study are having very low literacy rate. As per marine fisherman census 2010, total Literacy rate (%) to the total population of Navinal village is 27.27%, Jarpara village village 19.27%, Dhrab village 7.23%, Nana Bhadiya village 27.19%, Mota Bhadiya village 27.19% and Tragadi village 12.40%. The details of educational status and literacy rate of marine fishing villages' population in the study area is given in **Table-17** and **Table-18.**

TABLE-17
EDUCATIONAL STATUS OF MARINE FISHING VILLAGES POPULATION OF THE STUDY AREA

Sr. No	village Name	Name of the panchyat	Name of the Tahsil	Primary		Higher Secondary		Above Higher Secondary	
				Male	Female	Male	Female	Male	Female
1	Navinal	Navinal	Mundra	20	13	0	0	0	0
2	Jarpara	Jarpara	Mundra	20	16	1	0	0	0
3	Dhrab	Dhrab	Mundra	18	5	0	0	0	0
4	Nana Bhadiya	Nana Bhadiya	Mandvi	26	12	2	0	1	0
5	Mota Bhadiya	Mota Bhadiya	Mandvi	250	149	3	1	0	0
6	Tragadi	Tragadi	Mandvi	49	28	0	0	0	0

Source: Marine fisheries Census 2010 Gujarat

TABLE-18
LITERACY RATE OF MARINE FISHING VILLAGES POPULATION IN THE STUDY AREA

Particulars	Total Population
Navinal Fishermen families literatures	33
Navina Fishermen families Population	121
Total Literacy rate (%) to the total population of Navinal village	27.27
Jarpara Fishermen families literatures	37
Jarpara Fishermen families population	192
Total Literacy rate (%) to the total population of Jarpara village	19.27
Dhrab Fishermen families literatures	23
Dhrab Fishermen families Population	318
Total Literacy rate (%) to the total population of Dhrabl village	7.23
Nana Bhadiya Fishermen families literatures	41
Nana Bhadiya Fishermen families Population	331
Total Literacy rate (%) to the total population of Nana Bhadiya village	27.19
Mota Bhadiya Fishermen families literatures	403
Mota Bhadiya Fishermen families Population	1482
Total Literacy rate (%) to the total population of Mota Bhadiya village	27.19
Tragadil Fishermen families literatures	77
Tragadi Fishermen families Population	621
Total Literacy rate (%) to the total population of Tragadi village	12.40

In Gujarat, there were 82,901 active fishermen of whom 65,002 were fulltime fishermen, 10,983 part-timers and the rest engaged in fish seed collection. About 68% of fisher folk, excluding children, were occupied with active fishing (42%) and fishing allied activities (26%). There were 51,794 fisher folk engaged in fishing allied activities, such as laborer's (36%), marketing (35%), making/repairing net (16%), peeling (9%) and curing/processing (3%). Women outweighed men in fishing allied activities accounting about 69%. Among the major fishing allied activities, women dominated in marketing (88%) and peeling (87%) as per Marine fisheries Census 2010 Gujarat.

The study area there were 660 active fishermen of whom 654 were fulltime fishermen, 5 were part time fishermen and 1 person was engaged in seed

collection and 561 persons were fish allied activities. Fisher folk excluding children active fishing 54.05% and fishing allied activities such as Marketing of fish 24.73%, Making/Repairing Net 12.94% and Curing /Processing 8.27%. 78.25% of female were engaged in fishing allied activities and 21.75% male population were engaged in fishing allied activities. The details of active fisher folk is given in **Table- 19**, the No. of members involved in fishing allied activities (occupation profile) is given in **Table-20** and gender wise fishing allied activities in the study area is given in **Table- 21**

TABLE-19
ACTIVE FISHER FOLK IN THE STUDY AREA (A)

village Name	Name of the panchyat	Name of the Tehsil	Actual Fishing		Fish seed collection				Total Population
			Full time	Part time	Full time		Part time		
					Male	Female	Male	Female	
Navinal	Navinal	Mundra	30	0	0	0	0	0	30
Jarpara	Jarpara	Mundra	47	0	0	0	0	0	47
Dhrab	Dhrab	Mundra	45	0	0	0	0	0	45
Nana Bhadiya	Nana Bhadiya	Mandvi	104	0	0	0	0	0	104
Mota Bhadiya	Mota Bhadiya	Mandvi	317	5	0	1	0	0	323
Tragadi	Tragadi	Mandvi	111	0	0	0	0	0	111
Grand Total			**654**	**5**	**0**	**1**	**0**	**0**	**660**

TABLE-20
OCCUPATION PROFILE IN THE STUDY AREA

Sr. No	village Name	Name of the panchyat	Name of the Tahsil	No. of members involved in fishing allied activities								
				Active fisherman	Marketing of fish	Making/ Repairing Net	Curing /Processing	Peeling	laborer	Others	Other than fishing	Total occupied
1	Navinal	Navinal	Mundra	30	7	21	33	0	0	0	0	91
2	Jarpara	Jarpara	Mundra	47	8	41	68	0	0	0	0	164
3	Dhrab	Dhrab	Mundra	45	45	3	0	0	0	0	0	93
4	Nana Bhadiya	Nana Bhadiya	Mandvi	104	14	0	0	0	0	0	0	118
5	Mota Bhadiya	Mota Bhadiya	Mandvi	323	163	93	0	0	0	0	0	579
6	Tragadi	Tragadi	Mandvi	111	65	0	0	0	0	0	0	176
	Grand Total			**660**	**302**	**158**	**101**	**0**	**0**	**0**	**0**	**1221**
	Percentage %			**54.05**	**24.73**	**12.94**	**8.27**	**0**	**0**	**0**	**0**	**100**

Source: Marine Fisheries Census 2010 Gujarat

TABLE-21
GENDER WISE FISHING ALLIED ACTIVITIES IN THE STUDY AREA

Sr. No	village Name	Name of the panchyat	Name of the Tehsil	Marketing of fish		Making/Repairing Net		Curing /Processing		Peeling		Laborer		Total	
				Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Navinal	Navinal	Mundra	0	7	21	0	2	31	0	0	0	0	23	38
2	Jarpara	Jarpara	Mundra	0	8	41	0	7	61	0	0	0	0	48	69
3	Dhrab	Dhrab	Mundra	0	45	3	0	0	0	0	0	0	0	3	45
4	Nana Bhadiya	Nana Bhadiya	Mandvi	0	14	0	0	0	0	0	0	0	0	0	14
5	Mota Bhadiya	Mota Bhadiya	Mandvi	16	147	32	61	0	0	0	0	0	0	48	208
6	Tragadi	Tragadi	Mandvi	0	65	0	0	0	0	0	0	0	0	0	65
	Grand Total			**16**	**286**	**97**	**61**	**9**	**92**	**0**	**0**	**0**	**0**	**122**	**439**
	Percentage %			13.11	65.15	79.51	13.90	7.38	20.96	0.00	0.00	0.00	0.00	21.75	78.25

Source: Marine Fisheries Census 2010 Gujarat

In Gujarat, Hindus constituted 75% of the total fishermen families and the rest were Muslims. Hindus dominated the fishermen families in all the coastal districts except in Rajkot, Jamnagar and Kutch where Muslims formed the majority. Only 6% of the fisher folk families belonged to SC/ST. In the study area

all families were belongs to Muslims. There is no Hindu and schedule caste (SC) and Schedule tribe (ST) families. The detail village wise religion and community (no. of families) in the study area are given in **Table- 22.**

TABLE-22
RELIGION AND COMMUNITY (NO. OF FAMILIES) IN THE STUDY AREA

Sr. No.	village Name	Name of the Panchyat	Name of the Tehsil	Hindu	Muslim	others	Total	Community SC/ST
1	Navinal	Navinal	Mundra	0	22	0	22	0
2	Jarpara	Jarpara	Mundra	0	37	0	37	0
3	Dhrab	Dhrab	Mundra	0	45	0	45	0
4	Nana Bhadiya	Nana Bhadiya	Mandvi	0	75	0	75	0
5	Mota Bhadiya	Mota Bhadiya	Mandvi	0	210	0	210	0
6	Tragadi	Tragadi	Mandvi	0	87	0	87	0
	Grand Total			**0**	**476**	**0**	**476**	**0**

Source: Marine Fisheries Census 2010 Gujarat

In the study area Tragadi village 56 families were having membership in Fisheries co- operatives. There is no other fisheries co- operative families in the study area villages. The village wise membership in fisheries co-operative is given in **Table- 23**

TABLE-23
MEMBERSHIP IN CO-OPERATIVES IN THE STUDY AREA

Sr. No.	village Name	Name of the panchyat	Name of the Tahsil	Members in		
				Fisheries co- operatives	Other Co-operatives	Total Co-Operatives
1	Navinal	Navinal	Mundra	0	0	0
2	Jarpara	Jarpara	Mundra	0	0	0
3	Dhrab	Dhrab	Mundra	0	0	0
4	Nana Bhadiya	Nana Bhadiya	Mandvi	0	0	0
5	Mota Bhadiya	Mota Bhadiya	Mandvi	0	0	0
6	Tragadi	Tragadi	Mandvi	56	0	56

Source: Marine Fisheries Census 2010 Gujarat

In Gujarat, there were 16,825 crafts owned by fisher-folk, of which 8,746 were mechanized, 5,583 motorized and 2,496 non-motorized. In the study area 140 mechanized motor boats were available, there was no any non-motorized boats in all villages. The village wise craft owned by fisher folk (full ownership) in the study area as per Marine fisheries Census 2010 Gujarat is given in **Table- 24.**

TABLE-24
CRAFT OWNED BY FISHERFOLK (FULL OWNERSHIP) IN THE STUDY AREA

Sr. No.	Village Name	Name of the Panchyat	Name of the Tehsil	Mechanized Motor boats	Outboard Motorboats	Non-motorized Boats
1	Navinal	Navinal	Mundra	5	0	0
2	Jarpara	Jarpara	Mundra	12	0	0
3	Dhrab	Dhrab	Mundra	3	0	0
4	Nana Bhadiya	Nana Bhadiya	Mandvi	14	0	0
5	Mota Bhadiya	Mota Bhadiya	Mandvi	86	0	0
6	Tragadi	Tragadi	Mandvi	20	0	0
Grand Total				**140**	**0**	**0**

Source: Marine Fisheries Census 2010 Gujarat

4.0 MAJOR FINDINGS AND CONCLUSIONS

The present study gives sufficient space to include the respondents both from men and women to equalize gender hierarchy with unbiased perception. Since, most of the respondents were married the responses which are given by them are mostly based on their observations and experiences it has been assumed that the maturity level of the responses were of high standard. Although a marginal proportion of the respondents were illiterate a major portion consisted of people who attended at least the primary education, hence the respondents did not face much difficulty in understanding and responding adequately to the questions. Coming to the occupational status of the respondents, most of them were from the category of main workers other workers, agricultural laborers and this has made them to feel job insecurity which effects on their livelihood. It was also found that, a huge number of the respondents depend on both semi-skilled and unskilled occupations which make their employability level low and results in gaining less income. The selected area for research is a multicultural area where people of different ethnic groups and religious denominations were present with a majority of the people belonged to Hindu religion with consist of Other Backward Classes (OBC) as dominant groups and a visible proportion of the population belonged to the Scheduled Caste (SC) and Schedule Tribe (ST) and it was felt that, the welfare facilities need to be provided for them under corporate social responsibility (CSR) according to the terms of references. Though, the majority of people in study area predominantly speak in Kutchi language sindi, Gujarathi and hindi. The family size is an important variable in planning the CSR activities in any area, and the average size of the family in the research area was found as 4-5 members in a family and less than that. The families consisting above 6 members were of a countable number and very rare. This finding indicates that, the AEL has to plan the CSR activities in the research area very intensively. Selected research area is known for its prosperity in terms of socioeconomic and natural resources. Hence, obviously the majority of households belong to above poverty level families. As per the occupational status is concerned, the more number of respondents belonged to the unskilled, semi-skilled and agricultural casual laborers, factory workers category and their family income was also revealed as meager and seldom. It was also noticed that most of the household's annual income is more than 30000 thousand. Besides the CSR activities by the Company, it understood that Refinery plant shall also generate various opportunities for direct indirect employment and business in the area which shall positively impact the income generation activities for local people. During construction phase, about 2000-3000 persons on average per day will be required and during the operation phase about 2000 direct employment and about 5000 indirect employment would be generated.

Health and hygiene is an important area where lot of CSR activities can be carried out. It was found in the present study an overwhelming majority of the population in the study area was much aware about the health and hygiene and built toilets in their houses and very negligible percent of the populations yet to build the toilets in their houses. The study area all villages are not covered in Total Sanitation Campaign (TSC). As per primary survey 04 villages are having closed drainage facilities, 05 villages are having open drainage facilities, Nani

Khakhar village is covered with uncovered open pacca drainage, Mota Bhadiya, Tragadi and Nana Bhadiya villages are covered open kaccha drainage facilities, Kandagara Mota, Moti Bhujpar, Jarpara villages from Mundra tehsil and Mota Bhadiya, Tragadi, Nana Bhadiya, Nani Khakhar villages from Mandvi tehsil are having Drain water is discharged directly into water bodies or to sewar plant. Hence, AEL can do a lot under CSR activities to generate more awareness and promote the cleanliness and hygiene through Swachh Bharath and Total Sanitation Campaign. The study area on an average has 535 females per 1000 males as per 2011 census reports. In comparison to the district sex ratio (Kutch 908) the study area has recorded lowest sex ratio. The reason for lowest sex ratio is the study area is male migrants are more in the study area, who came for employment. The work participation rate in the study area 0-3 km is 80.77% which is more than the district (Kutch district work participation rate 37.1%). In comparison to the study area proportion of SC population to Kutchchh district less than in the district (Kutch district Proportion of SC Population 12.4%, Proportion of ST population 1.2%). The data of study area reveals that literacy rate of 76.40% as per 2011 census, which is found to be more than the district rate of literacy (Kutch 60.9%).The main workers to the total workers are 90.57% and the marginal workers constitute to 9.43% to the total workers.

16 villages are covered in the total Study area; the drinking water facilities are found to be poor in the proposed cooper smelter project area. Tap-water treated source is not available in the study area a. All villages are having untreated sources, 05 villages are having covered well sources, 13 villages are having Tube Wells/Borehole sources, 06 villages are having Tank/Pond/Lake sources, 01village is having River/Canal source. Majority of the population depend on the panchayat taps for the source of water. Hence the Project Proponent can support the panchayats in the drinking water development activities in the study area.

Majority of the households come under middle income category for them the meeting the expenses of their children's education is one of the heaviest burdens. The study also reveals that the respondents are expecting scholarships for higher education. Hence, awareness generation and linkages between rural masses and agencies who are providing different scholarship should be increased through CSR activities by ael.

The holistic development of the children depends on creative and contended childhood. The study revealed that a meager percentage of children do not participate in sports and cultural activities. But playing games, involvement in sports and cultural activities is an important part in growth and development and a vital activity in shaping child personality. The project proponent can actively involve in promoting inclusive sports and cultural activities through CSR programs.

The component of schooling plays a vital role in building the personality of the children towards constructing a prosperous nation. Therefore providing good amenities in the school is very important. As researched in the study area the respondents were quite happy with all the amenities like, school building, separate toilet facility, drinking water, library and computer lab facility,

playground and furniture equipment and teaching aids. However it is interesting to know that safety measures at schools are not up to the satisfaction of the respondents. Therefore, a special interest can be showed on safety measures along with improving other amenities in local schools through the CSR activities.

01 Primary Health center, 05 primary health sub centers, 03 Maternity and child welfare center, 01 dispensary are available overall 16 villages in the study area. The Community health centers, TB clinics, allopathic hospitals, hospital alternative medicine, veterinary hospitals, mobile health clinic and family welfare centers, community health centers are nil in the study area.

Even after introducing many provisions by the government related to health in different stages such as PHCs, CHCs and district hospitals it is quite interested to know that a sizeable respondents still depended on traditional health practices hence it is advisable that through the CSR activities a modernized health amenities can be made available to the vast Population.

Providing basic amenities to the citizens is the duty of the society and also supplying sufficient nutritious to the children and pregnant women is recommended to extend and enlarge to the maximum number of population. In the research it is identified that a vast number of respondents were not receiving supplementary nutrition from the anganwadi centers. Hence it is suggestible to make separate study to understand the reasons behind not receiving the nutritious food from the stake holders and on the basis of outcomes separate measures can be taken to fulfill the needs.

After making primary health as a major element in the Sustainable Development Goals (SDGs) the monitoring body of UNO has advised to every nation to take amicable health measure in enriching the slogan, health for all under this slogan respective states have taken measures to reach the general population. Through the study it is found that most of the respondents are familiar in accessible of health practitioners but a notable issue is here that the vast number still are not in the condition to reach the health practitioners due to other issues. Hence there is a huge scope for CSR activities to monitor the health practices with the collaboration of concerned authorities.

Since a majority of the respondents have opined that conducting and organizing health camps are beneficial to the people in the vicinity it is suggestible to extend and cover further activities in addition to existing events.

Extending the needed services to the beneficial depends on the level of infrastructure so in the present study as per satisfactory level of amenities it is found that majority of the respondents were satisfied concerned to the following: they are; infrastructure of the primary health center, ambulance services, hygiene in and around the hospital, availability of beds, modern treatment equipment's and specialized health practitioners and finally satisfaction of treatment processes. Though the respondents were satisfied with health amenities there is a scope for improving better than the present.

The study found that although majority of the households have immunized their children a sizeable percentage refrains from immunization. To have a healthy future of the nation immunization of each and every child is necessary. Therefore due steps need to be taken inconsideration while preparing CSR activities.

To have a healthy child, a mother should take care of herself; the research reveals that a vast portion of the sample size did not receive prenatal care prior to the child birth hence priority should be given to prenatal care to the woman.

Though the majority of respondents are well aware there is no meaning in preparing awareness campaigns on the issue of family planning however a portion of the population are unaware regarding the family planning methods hence more can be done in this aspect for the society. This initiative will definitely be of massive help to the families.

The research has highlighted the status of alcoholism in the research area. Alcoholism has been tormenting societies from time long-established and has been responsible in devastating families in all spears of life. A major portion of the society has been in the clutches of alcoholism and it already has caused havoc in their families, although there are households from which there are occasional drinkers and non- drinkers but there is utmost probability that they too become slaves of alcoholism. Therefore there is chance to establish de addiction centers in the surroundings and to create awareness regarding substance abuse.

Water as a source for our routine activities in the research it is found that majority of the population were depending on open wells as source for irrigation, improving the condition of water level is in priority and very marginal portion of the research were utilizing other sources of irrigation such as tube well, monsoon, and river or lake or pond. Hence through the CSR activities separate monitoring methods can be implemented in improving the quality of water for the irrigational purposes. The study found that for agricultural uses 24 hours of power is available for agricultural.

Concern of the population to concern the health condition of the livestock, hence the need of veterinary services so in the study it has been revealed that a vast number of population is haven't the accessibility of veterinary services. The veterinary hospitals are nil in the study area, At this juncture CSR activities can also be enlarged for the vast population in protecting their livestock's to improve their livelihood. Livestock's as the major source for people livelihood it's the prime.

As per the study is concerned the majority of the women in the household are doing household chores and during observation many of the women expressed their desire to involve themselves in some income generating activities whereas a few women expressed that they would like to spend their time in some activities which would help others as well as give recreation and self-satisfaction to them. Such women generally seek guidance from others to fulfill their desires but they

do not have any such guide. Hence the company can utilize this opportunity to involve them in income generation and social service.

The study reveals that many of the respondents were in need of skill based trainings as most of the population has transitioned from their earlier occupations to other occupations. It was also observed that a very negligible percent of the sample has received vocational training. It is recommendable to the CSR wing for taking up special skill based trainings to the project area population as part of income generation activities. Linkage with Pradhan Mantri Kaushal Vikas Yojana (PMKVY) is the flagship scheme of the Ministry of Skill Development & Entrepreneurship (MSDE). The objective of this Skill Certification Scheme is to enable a large number of Indian youth to take up industry-relevant skill training that will help them in securing a better livelihood. Individuals with prior learning experience or skills will also be assessed and certified under Recognition of Prior Learning (RPL), approved for another four years (2016-2020) to benefit 10 million youth Allocated Budget 12,000 Crores.

As revealed in the research report there are a number of Self Help Groups (SHGs) in the project areas and a majority of the members of the households are also the members of the SHGs. Hence suppose the Project Proponent needs to provide and promote any CSR activities can be initiated in these groups and they can become a gateway to the families

As the data reveals that many of the respondents were expecting financial assistance for income generation activities, it may not be possible for the project proponent to monitor the financial assistance extended to the individuals hence it is suggestible to the Project Proponent to collaborate with the SHGs and other local associations to extend financial assistance in income generation activities.

Though the project proponent do not have any direct role in providing assistance with the government schemes, The Company can, through its CSR wing help the beneficiaries to get accessibility towards what they are eligible for; like widow pensions, old age pensions and disability pensions.

The project proponent can be appreciated on the basis of the CSR activities already done in the past as seen in the field by the research team. The project proponent should take action in extending to maximum number of the respondents and to increase the size able number of beneficiaries.

The research agency made an attempt to understand the threats those were perceived by the respondents in anticipation of loss of their land and the question posed, revealed that majority of the respondents felt pollution would lead to face the problem of health, illness and finally it would lead to marginalization and social disintegration of the people.

There were 476 traditional fishermen families in the study area with a population of 3065. In the study area 140 mechanized motor boats were available, there was no any non-motorized boats in all villages. In Tragadi village 56 families were having membership in Fisheries co- operatives. In the study area all families were

belongs to Muslims. There is no Hindu and schedule caste (SC) and Schedule tribe (ST) families. The study area there were 660 active fishermen of whom 654 were fulltime fishermen, 5 were part time fishermen and 1 person was engaged in seed collection and 561 persons were fish allied activities. Fisher folk excluding children active fishing 54.05% and fishing allied activities such as Marketing of fish 24.73%, Making/Repairing Net 12.94% and Curing /Processing 8.27%. 78.25% of female were engaged in fishing allied activities and 21.75% male population were engaged in fishing allied activities. The total Literacy rate (%) to the total population of Navinal village is 27.27%, Jarpara village village 19.27%, Dhrab village 7.23%, Nana Bhadiya village 27.19%, Mota Bhadiya village 27.19% and Tragadi village 12.40%.

5.0 RECOMMENDATIONS AND SUGGESTIONS FOR AEL TO INTRODUCE CSR ACTIVITIES

Section 135 of the Companies Act, 2013 ("Act") provides that a company having net worth of rupees five hundred crores of more or turnover of rupees one thousand crores or more or a net profit of rupees five crores or more must constitute a corporate social responsibility committee ("CSR Committee") consisting of three or more directors, one out of whom must be an independent director. The CSR Rules have been notified on 27 February 2014 and will come into force on 1 April 2014. The CSR Committee is required to formulate a corporate social responsibility policy ("CSR Policy").

Additionally, it is required that the CSR Policy adopted by the company must specify that, any surplus arising out of CSR activities will be re-directed towards CSR Activities and not the business of the company. Further, the board of directors are required to submit a report under Section 134 (3) of the Act, and the relevant portions of the CSR Policy must be disclosed in the said report, also, the relevant portions of the CSR Policy adopted by the Company must be disclosed on the company's website.

A significant addition to implementation partners are companies incorporated under Section 8 (erstwhile Section 25) of the Act.

CSR Activities can now be implemented through the company's own established:

- Registered trust
- Registered society
- Company or its subsidiary or holding or associate company under Section 8.

If such a trust, society or company is not established by the company, then it must have an established track record of three years in undertaking similar projects or programs.

Here is a description of what counts and what doesn't, as per the rules:

Activities included in CSR expenditure:

- Expenditure on programs related to CSR Activities approved by the board of directors, and on the recommendation of the CSR Committee (must be cited in the CSR Policy)
- Expenditure on building capacity of CSR team (up to 5 percent of CSR expenditure), through institutions with an established track record of at least three years
- Contribution to corpus.

Activities excluded from CSR Expenditure:

- Political contribution
  Activities that are solely for benefit of employees and their families
- Activities that are in pursuance of business-as-usual / activities undertaken in pursuance of normal course of business of a company.

- Under the broader scheme of miscellaneous CSR initiatives, AEL has worked towards taking care of the environment wherein it operates as well as contributed towards overall rural development.

- AEL promotes and supports the initiatives taken by district Collectors and Superintendent of Police to adopt districts for their development and growth. As part of the qualitative and quantitative study the research team led by the Principle Investigator visited few selected areas of the sample to understand the ground reality. A reconnaissance survey to the study area was also made and information was gathered from the villagers, agriculturists, traders, and Panchayat officials with the help of FGD and observations. The qualitative information collected was analyzed and has been presented in this report. For the proposed expansion of the cement plant both skilled and semi-skilled employment shall be generated. This employment potential created by the proposed expansion project shall improve the socio economic life of the region and contributes in increase in the GDP as a whole.

- During construction phase, about 2000-3000 persons on average per day will be required and during the operation phase about 2000 direct employment and about 5000 indirect employment would be generated.Further, unskilled workforce required for maintenance and other day to day jobs shall be hired from nearby villages by the contractor. Hence, direct or indirect employment generation potential is envisaged. The following suggestions have been recommended to the Project Proponent under the CSR activities on the basis of qualitative as well as quantitative analysis.

Education:

1. Establishment of new school buildings in near villages to improve strength, support in improving the basic amenities at the schools like adding classrooms, auditorium or distribution of uniforms, science lab and computer labs.
2. Program for skills improvement of teaching staff in the elementary schools.
3. Increase the co-curricular and extra-curricular activities in the schools to

avoid dropouts.
4. Igniting minds of students through exposers to new age technologies and scholarships.

Rural Infrastructure Development:

1. Construction / Repairing of toilet facilities of Schools / Anganwadi / Solar Street Light & other Green Nurturing Programs / Swachch Bharat.
2. Upgrade primary health centers.
3. Support gram panchayats for renovation and expansion of connectivity roads between villages.
4. Create awareness and establish linkage between Government Departments and Local people so that available schemes of the government on solar lamps and solar pumps can be availed in local area.
5. Support village Panchayats to upgrade existing and introduce new public toilets.
6. Launch scheme for support and development of drinking water in the area and support village Panchayats in installation of RO based drinking water
7. Promote bio-gas installation in agri or animal husbandry based families households.
8. Scheme for maintenance of drainage facilities to curb the vector borne diseases and other diseases which spread through unhygienic practices.

Community Health and Sanitation:

1. Mobile Health Care Units.
2. Poor Patient Assistance Programmed and organize medical camps including alcohol de-addiction camps.
3. Provide equipment's for differently abled and disabled in the community such as the disabled, to have an autonomous life
4. Establish and support blood bank in identified villages in collaboration with health centers for the benefit of general public during an emergency.
5. Generating awareness on issues related to tabooed health practices in the society like personal hygiene and menstrual hygiene for ladies and girls.
6. Scheme for psychiatric health in collaboration with the existing health centers.
7. Medical insurance scheme for disabled and tribal population.

Livelihood Development:

1. Vocational and skill development trainings for the local youth and household women as part of income generation activities.
2. Extend assistance to start SHGs to empower women and material and financial support to take up self-employment.
3. Alternate livelihood opportunities creation for the seasonally unemployed people creation of an endowment of Fishermen Welfare Fund to enhance their quality of life through creation of facilities for fish landing platforms / fishing harbour / cold storage, also to provide relief in case of emergency situations such as missing of fishermen on duty due to rough seas, tropical cyclones and storms etc.

4. Different types of fishing nets are produced by the department and that is provided to the fishermen
5. Supply of different types of fresh water fish seeds like spawn, fry, advanced fry, finger lingsana and advanced finger lingsana.
6. Supply of mobile vans to fisherman co- operative societies for Retail sale of fresh water fishes and marine fishes
7. Separate fund for Fisherman Accident Insurance Scheme
8. Support to Government will issue biometric identification to all fishermen
9. Creation of an endowment fund for Tribal population to enhance their quality of life through livelihood generation activities, medical insurance and scholarships for tribal students for primary, secondary and higher education.
10. Special provisions can be introduced for the economic empowerment of vulnerable sections of the population such as the disabled and tribal.
11. AEL CSR team has a moral obligation towards the vulnerable among the population, the Company can employ deserving disabled people in its work force and also try to uplift through supplying disabled aids to the disabled people.

Community Environment:

1. Large scale plantation support scheme (1 Lac Surviving Tree) beyond green belt within 10 km area of the project within project phase in, participatory approach by including stake holders, schools and community based organizations.
2. Organization of Eco-clubs in schools with over 1000 students and teachers as members of the Eco Club in the area focused on creating awareness among children and harnessing their strength for environment protection activities including waste management and plantation.
3. Scheme for promotion of use of solar lamps and energy efficient equipment by community on the line of Government of India LED lamps distribution. Adani - way to Light mitigating part of the CO2 emission.
4. Awareness on rain water conservation and harvesting and Implementation of watershed management with scientific methods.

Donations

1. Contribution to the Prime Minister's National Relief Fund or any other fund set up by Central Government for socio-economic development and relief and welfare of Scheduled Castes, Scheduled Tribes other backward classes, minorities and women;
2. Contributions or funds provided to technology incubators located within academic institutions which are approved by the Central Government;
3. Protection of national heritage, art and culture including restoration off buildings and sites of historical importance and works of art; setting up public libraries; promotion and development of traditional arts and handicrafts;

Tax deductions under Income Tax Act 1961 (Section 80G)

1. Donation to State Government Fund for Medical Relief to the Poor

2. Chief Minister's or Lt. Governor's Relief Fund
3. Donations to government for promoting family planning.

Monitoring and Evaluation of CSR Activities:

1. Strengthening the existing CSR wing of the Project Proponent by increasing and improving the man power.
2. Proper follow-up methods need to be implemented after the completion of every programme.
3. Recognizing NGOs working in various fields and becoming a Partner in their work to fulfill their objectives.
4. The company could adopt villages in the vicinity and provide to their needs by the means of a registered NGO of the company. Such NGO should be open to the suggestions of stake holders in the community and provide need based help to the people.
5. Utilize the assistance of Quality council of India accredited social scientists and practitioners to evaluate and monitor the CSR activities.
6. Conduct regular social audit to know the accountability and transparency level regarding the existing CSR activities.

The proposed CSR activities 2018 to 2023 are given in **Table-25.**

TABLE-25
PROPOSED CSR ACTIVITIES 2018 to 2023 WITH TENTATIVE BUDGET*

Sr. No.	Key Area Identified for intervention through CSR activities by proposed Copper Refinery Plant	Proposed Expenditure in Project Construction Phase (Rs. in Crores)					Total Proposed Expenditure (Rs. in Crores)
		1st Year	2nd Year	3rd year	4th Year	5th Year	
A	**Education Initiatives**						
	• Supporting in creation of assembly halls, prayer hall, classrooms, computer labs, space for mid-day meal, playground, school walls etc. for government school • Igniting mind of students through Science on Wheels, UDAN schemes. • Educational Vocational Guidance Fair (EVGF) for career talk. • Balwadis for the kids of fisher-folk community to provide awareness about education, health, hygiene, and discipline. • Programme for skills improvements of teaching staffs in govt. schools.	1 Crore	1 Crore	1 Crore	1 Crore	1 Crore	5 Crore
B	**Community Health Initiatives**						
	• Senior Citizen Health Card Scheme to address the needs of the senior citizens. • Various health camps organization at regular intervals i.e. Gynaecological care, Blood donation, Health awareness programs, HIV/AIDS, Cataract detection. • Provision of Free Mobile Health Care Units (MHCU). • Promotion of awareness of Malnutrition and Anaemia. • Setting up rural clinics to ensures outreach services.	2 Crore	2 Crore	2 Crore	2 Crore	2 Crore	10 Crore
C	**Sustainable livelihood and Women Empowerment**						

	• Extend assistance to start SHGs to empower women and material and financial • support to take up self-employment • Amenities like equipment support, sanitation facilities, approach roads, fish lending sheds, fisher-folk vasahats (Settlements);training for livelihood, Insurance etc. • Skill Development Centre (SDC) to make the youth for achieving their Goals in life by becoming Skilled Professionals. • Provision of Fodder Support, Promote bio-gas installation in Agri and animal husbandry based families' households. Construction of cattle sheds, Awareness meetings and exposure visits for Animal Husbandry. • Support for Drip irrigation.	**1 Crore**	**1 Crore**	**1 Crore**	**1 Crore**	**1 Crore**	**5 Crore**
D	**Community Rural Infrastructure Development**						
	• To provide facility for Potable drinking water by providing RO Plants, drinking water supply system, overhead tank and underground pump at in villages. • Creation of clean and hygienic environment by proper drainage systems, sewage treatment plants, community led Sanitation Campaign etc. • Construction of various Community centres to facilitate social activities, Upgradation of facility at crematoriums, Gaushala, and creation of bus stands etc. • Conservation of water by construction of check dams and pond. • Upgradation of primary health centres, renovation of roads and expansion of roads, Construction of toilet facilities etc. • Provision of Solar street lighting, green nurturing programs, implementation of Swachchh Bharat initiatives	**4 Crore**	**4 Crore**	**4 Crore**	**4 Crore**	**4 Crore**	**20 Crore**
	Total Expenditure (Rs.)	**8 Crore**	**8 Crore**	**8 Crore**	**8 Crore**	**8 Crore**	**40 Crore**

ANNEXURE- 1
LAND USE IN THE STUDY AREA

Sr. No	Village Name	Total Geographical Area (in Hectares)	Forest Area (in Hectares)	Area Irrigated by Source (in Hectares)	Total Unirrigated Land Area (in Hectares)	Land Under Miscellaneous Tree Crops etc. Area (in Hectares)	Area under Non-Agricultural Uses (in Hectares)	Barren & Un-cultivable Land Area (in Hectares)	Permanent Pastures and Other Grazing Land Area (in Hectares)	Culturable Waste Land Area (in Hectares)	Fallows Land other than Current Fallows Area (in Hectares)	Current Fallows Area (in Hectares)
0-3 km Mundra taluk, Kutch district, Gujarat												
1	Shiracha	1676.64	0	40.47	824.92	0	356.88	242.17	212.2	0	0	0
2	Navinal	1038.33	0	66.92	548.81	0	303.98	101.2	17.42	0	0	0
3	Tunda	1314.3	0	24.66	136.11	0	605.24	316.78	214.41	17.1	0	0
	Sub Total	**4029.3**	**0**	**132.05**	**1509.8**	**0**	**1266.1**	**660.15**	**444.03**	**17.1**	**0**	**0**
3-7 km Mundra taluk, Kutch district, Gujarat												
4	Kandagara Mota	2084.96	0	300	972.41	0	677.9	4.89	97.37	32.39	0	0
5	Khakhar Moti	1250.77	0	710.22	308	0	20.23	90.11	101.98	0	20.23	0
6	Moti Bhujpar	3298.38	0	380	2068.87	0	32.48	720.4	0	96.63	0	0
7	Nani Bhujpar	440.98	35.64	54	294.53	0	4.47	4.45	47.89	0	0	0
	Sub Total	**7075.1**	**35.64**	**1444.2**	**3643.8**	**0**	**735.08**	**819.85**	**247.24**	**129.02**	**20.23**	**0**
7-10 km Mundra taluk, Kutch district, Gujarat												
8	Deshalpar	5184.08	0	0	2249.02	49	11	25.72	289.36	2497.12	0	62.86
9	Borana	107.29	0	1.8	53.6	0	3	19.99	8.9	20	0	0
10	Pratappar (1)	343.55	58.76	0	116.54	0	2.13	25.82	12.28	11.48	116.54	0
11	Jarpara	3191.3	0	217	1263.69	0	14	500.17	279.55	916.89	0	0
12	Dhrab	1573.7	0	404.7	169.99	12.27	731.23	144.12	108.51	2.58	0.3	0
Mandavi taluk, Kutch district, Gujarat												
13	Mota Bhadiya	436.76	0	77.89	298.99	0	10	38.88	11	0	0	0
14	Tragadi	1456.88	0	0	688.55	0	4	685.69	48.56	3.3	26.78	0
15	Nana Bhadiya	1853.32	0	0	1300.33	0	17.21	436.62	67.18	0	31.98	0
16	Nani Khakhar	981.91	0	81.24	494.76	0	16.41	193.88	178.15	0	17.47	0
	Sub Total	**15129**	**58.76**	**782.63**	**6635.5**	**61.27**	**808.98**	**2070.9**	**1003.5**	**3451.4**	**193.07**	**62.86**
	Grand Total	**26233**	**94.4**	**2358.9**	**11789**	**61.27**	**2810.2**	**3550.9**	**1694.8**	**3597.5**	**213.3**	**62.86**

Source : Census of India 2011

ANNEXURE- 2
DEMOGRAPHY DETAILS OF 10 KM RADIUS

Sl.No.	Name of Village	No.of House Holds	Total Male	Total Female	Total Population	Male Below 6 Agegroup	Female Below 6 Agegroup	Population Below 6 Age group	SC Population	ST Population	Male Literates	Female Literates	Total Literates	Total Workers	Main Workers	Marginal Workers	Non Workers
0-3 km Mundra tehsil, Kutch district, Gujarat																	
1	Tunda	3134	11261	1210	12471	234	207	441	109	7	9605	530	10135	11096	10203	893	1375
2	Shiracha	429	1171	708	1879	121	127	248	323	11	924	374	1298	873	854	19	1006
3	Navinal	602	2406	694	3100	114	100	214	261	0	2003	384	2387	2125	2116	9	975
	Sub Total	**4165**	**14838**	**2612**	**17450**	**469**	**434**	**903**	**693**	**18**	**12532**	**1288**	**13820**	**14094**	**13173**	**921**	**3356**
3-7 km Mundra tehsil, Kutch district, Gujarat																	
4	Deshalpar	584	1350	1261	2611	177	183	360	444	232	935	674	1609	923	747	176	1688
5	Khakhar Moti	436	1101	1038	2139	171	156	327	395	114	758	579	1337	807	701	106	1332
6	Kandagara Mota	1015	2729	1732	4461	271	257	528	356	113	2157	971	3128	2374	2139	235	2087
7	Nani Bhujpar	210	551	505	1056	114	98	212	298	9	365	236	601	355	353	2	701
8	Jarpara	1506	3872	3480	7352	617	606	1223	830	6	2565	1527	4092	3314	2782	532	4038
	Sub Total	**3751**	**9603**	**8016**	**17619**	**1350**	**1300**	**2650**	**2323**	**474**	**6780**	**3987**	**10767**	**7773**	**6722**	**1051**	**9846**
7-10 km Mundra tehsil, Kutch district, Gujarat																	
9	Moti Bhujpar	1979	4777	4501	9278	729	769	1498	1196	106	3442	2573	6015	3254	3035	219	6024
10	Borana	79	185	192	377	30	35	65	5	0	130	89	219	117	116	1	260
11	Pratappar (1)	48	136	132	268	21	23	44	26	0	92	66	158	74	74	0	194
12	Dhrab	629	2031	1250	3281	250	230	480	146	27	1465	585	2050	1521	1507	14	1760
Mandvi tehsil, Kutch district, Gujarat																	
13	Nani Khakhar	691	1758	1654	3412	236	201	437	606	154	1287	993	2280	1438	1183	255	1974
14	Nana Bhadiya	1011	3805	513	4318	72	72	144	395	0	2900	277	3177	3662	3620	42	656
15	Mota Bhadiya	624	1669	1615	3284	288	263	551	493	0	1084	783	1867	1597	1015	582	1687
16	Tragadi	216	636	602	1238	99	88	187	0	0	336	237	573	582	450	132	656
	Sub Total	**5277**	**14997**	**10459**	**25456**	**1725**	**1681**	**3406**	**2867**	**287**	**10736**	**5603**	**16339**	**12245**	**11000**	**1245**	**13211**
	Grand Total	**13193**	**39438**	**21087**	**60525**	**3544**	**3415**	**6959**	**5883**	**779**	**30048**	**10878**	**40926**	**34112**	**30895**	**3217**	**26413**
Source: Census of India 2011																	

ANNEXURE-3
EDUCATIONAL FACILITIES IN THE STUDY AREA

Sr.No	Village Name	Govt Primary School (Numbers)	Private Primary School (Numbers)	Govt Middle School (Numbers)	Private Middle School (Numbers)	Govt Secondary School (Numbers)	Private Secondary School (Numbers)	Govt Senior Secondary School (Numbers)	Private Senior Secondary School (Numbers)	Govt Arts and Science Degree College (Numbers)	Private Arts and Science Degree College (Numbers)	Govt Engineering College (Numbers)	Private Engineering College (Numbers)
0-3 km Mundra tehsil, Kutch district, Gujarat													
1	Tunda	2	0	0	0	0	0	0	0	0	0	0	0
2	Shiracha	1	0	0	0	0	0	0	0	0	0	0	0
3	Navinal	1	0	0	0	1	0	0	0	0	0	0	0
	Sub Total	**4**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3-7 km Mundra tehsil, Kutch district, Gujarat													
4	Deshalpar	1	0	0	0	0	0	0	0	0	0	0	0
5	Khakhar Moti	3	0	0	0	1	0	0	0	0	0	0	0
6	Kandagara Mota	3	0	0	0	1	0	0	0	0	0	0	0
7	Nani Bhujpar	1	0	0	0	0	0	0	0	0	0	0	0
8	Jarpara	6	0	0	0	1	0	0	0	0	0	0	0
	Sub Total	**14**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7-10 km Mundra tehsil, Kutch district, Gujarat													
9	Moti Bhujpar	7	0	0	0	1	0	1	0	0	0	0	0
10	Borana	1	0	0	0	0	0	0	0	0	0	0	0
11	Pratappar (1)	1	0	0	0	0	0	0	0	0	0	0	0
12	Dhrab	4	0	0	0	0	0	0	0	0	0	0	0
Mandvi tehsil, Kutch district, Gujarat													
13	Nani Khakhar	2	0	0	0	0	0	0	0	0	0	0	0
14	Nana Bhadiya	1	0	0	0	0	1	0	1	0	0	0	0
15	Mota Bhadiya	4	0	0	0	0	0	0	0	0	0	0	0
16	Tragadi	1	0	0	0	0	0	0	0	0	0	0	0
	Sub Total	**21**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
	Grand Total	**39**	**0**	**0**	**0**	**5**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
Source: Census of India 2011													

ANNEXURE- 4
HEALTH FACILITIES IN THE RURAL VILLAGES OF THE STUDY AREA

Sr.No	Village Name	Community Health Centre (Numbers)	Primary Health Centre (Numbers)	Primary Health Sub Centre (Numbers)	Maternity And Child Welfare Centre (Numbers)	TB Clinic (Numbers)	Hospital Allopathic (Numbers)	Hospital Alternative Medicine (Numbers)	Dispensary (Numbers)	Veterinary Hospital (Numbers)	Mobile Health Clinic (Numbers)	Family Welfare Centre (Numbers)
0-3 km Mundra tehsil, Kutch district, Gujarat												
1	Tunda	0	0	0	0	0	0	0	0	0	0	0
2	Shiracha	0	0	0	0	0	0	0	0	0	0	0
3	Navinal	0	0	0	0	0	0	0	0	0	0	0
	Sub Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3-7 km Mundra tehsil, Kutch district, Gujarat												
4	Deshalpar	0	0	1	1	0	0	0	0	0	0	0
5	Khakhar Moti	0	0	0	0	0	0	0	0	0	0	0
6	Kandagara Mota	0	0	1	0	0	0	0	0	0	0	0
7	Nani Bhujpar	0	0	0	0	0	0	0	0	0	0	0
8	Jarpara	0	0	1	1	0	0	0	1	0	0	0
	Sub Total	**0**	**0**	**3**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
7-10 km Mundra tehsil, Kutch district, Gujarat												
9	Moti Bhujpar	0	1	1	1	0	0	0	0	0	0	0
10	Borana	0	0	0	0	0	0	0	0	0	0	0
11	Pratappar (1)	0	0	0	0	0	0	0	0	0	0	0
12	Dhrab	0	0	0	0	0	0	0	0	0	0	0
Mandvi tehsil, Kutch district, Gujarat												
13	Nani Khakhar	0	0	1	0	0	0	0	0	0	0	0
14	Nana Bhadiya	0	0	0	0	0	0	0	0	0	0	0
15	Mota Bhadiya	0	0	0	0	0	0	0	0	0	0	0
16	Tragadi	0	0	0	0	0	0	0	0	0	0	0
	Sub Total	**0**	**1**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Grand Total	**0**	**1**	**5**	**3**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
Source: Census of India 2011												

ANNEXURE-5
DRINKING WATER FACILITY IN THE RURAL VILLAGES OF THE STUDY AREA

Sr.No	Village Name	Tap Water-Treated (Status) A(1)/NA(0)	Tap Water Untreated (Status) A(1)/NA(0)	Covered Well (Status) A(1)/NA(0)	Uncovered Well (Status) A(1)/NA(0)	Hand Pump (Status) A(1)/NA(0)	Tube Wells/Borehole (Status) A(1)/NA(0)	Spring (Status) A(1)/NA(0)	River/Canal (Status) A(1)/NA(0)	Tank/Pond/Lake (Status) A(1)/NA(0)	Others (Status) A(1)/NA(0)
0-3 km Mundra tehsil, Kutch district, Gujarat											
1	Tunda	0	1	0	0	0	1	0	0	0	0
2	Shiracha	0	1	0	0	0	1	0	0	0	0
3	Navinal	0	1	1	0	0	1	0	0	0	0
	Sub Total	**0**	**3**	**1**	**0**	**0**	**3**	**0**	**0**	**0**	**0**
3-7 km Mundra tehsil, Kutch district, Gujarat											
4	Deshalpar	0	1	0	0	0	1	0	0	0	0
5	Khakhar Moti	0	1	0	0	0	1	0	0	1	0
6	Kandagara Mota	0	1	0	0	0	1	0	0	0	0
7	Nani Bhujpar	0	1	1	0	0	1	0	0	0	0
8	Jarpara	0	1	1	0	0	1	0	1	1	0
	Sub Total	**0**	**5**	**2**	**0**	**0**	**5**	**0**	**1**	**2**	**0**
7-10 km Mundra tehsil, Kutch district, Gujarat											
9	Moti Bhujpar	0	1	1	0	0	1	0	0	1	0
10	Borana	0	1	0	0	0	1	0	0	0	0
11	Pratappar (1)	0	1	1	0	0	1	0	0	1	0
12	Dhrab	0	1	0	0	0	0	0	0	0	1
Mandvi tehsil, Kutch district, Gujarat											
13	Nani Khakhar	0	1	0	0	0	1	0	0	1	0
14	Nana Bhadiya	0	1	0	0	0	0	0	0	0	0
15	Mota Bhadiya	0	1	0	0	0	1	0	0	1	0
16	Tragadi	0	1	0	0	0	0	0	0	0	0
	Sub Total	**0**	**8**	**2**	**0**	**0**	**5**	**0**	**0**	**4**	**1**
	Grand Total	**0**	**16**	**5**	**0**	**0**	**13**	**0**	**1**	**6**	**1**

Source: Census of India 2011

* Note : A(1)= Available/NA(0): Not Available

ANNEXURE-6
COMMUNICATION INFRASTUCTURE ON THE STUDY AREA

Sr. No	Village Name	Post Office (Status A(1)/NA(0)	Sub Post Office (Status A(1)/NA(0)	Telephone (landlines) (Status A(1)/NA(0)	Public Call Office /Mobile (PCO) (Status A(1)/NA(0)	Mobile Phone Coverage (Status A(1)/NA(0)	Internet Cafes / Common Service Centre (CSC) (Status A(1)/NA(0)	Private Courier Facility (Status A(1)/NA(0)	Public Bus Service (Status A(1)/NA(0)	Private Bus Service (Status A(1)/NA(0)	Railway Station (Status A(1)/NA(0)	Auto/Modified Autos (Status A(1)/NA(0)	Taxi (Status A(1)/NA(0)	Vans (Status A(1)/NA(0)
0-3 km Mundra tehsil, Kutch district, Gujarat														
1	Tunda	0	0	1	1	1	1	0	1	0	0	0	1	0
2	Shiracha	0	1	1	1	1	1	0	1	0	0	1	0	0
3	Navinal	0	1	1	1	1	1	0	1	0	0	1	0	0
	Sub Total	**0**	**2**	**3**	**3**	**3**	**3**	**0**	**3**	**0**	**0**	**2**	**1**	**0**
3-7 km Mundra tehsil, Kutch district, Gujarat														
4	Deshalpar	0	1	1	1	1	1	1	1	0	0	1	1	0
5	Khakhar Moti	0	1	1	1	1	1	0	1	0	0	0	1	0
6	Kandagara Mota	0	1	1	1	1	1	0	1	1	0	0	1	1
7	Nani Bhujpar	0	0	1	1	1	1	0	1	1	0	0	1	1
8	Jarpara	0	1	1	1	1	1	0	1	0	0	0	0	0
	Sub Total	**0**	**4**	**5**	**5**	**5**	**5**	**1**	**5**	**2**	**0**	**1**	**4**	**2**
7-10 km Mundra tehsil, Kutch district, Gujarat														
9	Moti Bhujpar	0	0	1	1	1	1	0	1	1	0	1	1	1
10	Borana	0	0	1	0	1	1	0	1	1	0	0	1	0
11	Pratappar (1)	0	1	1	1	1	1	0	1	1	0	1	1	1
12	Dhrab	0	1	1	0	1	1	0	1	0	0	1	0	0
Mandvi tehsil, Kutch district, Gujarat														
13	Nani Khakhar	0	1	1	1	1	1	0	1	0	0	0	0	0
14	Nana Bhadiya	0	1	1	1	1	1	0	1	0	0	1	0	0
15	Mota Bhadiya	0	1	1	1	1	1	0	1	1	0	0	0	0
16	Tragadi	0	0	1	1	1	1	0	1	0	0	1	0	0
	Sub Total	**0**	**5**	**8**	**6**	**8**	**8**	**0**	**8**	**4**	**0**	**5**	**3**	**2**
	Grand Total	**0**	**11**	**16**	**14**	**16**	**16**	**1**	**16**	**6**	**0**	**8**	**8**	**4**

Source: Census of India 2011

*** Note : 1 = Available ; 0= Not Available**

ANNEXURE-7
AVAILABILITY OF POWER SUPPLY IN THE STUDY AREA

Sr. No	Village Name	Power Supply For Domestic Use (Status A(1)/NA(0)	Power Supply For Agriculture Use (Status A(1)/NA(0)	Power Supply For Commercial Use (Status A(1)/NA(0)	Power Supply For All Users (Status A(1)/NA(0)
0-3 km Mundra tehsil, Kutch district, Gujarat					
1	Tunda	1	1	1	1
2	Shiracha	1	1	1	1
3	Navinal	1	1	1	1
	Sub Total	**3**	**3**	**3**	**3**
3-7 km Mundra tehsil, Kutch district, Gujarat					
4	Deshalpar	1	1	1	1
5	Khakhar Moti	1	1	1	1
6	Kandagara Mota	1	1	1	1
7	Nani Bhujpar	1	1	1	1
8	Jarpara	1	1	1	1
	Sub Total	**5**	**5**	**5**	**5**
7-10 km Mundra tehsil, Kutch district, Gujarat					
9	Moti Bhujpar	1	1	1	1
10	Borana	1	1	1	1
11	Pratappar (1)	1	1	1	1
12	Dhrab	1	1	1	1
Mandvi tehsil, Kutch district, Gujarat					
13	Nani Khakhar	1	1	1	1
14	Nana Bhadiya	1	1	1	1
15	Mota Bhadiya	1	1	1	1
16	Tragadi	1	1	1	1
	Sub Total	**8**	**8**	**8**	**8**
	Grand Total	**16**	**16**	**16**	**16**
Source: Census of India 2011					
*** Note : 1 = Available ; 0= Not Available**					

ANNEXURE-8
AVAILABLE DRAINAGE FACILITATES IN THE STUDY AREA

Sr. No	Village Name	Closed Drainage (Status A(1)/NA(0)	Open Drainage (Status A(1)/NA(0)	No Drainage (Status A(1)/NA(0)	Open Pucca Drainage Covered with Tiles Slabs (Status A(1)/NA(0)	Open Pucca Drainage Uncovered (Status A(1)/NA(0)	Open Kuccha Drainage (Status A(1)/NA(0)	Whether Drain water is discharged directly into water bodies or to sewer plant (For Water Bodies-1/Sewer Plants-0)	Is the Area Covered under Total Sanitation Campaign (TSC)? (Status A(1)/NA(0)
0-3 km Mundra taluk, Kutch district, Gujarat									
1	Shiracha	0	0	1	0	0	0	0	0
2	Navinal	1	0	0	0	0	0	0	0
3	Tunda	0	0	1	0	0	0	0	0
	Sub Total	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**
3-7 km Mundra taluk, Kutch district, Gujarat									
4	Kandagara Mota	1	0	0	0	0	0	1	0
5	Khakhar Moti	0	0	1	0	0	0	0	0
6	Moti Bhujpar	1	0	0	0	0	0	1	0
7	Nani Bhujpar	0	0	1	0	0	0	0	0
	Sub Total	**2**	**0**	**2**	**0**	**0**	**0**	**2**	**0**
7-10 km Mundra taluk, Kutch district, Gujarat									
8	Deshalpar	0	0	1	0	0	0	0	0
9	Borana	0	0	1	0	0	0	0	0
10	Pratappar (1)	0	1	0	0	0	0	0	0
11	Jarpara	1	0	0	0	0	0	1	0
12	Dhrab	0	0	1	0	0	0	0	0
Mandavi taluk, Kutch district, Gujarat									
13	Mota Bhadiya	0	1	0	0	0	1	1	0
14	Tragadi	0	1	0	0	0	1	1	0
15	Nana Bhadiya	0	1	0	0	0	1	1	0
16	Nani Khakhar	0	1	0	0	1	0	1	0
	Sub Total	**1**	**5**	**3**	**0**	**1**	**3**	**5**	**0**
	Grand Total	**4**	**5**	**7**	**0**	**1**	**3**	**7**	**0**

Source : Census of India 2011

*** Note : A(1): Available; NA(0): Not Available**

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Annexure-XIII
Public Hearing Details

The Public Hearing proceedings is given as Volume-III

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Annexure-XIV

Risk Assessment Report

SCS
Safety Consultancy Services

SAFETY CONSULTANCY SERVICES

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" Specialist in Safety Audit, Electrical & Fire Audits , Risk Assessment, HAZOP, RRA, Dispersion Modeling, Preparation of Safety Manual , On Site / Off Site Emergency Plan , Training & Other Studies ".

Service Tax No.: AIWPS6857KSD001

REGISTERED MICRO SERVICE INDUSTRY
(Life Member of National Safety Council of India)

EXECUTIVE SUMMARY

The present 'Hazard Identification and Risk Assessment' study carried out during December 2016 by Safety Consultancy Services, Ahmedabad for the copper smelter project of Adani group at Mundra Gujarat on the instance of the Management. Present study includes identification of hazards inherent in various plants likely to come up in the proposed project. The methodology used for the hazard identification and risk assessment was by personal discussions with the plant personnel who are aware of all the aspects of the plant or equipment being studied and identification of the hazards in the light of various statutes and standards applicable to the respective plants or equipments. Each identified hazard was also assigned with the risk matrix to indicate the gravity of the problem which is depends on the severity and likelihood of the considered hazardous situation.

The information generated during the study has been presented in the main body of the report under the title Hazard Identification and Risk Assessment Sheets. These sheets includes the hazard, action contemplated by the management to cope up with the hazard, residual hazard if any and suggestion to cope up with the residual hazards also. The recommendations generated during the study have been presented once more in the section "Recommendations".

Basis the available documents and discussions held with the process officials, it is observed the proposed system to provide safety to the personal, Environment and mitigate risk adequate still to ensure the objective make overall safe are here are few recommendations of various types are given in the report. It is not practical to describe each of them in this summary, yet important suggestions are being indicated in the summary.

The concentrate unloading and its transfer to the storage hopper and to designated storage area, involve the dust generation which are being taken care by adequate measures to minimise the dust generation. To minimise hazards involved in belt conveyors the company intends to provide pull chord switches and rolling the belt into pipe form while transferring. Guarding of nip points of the belt rollers has been

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suggested to avoid entanglement of the body parts of the workers around. It is suggested the after commissioning of the plant the dust levels should be monitored and if the workplaces are found dusty, the local exhaust arrangements is recommended to extract the dust from each transfer point.

The Sulphur dioxide is generated during the smelting and converting process from furnaces, is collected under negative pressure to avoid release of gas from any system. There is a possibility of failure of the blower and the whole system going under positive pressure and release gas from several places. System is designed such that in such scenario the plant operations will be automatically comes to halt and generation of the gases will stop. Residual gases in the system will be routed to scrubbing system. Keeping this in view the suggestions have been made to keep respiratory protective devices and remedies for the situation. Copper fumes are also likely to evolve. Periodic monitoring of copper fumes is suggested to ensure that the exposures are within the limits.

Working in furnace area involves exposure to thermal stress also. Though all the vessels and ducts are likely to be lagged, it may still be difficult work in some areas for long time. It is suggested that air conditioned rest room should be provided so that the workers are able to get relief from the stress. The workers should be encouraged to increased intake of water and salt during summer. Possibility of localised cool air blowing at the work spots may be considered if the work spots are fixed.

Hot metal from furnace to furnace is transferred by way of launders and ladles. It is suggested that the area where there is possibility of falling of molten metal should be barricaded to avoid short routes. The spillage of molten metal can take place from the ladles also. It is suggested that the route of the ladle should be marked and workers should be advised/warned through display boards about the risks.

The hazards of lightening may exist in all the plants and equipments. It should be ensured that the whole factory should be under the coverage of the lightening arrestors. All the equipments and vessels should be provided with the double earthling. The electrical hazards in each switch room should be adequately handled by providing tested rubber mats in front of panels, danger board on each high voltage panels, exhaust fans to ensure proper ventilation, fire extinguishers, escape routes of adequate size, doors opening outwardly etc. The provisions of Indian Electricity Rules should be strictly followed in transformers, electrical panels, switch yards etc. The methods of artificial respiration should be displayed. Unauthorised persons should not be allowed in the switch rooms. The earth resistances should be checked with adequate records. The rescue rod and discharge rods should be kept available in the switch room. The chances

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of electrocution due to faults in ESP and wet electrostatic precipitator and gas washing area should be avoided.

Melting of the scraps in the furnace involves possibility of entry of water or other liquids which may cause localised blasts furnace leading to splashes of molten metal. Keeping this hazard in view the scrap should be visually examined before allowing to charge in to the furnace. The furnace is operated under negative pressure, and generated SO2 is transferred through a closed ducting to Sulphuric Acid Plant. Fugitive gases from the process are scrubbed in Lime/ Caustic solution. It should be ensured not only pH but also concentration measurement to be monitored to ensure alkalinity. This will give adequate time for doing the make-up of the alkalinity.

Use of chlorine in the plant involves the risk of chlorine release. It is suggested that the chlorine emergency kit and the self contained breathing apparatus should be kept available close to the use point. Ensure that the chlorinator is provided with vacuum valve to stop chlorine flow in case of water flow failure.

The material handling equipments like cranes and lifting tackles play a very important role in total safety of the plant. It should be ensured that only tested & certified equipments by a competent person at prescribed intervals should be allowed to be used. The operators of fork lift trucks and other mobile equipments should have certificate of competency in operating of the such special equipments/vehicles in addition to the driving license for transport vehicles.

There are Pressure Regulating valves in various gases and steam. These devices fail due to diaphragm rupture equalising the pressure at both sides of the regulator. It is suggested that safety valves should be provided in downstream side to present damage of downstream fittings.

Heat exchange surface of the heat exchangers used for cooling the sulphuric acid is subject to develop leakage. The pressure of the acid should be kept higher and the pH of the water should be measured once in a day. Online monitoring of cooling-water pressure and pH to be maintained.

All the flanges in the acid piping should be guarded suitably to avoid the spray release of acid and contact with skin or eyes. Secondary absorption system should be started as soon as SO2 is allowed to be vented through chimney. Sufficient number respiratory protection against acid gases should be kept available in the plant. Provision the dyke walls may be made to hold the spillage of acid within a dyke wall.

The vent of the concentrate sulphuric acid should be provided with the self indicating silica gel column, colour of which should be checked once in a week with record. In case the 75% gel is decolorized the gel should be changed with regenerated

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silica gel. The hazards of all the toxic, flammable, reactive and explosive substances with the control measures and emergency response procedure should be displayed in the language known by majority of workers.

The robot system being provided for handling the Copper Cathodes should be barricaded with door interlocked in such a way that robot cannot start as long as the door is open.

Rock phosphate handling will be generating lot of dust; the same is to be controlled by way of adequate capacity of bag filters. Hydrogen Fluoride generated during manufacturing of Phosphoric Acid is scrubbed in the scrubbers, before it is released through the stack. In case of the failure of the scrubber pumps, the process should get automatically stopped, to prevent further generation of the gases.

It should be ensured that the components of the Oxygen gas manufacture and handling system is free of any grease or oil.LPG Storage, handling and use should be provided with all the safety measure prescribed by the supplier of the system and PESO directives. Usage of the required personal protective equipments as defined in the various processes by Employees to be ensured. Employees to trained, working in the various areas, on the risk involved and mitigation measures to be taken.

Ahmadabad
Dated: 09:02:2017

Safety Consultancy Services SCS AHMEDABAD

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1.0 INTRODUCTION:

The present Hazard and Risk Assessment studies were carried out by Safety Consultancy Services, Ahmadabad in order to identify the hazards inherent in proposed copper smelter plant at Mundra, District Kutch, Gujarat at the instance of the Management of Adani Copper Project, Mundra. Objective of the study was to review the operations likely to be carried out in the project. Process details were made available by the management and where ever explanation was required, explanations were sought from the plant officials. As the whole thing is only in plan, the method adopted was brain storming to derive subjective assessment and the precautionary and control measures on the basis of the experience. The scope of the studies was mainly in the process area, as the storages are likely to be covered by another team of experts.

2.0 METHODOLOGY:

The method adopted for carrying out the study was based mainly on the subjective assessment. The processes were first explained to the team by a plant official. The only document that included the processes was, 'pre-feasibility report, for the proposed copper smelter project at Mundra, Kutch District, Gujarat'. Each location or section of the project was considered for identifying the hazards and risk. In each section the equipment and process substances were viewed for their inherent hazards, and the preventive and control measures which the management proposes to include. Any residual hazard that was considered significant by the team members was recorded along with the suggestion to cope with that hazards. In order to record all the points a format as presented below was used. Severity of hazard, extent of likely hood and net risk ranks were ranked with the help an established method being presented below:

2.1 RISK RATINGS:

Based on the subjective ratings of severity (S) and the Likely hood ratings (L) the HAZOP Risk Matrix (R) has been estimated and present along with each item of analysis. The basic criteria used for these ratings are presented below:

2.2 Severity Rating (S):

Event having the potential of fatality:	1
Event having the potential of Recordable/ lost work case/minor fire:	2
Event having the potential of minor injuries:	3
Event having the potential of no injury, minor property/ equipment loss:	4
Event having the potential of recoverable operational problem:	5

2.3 Likely hood (or frequency) Ratings (L):

Probable > 1 per year	1
Possible 10^{-2} to 1 per year	2
Unlikely 10^{-4} to 10^{-2} per year.	3
Very unlikely 10^{-6} to 10^{-4} per year	4
Extremely unlikely < 10^{-6} per year	5

2.4 Risk Matrix (R)

Likely hood (L)	1	4	4	2	1	1
	2	4	4	3	2	1
	3	4	4	4	2	1
	4	4	4	4	3	2
	5	4	4	4	4	4
		5	4	3	2	1
		Severity (S)				

The Risk levels used in table above are defined as below:

SNo.	Risk Level Definition	Definition
1.	**Unacceptable**	Should be mitigated with engineering or administrative.
2.	**Undesirable:**	Should be mitigated with engineering or administrative actions to a risk level of 3 or less within 12 months.
3.	**Acceptable with existing control**	Verify that procedures or controls are in place
4.	**Acceptable as is**	No further mitigation is required

3.0 PROCESS DESCRIPTION:

Raw Material Handling:

To have the raw materials handling as the most environment friendly process, the following are planned:

1. Concentrate transportation from Port to Plant concentrate warehouse by Pipe Conveyor
2. Covered Concentrate warehouse
3. Internal transportation of the concentrate by pipe conveyor to the furnace.
4. Covered bin building for intermediate storage of concentrate
5. Covered Storage for other Raw Material during rainy season.

Concentrate Warehouse:

Concentrate will be imported from across the world. Concentrate will be unloaded from the ship at Port and will be conveyed to plant warehouse in pipe conveyor. The concentrate will be stored separately in different heaps based on the quality of the material. Warehouse will be built to store at least 25 days consumption quantity. This will help to take care of the shipping schedule as well as blending requirement as per furnace feed design.

Flux Storage Area:

Silica Sand, Lime stone and Coal will be required for addition in the concentrate for effective smelting. They will be stored in open space. However a covered storage will be provided for minimum of 15 days storage, which will be required during rainy season continuous operations.

Bin Building:

Bin building will have intermediate storage bins to store different quality of the Copper Concentrate, Flux material along with Coal and Process Reverts. These bins will be equipped with weighing system for effective blending and maintaining the metallurgy of the furnace.

Paddle Mixer

Paddle mixer is a online mixing system to mix effectively different ratio of Concentrate with flux material and will have provision to add moisture to get required mix material, suitable for furnace feed.

Smelting Furnace:

It is proposed to have smelting furnace for production of 9,00,000 TPA of copper anode production. Copper Concentrate blend mixed with flux material is fed to the smelting furnace, where enriched air added with oxygen is fed to furnace. The smelting reaction takes place at furnace temperature around 12000C. Furnace produces Copper Matte (~60% Cu); Copper Slag (~1% Cu) and Sulphur Di-Oxide Gas (SO2). Both Copper Matte (~60% Cu) and Copper Slag (~1% Cu) is tapped to Settling furnace and Sulphur Di-Oxide Gas (SO2) is transferred to Sulphuric acid plant through a closed pipeline. The smelting furnace will be provided with a waste heat recovery boiler to recover the heat from the off gas of the process.

$$CuFeS2 + O2 + Si02 \rightarrow Cu\text{-}Fe\text{-}S + Fe0.Si02 + SO2$$

The purpose is to utilise heat of the gases within the process and also conservation of water. The furnace will be attached with a state of the art, electrostatic precipitator and a high capacity induced draft fan to transfer the gases to Sulphuric Acid Plant. The secondary off gas will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO2 before it is discharged to atmosphere.

Settling Furnace(s) :

Settling Furnace will be provided for Matte and Ferrosand (Copper Slag also called as Iron Silicate) separation. The Copper matte & ferro sand from smelting furnace will be periodically tapped from the tap hole which will be provided with water cooled copper block in the smelting furnace. The tap hole will be opened with a tap gunning

machine. The ferro sand/ matte together will flow by gravity to the settling Furnace for ferro sand and matte settling and separation. Separation of will take place on the basis of the density difference. The temperature around 1250°C will be maintained. The off-gases from the furnace operation will be taken smelting furnace scrubbing system.

Smelting

Ferro sand settled in the settling Furnace will be granulated and will be collected in the collection pond. Ferro sand granulation clear water will overflow into a clear water pond and it is pumped to spray pond for cooling and then recycled back. The granulated ferro sand from settling pond will be collected and discharges the same in a steel bunker. From the steel bunkers ferro sand will be transported to the designed ferro sand dump area and further sale/disposal.

Pierce Smith Converter :

Pierce- Smith Converters will be used to Convert Copper matte to Blister Copper (~98% Cu). Converting is oxidation of molten Cu-Fe-S matte to form molten 'blister' copper(~ 98 % Cu). It entails oxidizing Fe and S from the matte with oxygen-enriched air or air 'blast'. It is mostly done in the Peirce-Smith converter, which blows the blast into molten matte through submerged tuyeres.

The main raw material for converting is molten Cu-Fe-S matte from smelting. Other raw materials include silica flux, air and industrial oxygen. Several Cu bearing materials are recycled to the converter - mainly solidified Cu-bearing reverts and copper scrap. The products of converting are:

(a) molten blister copper which is sent to fire- and electrorefining
(b) molten iron-silicate slag which is sent to Cu recovery, then discard
(c) SO2-bearing off gas which is sent to cooling, dust removal and & H2SO4 manufacture.

The heat for converting is supplied entirely by Fe and S oxidation; i.e. the process is autothermal. The overall converting process may be described by the schematic reaction:

Cu-Fe-S + 02 + Si02 Cuo l+ { 2FeO:SiO2 :Fe3O4 } + SO2

Molten in air and in flux molten slag with Gas matte oxygen some solid Fe304 Primary Gases from these furnace will be routed to Sulphuric Acid Plant. The furnace will be attached with a state of the art, electrostatic precipitator and a high capacity induced draft fan to transfer the gases to Sulphuric Acid Plant. Proper water cooled double hood arrangement and gas cooling system, etc will be installed to collect the secondary fugitive emission. The secondary off gases will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO2. This will enable continuous operation of three converters with one converter on periodical maintenance.

Ferro sand Cleaning Furnace (FSCF) :

The ferrosand (Copper Slag) from converter will be processed in the ferro sand cleaning furnace. Slag-cleaning furnaces process smelting furnace slag as well as slag from Pierce Smith Converters. A reducing agent is often required to reduce Cu oxide in the slag to Cu metal or Cu sulfide. Coal or Metallurgical coke is often added for this reduction.

C + Cu2O CO + 2Cu0

Carbon additions also reduce solid magnetite in the slag to liquid FeO:

C + Fe304(s) CO + 3Fe0

This decreases slag viscosity and improves settling rates. Copper Slag is also called as Iron Silicate as well as Ferro sand. Ferro Sand from Cleaning Furnace will be granulated and will be collected in the collection pond. Ferro sand granulation clear water will overflow into a clear water pond and it is pumped to spray pond for cooling and then recycled back. The granulated ferro sand from settling pond will be collected and discharges the same in a steel bunker. From the steel bunkers ferro sand will be transported to the designed ferro sand dump area and further sale/disposal.

Copper Scrap Melting system

Considering the availability of the Copper scrap getting generated within the country as well as in house; a dedicated Copper scrap melting system will be designed to have a sustainable solution for the country. This will help the various copper scrap producer a sustainable outlet to treat the copper scrap and produce LME Grade A Copper cathode. System is also designed to handle utilization of the imported copper scrap as feed stock as well. A state of art technology will be used for the same. Such facilities are available in various developed countries.

Anode furnace & Anode Casting Wheel:

Anode furnaces will be used to make anode copper (~99.5% Cu) from blister received from Pierce Smith Converters. The molten blister copper from Peirce- Smith converting contains -0.01% S and -0.5% 02 . At these levels, the dissolved Sulfur and oxygen would combine during solidification to form bubbles ('blisters') of SO_2 in newly cast anodes – making them weak and bumpy. In stoichiometric terms, 0.01 mass% dissolved Sulfur and 0.01 mass% dissolved Oxygen would combine to produce about 2 cm3 of SO2 (1083OC) per cm3 of copper. Fire refining removes Sulfur and Oxygen from liquid blister copper by:

(a) air-oxidation removal of Sulfur as SO2 to -0.002% S then:
(b) hydrocarbon-reduction removal of oxygen as CO and H2O(g) to -0.15%

Liquefied Petroleum Gas or Natural Gas is used for doing fire refining. The secondary off gases will be taken to a high capacity secondary gas scrubbing system to scrub the traces of SO2. . The final product of fire refining is molten copper, **-0.002% S,** 0.15% 0, 1180- 12000C, ready for casting as anodes. Most copper anodes are cast in open anode-shaped impressions on the top **of** flat copper moulds. Newly developed latest designed double casting wheel system will be installed with Casting rate of ~100 TPH. The newly poured anodes are cooled by spraying water on the tops and bottoms of the moulds while the wheel rotates. They are stripped from their moulds (usually by an automatic raising pin and lifting machine) after a half rotation. The empty moulds are then sprayed with a barite-water wash to prevent sticking of the next anode. The most important aspect of anode casting, besides flat surfaces, is uniformity of thickness. This uniformity ensures that all the anodes in an electro refining cell reach the end of their useful life at the same time. Automatic control of the mass of each pour of copper (Le. the mass and thickness of each anode) will be used. Anode mass is normally 375-425 kg. Anode-to-anode mass variation in a smelter or refinery is **+2** to 5 kg with automatic weight control.

Recent anode designs have incorporated

(i) Knife-edged lugs which make the anode hang vertically in the electrolytic cell and
(ii) Thin tops where the anode is not submerged (i.e. where it isn't dissolved during refining).

The latter feature decreases the amount of un-dissolved 'anode scrap' which must be recycled at the end of an anode's life. Suitable capacity Twin caster wheel arrangement will be provided to produce Copper anode. The Copper anode will be transferred to Copper Refinery for further processing.

Off gas handling:

We propose to install a Waste Heat Recovery Boiler (WHRB) to recover the entire off gas heat from the smelting furnace before reaching to Sulphuric Acid Plant for production of Sulphuric Acid through suitable ESP, ID fan, ducting and a gas-mixing chamber. b. A suitable dust conveying system for WHRB & ESP will be installed and will be consumed within the process. c. The secondary collection system with Scrubbing System will be ensured to have sufficient capacity to handle all the secondary gas. d. Gases will be charged through required size stack to atmosphere after scrubbing and meeting standards prescribed authorities.

Sulphuric acid plant:

Sulphuric acid plant having capacity of 30 LTPA will be provided to handle the gases from Copper smelter with required capacity of Gas cleaning plant to treat the incoming gases. State of art environment friendly technology of Double Contact Double Absorption will be used for Sulfuric acid plant. Effluent generated from Sulphuric Acid plant will be treated in state of art Effluent Treatment Facility. The sulphurous gases generated during the sulphidic copper concentrate smelting and matte converting operation in a Copper Smelter plant are treated in Sulphuric acid plant for the production of Monohydrate sulphuric acid as a byproduct.

The process of production of sulphuric acid consists of three principal steps, namely:
i. Cleaning of the sulphur dioxide gas from the ISASMELT furnace and PS converters.
ii. Catalytic conversion of the sulphur dioxide (SO2) gas to sulphur trioxide (SO3) gas according to the chemical reaction:

$$SO2 + ½\ O2 = SO3$$

iii. Absorption of the sulphur trioxide (SO3) gas by combining with water (H2O) to form a solution of sulphuric acid (H2SO4) according to the chemical reaction:

$$SO3 + H2O = H2SO4$$

The conversion of SO2 to SO3 is an exothermic, reversible and adiabatic reaction and with increase in temperature the equilibrium constants become more unfavorable with respect to SO3 formations. The other factors, which favour equilibrium conversions, are increase in oxygen concentration in the gases or high pressures but the relative gains are rather small. In contrast to the unfavorable effect of high temperature on equilibrium it is found that the rate of reaction increases rapidly with rising temperature. Consequently
optimum performance requires a balance between the opposing effects of reaction rate and equilibrium. Thus the gases entering the V2O5 catalyst normally are maintained between 400 - 450°C. Therefore, in order to achieve over-all high conversion efficiencies between 99.6% - 99.7%, it is imperative that the converter gases need to be cooled between stages to the above temperature range and also removing the partially converted sulphur trioxide formed normally after 2nd/3rd beds, before returning them to subsequent stages. This process is commonly known as Double Conversion and Double Absorption (DCDA).

Gas Cleaning Systems

Waste gases from the metallurgical process must be treated to reduce the sulphur dioxide emissions to the atmosphere. To achieve this the sulphur dioxide in the gas is converted to sulphur trioxide for the production of sulphuric acid in the sulphuric acid plant. The metallurgical off-gases must be cleaned prior to entering the contact section of the acid plant to enable the plant to produce a product acid of acceptable

quality for use and sale. As well, clean gas is required to prevent plugging of catalyst beds and other detrimental effects on equipment such as corrosion and erosion.

Gas Cleaning Systems

There are four main duties to be performed by the gas cleaning system of a metallurgical sulphuric acid plant:

1. **SATURATION** of the gases and **ELIMINATION** of the coarse and fine particulate matter,
2. **COOLING** of the gases, **CONDENSATION** of the metallic fumes and REDUCTION of the moisture content,
3. Removal of the very fine particulate matter as well as the bulk of the acid mist by **ELECTROSTATIC PRECIPITATION** to produce an optically clear gas which is fed to the acid plant downstream.
4. Specialty processes for removal of specific impurities in the gas (i.e. mercury removal, halogens)

Saturation – Adiabatic cooling and saturation of the gas is done in an open spray tower, low or high pressure drop venturi. Some removal of course particulate is achieved.

Elimination – The nature (type, concentration, size) of the impurity/dust determines the type of cleaning device required. Typically, high pressure drop venturi (fixed or variable throat), reverse jet scrubber (DynaWave), radial flow scrubber, etc. is required if dust loadings are high or particle size is small.

Cooling and Condensation – Removal of water from the gas is required to achieve the plant water balance. Direct contact devices (packed towers, tray scrubbers) or indirect cooling (star coolers, shell and tube condensers) are used to cool the gas and provide some removal of gaseous impurities.

Electrostatic Precipitation – Usually the last stage of gas cleaning before the drying tower. Removes the finest dust particles and acid mist.

Special Process – These include mercury removal (Boliden-Norzink), fluoride scrubbers, sodium silicate systems, etc.

a. Mercury Removal

Three primary Outotec technologies which have since been further developed over the years:

- Outotec Mercury Removal Process – utilizes a chloride scrubber
- Outotec Mercury Removal Process – utilizes a selenium filter
- Outotec Mercury Removal Process – utilizes sodium thiosulfate Outotec's chloride scrubber process has essentially become industry standard process providing these benefits:
- Insensitivity to high incoming values of mercury
- Cost-effectiveness; moderate investment costs and low operating costs, which are practically independent of the mercury level
- Applicability to almost any gases including ones containing SO2
- Proven technology: approx. 40 reference plants
- Option for an additional step involving a specially designed electro-winning cell, in which the calomel produced can be converted to high purity metallic mercury

Process equipment

- Reactor tower and other special vessels
- Chlorination system
- Electrowinning cell for metallic mercury production from calomel
- Process control

Fluoride Removal Process

Hydrogen fluoride in the SO2 gas can cause damage to the sulfuric acid plant and therefore requires removal from the gas. This can be achieved by adding sodium silicate solution to the packed gas cooling tower. The hydrogen fluoride is absorbed

in the gas cooling tower, reacts with the sodium silicate forming a reaction product with low vapor pressure and is finally bled to the waste water treatment plant.

c. Arsenic Removal Process

To avoid contamination to the sulfuric acid, it is necessary to remove as much arsenic in the SO2 gas as possible. Particulate arsenic has already been removed during the hot gas cleaning process. High-efficiency scrubbers with a variable throat for efficient continuous scrubbing for removing most of the arsenic content to wet electrostatic precipitators for the final cleaning of the gas will be used. Gaseous arsenic

condenses in the quench section where the SO2 gas is cooled down to the saturation temperature. Solid arsenic forms here and is ready to be scrubbed out of the gas in the wet gas cleaning plant. The solved arsenic is then transferred to the waste water treatment plant with the weak acid bleed, where the arsenic has to be separated from the bleed.

Alternatively, some of the arsenic can be precipitated out of the weak acid as early as in the wet gas cleaning plant assuming the acid concentration in the quench liquid is high enough. This will allow for the solid arsenic to be separated from the weak acid before it is transferred to the waste water treatment plant.

Conversion of SO2 to SO3

Double Absorption

Also known as Double Contact/Double Absorption

Characterized by two SO3 absorption towers

Double Absorption Plant Arrangements

2/1 Arrangement - 2 catalyst beds before intermediate absorber followed by 1 catalyst bed. Will not meet current emission regulations.

2/2 Arrangement - 2 catalyst beds before intermediate absorber followed by 2 catalyst beds. Used by Lurgi in many plants around the world.

3/1 Arrangement - 3 catalyst beds before intermediate absorber followed by 1 catalyst bed. Standard arrangement for the modern contact sulphuric acid plant for obtaining SO2 emissions of 4 lb/ST (2 kg/MT) or 99.7% conversion.

3/2 Arrangement - 3 catalyst beds before intermediate absorber followed by 2 catalyst beds. Used when high overall conversions (>99.9%)/low SO2 emissions are required. Plants with 3/2 arrangements are required to ensure low SO2 emissions and are considered Best Available Technology (BAT). The optically cleaned SO2 rich gases along with dilution air to the extent required for maintaining the requisite O2 / SO2 ratio are dried in a drying tower with 96% concentrated sulphuric acid in counter current circulation. The dried gases after heating to 400 - 450 ° C passed through converter with cesium promoted vanadium pent oxide catalyst. The converted SO3 gases are absorbed in two absorption towers where 98% concentrated sulphuric acid is circulated to produce 98.5% strength Sulphuric acid product. During the start up and other abnormal operations such as when SO2 content is less than auto thermal point, gases are heated before conversion in converter which helps in low SO2 content in vent gases.

Acid Section

Acid produced is at during the absorption process is given bleed at > 98%. This acid is at a high temperature and need to be brought to the room temperature level say ~< 40 Deg C. Acid coolers are used for the same. Acid coolers are either plate heat exchangers or shell & tube heat changer with anodic protection to protect the cooler. Cooling of the acid is down either by using water or air or combination of the both depending upon the application. Cooled product acid is stored in the storage tanks and supplied for further us in the market as well as in house consumption to produce phosphoric acid.

Oxygen plant:

Oxygen plant with capacity of 90,000 TPM with 95% purity will be provided for Copper smelter plant requirement. To have flexibility in operations 2 Plants of 1500 TPD capacity each with 95% Purity Oxygen plant will be set up.

Refinery Unit:

The anodes produced from the smelter will be refined through electrolysis process to remove the impurities present. A refinery unit capable of handling the smelter capacity will be built. State of art electro refining technology will be used to produce Copper Cathode of LME Grade A from Copper anodes produced in the Copper Smelter. Refinery will have state of art technology to produce value added products from the impurities include Bi, Te, Ni, etc. Copper Anode slime generated during copper electro refining process will have precious metals such as Au, Ag, Pt, Pd, etc. Effluent generated from Copper refinery will be treated in state of art effluent treatment facility.

Electrorefining entails:

a. Electrochemically dissolving copper from impure copper anodes into
CuSO4 –H2SO4 – H20 Electrolyte

b. Selectively electroplating pure copper from this electrolyte without the anode impurities. It serves two purposes:

a. It produces copper essentially free of harmful impurities
b. It separates valuable impurities (e.g. gold and silver) from copper for recovery as by-products.

Application of an electrical potential between a Copper Anode and a metal cathode in CuSO4 –H2SO4 – H20 Electrolyte causes the following:

a. Copper is electrochemically dissolved from the anode into the electrolyte - producing copper cations plus electrons:
Cu0 anode Cu++ + 2e-
b. The electrons produced by above Reaction are conducted towards the cathode through the external circuit and power supply.
c. The Cu++ cations in the electrolyte migrate to the cathode by convection and diffusion.
d. The electrons and Cu++ ions recombine at the cathode surface to form copper metal (without the anode impurities), i.e.:
Cu++ + 2e- Cu0
Cathode
Overall copper electrorefining is the sum of Reactions
Cu0
impure Cu0
pure

Precious Metal Recovery Plant (PMRP):

Copper Anode slime generated in Copper Electro Refining process undergo roasting process to recover Selenium. Selenium is of a commercial grade with purity of 99.5%.

Selenium roasting process

The roasting of copper anode slime with selenium is done in an electrically heated furnace where the temperature is around 500°C. Oxygen and SO2 gas are used as reagents. Selenium compounds react at this temperature forming gaseous selenium dioxide. Selenium dioxide is then sucked from the furnace into an aqueous solution. Elementary selenium and sulphuric acid is generated in the solution at a temperature of 80°C. Selenium crystals are then filtered, washed and dried.

The elementary selenium is of a commercial grade (99.5%) selenium. The attained purity rate is very high and the selenium content of the roaster slime is normally about 0.5%.

Deselenised Anode Slime Smelting

The Outotec® TROF (Tilting Rotating Oxy-Fuel) Converter was originally designed for processing selenium-free copper anode slime, but today the converter can also be adapted for other solutions, such as processing precious metals containing dusts, scraps and bullions. The Outotec® TROF Converter offers smooth tilting and rotating functions thanks to its sophisticated hydraulic system.

The selenium-free slime containing precious metals is mixed with soda and borax. This mixture is smelted in the furnace. The smelting temperature is as high as 1300°C. The slag is poured off by tilting the furnace. The metal is further refined by blowing oxygen and the end product is cast into anodes using casting equipment and called as Dore Anode.

Outotec silver electrolysis tankhouse

Dore Anode is consisting of Ag, Au, Pt, Pd, etc. Dore anode further undergoes electrolysis process to recover the precious metals. The heart of the Outotec Silver Refining Plant process is the silver electrolysis tankhouse, which consists of electro-refining cells, circulation tanks and pumps, sieve tanks, a cooling system, and a pH control and adjustment system. A sophisticated control system monitors and controls the process, making it both easy to operate and highly efficient. With Outotec HCD (High Current Density) silver electro-refining cells, current densities exceeding 1000 A/m2 are possible, depending on the composition of the silver Dore anodes being processed.

The electro-refining process is continuous except when new silver Dore anodes are loaded in the cells and silver anode slime and anode scrap is discharged from the cells at the end of the electrolysis cycle. The anodes continuously dissolve, depositing refined silver on the cathodes. The cell is equipped with an automatic scraper system that removes the deposits – the silver crystals scraped off the cathodes are collected at the bottom of the cells. At the end of the electrolysis cycle, a slurry containing crystals of cathode silver and electrolyte is discharged into a sieve tank. The quality of the silver crystals produced in the electrolytic refining process is ensured by electrolyte circulation. All this helps increase the efficiency of the process, decrease manual work,and increase the amount of silver recovered. The modular design makes it easy to scale the solution for your desired capacity. Silver anode slime containing valuable impurities such as gold and platinum-group metals (PGMs) is also formed during the electrolysis process. The slime is collected inside anode bags surrounding silver Doré anodes and can be further processed using the Outotec Gold Refining process for recovery of gold and PGMs.

The non-dissolved anodes remaining after electrolysis are recycled for smelting and casting of new silver Doré anodes. Spent electrolyte withdrawn from circulation is replaced with fresh silver nitrate electrolyte in order to keep the silver content at a constant level. Outotec silver electrolyte preparation system Some of the silver crystals produced in the silver electrorefining cell are processed in the Outotec silver electrolyte preparation system, where they are dissolved to produce pure silver nitrate solution. The process and equipment design avoids the formation of toxic NOx gases, which improves the safety of the working environment. The system is also available as standalone equipment with its own control system.

Drying of silver crystals

The final product can be either silver bars or silver granules. In both cases the silver crystals are dried using the fully automated Outotec Silver Dryer, which consists of a fan, a heater, and a sieve tank for the silver crystals. The dried silver crystals are then melted using an induction furnace.

Casting and bar processing

Casting of silver bars is performed using an Outotec Silver Bar Casting Wheel for 1000 troy ounce (approximately 31 kg) ingots. The bars are then cooled in a water bath. Further operations, such as polishing, weighing, marking, and stacking can be performed by the Outotec Silver PWMS Robot. The equipment produces silver bars that meet the requirements of the London Bullion Market Association's Good Delivery standards.

Granulation and packing

Outotec Silver Granulation Equipment consists of an induction furnace, granulation equipment and a receiving tank. Granules are dried in the Outotec Silver Dryer and packed using a material-handling system that produces readyto- ship bags that are sealed and marked.

Gold Leaching & Recovery

Outotec has developed a new environmentally friendly chloride leaching process for gold ores and concentrates. The new process combines effective gold leaching with a new type of gold solvent extraction process.

Highly oxidizing power in gold leaching provides very fast leaching kinetics and excellent gold recovery. Gold can be extracted from pregnant leach solutions using an Outotec's patented solvent extractant. Pure gold product is precipitated directly from the stripping solution. Solvent extraction technology enables also direct silver recovery. Effluent generated during the process is treated in state of art effluent treatment facility.

Continuous Cast Copper Wire Rod Plant (CCR):

Copper Cathode produced from Copper Refinery will be melted in a vertical shaft furnace with the help of gaseous fuel like LNG/LPG/ etc and drawn in the form of Copper wire rod on continuous basis from a continuous casting and rolling machine. Rod will be of various sizes as per market requirement such as 8 to 25 mm. The copper rod is manufactured by the modern continuous casting and rolling technology CONTIROD/ South Wire/ Properzi using the machinery supplied by Asarco (USA) – shaft furnace, Hazelett (USA) – twin belt caster/ South wire/ Continuous Properzi Caster, SMS-MEER (Germany)/ Morgan (USA)/ Continuous Properzi (Italy) – rolling mill.

The process of copper rod manufacturing consists of the following main stages:

1. Charging copper cathodes into the shaft furnace by the skip hoist and melting of the metal with gaseous fuel.
2. Preparation of metal for casting in the holding furnace.
3. Continuous casting rectangular/ Trapezoidal shape copper bar on the caster.
4. Rolling of continuously cast in the rolling mill.
5. Cooling and brightening of copper rod.
6. Coating the copper rod with anti-corrosion wax layer.
7. Coiling of the copper rod into coils.
8. Weighing, packing, warehousing, and shipping of the finished product.

Phosphoric Acid Plant:

Phosphoric acid plant of 5LTPA capacity will be set up. This will be value addition to proposed copper smelter project as well as Indian Fertilizer industries . This will be sold to fertilizer companies. Phosphogypsum produced during the process will be sold to cement industries as well as fertilizer and rest will be stock piled. Hydro Fluro Silicic acid generated as a byproduct will be converted as Aluminum Fluoride as well as sold in the market.

The rock phosphate received by conveying system from port and stored in Rock phosphate storage area. The rock phosphate will be taken to reactor (R1) by conveyor and hopper where it is mixed with recycled slurry, which contains mainly P2O5, CaO, SO3 and H20 received from Reactor (R2). Slurry prepared in the reactor (R1) series will be sent to Flash Column to cool the slurry and maintain the required temperature in the reactor compartment. The slurry separated out from flash column will be fed to Reactor (R2) to react with sulphuric acid and form the slurry which will be sent to filter. Phosphoric Acid of 26-27% To 42-43% (Weak Phosphoric Acid) will be recovered based on the process of phosphoric acid is selected. A series of washes has been introduced to recover the P2O5 from the filtered cake, before it is sent Gypsum Pond.

Filtered acid is then sent to Clarification section to trap the solids passed through the filter cloth. Clarified acid is then fed through Evaporation section to enhance the concentration to 48-54% P2O5 (Strong Phosphoric Acid) suitable for fertilizer manufacturer.

During evaporation of the weak Phosphoric acid to strong phosphoric acid, Hydro fluro Silicic acid of 18 -20% concentration is generated. This acid is then partially consumed in house for Aluminum Fluoride manufacturing and rest is sold in the market.

Aluminum Fluoride Plant

Hydro fluro Silicic acid generated from Phosphoric acid plant will be converted in value added Aluminum Fluoride. Aluminum Fluoride plant of 30,000 MTPA capacity will be set up. Aluminum Fluoride produced will be sold to Aluminum manufacturing Companies. Aluminum hydrate will be sourced from local market. Aluminum hydrate will be digested with hydro fluro silicic acid to make Aluminum fluoride in liquid form and silica part will be separated by filtration. Liquid aluminum fluoride will then undergo crystallization process and then Aluminum Fluoride will be filtered and dried with gaseous fuel before sending it to packaging section. Cyclonic separator and bag filters will be installed to recover the Aluminum fluoride, which may get escaped during the drying process.

Effluent Treatment Plant (ETP):

Waste water generated from Copper Smelter, Sulphuric Acid Plant and Copper Refinery will be treated in state of art effluent treatment facility. The Ferric arsenate process is a solution for managing toxic arsenic in process and effluent streams. The process consists of a ferric arsenate precipitation stage followed by neutralization using lime milk. The process is based on easy, robust and understandable precipitation. The treatment of toxic arsenic requires a high level process reliability. This can be guaranteed using the cost effective Ferric arsenate process.

After the ferric arsenate process the treated water has a low arsenic concentration, typically containing 1-3 mg/L arsenic. If an even lower arsenic concentration is required, a polishing step with enhanced arsenic removal can be included. The process comprises the neutralization of acidic streams and the advanced removal of metal impurities, including Ni, Cd, Cu, Sb and Zn. The final product of the ferric arsenate treatment process is treated water that can be safely discharged to the

environment or recycled back for process use. The selection of the arsenic treatment process is governed by residual stability. The residue of the Ferric arsenate process is a stable solid precipitate. Treated effluent will be consumed within the plant operations to maximum extent and rest will be discharged to Sea, ensuring it confirm the discharge standards.

Utilities Requirement:

Water:

The Requirement Water for the plant has been estimated around 32,800 M3/Day. M/s. Adani Ports & Special Economic Zone Ltd (APSEZL) will be supplying the total water requirement for the plant.

Power:

The total estimated power requirement for Copper Smelter Plant is 300 MW out of which 40 MW would be generated from internal process steam and balance 260 MW power would be sourced from Grid/ M/s. Adani Ports & Special Economic Zone Ltd (APSEZL)

Fuel Oil:

Fuel oil storage facility will be built as per requirement in accordance with guidelines from CCOE. Capacity of the system will be based on the design requirement after finalization of the engineering.

LPG/ LNG:

LPG/LNG storage facility will be built as per requirement in accordance with guidelines from CCOE. Capacity of the system will be based on the design requirement after finalization of the engineering

Air Compressor:

A dedicated air compressor station will installed to supply process air as well as moisture free air as Instrument air for operation of pneumatic based instruments. Capacity of the system will be based on the design requirement after finalization of the engineering.

Oxygen Plant:

Oxygen plants each of 1500 TPD Capacity delivering 95% purity Oxygen will be set up for Copper smelter requirement.

Waste Heat recovery based power Plant:

With focus on recovery of heat energy, waste heat recovery based power plant with ~ 50 MW capacity will be installed.

DM Plant

A dedicated DM plant will be set up to fulfill the requirement of Copper Refinery Tank House and Continuous Cast Copper Rod Plant.

Secondary RO Plant:

A dedicated secondary RO plant will be installed at the down stream of the proposed Effluent Treatment Plant. This will help to reuse and recycle the treated water effectively within the plant requirement. Rejects from the secondary RO plant will be discharged to sea through existing APSEZ's desalination plant outfall channel.

4.0 SUMMARY OF RECOMMENDATIONS:

Concentrate unloading from ships and transfer to the plant.	1.	Permit to work system should be used for allowing the operator to go inside the ship hatch with loader or otherwise. Keep watching from outside. Ensure all safety arrangement including ongoing ventilation to avoid build up of the concentration of combustion products of loader engine.
	2.	Only trained crane operators should be employed. Ensure certification of crane and /or other handling devices including tools and tackles is done by competent person.
	3.	Ensure that each support of the belt conveyor should be earthed / bonded. Nip guard should be provided at all the nip points of the belt conveyor
Transfer station from the belt conveyor to the bonded ware house.	4.	SiO2 (Crystalline) concentrations of the concentrates should be evaluated and permissible limit of exposure for the dust should be established. Ensure that the dust concentration as found by periodic evaluation does not exceed permissible limit.
	5.	Some visible signals (blinkers/flickering lights) with audio alarm should be provided to area where the material is going to be poured. Route crane may be predefined and possibly barricaded.
Concentration and flux	6.	SiO2 in the worker's breathing zone should be monitored. The hazards and precautions of SiO2 and coal dust should be displayed.
Paddle mixer	7.	Ensure that the top cover and windows are closed as long as the mixer is working. Emergency stop switch, should be provided close to the inspection window
Smelting furnace	8.	Monitoring of gas/dust release at SO2 gas injection point should be done and based on that the exposures should be controlled.
	9.	Ensure that the operator carrying out the drilling and mud packing are experienced operators. They should put on the protection against molten metal splash, IR radiations from the molten matter, exposure to SO2, metallic copper fumes and heat stress.
	10.	The area under the launders should be barricaded to avoid walking and working there. Conditions of the launders should be checked before taping the molten metal.
	11.	Air cooling system with plenums above the work spot should be provided to avoid thermal stress.
	12.	Use of more water and more salt dishes should be promoted. (A drink with 6% sugar and 0.9% salt is suitable during the summer season.)

	13.	SO2 monitoring should be done for 15 minutes. Each sample to compare the level with STEL-PLE[1]. (Short Term Exposure Limit) and sources of gas should be attended to as early as possible. Arrangement for immediate treatment of exposed workers should be made available.
	14.	Periodic monitoring of Copper fumes should be done to ensure that the exposures are not above the limits prescribed for 8 hours exposure.
	15.	Ensure that the person carrying out the mud plugging operation is experienced. He should put on the protection against molten metal splash, IR radiations from the molten matter, exposure to SO2, metallic copper fumes and heat stress.
	16.	Roof of the melting furnace should be kept leak proof.
	17.	All the tools to be used should be kept in warm conditions.
	18.	Periodic monitoring of SO2 in work room air and ensuring that the levels are below the PLE.
	19.	If the levels are found more general ventilation of the room should be increased.
	20.	Hazards and precautionary measures of SO2 and copper fumes should be displayed in the language known by the majority of employees.
	21.	Cooled air blowing at the work spots should be considered. Minimum rest period every hour should be defined for different hot jobs.
	22.	Marking of the routes of ladle movement should be done and movement of workers on the ladle routes should be prohibited.
	23.	Ensure that level of SO2 and metal fumes are monitored periodically
	24.	Ensure that the systems are under the effective zone of lightening arrestors. Ensure double earthing of the electrical equipments and structures.
Pearce Smith Converter. (Removal of Fe and S)	25.	Inspection of the scraps and the container should be done before feeding to avoid and objects with cavity and moisture.
		The SO2 and fumes Concentrations in Pears Smith converter area should be monitored.
	26.	Proportion of time spent in hot area per hour should be specified to avoid any heat disorders among the workers. The drinks containing 6 % glucose and 0.9 percent salt should be promoted in those areas.
	27.	The noise measurements should be done to ensure that excessive

[1] The short term exposure limits – permissible level of Exposure as prescribed in the Indian Factories Act 1948.

		exposures of the workmen is not more than 90 dB(A) the hearing conservation programme as laid down in the schedule on noise in Gujarat Factories Rules (made under Section 87 of the Factories Act) should be followed.
	28.	The route of the ladle should be marked and possibly barricaded. Alarm should be sounded before transfer by ladle.
Slag Cleaning Furnace	29.	Use of concentration monitoring instead of pH monitor may be considered to ensure that solution is always alkaline. The availability of chemical cartridge respirators for acid gases should be ensured in the area.
	30.	The scrap should be manually inspected to ensure that it does not have any moisture. All hollow object/objects with cavities having even rare possibility of moisture should be broken by cold methods before feeding into the furnace.
	31.	The route of the ladle should be marked and barricaded. Alarm should be sounded before transfer by ladle.
	32.	Ensure to monitor the conditions of bag filter by suitable method and regular analysis.
	33.	Inspection of the scrap should be done to ensure that there is no moisture and objects with cavities to avoid flash release of steam on sudden boiling of water.
	34.	Barricading and display of precautions should be done to avoid persons moving or working under launder.
	35.	All the components of the lifting system should be duly tested at regular intervals by competent persons.
	36.	The workers in the area should be protected by safety shoes to prevent injuries due to falling of heavy objects on the feet.
	37.	Ensure that all forklift truck driver are well trained, certified and having valid driving licence.
	38.	Ensure that safety valve is provided in the downstream of the pressure regulator.
	39.	Discharge rod should be provided to ensure no potential in any object.
	40.	All the protective equipments should be tested to bear the voltage on which the workers have to work.
	41.	Ensure that the persons duly certified by the electric department should be allowed to work in such areas.
	42.	The danger boards (Skull and cross bone) should be suitably placed on the equipment.
	43.	Ensure that running of ID fan is monitored with the help of load monitoring.
	44.	Ensure that redundant ID Fan is provided to use in case of failure of one fan. It should automatically start on failure of the first one. Ensure that dampers to connect the gas line through secondary

		gas scrubber to function in case of failure of sulphuric acid plant are provided.
	45.	It should be ensured that the caustic concentration is maintained by automatic system or on manual basis as long as secondary gas scrubber is used.
	46.	Ensure that the chimney is applied with anti corrosion coatings to prevent their damage due to acid depositions.
Gas cleaning plant	47.	Ensure that water flow is monitored with record in the control room.
	48.	Ensure that indication on pump failure and local flow indicator are also provided.
	49.	Ensure that washing tower outlet gas temperature is interlocked with SO2 blower trip.
	50.	Earthing resistance should be monitored at fixed intervals and record of testing should be kept. Ground fault current interrupter should be provided.
	51.	The system to discharge the vessel before any work in it, should be provided.
	52.	Proper Chemical cartridge respirator should be kept available in the area.
	53.	Precautions and danger board should be provided at the wet electrostatic precipitator.
	54.	Ensure that the PPE used by the workers are tested for high voltage available in the system.
	55.	Ensure that the pressure is monitored with low pressure alarm with blower interlock.
	56.	Ensure that SO2 stripper is provided to recover the gas before the water is released into the drain.
	57.	Ensure to monitor Temperature and pressure across the star cooler.
	58.	Ensure to monitor the fluorine and mercury concentration at the downstream of fluorine absorber or mercury scrubber.
	59.	The instructions should be displayed to ensure that system is wet before applying the charge. Interlocking should be considered.
	60.	Hazards and precautionary measures for mercury should be displayed. The MSDS of the respective chemical should be readily available.
	61.	Mercury in treated SO2 should be checked periodically.
	62.	Ensure to provide chlorine emergency kit with at least two self contained breathing apparatus. Workers should be trained in use of emergency kit application. (Provision of chlorine sensor with alarm should be considered.)
	63.	Ensure to provide vacuum valve which may stop the flow of chlorine in case of water flow failure.

	64.	Arsenic level of SO2 should be tested periodically / on line to ensure that it has been removed effectively.
	65.	The fact that arsenic forms deadly poisonous arsine gas on contact with mineral acids should be displayed.
	66.	The Solid particulate matter collected in the ESP may contain arsenic. Hence it should not be allowed to come in contact with any acid to prevent arsine gas formation which is highly poisonous.
	67.	Level monitoring dryer should be done with alarm at the site and in control room on high and low levels.
	68.	Ensure that a standby pumps with NRV s provided in auto start mode with alarm in control room.
	69.	The SO2 blower and diversion to stack should be interlocked with the pump failure.
	70.	Ensure that the pressure of acid line is more than the water line.
	71.	pH of the water should be monitored on line with alarm.
	72.	Acid concentration should be monitored on line and fresh acid should be added to maintain the concentration.
	73.	On line monitoring of moisture in acid line should be done.
Sulphuric Acid Plant	74.	A parapet wall with acid proof tiles should be provided to divert the spilled acid to treatment plant.
	75.	All the flanges and pump seals should be provided with flange guards to prevent spray release of the acid.
	76.	If the flanges are above working areas, the catch pots with adequate drain pipe should be provided.
	77.	Ensure that eye wash fountain and safety shower should be provided nearby.
	78.	It should be ensured that the total capacity of the circulation tank should be enough to hold the total acid in the system.
	79.	pH of the water should be monitored to detect any leakage and leaking members of the coil should be replaced/repaired.
	80.	Ensure that a dyke wall of capacity more than total contents of the largest tank within the dyke is provided. The floor of the dyke area should be impervious and acid resistant. Slope of the floor should be diverted to sump provided with a drain pipe. Drain pipe should be provided with a valve approachable from outside the

		dyke. The valve should be kept closed under normal conditions. Whenever required for discharging the rain water the valve should be closed.
	81.	Ensure that vent pipe of adequate dimensions is provided on the top of the tank with protection rain water protection.
	82.	The vent should be cleaned periodically. Wire mesh protection should be provided to prevent entry of birds and insects.
	83.	Self indicating silica gel column should be provided in the vent to arrest moisture ingress. The silica gel conditions should be observed every week and the gel should be replaced with fresh or regenerated silica gel as soon as 75% of the gel is decolorized.
	84.	The overflow pipe should be provided from the upper most point in the tank wall. The pipe end should be kept sealed by dipping into a vessel filled with acid to prevent moisture entry through the overflow pipe.
	85.	Ensure that the drain is provided at the lowest point of the tank. The drain should be provided with two valves in series or one and one blind. Open and close positions of the valve should be visible from a distance.
	86.	Ensure that level indicators with alarm for high and low levels should be provided both in at the site and in control room.
	87.	The tank should be earthed by two or more earthing strips.
	88.	Proper ladder with guarding and independently supported platform with railings and toe guard should be made for approach of the workers to the top fittings of the tank.
	89.	All the flanges should be guarded to prevent spray release. Catch pots should be provided under the flanges above working areas to receive and deliver the acid at safe place.
Oxygen Plant	90.	Ensure that the oxygen is fully evaporated and brought to ambient temperature before transferring it through non cryogenic piping.
	91.	Ensure that only degreased components are used in the vessels and piping.
	92.	The solvent washing of internal spaces should be done with suitable degreasing agent before using the vessel/piping.
	93.	The area should be kept completely free of greasy materials and other combustible substances.
Refinery unit (Copper)	94.	Safety shoes, helmets and canvas gloves with hard toe should be used by all the workers in the area.
	95.	Persons should be provided with complete body protection in such a way that toxic chemicals exposures are avoided.
	96.	Safety Showers & eye wash fountains should be provided nearby.

	97.	Ensure that Acid is poured in dilution water for the sake of dilution.
	98.	Ensure to provide local exhaust system to collect mist from the cells and discharge into the ambient air after suitable treatment.
	99.	Use of tennis balls and anti mist additives may be considered.
	100.	Exhaust system to collect mist from the cells and discharge into the ambient air after suitable treatment.
	101.	Use of tennis balls and anti mist additives may be considered.
	102.	Ensure that the hazards and preventive measures of low voltage high amperage current are displayed in the language known by majority of workers.
	103.	Warning for people using heart pace maker should be displayed.
	104.	Food keeping and eating should not be allowed in the cell house. Adequate hand-washing facilities should be made available.
	105.	MSDS of copper compounds should be kept readily available. All the precautions laid down in MSDS should be used to prevent any intoxication among the employees.
	106.	Concentration of sulphuric acid and copper sulphate should be periodically monitored to ensure that the exposure does not exceed the Permissible Limits of Exposures in Indian Factories Act.
Precious Metal recovery	107.	Ensure to provided impervious hand gloves, safety shoes, face shield and apron should be used by the employees carrying this operation.
	108.	Ensure that the temperature has reduced to safe level before removing the materials from the furnace.
	109.	Ensure double earthing of the furnace.
	110.	Toxic properties of selenium should be displayed along with the precautions.
	111.	Hydraulic system should be tested periodically at the intervals suggested by the technology suppliers.
	112.	The path of ladle should be marked on the floor. Alarm should be sounded while starting the ladle transfer.
Silver refining	113.	Precautions recommended for copper refining should be observed for silver refining also.
Induction furnace	114.	Ensure that water temp both at the inlet and on the outlet should be monitored to ensure integrity of the system.
	115.	The furnace specifications should match with the applicable standards to avoid the weaker material of crucible.

	116.	Furnace should not be allowed to be overheated.
	117.	Ensure that GFCI (Ground fault current interrupter) should be provided.
	118.	Ensure that the furnace is operated as per prescribed current flow by the manufacture. Bridging of the induction furnace should be avoided by checking the inlet and outlets of water and power drawn by the furnace.
	119.	Ensure that the robot area is barricaded from all the sides, the door to approach the area should be provided with interlocking in such a way that the robot cannot perform any task as long as the door is open.
	120.	Ensure that the workers in the area are equipped with adequate hand and feet protection.
	121.	Ensure that area around the Induction furnace operation and granulation is barricaded to avoid entry of any employee to risk zone.
	122.	Concentration of silver in the form of fumes should periodically monitor to ensure healthful work environment.
	123.	Canopy exhaust should be provided to cover top opening of the induction furnace and hot and contaminated air and water vapour generating at the time of pouring on the receiving tray.
	124.	Ensure effective ventilation to allow fresh air at the workplace. (Minimum 6 air changes per hour) or localised air blowing of outside air/conditioned at the work station.
	125.	Silver fumes should be monitored to ensure that the room is free from silver fumes.
	126.	Ensure that all the moving parts of the stitching machine are guarded to prevent injuries.
	127.	MSDS of the solvent should be obtained from the supplier. Hazardous properties of the solvents should be displayed along with the precautionary measures and emergency response procedures
	128.	Ensure that all the electrical motors, tanks and other equipments like drier, induction furnace, crucible heaters & other equipments of the area are earthed at two places.
	129.	Ensure to provide safety shower and eye wash fountain in the area.
	130.	Ensure to provide a stand by exhaust blower in order to meet emergency situations.
	131.	Ensure to provide a stand by circulation pump in order to meet emergency situations.

	132.	Pressure monitoring of the jackets will indicate health of the interface surface.
	133.	Ensure that the vent pipe is resistant to the acidic vapours and high enough to discharge the emissions away from working zone.
	134.	Auto temp monitoring of the drier should ensured.
	135.	Ensure to provide heat resistant hand gloves and leather safety shoes and gauntlets. .
	136.	Ensure that crucible is not cracked and handled with proper tong.
	137.	Only well trained and experienced employees should carry out the pouring operation. Ensure that the mould is dry before molten metal is poured into it.
	138.	Leaks in the line should be detected at early stage by periodic checking of joints and valves with the help of explosive gas meter.
	139.	Possibility of explosion of gas within the lines should be eliminated by provisions of NRVs and flame arrestors in both fuel line and air line.
	140.	The nozzles of the burners should be cleaned at periodically with records. Frequency of cleaning should be decided on the basis of the experience.
	141.	Ensure that the cathodes are free from any moisture. Any other source of water ingress should be avoided.
	142.	The area under the launder should be barricaded with cautionary notice.
	143.	Strict care should be taken to avoid falling of rain water into this and other furnaces.
	144.	Strict maintenance of the launder should be ensured. [There have been several events of bursting of water jacket provided for spraying water on the lower part of the wheel and leading to violent destruction of building due to shock ware generated by the event.]
	145.	Ensure to carry out any work in cooling and coating zone only after closing the extrusion operation.
	146.	Efforts should be made to minimise dust generation and prevent exposure by strict use of protective devices. The workplace should be monitored for rock phosphate dust& ensure that it does not exceed 3mg/M^3. (Computed from Fist schedule of Factories Act assuming silica is 7%.)
	147.	The workers should be provided with dust respirators.
	148.	Dust survey should be done to ensure that the levels are less than 3 mg/M^3.
	149.	Ensure to provide chemical cartridge respirator with special filter

		to remove the HF gas and dust in any.
Aluminium Fluoride Plant.	150.	Choking conditions of exhaust duct on Aluminium Fluoride reactor should be checked and cleaned periodically.
	151.	Ensure that washing facilities are available. Safety shower and eye was fountain should also be provided.
	152.	The work environment should be monitored to ensure that there is no objectionable concentration of the corrosive dust.
Effluent Treatment Plant	153.	Local exhaust arrangement should be provided to extract the dust generation at the lime dissolving point. (It should be kept in view that CaO is highly exothermic on contact with water. A particle entering the eyes will slake the lime generating excessive heat and eye injury.)
Utilities - Electricity	154.	Only authorised person with competency certificates should be allowed to operate the panel/system.
	155.	Earth fault relay, all other relays, equipment and controls should be in healthy conditions.
	156.	Ensure that the lightening arrestors/ earthing pits meet with BIS standard. The Indian Electricity rules should be strictly followed.
	157.	Ensure that all the workers in the substation should be well trained in artificial breathing. The chart of artificial breathing should be displayed in the substation.
	158.	Ensure that discharge rod and rescue rod are kept available in the substation.
	159.	Ensure that personal protective equipments are tested for the voltage in question.
	160.	The first aid box should be kept available with list and phone numbers of the trained first aiders.
	161.	Escape routes at two diagonally opposite direction should be provided in each panel room.
	162.	Ensure to display electric circuit diagram is displayed on the wall of the switch room.
	163.	Ensure that rubber mats are kept in front of all the control panels should be laid with tested rubber mats.
	164.	Ensure that emergency light is as available in the switch rooms.
	165.	All the equipments and cables etc. used is substation should be of required capacities meeting the specific BIS standards.
	166.	Cable trays should be earthed at two separate points.

	167.	A qualified electrical engineer should be declared as Electrical Safety officer to ensure compliance of Indian Electricity rues during construction and maintenance and operation of electrical installation.
	168.	Ensure that substation is well ventilated and adequately illuminated
	169.	Ensure that all the equipment in substation are periodically inspected and maintained.
Utilities - Transformers	170.	Ensure that the earthing resistance is maintained as per Indian Electricity Rules.
	171.	Ensure that only tested PPE are used by the electricians.
	172.	Ensure provision of the followings in each transformers: 1. The conservator tank should be provided with vent having silica gel column. The column should b inspected weekly to ensure its effectiveness. In case discoloration of the 75% of the column the gel should be replaced by regenerated or fresh silica gel. 2. A fire wall of 4 hour fire resistance should be provided between two transformers with oil capacity more than 2000 litres each. 3. Emulsifier should be provided for each transformers having oil storage capacity of 2000 L. 4. Pressure relief valve should be provided in the transformer tank. 5. Thermostat for winding and oil of the transformer should be provided. 6. Transformer should be provided with pressure relief valve and Buchholz relay. 7. The oil pit with drain and collection arrangement is provided for each transformer. 8. Emergency stop buttons should be provided near each transformer and motors. Transformer should be provided with double earthing. 9. The hydrant operating point near transformer should be provided with fire wall. 10. Danger boards should be provided close to the primary and secondary terminal boxes and on the fencing of the transformer. 11. Separate lightening arrestor should be provided on overhead lines.
Utilities - Process Air Compressor	173.	The provision of enclosure on the compressor to prevent propagation of sound may be considered.
	174.	The control room where some employee is likely to remain should be provided with Sound proof room with glass panel for looking into the compressor room.

	175.	The sound levels should be measured at fixed intervals.
	176.	The person going close to the compressor should use adequate ear protection.
	177.	Warnings should be displayed to not allow unauthorised persons.
	178.	All the requirements of Schedule on Noise in Gujarat Factory rules made under section 87 should be complied with.
	179.	Ensure that thickness of the lines and vessels is measured once in a year to ensure that the thickness will be safe till next date of thickness monitoring.
	180.	Ensure that the dehumidification system is maintained in healthy condition.
LPG storage and use.	181.	Ensure that all the requirements of PESO with regard to LPG/LNG are meticulously observed.
Raised platforms	182.	Ensure that all the raised platforms and the landings of stair cases are provided with double railing and toe guards of 10 to 15 cm height with 1 cm gap from the floors.
Water treatment plant	183.	The tank should be provided with dyke wall with acid proof linings in the interior surface The dyke area should be provided with two staircases situated in opposite directions. The dyke wall should be located in such a way that all foreseeable releases from the tank are contained within the dyke
	184.	Tank for hydrochloric acid should be of M S with rubber lining.
	185.	The slope of the floor of dyke should be directed towards a sump having drain pipe. The pipe should be provided with a valve approachable from outside.
	186.	The tank should be provided with vent with water scrubber at the end. The overflow pipe should be kept dipped in water to prevent vapour release from the overflow pipe.
	187.	Arrangement of level monitoring should be provided.
	188.	The tank should be earthed at two points.
	189.	The drain pipe of the tank should be provided with two valves in series or one valve and blind.
	190.	The flanges in the line should be provided with the flange guards in such a way that there is no spray release of the acid in case of leakage.
	191.	No electrical equipments should be located within the dyke wall. Safety Showers and eye wash fountains should be provided nearby.
	192.	The hazardous properties of the hydrochloric acid with precautionary measures and the emergency response procedure

		should be displayed near the tank.
Caustic lye tank(Water treatment Plant)	193.	Tank for Caustic lye should be of MS and should be provided with dyke wall with caustic proof linings in the interior surface.
	194.	The slope of the floor should be directed towards a sump having drain pipe. The pipe should be provided with a valve approachable from outside. The valve should be kept closed under normal condition.
	195.	The dyke area should be provided with two staircases situated in opposite directions.
	196.	The tank should be provided with vent with outer end provided with wire mesh to avoid entry of birds.
	197.	The overflow pipe should be provided at the highest filling level of the tank.
	198.	The dike wall should be located in such a way that all foreseeable releases from the tank are contained within the dyke.
	199.	Arrangement of level monitoring should be provided.
	200.	The tank should be earthed at two points.
	201.	The drain pipe of the tank should be provided with two valves in series or one valve and blind.
	202.	The flanges in the line should be provided with the flange guards in such a way that there is no spray release of the acid in case of leakage.
	203.	No electrical equipments should be located within the dyke wall.
	204.	Safety Showers and eye wash fountains should be provided nearby.
	205.	The hazardous properties of the caustic lye with precautionary measures and the emergency response procedure should be displayed near the tank in the language known by the majority of workers.

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Section	No	Location	No	Activity/ Condition	No	Hazard	S[1]	L[2]	R[3]	Existing Controls	Residual hazards	Suggested control
1. Concentrate unloading	1	Ship and port operations	1	Transfer from the ship Hatch to the hopper (Crane operations)	1	Dust while transfer	3	1	2	Material is moist. Arrangement of water sprinkler.		No recommendations, present system is adequate
					2	Entry of persons into the hatch with loader with the risk accidents and smoke build up.	3	3	4		Possibility of worker getting involved in accident	• Use permit to work system for allowing the operator to go inside. Keep watching from outside. Ensure all safety arrangement including ongoing ventilation to avoid build up the concentration of combustion products of loader engine.
					4	Possibility of crane accidents: Possible toppling	3	3	4	Crane is designed to ensure safe operation.	Crane operator ignorance may lead to problem	• Only trained crane operators should be employed. • Ensure certification of crane (and other special vehicle) drivers by a competent agency.

[1] Severity Rating
[2] Likely hood Rating
[3] Risk Rating

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					5	Breaking of boom	2	2	2	Work will be done within Safe working load.		• No recommendations , present system is adequate
					6	Electrocution	1	2	1	No overhead lines in the jetty.	Electrocution can still occur through drive motors.	• Each support of the conveyor should be earthed and bonded.
					7	Wire rope breaking	3	2	2	All the components will be tested as per the statutory norms.		No recommendations
			2	Fire during work	1	Fire in the port	3	2	3	Fire hydrant tem with sprinkler provided in the jetty. Fire extinguishers will be kept.		No recommendations
	2	Hopper to conveyer end	1	Dust Generation	1	Possible hazardous dust release	3	1	2	Inlet point will be covered to prevent release of dust. Material is wet to prevent dust release.		No recommendations
					2	Possible entanglement of body parts with the running belt or rollers.	4	3	4	Pull chord switches will be provided.	Possible entanglement of body parts with running nips.	• Nip guard should be provided at all the nip points of the belt conveyor.

					3	Possible falling of material from the running belt due to belt displacement.	4	3	4	The belt will become tubular after receiving the material.		No recommendations
					4	Possible electrification of the system	1	2	1	Double earthing of the motor and conveyor structure will be provided.		No recommendations
2. Transfer station from the belt conveyor to the bonded ware house.	1	Receiving end of belt conveyor	1	Dust generation at the transfer points.	1	Toxic Silica Dust exposure.	4	3	4	Water spray system will be provided.	Keeping view the possibility of presence of free silica dust monitoring is required.	• If the SiO2 (Crystalline) and copper salts found in the breathing zones are found higher than the Permissible Limits of Exposure, additional control such as local exhaust system should be used to control the dust.
					2	Possible falling of concentrate on the persons in the warehouse.	4	3	4	Hooter/Horn will be sounded to warn the persons before starting a conveyor.	The hooter will not indicate as to where that concntrate will be discharged. T	• Some blinkers should be provided by flickering lights in the area where the material is going to be poured.
					3	Dust in the area. Containing crystalline silica	4	3	4	Dust masks will be provided.	Attempt to avoid exposure	• Periodic monitoring of the dust should be done to ensure that the dust is within the permissible limits of Exposure.

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						and copper salts.					should be done.	
3. Concentrate and flux building	1	Addition of flux	1	Generation of dust	1	Possible exposure to harmful SiO2, Coal, lime stone)	4	3	4			• SiO2 in the worker's breathing zone should be monitored. • The hazards and precautions of SiO2 and coal dust should be displayed.
4. Paddle mixer					1	Possible injuries if the top cover and window inspection open.	4	3	4	Enclosed system with a removable top cover. Limit switch will be provided in the top cover	Window provided on the top cover.	• Ensure that the top cover and windows are closed as long as the mixer is working. • Emergency stopping switch should be provided close to the inspection window.
5. Smelting furnace	1	Feeding of raw material			1	Generation of dust and subsequent exposures	4	3	4	The solid inlet is exhausted and the releasing emissions are sent to scrubber system. The exhaust gases are filtered by bag filter before scrubbing.		No recommendations
	2	SO2 Gas injection port	1	Release of flue gases with dust		do	3	2	2	All sources of dust and gas release will be exhausted.		• Monitoring should be done and based on that the exposures should be controlled.
	3	SO2 transfer to H2SO4 plant.			1	Possible exposure	3	2	3	Under negative pressure.		No recommendations

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	4	High temperature of the furnace shell	1	Possible failure of brick lining.	1	Possible Failure of metal shell. More radiation of heat.	4	3	4	The external surface of the furnace is cooled by curtain cooler and copper level portion is jacketed to cool. The shell temp will not be allowed to go beyond 300 ^{0}C. The cooling system is provided to prevent damage of the metallic shell. Periodic thermo-graph will be done to assess the brick conditions.		No recommendations
	5	Feeding of concentrate			1	Possible bumping due to steam formation	4	2	4	The material gets dried before it reaches the molten metal.		No recommendations.
	6	Lance pipe damage (Injection of 80% Oxygen and 20% air.)			1	Process disturbance.	4	3	4	One rod is always kept ready. As and when required the pipe is changed.		No recommendations.

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	7	Tap hole plugging	1	Drilling and packing	1	Possible splashing of the molten metal.	3	2	3	Persons are allowed to carry out the operation with complete protection against gases and for heat.		• Ensure that the person carrying out the operation is experienced. • He should put on the protection against molten metal splash, IR radiations from the molten matter, exposure to SO2, metallic copper fumes and heat stress.
			2	Falling of molten metal from the launders		Burn hazard	3	3	4			• The area under the launders should be barricaded to avoid walking and working there. • Conditions of the launders should be checked before taping the molten metal.
	8	Thermal stress	1	Radiant and convective heat from the hot surfaces	1	Exposure to thermal stress	3	2	3	AC rest rooms are provided for each operator when there is no work. Air circulators will be provided in the work area also.		• Air cooling system with plenums above the work spot should be provided. • Use of more water and more salt dishes should be promoted. (A drink with 6% sugar and 0.9% salt is suitable during the summer season.)
	9	Release of SO2 and			1	SO2 and copper fumes in work environment	3	2	3			• SO2 monitoring should be done for 15 minutes each sample to compare level with STEL-PLE[4]. (Short Term Exposure Limit)

[4] The short term exposure limits – permissible level of Exposure as prescribed in the Indian Factories Act 1948.

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		copper fumes into the work place.										and sources of gas should be attended to as early as possible. • Arrangement for immediate treatment of exposed workers should be kept available. • Periodic monitoring of Copper fumes should be done to ensure that the exposures are not above the limits prescribed for 8 hours exposure.
	10	Preheating of the furnace	1	Heating by LPG	1	Back fire in the mixed gas zone.	3	2	3	NRVs have been provided in both PLG and air lines.		No recommendations.
			2	Maintained at same temperature by electric furnace	1	Generation of SO2 from the molten metal	3	1	2	Canopy type hood with exhaust is provided over the top of the feeding end.		No recommendations.
					2	Electrification of the furnace	1	3	1	Furnace is doubly earthed.		No recommendations.
			3	Possible loss of thickness and furnace failure	1	Spillage of molten copper	3	2	3	The thermo-graph is done at fixed intervals.		No recommendations.

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			4	Accidental contact with hot surfaces.	1	skin burns	3	1	2	The hazard of the hot objects will be displayed. Area will be barricaded to prevent contact with hot objects.		No recommendations.
			5	Falling of rain water on the furnace surface	1	The water will be vaporized and possible bumping.	4	3	4	Not much impact is observed.		No recommendations.
			6	Contact of furnace with cold objects	1	Possible local cooling of the molten metal	4	3	4			All the tools to be used should be kept in warm conditions.
			7	Cooling of slag by water	1	Possible bumping if the water added is insufficient and inadequate granulation.	4	3	4	Flow of water is monitored for temp and flow rate and kept within safe zone.		No recommendations.
			8	Release of fumes from the opening	1	Possible contamination of air with the copper fumes	3	3	4	Canopy type exhaust arrangements will be provided.		No recommendations.
			9	Release of SO2 in the work	1	Possible exposure of workers to SO2	3	3	4			• Periodic monitoring of SO2 in work room air and ensuring that the levels are below the PLE. If the levels are found

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				environment								more general ventilation of the room should be increased. Hazards and precautionary measures of SO2 and copper fumes should be displayed in the language known by the majority of employees.
			10	More level of the molten metal	1	Possible over flow of molten metal.	3	3	4	40% free area is kept empty in the furnace. Alarm is sounded if the level is rising above the set point. The level of settling furnace and possible rise in the level is pre calculated before starting the settling. Safety margin is always kept.		No recommendations.
			11	Entry of persons into the furnace	1	Possible exposure of the workmen to high thermal stress and SO2. And metal fumes.	2	3	4	Work permit system will be followed for allowing entry of persons into the settler and smelter.		No recommendations..
			12	Radiation and convection of heat from the hot surfaces.	1	Possible exposure of the workers to high thermal stress.	3	3	4	AC room provided for providing rest to the workers after the work.		• Cooled air blowing at the work spots should be considered at the work spot if the spots are fixed.. • Minimum rest period every hour should be defined for different hot jobs.

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			13	Ladle handling	1	Possible splashes of molten metal	3	3	4	The routes will be pre-decided. Alarm will be sounded before starting transfer of ladle.		• Marking of the routes should be done and movement of workers on the ladle routes should be prohibited.
			14	Feeding of recycled slag from the converter.	1	Release of copper fumes and SO2 from the opening	3	3	4	The crane operator cabin is air conditioned to ensure that the air is free from any copper fumes.		• Ensure that level of SO2 and metal fumes are monitored periodically.
	11	Molten copper transfer of crude molten copper through ladle.	1	Delay in blocking the tapping hole. Disturbance while handling the filled ladle.	1	Possible splashes while tapping and transfer.	3	3	4	Route of the ladle will be marked and barricaded. Instructions will be displayed to avoid approaching the marked area. The persons carrying out tapping are protected by all possible hazards. Only well trained employees will be engaged in tapping operations		No recommendations.
			2	Lightening of the machinery and equipme	1	Possible damage and injuries	3	3	4			• Ensure that the systems are under the effective zone of lightening arrestors.

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				nt								
					2	Electrification of the equipments due to contact with the power	1	2	1			• Ensure double erthing of the electrical equipments and structures.
			3	Keeping and consuming food stuffs in the workplace	1	Possible contamination of food with the copper.	3	3	4	Separate places will be provided for keeping and eating foods.		No recommendations.
6. Pearce Smith Converter (Removal of Fe and S)			1	Mixture of Air and Oxygen is blasted into the molten copper	1	Disturbance due to change in the proportion of the gases.	4	3	4	Online monitoring of the proper ratio of air and oxygen will be done. In case of disturbance the system will stop.		No recommendations.
			2	Blockage of openings to allow air oxygen mixtures.	1	Possible disturbance in the process	4	3	4	Differential pressure will be monitored to recognize blockage of the holes.		No recommendations.
			3	Sudden power	1	Process disturbance	4	3	4	The process will be rescued with the emergency power.		No recommendations.

				failure							
			4	Back fire in the LPG/ air lines.	1	Possible losses and injuries.	3	2	4	NRVs and flash back arrestors will be provided in both LPG and air lines to prevent formation of the explosive mixtures.		No recommendations.
			5	Moisture in the scrap being fed to the furnace.	1	Possible bumping due to sudden formation of the steam.	4	3	4	The moisture gets removed during passing up to the molten metal.		• Inspection of the scraps and the container should be done before feeding to avoid and objects with cavity and moisture.
			6	Release of copper fumes and SO2.	1	Possible health hazard to the exposed employees.	3	1	2	The gases going out are scrubbed and sent to H2SO4 plant.		No recommendations.
					2	Fugitive emissions of SO2 and copper fumes	3	1	2	The fugitive emissions of the furnace are scrubber.		The SO2and fume concentration in Pears Smith converter area should be monitored.
			7	Thermal Stress in the converter area.	1	Radiant heat from hot surfaces and convective heat from hot emission are likely to render the environment uncomfortable from heat point	3	1	2	Air conditioned rooms are provided to facilitate rest of the workers in comfortable environment.		• Proportion of time spent in hot area per hour should be specified to avoid any heat disorders among the workers. The drinks containing 6 % glucose and 0.9 percent salt should be promoted in those areas.

						view.						
			8	Noise	1	Possible hearing loss and annoyance among workers.	3	1	2			• The noise measurements should be done to ensure that excessive exposures of the workmen is not more than 90 dB(A) the hearing conservation programme as laid down in the schedule on noise in Gujarat Factories Rules (made under Section 87 of the Factories Act) should be followed.
			9	Failure to plug the tap hole.	1	Spillage of material and subsequent burn hazard.	2	2	2	Necessary emergency actions will be taken up.		No recommendations.
			10	Shortage of water for granulating the slag	1	Possible bump release of steam in granulation process	5	2	4	Water flow is monitored on water line with alarm of flow failure to stop the plant.		No recommendations.
			11	Transfer of the molten copper to anode furnace through ladle	1	Possible overflow of material from the ladle and subsequent falling of the molten copper.	3	1	2			• The route of the ladle should be marked and barricaded. Alarm should be sounded before transfer by ladle.

					2	Failure to plug the tapping hole may lead to spillage and contact with the molten copper.	2	2	2	Only trained operators with complete body protection against contact with hot metal and inhalation of SO2 will be ensured.		No recommendations.
					3	Accident due to crane failure.	4	3	4	All the components of the lifting machinery will be tested by the competent person as per the frequency prescribed under the applicable rules. The cabin of the EOT crane operator will be AC.		No recommendations.
7. Slag Cleaning of Furnace	1		1	Feeding of matel, coal and Return slag from PS converter from the smelting furnace.	1	Escape of Carbon monoxide in the work room	2	3	3	CO is monitored by CO monitor. Oxygen is introduced with air to ensure that all the CO that is generated is fully oxidised to CO2. The local exhaust arrangements provided.		No recommendations.
			2	Water deficienc y in slag granulato r	1	Inadequate granulation	4	3	4	The flow and temp. of the water is monitored on line and alarm is sounded and plant will be shut down.		No recommendations.

			3	Failure of scrubber efficiency	1	Release of SO2 from the vent.	4	3	4	pH monitoring will be done. Alarm will be sounded then action will be taken. The sample of circulating fluid will be taken for lab analysis once in a day. Action is taken before it falls to 8 pH.		• Use of concentration monitoring instead of pH monitor may be considered to ensure that solution is always alkaline. • The availability of chemical cartridge respirators for acid gases should be insured in the area.
	2	Copper scrap melting furnace.	1	Emission of the SO2 from the copper scrp melting furnaces	1	Gas exposure while feeding	3	3	4	The furnace is maintained under negative pressure.		No recommendations.
			2	Feeding the scrap	1	Possible bumping due to presence of moisture and hollow cavities in the scrap being fed.	4	2	4			• The scrap should be manually inspected to ensure that it does not have any moisture and objects with cavities. If any hollow object is found it should be broken by cold methods before feeding into the furnace.
			3	Flame failure and release of LPG.	1	Possible confined vapour cloud explosion and subsequent damages..	2	2	3	The burners are optically monitored and gas flow is stopped on flame failure.		• No recommendations.

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					2	Possibility of entry of gas into air line and /or air into LPG line.	4	2	4	NRV and Flash back arrestors will be provided in both the lines.		No recommendations.
			4	Transfer of the molten copper to anode furnace through launder	1	Possible overflow of material from the ladle and subsequent falling of the molten copper.	3	2	3			• The route of the ladle should be marked and barricaded. Alarm should be sounded before transfer by ladle.
						Failure to plug the tapping hole may lead to spillage and contact with the molten copper.	2	2	2	Only trained operators with complete body protection against contact with hot metal and inhalation of SO2 will be ensured.		No recommendations.
					2	Accident due to crane failure.	3	2	3	All the components of the lifting machinery will be tested by the competent person as per the frequency prescribed under the applicable rules. The cabin of the EOT crane operator will be AC.		No recommendations.
8. Anode Furnace and anode casting			1	Molten matte pouring	2	Splashes of molten copper and subsequent injuries	3	2	3	Trained employees with protection for body, heat resistant clothing, furnace glasses, foot and leg protection, helmets are used while		No recommendations.

wheels										ladle handling and pouring into the furnaces.		
			2	Scrap copper feeding	1	Possible release of SO2 gas and copper fumes and subsequent exposure of workers to them.	3	1	2	The furnace is maintained under negative pressure avoiding release of gases from the opening. The particulate matter is separated with the help of bag filter.		• Ensure to monitor the conditions of bag filter by suitable method and regular analysis.
			3	Possible bumping due to moisture impregnation of the scrap.	1	Process disturbance and possible injuries.	3	2	3			• Inspection of the scrap should be done to ensure that there is no moisture and objects with cavities to avoid flash release of steam on sudden boiling of water.
			4	Removal of the particulate matter by bag filter	1	Possible damage of fabric filter due to high temperature	4	2	4	Mineral wool filter is used that can withstand the high temp of the gases.		No recommendations.
			5	Transfer of molten copper through a launder.	1	Possible overflow of molten copper from the launder and subsequent injuries to persons under launder.	3	1	2			• Barricading and display of precautions should be done to avoid persons moving or working under launder.

			6	Pouring of molten metal to the moulds.	1	Possible spillage of the metal under abnormal conditions	3	1	2	Workers in that areas will be allowed only with adequate protection.		No recommendations.
			7	Presence of moisture in the moulds.	1	Bumping while pouring of the metal	4	1	4			• Ensure proper inspection to avoid moisture before starting pouring.
			8	Mould defective	1	Possible entrapment of moisture and subsequent bumping on pouring.	3	1	4			• Ensure proper inspection to avoid moisture before starting pouring.
			9	Falling of moulds from height during removing of moulds from the system for maintenance work.	1	Possible injuries due to falling	3	1	2			• All the components of the lifting system should be duly tested at adequate intervals by competent persons. • The workers in the area should be protected by safety shoes to prevent injuries due to falling of heavy objects on the feet.
			10	Failure of water for	1	Possible hot castings with	4	2	4	Water flow monitor will be provided with alarm		No recommendations.

				cooling		liquid spill.				on less flow. Parapet walls will be provided to ensure proper management of water cooling system		
			11	Transfer of normal anodes to the refinery tank and rejects to PS converter	1	Possible accidents due to fault in forklift truck driving.	4	2	4			• Ensure that appointment of forklift truck driver should be done only to persons who are well trained, certified and having driving licence for the commercial transport vehicles.
9. Off gas handling	1	Waste heat recovery boilers	1	Over pressure of the boiler	1	Over pressure bursting of the boiler	1	2	1	The integrity of the boiler will be ensured by periodic hydraulic testing as required under Indian boiler act and rules and provision of safety relief valves of adequate settings.		No recommendations.
			2	Overpressure of the system in case of pressure regulator failure by diaphragm		Possible damage of the equipments and instruments on down-stream.	3	2	3			• Ensure that safety valve is provided in the downstream of the pressure regulator.

				rupture.							
	2	Electro static precipi tator	1	Electrific ation	1	Electric shock to the persons	2	2	2	Proper insulations will be provided to ensure that personal electrocution is avoided.		No recommendations.
			2	Static charge on the compone nts when system not in use.	1	Electric shock to persons due to accumulation of charge on the components.	2	2	2			• Discharge rod should be provided to ensure no potential in any object. • All the protective equipments should be tested to bear the voltage on which the workers have to work. • Ensure that the persons duly certified by the electric department should be allowed to work in such areas. • The danger boards (Skull and cross bone) should be provided in the equipment.
					2	Electrification of ID fan.	2	2	2	All the electrical equipments will be doubly earthed.		• Emergency stop button should be provided close to the ID fan and ESP.
			3	Mechanic al Failure of the ID fan	1	No suction in the duct resulting in release of gas from several points.	2	2	2			• Ensure that stand by blower is provided to use in case of ID fan mechanical failure. • Ensure that running of ID fan is monitored with the help of load monitoring.
			4	Electrical failure of ID Fan.	1	do	2	2	2	Fan running will be monitored in control room with alarm on failure.		• Ensure that redundant ID Fan is provided to use in case failure of one fan. It should automatically start on failure of

										A system to bypass the gases to chimney through gas scrubber is provided, which will operate immediately on blower failure. The SO2 will be monitored in the stack and in case of more gas in the stack the efficiency of scrubber will be increased by adding the scrubbing substance.		the first one. • Ensure that dampers to connect the gas line through secondary gas scrubber to function in case of failure of sulphuric acid plant are provided. • It should be ensured that the caustic concentration is maintained by automatic system or on manual basis as long as secondary gas scrubber is used.
			5	Lightening in the plant.	1	Possible damage of structures and building.	3	2	3	The lightening arrestor will be provided in the stack as per BIS standard.		No recommendations.
					2	Striking of stack with aircrafts	3	2	3	The chimney will be provided with aviation light.		No recommendations.
			6	Corrosion of stack.	1	Possible weakening of the stack due to deposition of acid if the temperature drops below dew point.	4	2	4			• Ensure that the chimney is applied with anti corrosion coatings to prevent their damage due to acid depositions.
10. Gas cleaning plant	1	Quenching with high	1	Leakage while quenching	1	Release of toxic SO2 in the work environment	3	2	3	The system is in negative pressure.		• Ensure that water flow is monitored with record in the control room. • Ensure that indication on pump

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		efficiency scrubber										failure and local flow indicator are also provided. • Ensure that washing tower outlet gas temperature is interlocked with SO2 blower trip.
	2	Wet Electro static precipitator			1	Possible electric shock and leakage	1	2	1	Tank will be doubly earthed.		• Earthing resistance should be monitored at fixed intervals and record of testing should be kept. • Ground fault current interrupter should be provided. • The system to discharge the vessel before any work in it, should be provided. • Proper Chemical cartridge respirator should be kept available in the area. • Precautions and danger board should be provided at the wet electrostatic precipitator. • Ensure that the PPE used by the workers are tested for high voltage available in the system.
			2	Pressure drop in the gas cleaning system and duct.	1	Possible bucking of the ducts	4	2	4			• Ensure that the pressure is monitored with low pressure alarm with blower interlock.
			3	Release of SO2 dissolved	1	Release of toxic SO2 as soon as the water comes	3	2	3			• Ensure that SO2 stripper is provided to recover the gas before the water is released

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				in the process water.		into the drain.						into the drain.
				Inadequate cooling		Process disturbance	5	2	4			• Ensure to monitor Temperature and pressure across the star cooler.
			4	Inadequate fluorine/ mercury removal	1	Process disturbance	4	2	4			• Ensure to monitor the fluorine and mercury concentration at the downstream of fluorine absorber or mercury scrubber.
			5	The wet ESP failure	1	Failure of cleaning operation	4	2	4			• Ensure that plant trips in case of wet ESP Failure.
			6	Short circuiting of electrodes	1	Failure of cleaning operation	4	2	4			• The instructions should be displayed to ensure that system is wet before applying the charge. (interlocking should be considered.)
			7	Exposure to mercury vapour	1	Toxic gas exposure	3	2	3			• Hazards and precautionary measures for mercury should be displayed. The MSDS of the respective chemical should be readily available. • Mercury in treated SO2 should be checked periodically.
	3	Use of chlorine	1	Leakage of chlorine	1	Exposure to toxic chlorine gas	2	2	2			• Ensure to provide chlorine emergency kit with at least two self contained breathing

				in the work environment								apparatus. Workers should be trained in use of emergency kit application. • Provision of chlorine sensor with alarm should be considered.
			2	Chlorine flow in spite of water flow failure	1	Release of chlorine from the discharge point and corrosion of the pipeline.	3	2	3			• Ensure to provide vacuum valve which may stop the flow of chlorine in case of water flow failure.
			3	Presence of arsenic in the gas	1	Process disturbance and possible formation of arsine gas	3	2	3			• Arsenic level of SO2 should be tested periodically / on line to ensure that it has been removed effectively. • The fact that arsenic forms deadly poisonous arsine gas on contact with mineral acids should be displayed. • The Solid particulate matter collected in the ESP may contain arsenic. Hence it should not be allowed to come in contact with any acid to prevent arsine gas formation which is highly poisonous.
	4	Drying Tower	1	Acid circulation tank	1	Spillage from the circulation tank or process	3	2	3			• Level monitoring should be done with alarm at the site and in control room on high and low

				level low and high		disturbance.						levels.
			2	Circulation pump failure	2	Process disturbance and SO2 release into the atmosphere.	3	2	3			• Ensure that a standby pumps with NRV s provided in auto start mode with alarm in control room. • The SO2 blower and diversion to stack should be interlocked with the pump failure.
			3	Leakage of the heat exchange surface in heat exchanger for acid cooling.	3	Transfer of water to the Acid line and subsequent heating of acid.	3	2	3			• Ensure that the pressure of Acid line is more than the water line. • PH of the water should monitor "on line" with alarm.
			4	Too much dilution of the acid.	1	High moisture in SO2.	4	2	4			• Acid concentration should be monitored on line and fresh acid should be added to maintain the concentration.
			5	More moisture in SO2.	1	Process disturbance	4	2	4			• On line monitoring of moisture in acid line should be done.
			6	Acid spillage from the circulatio	1	Spillage of acid and contact with skin.	3	2	3			• A parapet wall with acid proof tiles should be provided to divert the spilled acid to

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				n tank.							treatment plant.
			7	Flange leakage of acid	1	Possible injury to skin and eyes due to spray release.	2	2	2			• All the flanges and pump seals should be provided with flange guards to prevent spray release of the acid. • If the flanges are above working areas, the catch pots with adequate drain pipe should be provided. • Ensure that eye wash fountain and safety shower should be provided nearby.
			8	More acid in the system	1	Circulation Tank overflow	3	2	3			• It should be ensured that the total capacity of the circulation tank should be enough to hold the total acid in the system.
11. Sulphuric Acid plant (Common for intermediate absorption tower and final pass absorption tower.)			1	Low temperature of the converter column.	1	No conversion of SO2 into SO3. Leading to SO2 release to atmosphere.	3	2	3			• Minimum temperature at which preheating of the converter will be started should be specified in the SOP. • Arrangements for heating should be kept readily available. • The secondary scrubbing system should be started as long as the unconverted SO2 is released.

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			2	Leakage of gases from the duct or heat exchange r.	1	Exposure of the employees to the toxic SO2.	3	2	3			• Sufficient number of Chemical Cartridge Respirators should be kept available for use during such emergencies. Thickness monitoring of duct should be carried out once in a year.
			3	Internal leakage of heat exchange surface	1	Possible release of SO2 from the stack.	3	2	3			• Stack gas should be periodically monitored to ensure that More SO2 is not releasing from the stack.
			4	Leakage of gas from the Intermed iate absorptio n tower	1	Release of SO2 &SO3 and 98% acid from the leakages.	3	2	3			• Ensure thickness monitoring of the column walls.
			5	Leakage of gas from the flanges and duct.		Exposure to highly irritant gases.	3	2	3			• Leakage should be checked up periodically with ammonia torch.
			6	Acid circulatio n tank level low and high	1	Spillage from the circulation tank or process disturbance.	3	2	3			• Level monitoring should be done with alarm at the site and in control room on high and low levels.

			7	Circulation pump failure	2	Process disturbance and SO2 release into the atmosphere.	3	2	3			• Ensure that a standby pumps with NRV s provided in auto start mode with alarm in control room. • The SO2 blower and diversion to stack should be interlocked with the pump failure.
			8	Leakage of the heat exchange surface in heat exchanger for acid cooling.	1	Transfer of water to the Acid line and subsequent heating of acid and process disturb.	4	2	4			• Ensure that the pressure of Acid line is more than the water line. • PH of the water should monitor on line with alarm.
			9	Too much dilution of the acid.	1	High moisture in SO2.	4	2	4			• Acid concentration should be monitored on line and fresh acid should be added to maintain the concentration.
			10	More moisture in SO2.	1	Process disturbance	4	2	4			• On line monitoring of moisture in acid line should be done.
12. Sulphuric Acid Plant			1	Acid spillage from the circulation tank.	1	Skin contamination and acid burns	3	2	3			• A parapet wall with acid proof tiles should be provided to divert the spilled acid to treatment plant.

			2	Flange leakage of acid	1	Possible injury to skin and eyes due to spray release.	3	2	3			• All the flanges and pump seals should be provided with flange guards to prevent spray release of the acid. • If the flanges are above working areas, the catch pots with adequate drain pipe should be provided. • Ensure that eye wash fountain and safety shower should be provided nearby.
			3	Circulation Tank overflow due to more acid in the system	1	Spillage and skin burns	3	2	2			• It should be ensured that the total capacity of the circulation tank should be enough to hold the total acid in the system.
			4	Leakages in the sprinkler with air cooled heat exchangers	1	Possible gas release of toxic gases and risk of exposure of the workers.	2	2	2			• pH of the water should be monitored to detect any leakage and leaking members of the coil should be replaced/repaired.
13. Sulphuric Acid			1	Heavy spillage of acid	1	Possible exposure of workers in the	2	2	2			• Ensure that a dyke wall of capacity more than total contents of the largest tank within the dyke is provided.

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Storage						area.						The floor of the dyke area should be impervious and acid resistant. Slope of the floor should be diverted to sump provided with a drain pipe The drain pipe should be provided with a valve approachable from outside the dyke. The valve should be kept closed under normal conditions. Whenever required for discharging the rain water the valve should be closed. • The interior side of the wall should be resistant to acid. • The approach stairs should be provided at two diagonally opposite side of the dyke. • The minimum distance of the dyke wall should be so made that all foreseeable jets from the tank fall within the dyke. • The pump and other electrical fittings should be installed outside the dyke.
			2	Tank not properly vented	1	Flow into and from the tank will be disturbed.	4	2	4			• Ensure that vent pipe of adequate dimensions is provided on the top of the tank with protection rain water protection.

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			3	Vent blockage		Do	4	2	4			• The vent should be cleaned periodically. Wire mesh protection should be provided to prevent entry of birds and insects.
			4	Entry of moisture	1	Dilution of acid with moisture and subsequent corrosion of wall and possible hydrogen formation and explosion.	4	2	4			• Self indicating silica gel column should be provided in the vent to arrest moisture ingress. The silica gel conditions should be observed every week and the gel should be replaced with fresh or regenerated silica gel as soon as 75% of the gel is decolorized.
			5	Overflow of acid	1	Possible flow of acid from the vent or other openings with injuries.	3	2	3			• The overflow pipe should be provided from the upper most point in the tank wall. The pipe end should be kept sealed by dipping into a vessel filled with acid to prevent moisture entry through the overflow pipe.
			6	Drain pipe passing	1	Leakage of the acid from the passing valve.	3	2	3			• Ensure that the drain is provided at the lowest point of the tank. The drain should be provided with two valves in series or one and one blind. Open and close positions of the valve should be visible from a distance.
			7	Low or high levels in	1	Process disturbance	4	2	4			• Ensure that level indicators with alarm for high and low levels should be provided both

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				the tank								in at the site and in control room.
			8	Electrification of the tank	1	Possible electric shock.	1	2	1			• The tank should be earthed by two or more earthing strips.
			9	Approach to the top of the tank	1	Falling of persons due to weakening of tank top because of corrosion.	1	2	1			• Proper ladder with guarding and independently supported platform with railings and toe guard should be made for approach of the workers to the top fittings of the tank.
			10	Flange leakages	1	Possible injuries to eyes and skin	3	2	3			• All the flanges should be guarded to prevent spray release. Catch pots should be provided under the flanges above working areas to receive and deliver the acid at safe place.
14. Oxygen plant	1	Oxygen Storage tank	1	Tank over pressure	1	Possible bursting due to over pressure	2	2	2	Vessel will be subjected to hydraulic pressure testing as per statutory provisions. Safety valve will be provided to release excess pressure if any.		No recommendations.
			2	Possible cracking of material of vessel	1	Possible failure of vessel or piping.	4	2	4	Only cryogenic steels will be used.		• Ensure that the oxygen is fully evaporated and brought to ambient temperature before transferring it through non cryogenic piping.

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				/ piping wall due to contact with cryogenic temperature.								
			2	Contact of oxygen with greasy material		Possible spontaneous burning of grease leading to fire or explosion if the space in confined.	4	2	4			• Ensure that only degreased components are used in the vessels and piping. • The solvent washing of internal spaces should be done with suitable degreasing agent before using the vessel/piping. • The area should be kept completely free of greasy materials and other combustible substances.
15. Refinery unit	1	Handling of heavy anodes.	1	Possible hazard of anodes falling from height	1	Possible injuries due to falling of heavy anode on the feet.	3	2	3	The handling equipments, wire ropes, slings, hooks etc. will be tested as per statutory provisions.		• Safety shoes, helmets and canvas gloves with hard toe should be used by all the workers in the area.
	2	Handling of H2SO4 and copper sulphate	1	Spillage or leaking of acid and CuSO2 solution.	1	Possible skin and eye injuries due to contact with Acid.	3	2	3			• Persons should be provided with complete body protection in such a way that toxic chemicals exposures are avoided. • Safety Showers and eye wash fountains are provided nearby.

		solution									• Ensure that Acid is poured in dilution water for the sake of dilution.
	3	Electrolysing cells	1	Emission of hydrogen with mists containing Acid and copper sulphate from the cells.	1	Possible exposure of workmen to hazardous mist.	3	1	3			• Ensure to provide local exhaust system to collect mist from the cells and discharge into the ambient air after suitable treatment. • Use of tennis balls and anti mist additives may be considered.
			2	Magnetic field hazards	1	Exposure to harmful magnetic field formed bylow voltage high current from the cells.	3	2	3			• Ensure that the hazards and preventive measures of low voltage high amperage current are displayed in the language known by majority of workers. • Warning for people using heart pace maker should be displayed. Conspicuously.
			3	Hygiene considerations	1	Possible food contamination from Copper sulphate.	3	1	3			• Food keeping and eating should not be allowed in the cell house. • Adequate hand washing facilities should be kept available. • MSDS of copper compounds should be kept readily available. All the precautions

												laid down in MSDS should be used to prevent any intoxication among the employees. • Concentration of sulphuric acid and copper sulphate should be periodically monitored to ensure that the exposure does not exceed the Permissible Limits of Exposures in Indian Factories Act.
		4. Precious Metal recovery	1	Contact with acidic slime in the filter	1	Possible skin injuries due to acid in the slime.	3	2	3			• Ensure to provided impervious hand gloves, safety shoes, face shield and apron should be used by the employees carrying this operation.
			2	Drying and treatment	1	Possible contact with high temp surfaces leading to skinburns.	3	2	3			• Toxic properties of selenium should be displayed along with the precautions.
	4	Absorption of selenium dioxide in water and filtration	1	Contact of skin with solution and sludge	1	Possible skin problems	3	2	3	The operators will use proper PPE to avoid all possible contacts.		No recommendations.

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	5	Roasting with borax and sodium bicarbonate	1	Possible splash of slag and molten metal while pouring.	1	Possible burn hazard Heat tress	3	1	3	The well trained workers ilbe posted who will be fully protected against the hazards.		No recommendations.
	6	Working with LPG	1	Possible flame failure while starting.	1	Possible damage due to delayed ignition.	3	2	3	The gas ignition process will involve auto closing of gas flow in case the flame is not established within a few seconds.		No recommendations.
			2	Entry of gas into the air line or the air in gas line.	1	Possible firing of the gas in pipeline and bursting of the line.	4	2	4	The NRV s and flame arrestors will be provided in both LPG and air lines.		
			3	Transfer of slag through ladle	1	Possible falling of hot objects and burn injuries.	3	2	3	The ladle will be handled with the help of hoist. Workers will be fully protected against the hazards. Adequate rest pauses in AC rooms will be allowed. Slag cooling area will be marked conspicuously.		• Hydraulic system should be tested periodically at the intervals suggested by the technology suppliers. • The path of ladle should be marked on the floor. Sound alarm will be sounded while starting the ladle transfer. • Ensure proper training and licensing of the fork lift truck drivers.

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										Unauthorised persons will not be allowed.		
15.a Silver refining by Electrolysis	7	*Silver refining by Electrolysis*	*1*	• *Observe same precautions as suggested for copper refining.* • *The cell is designed not to generate any toxic NOx.*								
			2	Silver crystal re-drying, melting and making bars	1	Possible electric shock and heat stress,	1	2	1	Double earthing will be provided on the electrical devices and other structures. Sufficient rest times will be provided to avoid heat disorders.		No recommendations.
15.b Induction furnace hazards			3	Induction furnace hazards	2	Possible aperture in the crucible and subsequent contact of the molten metal with electric heating device and short circuiting.	4	2	4			• Ensure that water temp both at the inlet and on the outlet should be monitor to ensure integrity of the system. • The furnace specifications should match with the applicable standards to avoid the weaker material of crucible. • Furnace should not be allowed to be overheated.
			4	Current leakage	1	Possible electric shocks	1	2	1			• Ensure that GFCI (Ground fault current interrupter) should be provided. • Ensure that the furnace is operated as per prescribed current flow by the manufacture. Bridging of the

												induction furnace should be avoided by checking the inlet and outlets of water and power drawn by the furnace.
			5	Management of bullions with the help of Robot.	1	Possible involvement of employees with robot activity.	3	2	3			• Ensure that the robot area is barricaded from all the sides, the door to approach the area should be provided with interlocking in such a way that the robot cannot perform any task as long as the door is open.
			6	Manual handling of bullions.	1	Possible injuries on hands and foot due to falling of heavy objects on the feet.	3	1	2			• Ensure that the workers in the area are equipped with adequate hand and feet protection.
			7	Silver granulation in induction furnace	1	Possible injuries, thermal stress and possibility of burns during induction furnace operation and granulation.	3	1	2			• Ensure that area around the Induction furnace operation and granulation is barricaded to avoid entry of any employee to risk zone. • All the precautions for induction furnace safety as discussed earlier should be adhered to. • Concentration of silver in the form of fumes should periodically monitored to ensure healthful work environment.
			8	Radiation of heat,	1	The thermal stress and possible toxic	3	2	3			• Canopy exhaust should be provided to cover top opening of the induction furnace and

				convective heat from the hot discharge of the furnace and steam generation from the water trays		silver fumes						hot and contaminated air and water vapour generating at the time of pouring on the receiving tray.
	8	Drying of granules and packing	1	Heat tress due to hot air oven	1	Possible thermal discomfort of the employees	3	1	2			• Ensure effective ventilation to allow fresh air at the workplace. (Minimum 6 air changes per hour.) or localised air blowing of outside air/conditioned at the work station. • All the electrical equipments and the structures should be provided with double earthing. • Silver fumes should be monitored to ensure that the room is free from silver fumes. • Ensure that all the moving parts of the stitching machine are guarded to prevent injuries.
	9	Gold leaching refining.	1	Contact of skin or eyes with the highly acidic	1	Injuries to skin or eyes	3	1	2			• MSDS of the solvent should be obtained from the supplier. • Hazardous properties of the solvents should be displayed along with the precautionary measures and emergency

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				solvent (Exact compositi on not known)								response procedures.
			2	Acid Fumes from the leaching tanks	1	Possible exposure of employees to acidic fumes and corrosion of the surrounding structures.	3	1	2	The leaching tanks will be exhausted and scrubbed with water to remove the acid fumes.		No recommendations.
			3	Possible electrificat ion of vessels.	1	Possible electrical shock.	1	2	1			• Ensure that all the electrical motors, tanks and other equipments like drier, induction furnace, other equipments of the area. are earthed at two places.
			4	Process disturbanc e due to agitator failure.	1	Process disturbance and confusions.	5	2	4			• The load monitoring of each agitator should be done to ensure proper running of agitators.
			5	Contamin ation of body and eyes of acidic fluid	1	Injuries	3	2	3			• Ensure to provide safety shower and eye wash fountain in the area.
			6	Temperat ure disturbanc e.	1	Process disturbance	5	2	4	Temperatures of each vessel will be controlled with the help of heating or		No recommendations.

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										cooling jacket provided in each leaching tank.		
			7	Failure of blower in the exhaust system	1	Release of gas from the openings and exposure to the hazardous fumes.	3	2	3			• Consider to provide a stand by exhaust blower in order to meet emergency situations.
			8	Failure of water flow in the scrubber	1	Release of acidic air from the vent of the scrubbing tower.	3	2	3			• Ensure to provide a stand by circulation pump in order to meet emergency situations.
			9	Leakage of heat exchange surfaces in the jackets	1	Possible disturbance in the process	4	2	4			• Pressure monitoring of the jackets will indicate health of the interface surface.
			10	Contamination of skin with cake in the filter installations.	1	Possible skin injuries.	3	1	2			• Ensure protection against all possible hazards.
			11	Release of steam and HCl fumes from the drier.	1	Exposure of employees and corrosion of the surrounding objects.	3	2	3			• Ensure that the vent pipe is resistant to the acidic vapours and high enough to discharge the emissions away from working zone.

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			12	Less/excessive drying.	1	Process disturbance	4	2	4			• Auto temp monitoring of the drier should ensured.
			13	Handling of silver granules tray.	1	Exposure to high temp. May cause burn injuries.	3	2	3			• Ensure to provide heat resistant hand gloves and leather safety shoes and gauntlets. .
			14	Working with crucible heater.	1	Electrical shock from crucible	1	2	1			• Ensure double earthing of the crucible heater. • Ensure that crucible is not cracked and handled with proper tong.
			15	Temperature of crucible	1	Process disturbance	4	2	4	Settings are provided in the crucible induction heater.		No recommendations.
			16	Pouring of molten metal in the mould.	1	Possible spillage of molten metal and subsequent injuries. Possible bump of the crucible due moisture present in the mould.	3	2	3			• Only well trained and experienced employees should carry out the pouring operation. • Ensure that the mould is dry before molten metal is poured into it.
16. Continuous cast copper wire rod plant.	1	Charging the copper cathodes into the furnace by	1	Material Handling accidents due to material falls on the	1	Possible crushing and fractures among the employees.	3	2	3	All the lifting equipments and tackles will be tested as per statutory requirement.		No recommendations.

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		the skit hoist.		workers.							
			2	Accidents due to human errors	1	-Do-	3	2	3	Training on safety in material handling will be provided		No recommendations.
			3	LPG related problems	1	Gas leakage and subsequent ignition with explosion	1	2	1	Gas firing system with flame monitoring with auto stoppage of gas flow if the ignition fails within a few seconds.		• Leaks in the line should be detected at early stage by periodic checking of joints and valves with the help of explosive gas meter. • Possibility of explosion of gas within the lines should be eliminated by provisions of NRVs and flame arrestors in both fuel line and air line. • The nozzles of the burners should be cleaned at periodically with records. Frequency of cleaning should be decided on the basis of the experience.
			4	Bumping while melting due presence of moisture or other fluids trapped in	1	Possible bumping in the furnace and with the possibility of furnace damage and injuries	4	2	4			• Ensure that the cathodes are free from any moisture. • Any other source of water ingress should be avoided.

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				the material fed into the furnace.								
			5	Tapping and mud plugging	1	Possible injuries of workmen due to spattering of the molten metal.	3	2	3	The tapping will be done by experienced and trained workers under strict supervision.		No recommendations.
			6	Transfer of molten metal from the melting furnace to holding furnace through launder.	1	Possible overflow of molten metal and falling on the ground.	3	2	3			• The area under the launder should be barricaded with cautionary notice.
			7	Falling of rain water due to leakage in the roof.	1	Spattering of metal with possible accident leading to spreading of molten metal.	3	2	3			• Strict care should be taken to avoid falling of rain water into this and other furnaces.
			8	Continuous tapping of molten metal in holding furnace though	1	Possible falling of molten copper from the launder to the water below the casting wheel due to damage of refractory of the	3	2	3			• Strict maintenance of the launder should be ensured. • [There have been several events of bursting of water jacket provided for spraying water on the lower part of the wheel and leading to violent

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				launder.		launder. And subsequent sudden release of steam and damage to room and injuries to persons around.						destruction of building due to shock ware generated by the event.]
			9	Hot wire extrusion	1	Risk of burn injuries on contact of body parts with the running hot rod.	3	2	3			• The area around the rod should be barricaded. Hazard and precautionary measures should be displayed.
			10	Electrical motor provided for spool rolling of the rod/wire	1	Possible electric shock.	1	2	1	Motor and other equipment will be provided with double earthing.		No recommendations.
			11	Cooling and coating of the rod	1	Possible exposure to high temp and possible skin burns.	3	2	3			• Ensure to carry out any work in cooling and coating zone only after closing the extrusion operation.
			12	Packing and shipping of the coiled rod.	1	Possible material handling accidents	3	2	3	All the lifting machinery and tackles will be tested as per the statutory requirements.		No recommendations.
17. Phosphoric acid plant.	1	Transport from the port to	1	Dust generation at the conveyor feeding	1	Risk of silicosis among the workers due to presence of free silica in the rock phosphate.	3	2	3	The bins to which the rock phosphate is to be delivered will be exhausted and cleaned with cyclone		• Efforts should be made to minimise dust generation and prevent exposure by strict use of protective devices.

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		the storage shed.		point.						separator and bag filters.		
	2	Rock phosphate storage and handling	1	Generation dust while unloading, storage and feeding of the rock phosphate.	1	Exposure of the workers to rock phosphate dust (Rock phosphate is generally consists free silica which renders the dust especially hazardous from silicosis point of view.)	2	2	2	The material is dropped to the belt conveyor which is provided with weighing system after which it is dropped into the slurry mixer.		• The workplace should be monitored for rock phosphate dust and ensured that it does not exceed 3mg/M^3. (Computed from Fist schedule of Factories Act assuming silica is 7%.) • The workers should be provided with dust respirators.
	3	Preparation of rock phosphate slurry	1	Possible dust generation while slurry preparation.		Health hazard	2	2	2	The water is first filled then Rock phosphate is added with the help of a conveyor.		• Dust survey should be done to ensure that the levels are less than 3 mg/M^3.
	4	Mixing of sulphuric acid with the slurry.	1	Generation of irritating and corrosive hydrogen fluoride gas.	1	Toxic exposure of the workers to HF.	2	2	2	The generating gases are collected by local exhaust system and HF and silicon tetra fluoride is are converted in Hydro Fluosilicic acid.		• Ensure to provide chemical cartridge respirator with special filter to remove the HF gas and dust in any.

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	5	Filtration of slurry	1	Possible contact of slurry with skin and eyes.	1	Toxic exposure	3	2	3	Strict precautions will be taken to avoid contact with acidic slurry. The generating gases are sucked by canopy hood and sent to HF treatment system. The openings will be provided in the duct to clean the deposited semisolid as and when required.		No recommendations.
	6	Phosphoric Acid evaporation and storage	1	Phosphoric acid fumes while evaporation.	1	Health hazard	3	1	2	Dedicated scrubber will be provided to absorb the HF from the gases emanating from the evaporator.		• Avoid contact with phosphoric acid. • Safety shower and eye wash fountain should be provided.
18. Aluminium Fluoride Plant.	1	Reaction between H2SiF6 and Aluminium hydroxide under	1	Release of toxic and corrosive acidic fumes.	1	Possible exposure of workers to corrosive and irritating gas.	3	1	2	The released gases are exhausted and scrubbed out in a dedicated unit.	Possibility of blocking of duct due to hygroscopic dust.	• Choking conditions should be checked and cleaned periodically.

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		steam heater										
	2	Possible contact of slurry while filtration	1	Corrosive slurry	1	Possible exposure of worker through skin contact.	3	1	2	The worker is provided with the complete body protection to avoid exposure.		• Ensure that washing facilities are available. Safety shower and eye was fountain should also be provided.
	3	Crystallisation	1	Generation of irritating fumes from the vent.	1	Possible exposure of irritating gases to the workers.	3	1	2	The vent will be exhausted and neutralised.		• Ensure that washing facilities are available. Safety shower and eye was fountain should also be provided.
	4	SB Filter	1	Possible contact.	1	Possible exposures and contact with skin.	3	1	2	Filters will be provided with hood to extract releasing fumes that will be scrubbed out.		No recommendations.
	5	Flash drier with hot air		No hazard								No recommendations.
	6	Cyclone separator with star	1	Dust while bag filling	1	Dust exposure	3	1	2	Star feeder provided to ensure controlled bag filling.		• The work environment should be monitored to ensure that there is no objectionable concentration of the corrosive dust. If required annular canpy around the starfeeder outlet should be with adequate

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		feeder										suction by local exhaut system should be considered.
19. Effluent Treatment Plant	1	Neutralisation	1	Neutralisation with acid may generate Arsine gas.	1	Risk of Exposure to highly toxic arsine gas.	1	5	4	The arsenic is converted into ferric arsenate which is stable compound which will be kept isolated to ensure mixing with any acidic chemical. The display about the hazards of this material will be provided. Leachet of this pond will be taken back to the treatment plant.		• Awareness about the possible generation of arsine gas in the plant should be popularised among the employees by suitable warnings at respective places.
	2	Liquid waste neutralisation at the Effluent treatment plant.	1	The acidic solutions are taken to treatment plant where it is neutralised by lime	1	Possible release of arsine gas in the treatment plant.	1	5	4	The cautionary notices will be displayed at relevant places to prevent Arsine generation chances.		No recommendations.
	3	Preparation of lime slurry for	1	Contact with highly corrosive and	1	Possible skin burns and possible risk of particles entering eyes.	3	2	3	The imported CaO is received in imperious bags, which are as such shifted to the		• Local exhaust arrangement should be provided to extract the dust generation at the lime dissolving point. (It should be kept in view that CaO is highly

		neutralisation of the acidic waste.		irritant lime.						neutralisation area. The alkaline solid waste generated in the plant will be dumped into the special site provided for Ferric arsenate wastes.		exothermic on contact with water. A particle entering the eyes will slake the lime generating excessive heat and eye injury.) • The area should be provided with the safety shower and eye wash fountain.
20. Utilities Requirements	1	Power – incoming substation.	1	Energising of panels	1	Possible electric shock to employees.	1	2	1	Each panel will be doubly earthed. Danger boards (Skull and cross bone) will be displayed on every panel. The building will be protected with lightening arrestor.		• Only authorised person with competency certificates should be allowed to operate the system. • Unauthorised person should not be allowed to enter into the panel room. • Earth fault relay, all other relays, equipment and controls should be in healthy conditions. • Ensure that the lightening arrestors meet with BIS standard. The Indian Electricity rules should be strictly followed. • Ensure that all the workers in the substation should be well trained in artificial breathing. The chart of artificial breathing should be displayed in the substation. • Ensure that discharge rod and rescue rod are kept available in the substation. • Ensure that earthing pits of the

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												substation are maintained as per India Electricity Rules. • Ensure that earthing resistance of all the earth pits are maintained as per the rules. • Ensure that personal protective equipments are tested for the voltage in question. • The first aid box should be kept available with list and phone numbers of the trained first aiders. • Escape routes at two diagonally opposite direction should be provided in each panel room. • Ensure to display electric circuit diagram is displae3d in the wall of the switch room. • Ensure that rubber mats are kept in front of all the control panels should be laid with tested rubber mats. • Ensure that emergency light is as available in the switch rooms. • All the equipments and cables etc. used is substation should be of required capacities meeting the specific BIS standards. • Cable trays should be earthed at two separate points. • A qualified electrical engineer should be declared as Electrical

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												Safety officer to ensure compliance of Indian Electricity rues during construction and maintenance and operation of electrical installation.
			2	Heat generation leading to hot environment and fire	1	Possible electrical fire and panel bursting.	3	2	3	All the panels will be provided with explosion vent. Fire extinguishers of adequate type and fire bucket filled with dry san will be installed on the panel rooms. Gas mask (for carbon monoxide) and self contained breathing apparatus will be provided.		• Ensure that substation is well ventilated. • The substation should be well illuminated. • Ensure that all the equipment in substation are periodically inspected and maintained. • Ensure that the housekeeping of the substation is kept in good conditions.
	2	Transformers	1	Current leakage	1	Electric shock to employees.	1	2	1	Each of the body of transformer and neutral point of the transformer will be provided with two separate earthing for each.		• Ensure that the earthing resistance is maintained as per Indian Electricity Rules. • Ensure that only tested PPE are used by the electricians.
			2	Short circuiting of transformer due several	1	Possible fire and transformer explosion	4	2	4			• Ensure provision of the followings: • The conservator tank should be provided with vent having silica gel column. The column should b inspected weekly to ensure

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				reasons								its effectiveness. In case discoloration of the 75% of the column the gel should be replaced by regenerated or fresh silica gel. • A fire wall of 4 hour fire resistance should be provided between two transformers with oil capacity more than 2000 litres each. • Emulsifier should be provided for each transformers having oil storage capacity of 2000 L. • Pressure relief valve should be provided in the transformer tank. • Thermostat for winding and oil of the transformer should be provided. • Transformer should be provided with pressure relief valve and Buchholz relay. • The oil pit with drain and collection arrangement is provided for each transformer. • Emergency stop buttons should be provided near each transformer and motors. Transformer should be provided with double earthing. • The hydrant operating point near transformer should be provided with fire wall. • Danger boards should be

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												provided close to the primary and secondary terminal boxes and on the fencing of the transformer. • Separate lightening arrestor should be provided on overhead lines.
	3	Process Air Compressor	1	Exposure to high levels of noise	1	Possible noise induced hearing loss.	3	2	3			• The provision of Enclosure on the compressor to prevent propagation of sound may be considered. • The control room where some employee is likely to remain should be provided with Sound proof room with glass panel for looking into the compressor room. • The sound levels should be measured at fixed intervals. • The person going close to the compressor should use adequate ear protection. • Warnings should be displayed to not allow unauthorised persons. • All the requirements of Schedule on Noise in Gujarat Factory rules made under section 87 should be complied with.
			2	High pressure	1	Possible bursting of the piping or	4	2	4	Safety valve and high pressure cut out		• Ensure that thickness of the lines and vessels is measured once in a year to ensure that

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				in the piping and vessels.		receivers.				switch will be provided on compressor and air receivers. Hydraulic testing of the vessels will be done once in four years. Thickness monitoring of the receivers will be done once in a year. The Safety valves provided in the lines or vessels will be tested once in a year.		the thickness will be safe till next date of thickness monitoring.
	3	Electrical hazard	1	Lack of earthing	1	Possible electric shock	1	2	1	Double earthing will be provided in the compressor set.		No recommendations.
			2	Loss of efficiency of air drier	1	The moisture going to the instrument air of the plant and cause process disturbance.	4	2	4	Molecular sieves type dehumidifier will be provided to render the instrument air moisture free.		• Ensure that the dehumidification system is maintained in healthy condition.
21. LPG storage and use.	1	Storage of LPG in horizontally mounted bullets	1	Decanting, storage and vaporisation of liquefied gas.	1	Possible leakage or release of LPG from the tanker/tank, forming explosive vapour cloud and subsequent vapour cloud ignition leading to shock	1	2	1	Tanks will be mounded to reduce the risk. All the precautions suggested by the supplier of the systems or by PESO will be executed.		• Ensure that all the requirements of PESO with regard to LPG/LNG are meticulously observed.

		(Capacity not known at this stage)				wave destructions and, burn injuries and subsequent BLEVE and fire ball leading to injuries and destructions.						
22. Raised platforms	1	At different places in the plant	1	Falling of persons from height and falling of objects from height and subsequent injuries	1	Possibility of falling of persons from height and falling of objects from height with possibility of getting injured.	2	2	2			• Ensure that all the raised platforms and the landings of stair cases are provided with double railing and toe guards of 10 to 15 cm height with 1 cm gap from the floors.
23. Water treatment plant (HCL)	1	Hydrochloric acid storage	1	Heavy leakage from the tank or tank collapse	1	Hydrochloric Acid exposure and resulting injuries.	2	2	2			• Tank for hydrochloric acid should be of MS with rubber lining. • The tank should be provided with dyke wall with acid proof linings in the interior surface. • The slope of the floor should be directed towards a sump having drain pipe. The pipe should be provided with a valve approachable from outside. • The dyke area should be provided with two staircases situated in opposite directions. • The tank should be provided with vent with water scrubber

												at the end. The overflow pipe should be kept dipped in water to prevent vapour release from the overflow pipe. • The dike wall should be located in such a way that all foreseeable releases from the tank are contained within the dyke. • Arrangement of level monitoring should be provided. • The tank should be earthed at two points. • The drain pipe of the tank should be provided with two valves in series or one valve and blind. • The flanges in the line should be provided with the flange guards in such a way that there is no spray release of the acid in case of leakage. • No electrical equipments should be located within the dyke wall. • Safety Showers and eye wash fountains should be provided nearby. • The hazardous properties of the hydrochloric acid with precautionary measures and the • Emergency response procedure should be displayed near the tank.

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24. Water treatment plant (NaOH)	1	Sodium Hydroxide lye storage.	1	Heavy leakage from the tank or tank collapse	1	Sodium Hydroxide exposure and resulting injuries	2	2	2			• Tank for Caustic lye should be of MS. • The tank should be provided with dyke wall with caustic proof linings in the interior surface. • The slope of the floor should be directed towards a sump having drain pipe. The pipe should be provided with a valve approachable from outside. The valve should be kept closed under normal condition. • The dyke area should be provided with two staircases situated in opposite directions. • The tank should be provided with vent with outer end provided with wire mesh to avoid entry of birds.. • The overflow pipe should be provided at the highest filling level of the tank. • The dike wall should be located in such a way that all foreseeable releases from the tank are contained within the dyke. • Arrangement of level monitoring should be provided. • The tank should be earthed at two points. • The drain pipe of the tank should be provided with two

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												valves in series or one valve and blind. • The flanges in the line should be provided with the flange guards in such a way that there is no spray release of the acid in case of leakage. • No electrical equipments should be located within the dyke wall. • Safety Showers and eye wash fountains should be provided nearby. • The hazardous properties of the caustic lye with precautionary measures and the emergency response procedure should be displayed near the tank in the language known by the majority of workers.

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Annexure-XV

CSR Policy

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ADANI ENTERPRISES LIMITED

CORPORATE SOCIAL RESPONSIBILITY (CSR) POLICY

(Approved by the Board of Directors on 9 th August, 2014)

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2. "Adani Foundation" means a society formed and registered under the Societies Registration Act, 1860 and includes a society jointly formed and registered by the Company with all or any of its Group Companies.

3. "Agency" (or Agencies) means any Section 8 Company or a registered trust/ society/NGO/ institution, performing social services for the benefit of the society and excluding a registered trust/society/ NGO/institution/Section 8 Company which is formed by the Company or its holding or subsidiary company/companies.

4. "Approved Budget" shall mean the total budget as approved by the Board of the Company upon the recommendation of the CSR Committee, which is to be utilized for CSR Projects.

5. "Board" shall mean the Board of Directors of the Company.

6. "Company" shall mean Adani Enterprises Limited and wherever the context requires, shall signify the Company acting through its Board.

7. "CSR Annual Plan" shall mean the annual plan detailing the CSR expenditure for the year.

8. "CSR Committee" shall mean the Corporate Social Responsibility Committee constituted by the Board of the Company in accordance with the Act, consisting of three or more directors, out of which at least one director shall be an independent director.

9. "CSR Expenditure " means all CSR Expenditure of the Company as approved by the Board upon recommendation of the CSR Committee , including the following:

   i. contribution to CSR Projects which shall be implemented and/or executed by the Company;

   ii. contribution to CSR Projects (including for corpus as required) which shall be implemented and/or executed by Adani Foundation and associated organizations such as Adani Research and Education Foundation, Adani Skill Development Centre , etc.

   iii. Any other contributions covered under Schedule VII to the Act .

   Contribution of any amount directly or indirectly to any political party under section 182 of the Act, shall not be considered as CSR Expenditure.

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10. "CSR Officer" shall mean the whole time person engaged by the Company for activities envisaged in the CSR Policy; having due comprehension, understanding, drive and passion for such activities and designated as such.

11. "CSR Policy" shall mean the present Corporate Social Responsibility Policy of the Company, which covers the activities to be undertaken by the Company as specified in Schedule VII to the Act and the CSR Expenditure thereon.

12. "CSR Projects" or "Projects" means Corporate Social Responsibility projects/activities/ programs/ initiatives instituted in India, either new or ongoing, and include but not limited to those undertaken by the Board in pursuance of recommendations of the CSR Committee as per the declared CSR Policy of the Company.

    Projects/activities/ programs/ initiatives undertaken in pursuance of normal course of business of the Company and projects which benefit only the employees of the Company and their families shall not be considered as CSR Projects.

13. "Financial Year" shall mean the period beginning from 1st April of every year to 31st March of the succeeding year.

14. "Group Companies" means holding, subsidiaries and associates of the Company.

15. "Net profit" shall mean the net profit as per the Act and Rules based on which the specific percentage for CSR Expenditure has to be calculated.

16. "Rules" shall mean the Companies (Corporate Social Responsibility) Rules 2014, including any re -enactment, modifications or amendments thereof.

17. "Thrust Areas" shall have the meaning as ascribed to them as per provision G of the Policy.

18. "Trust" means a Trust created and registered under the India Trust Act, 1882 by the Company and includes a Trust jointly created and registered by the Company with all or any of its Group Companies.

Words and expressions used and not defined in the Policy shall have the same meanings respectively assigned to them in the Act and/or Rules.

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G. Thrust Areas:

While the Company is eligible to undertake any suitable/rightful activity as specified in Schedule VII to the Act, however, at present, it proposes to undertake the relevant activities on priority basis in the following four Thrust Areas:

- Primary Education
- Community Health
- Sustainable Livelihood Development
- Rural Infrastructure Development

H. CSR Objectives and Projects:

Adani Group will carry out/ get implemented its CSR activities projects through Adani Foundation and associated organizations such as Adani Research and Education Foundation, Adani Skill Development Centre, etc.

CSR Projects will be taken up in following core sectors covering influenced villages near business sites and some projects having state wide and nationwide coverage:

(i) Primary Education:

"Ignited Minds for a brighter future"

- Establish and run our own schools
- Support to the Government anganwadis and schools
- Joining hands with the Government through Public Private Partnership (PPP)

All efforts geared towards improving Quality of Education.

(ii) Primary Health Care:

"Ignited Minds for Healthy Life"

- Rural Clinics
- Mobile Health Care Units
- Joining hands with the Government through Public Private Partnership (PPP)
- Innovative and need based projects such as Anaemia Prevention Program, Health Card to Senior Citizens , etc.
- Medical Education

All efforts will be geared towards Preventive and Primary Health Care.

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(iii) Sustainable Livelihood Developments:

"Ignited Minds for an Empowered Life"

- Support to Fisher Folk community for livelihood enhancement
- Empowering Women for better Livelihood
- Improving Agriculture and Animal Husbandry
- Optimising Natural Resource Utilization in Rural areas and conservation of natural resources
- Encouraging Vocational Skill Development and Entrepreneurial Initiative especially among women, children, elderly and differently abled

All efforts will be geared towards enhancing Socio-Economic Stature.

(iv) Rural Infrastructure Development :

"Ignited Minds for better Living"

Infrastructure related to

- Water conservation and Recharge
- Drinking Water availability
- Upgrading Infrastructure for Education
- Upgrading Infrastructure for primary Health and Hygiene Promotion
- Community Utility Infrastructure

All projects will be geared towards enhancing Rural Civic Amenities .

(v) Rural Sports and Sports Training:

"Ignited Minds for Disciplined Life"

- Training in promotion of Rural Sports
- Creating or upgrading rural sports grounds
- Encouraging sports activities amongst rural youth

All projects will be geared towards promoting Rural Sports.

I. Identification of CSR Projects:

1. CSR Projects need to be identified and planned for approval of the CSR Committee, in particular in Thrust Areas, with estimated expenditure and phase wise implementation schedules.

2. The Company shall ensure that in identifying its CSR Projects, preference shall be given to the local area and areas around which the Company (including its Units) operates. However, this shall not bar the Company from pursuing its CSR objects in other areas.

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3. As a cardinal principle, the CSR Projects in Thrust Areas shall be identified on th e basis o f a detailed assessment survey.

4. The CSR Officer may engage external professionals/firms/agencies if required for the purpose of identification of CSR Projects.

J. Implementation of CSR Projects:

The Company shall implement the identified CSR Projects by the following means:

I. Direct Method

1. The Company may itself implement the identified CSR Projects presently within the scope and ambit of the Thrust Areas as defined in the Policy;

2. The Company may also implement the identified Projects presently through its Foundation or Society which is involved in CSR activities, within the scope and ambit of the Thrust Areas as defined in the Policy.

3. The CSR Officer may engage external professionals/firms/agencies if required, for the purpose of implementation of its CSR Projects.

4. The Company may collaborate with other companies, including its Group Companies if required, for fulfilling its CSR objects through the Direct Method, provided that the CSR Committees of respective companies are in a position to monitor separately such CSR Projects.

II. Indirect Method

1. The Company may implement the identified CSR Projects through Agencies, subject to the condition that:

   - The activities pursued by the Agency are covered within the scope and ambit of Schedule VII to the Act provided

     - The Agency has an established track record of at least three years in undertaking similar programs or projects, and

     - The Company has specified the Project to be undertaken through the Agency which shall preferably be in Thrust Areas, the modalities of utilization of funds on such Projects and the monitoring and reporting mechanism which shall be at least once in three months.

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2. The Company may collaborate with other companies, including its holding and subsidiary Companies and Group Companies if required, for fulfilling its CSR objects through the Indirect Method provided that the CSR Committees of respective companies are in a position to monitor separately such Projects.

K. Monitoring Mechanism:

There will be a review and monitoring committee comprised of Business Site Head, Head Operations, Volunteer Employee and Adani Foundation representative which will meet every quarter. This committee will report to the board through CSR Committee of the business.

Internal Audit and review as well as regular capacity building at all levels of execution/implementing partners and monitoring/review committees will be done on regular basis.

L. Fund allocation and Others:

A. Fund allocation

1. The Company, in every Financial Year, shall endeavor to spend such feasible amount as CSR Expenditure, which shall not be restricted by the statutory limit of a specified percentage of its average net profits of the immediately preceding three Financial Years. However, the aforementioned CSR Expenditure in any Financial Year shall be at least 2% of Company's average Net profits for the three immediately preceding Financial Years.

2. The CSR Committee shall prepare a CSR Annual Plan for the above which shall include:

   a. Identified CSR Projects
   b. CSR expenditure
   c. Implementation Schedules

3. Total expenditure in the CSR Annual Plan shall be approved by the Board upon recommendation by the CSR Committee

4. In case the Company fails to spend the statutory minimum limit of 2% of Company's average net profits of the immediately preceding three years, in any given financial year, the Board shall specify the reasons for the same in its report in terms of clause (o) of sub -section (3) of section 134 of the Act .

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iv. The CSR Committee shall place before the Board in April/May every year a responsibility statement of the CSR Committee that the implementation and monitoring of CSR Policy, is in compliance with CSR objectives and Policy of the company for inclusion in the Board's Report.

v. The CSR Committee shall ensure that the CSR Policy and finalized Annual Plan is displayed on the Company's website.

N. Review Periodicity and Amendment:

i. CSR Plan may be revised/modified/amended by the CSR Committee at such intervals as it may deem fit.

ii. The CSR Committee shall review the Policy every two years unless such revision is necessitated earlier.

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B. Others

1. The CSR Committee shall ensure that major portion of the CSR expenditure in the Annual Plan shall be for the Projects as per CSR objectives . However, there shall not be any preference given to any particular projects for budgetary allocation and it shall be made purely as per the identified CSR Projects on need basis.

2. The Chairman and the Managing Director of the Company are authorized severally to decide on Projects to be implemented within the allocation as per the Annual Plan.

3. Any surplus arising out of the CSR Projects shall not form a part of the business profit of the Company.

4. The Company may build CSR capacities of their own personnel or personnel of Adani Foundation or its Trust or Society, as well as those of the Agencies through institutions with established track records of at least three Financial Years but such expenditure on capacity building shall not exceed 5% of the Approved Budget of the Company in one Financial Year.

M. Duties and responsibilities:

I. Board of Directors

The Board shall include in its Report the annual report on CSR Projects as per the format provided in the Annexure to the Rules.

II. CSR Committee

i. The CSR Committee shall monitor the implementation of the CSR Policy and CSR Plan. For this purpose, the CSR Committee shall meet atleast twice a year.

ii. In discharge of CSR functions of the Company, the CSR Committee shall be directly responsible to the Bo ard for any act that may be required to be done by the CSR Committee in furtherance of its statutory obligations, or as required by the Board.

iii. The CSR Committee shall place before the Board the draft annual report as per the format in annexure to the Rules in Board meeting in April/May of the following year for Board review and finalization.

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Annexure-XVI

Environment, Health & Safety Policy

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ENVIRONMENT, HEALTH & SAFETY POLICY

We at Adani, strive to make our businesses sustainable, that benefits our customers, our employees, our shareholders and society in general. We believe that in addition to integrated infrastructure business, there is a bottom line in performing our operations according to prescribed standards, specifications and regulations on governance, which are safe in working and environmental friendly for the well-being of the working community.

As a responsible corporate, we at ADANI have a firm conviction that the industrial injuries, occupational hazards as well as safety and environmental incidents are preventable. We recognize and trust people as our most important asset and have commitment to provide safe and healthy work environment impacting not only those, who are working in our industry but also community, which is living in the vicinity.

To achieve this objective, we shall

a. Develop, implement, maintain and sustain EHS Management System across the Group to set up new benchmarks for the respective sector of operations, which superimpose the regulatory and statutory requirements.

b. Verify, audit and periodically review EHS performance and set new targets to revise these benchmarks.

c. Formulate EHS objectives and targets for continual improvement and to have a periodic review for ensuring that these are in conjunction with the individual business and corporate levels.

d. Conduct all our operational activities in such a manner as to avoid harm to employees, contractors, stakeholders and community at large.

e. Inculcate safety & health as a personal value through behavioral intervention and recognize it across levels with continuous correction of unsafe behavior.

f. Provide adequate training and resources so as to bring awareness and ability to carry out work safely.

g. Emphasize responsibility and accountability to all employees and contractor workforce for safe performance on the job and encourage safe behavior off the job.

h. Evolve ways to reduce or eliminate the use or release of toxic and hazardous material and prevent pollution by conserving natural resources, recovering and recycling the raw materials for safe, healthy and clean environment.

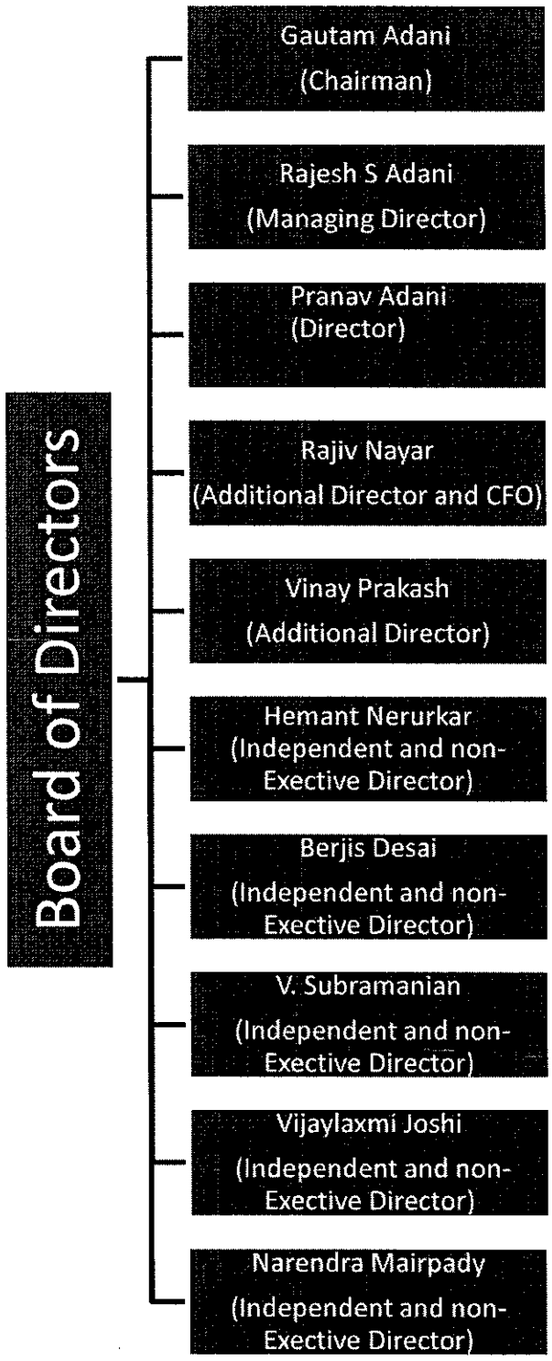
GAUTAM S ADANI

Date: 01.01.2016

Annexure-XVII

List of Board Directors

ANNEXURE-XVII
LIST OF BOARD DIRECTORS



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ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

Annexure-XIII: PUBLIC HEARING PROCEEDINGS

Volume-III

Sponsor :

adani™

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

Prepared by :

Vimta
Driven by Quality, Inspired by Science.

Vimta Labs Limited
142, IDA, Phase-II, Cherlapally
Hyderabad–500 051, Telangana State
env@vimta.com, www.vimta.com
(NABL Accredited and ISO 17025 Certified Laboratory,
Recognized by MoEF&CC, New Delhi)

December, 2018

PREFACE

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

ENVIRONMENTAL IMPACT ASSESSMENT

FOR
THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

Volume-III
Annexure-XIII: Public Hearing Proceedings

For and on behalf of VIMTA Labs Limited

Approved by : **M. Janardhan**

Signed :

Position : **Head & Vice President (Env)**

Date : 6th December, 2018

The report has been prepared inline with the prescribed TORs issued vide letter No.J-11011/113/2016-IA.II(I) dated 21st June 2016 of Ministry of Environment, Forests and Climate Change, New Delhi.

This report has been prepared by **Vimta Labs Limited** with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

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GUJARAT POLLUTION CONTROL BOARD

Regional Office, Kutch (East),

Room No. 215,216,217, Second Floor, Kandla Port Trust,

Administrative Building, Sector-08, Gandhidham, Kutch – 370 201

Website: www.gpcb.gov.in

PUBLIC HEARING PROCEEDING

It is hereby informed that as per the Ministry of Environment, Forests and Climate Change Government of India, New Delhi Vide its Notification No. S. O. 1533 dated 14th September, 2006 and its subsequent amendments S.O. 3067 (E) dated December 01' 2009. Public hearing was scheduled for **M/s. Adani Enterprises Limited, Setting up of proposed Greenfield Copper Refinery Project/Plant 1.0 MTPA (Million Tonnes per Annum) at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka: Mundra, District: Kutch, Gujarat** which is covered under "Category–A" as mentioned in their request application.

A copy of Draft Environment Impact Assessment (EIA) Report and Executive Summary of Draft Environment Impact Assessment (EIA) Report in English and Gujarati were submitted / provided to following Authorities or office to make available for inspection to the public during normal office hours, till the Public Hearing is over:

1. The District Collector, Bhuj, District Kutch
2. District Development Office, Bhuj, District Kutch
3. District Industry Centre, Bhuj, District Kutch
4. Taluka Development Office, Mundra, District Kutch
5. Taluka Development Office, Mandvi, District Kutch
6. The Chief Conservator of Forest, Ministry of Environment, Forests and Climate Change Government of India, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E-5, Arera Colony, Link Road -3, Ravishankar Nagar, Bhopal 462016
7. Regional Office, Kutch (East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Admn Building, Sector 08, Gandhidham, Kutch.

Executive Summary of Draft Environment Impact Assessment (EIA) Report in Gujarati & Public Notice regarding public hearing were also circulated to Gram Panchayats in the affected area for wide circulation.

All local affected person of the project were requested to remain present in the public hearing or send their response in writing to Member Secretary, Gujarat Pollution Control Board before the public hearing.

Other concerned persons having stake in the Environmental aspect were requested to send their response in writing to Member Secretary, Gujarat Pollution Control Board before the public hearing.

The Public Hearing was conducted on 29.04.2017 at 11:00 Hrs. at Community Premises Centre (Samajvadi), Opposite Tunda Primary School, Village: Tunda, Taluka: Mundra, District: Kutch, Gujarat.

GUJARAT POLLUTION CONTROL BOARD

Regional Office, Kutch (East),

Room No. 215,216,217, Second Floor, Kandla Port Trust,

Administrative Building, Sector-08, Gandhidham, Kutch – 370 201

Website: www.gpcb.gov.in

The advertisement was published in Gujarati Daily "KUTCH MITRA" Kutch edition, dated 26.03.2017 and in National English Daily "The Times of India" dated 26.03.2017 (Enclosed as Annexure E).

Shri D R Patel (GAS), Additional District Magistrate and Resident Additional Collector, representative of District Magistrate and Collector, Kutch, Bhuj supervised and presided over the entire public hearing proceeding.

A statement showing attendance of participants during the public hearing is enclosed herewith as **Annexure A.**

A statement showing salient points of issues raised by the participants and responses by the representative of the project proponent during the public hearing in English language is enclosed as **Annexure B** and in Gujarati language is enclosed as **Annexure B-1.**

Statements showings response and comments received in writing, with respect to aforesaid public notice regarding public hearing, before public hearing is enclosed as **Annexure C-Q-1 to C-Q-8** & during public hearing is enclosed as annexure **C-Q-9 to C-Q-44** and replies by project proponent with respect to these response and comments received in writing are enclosed as **Annexure D-A-1 to D-A-44** respectively.

Place: Community Premises Centre (Samajvadi), Opposite Tunda Primary School
Village: Tunda
Taluka: Mundra
District: Kutch,
Gujarat.
Date: 29.04.2017

K. B. Chaudhari
Regional Officer,
and
as a representative of the Member Secretary, GPCB

D. R. Patel (GAS)
Additional District Magistrate and Resident Additional Collector,
and
as a representative of District Magistrate and Collector, Kutch, Bhuj

Enclosures:

- Annexures: A, B, B1, C-Q-1 to C-Q-44, D-A-1 to D-A-44 and E as above
- DVD (1 to 3) containing Videography of Public Hearing
- CD containing PDF file of Minutes of Meeting (MoM) of Public Hearing and Annexures

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GUJARAT POLLUTION CONTROL BOARD

Regional Office, Kutch (East),
Room No. 215,216,217, Second Floor, Kandla Port Trust,
Administrative Building, Sector-08, Gandhidham, Kutch – 370 201
Website: www.gpcb.gov.in

ANNEXURE – A

A statement showing participants present during the public hearing

As per the Ministry of Environment, Forests and Climate Change Government of India, New Delhi Vide its Notification No. S. O. 1533 dated 14th September, 2006 and its subsequent amendments, Environmental Public Hearing is scheduled for **M/s. Adani Enterprises Limited, Setting up of proposed Greenfield Copper Refinery Project at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka: Mundra, District: Kutch, Gujarat** which is covered under "Category–A" as mentioned in their request application.

The statement showing Participants present during public Hearing held on 29/04/2017 at 11:00 AM at **Community Premises Centre (Samajvadi), Opposite Tunda Primary School, Village: Tunda, Taluka: Mundra, District: Kutch (Gujarat)** is as under:

ભારત સરકારના વન, પર્યાવરણ અને જળવાયુ પરિવર્તન મંત્રાલય, નવી દિલ્હીના જાહેરનામા ક્રમાંક : એસ.ઓ. ૧૫૩૩ તા. ૧૪-૦૯-૨૦૦૬ અને તેના પછીના સુધારાઓ અન્વયે કેટેગરી "એ" માં આવરી લેવાયેલ મેસર્સ અદાણી એન્ટરપ્રાઈઝીસ લીમીટેડ, અદાણી સ્પેશિયલ ઇકોનોમિક ઝોનની જમીન ગામ:સિરાચા અને નવીનાળ, તા: મુન્દ્રા, જિ:કચ્છ, ગુજરાત દ્વારા સૂચિત ગ્રીનફિલ્ડ કોપર રીફાઇનરી પ્રોજેક્ટ ની સ્થાપન માટેની સૂચિત પરિયોજના (પ્રોજેક્ટ) અંતર્ગત તેઓની અરજીના અનુસંધાને પર્યાવરણીય લોકસુનાવણી આયોજીત કરવામાં આવેલ છે.

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
1.	J. Bhalnagar Adani Power A'bad	J Bhalnagar
2	Santosh Kr Singh Adani Pow A'bad	
3	PRADEEP GURJARAO	
4	Shalin Shah APSEZ, Abad	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
5	Jayesh Joshi ડોકટર	J. M. Joshi
6	Rajesh Audit Dr	Patel
7	Zala. A. C.	A= Jala
8	R.B. Solanki	R.B.Solanki
9	Prakashba bhanuba chavda Kandagra	પ્રકાશબા
10	સંચલાબા જુવુભા રાઠોડ, કાંડાગારા	સંચલાબા જુવુભા
11	આયદાન જૈનાબા ચૌહુભા, કાંડાગરા	આયદાન જૈનાબા ચૌહુભા
12	આયદા સોનલબા રણજીતસિંહ, કાંડાગારા	આયદા સોનલબા
13	ગઢવી પુજાબા ભુપેન્દ્રસિંહ, કાંડાગરા	ગઢવી પુજાબા
14	ગઢવી નગરાબા અજયસિંહ, કાંડાગારા	
15	ગઢવી રાજુબા સિધુભા, કાંડાગારા	ગઢવી રાજુબા
16	ગઢવી રામબા નાથાજુભા, કાંડાગારા	
17	આયદા ગાયત્રીબા રાજેન્દ્રસિંહ	આયદા ગાયત્રીબા
18	રાજબા કે કે	રાજબા કે કે

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
19	મોહા ભાડિયા રાજ ગઢવી 8758969699	
20	ભાડાડુ ગઢવી (મોહા ભાડિયા)	
21	દેવ ભાડાડુ (મોહા ભાડિયા)	
22	શ્યામ ગઢવી મોહા ભાડિયા	
23	મનીષ ડુંગર (ભચીભાયા)	
24	રઘુનાથસિંહ જાડેજા (")	
25	વિજયસિંહ રૂડાભાઈ ઉદાવદિયા	
26	રઘુવીરસિંહ .કે. જાડેજા	S.K. જાડેજા ભચીભાયા
27	મેઘરાજભાઈ ગોવિંદભાઈ ભચીભાયા	
28	સંગાણી ખોડાભાણ જુસબ સરપંચશ્રી ભાગાતળાવીયા ગ્રામપંચાયત	
29	ભરત પરમાર	
30	ઉકા ભાગુરા, ટુંડા	
31	કરીમ ગફુરભાઈ, ટુંડા	
32	વાઘાભાઈ ભોજરાજ, વાંઢ	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
33	રાજુભાઈ રોમાર, ટુંડા	
34	ઈસાભાઈ લધુમણિ, ટુંડા	
35	પ્રાગજીભાઈ રાજેન્દ્ર ગોસ્વામી	
36	કુલાર સાલમકુમાર, ટુંડા	
37	[illegible]	
38	કુમાર રમણ ના ચોરસમાડા	
39	[illegible]	
40	Dinesh S. Gadhvi (Mota Kandagra)	
41	[illegible]	
42	[illegible]	
43	[illegible]	
44	[illegible]	
45	[illegible]	
46	[illegible]	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
47	જાડેજા કેસુભાતસિંહ જીતુભા ટુંડા(કચ્છ)	I. J. JADEJA
48	જાડેજા હકુભા મોડજી ખેડૂત	જાડેજા હકુભા મોડજી
49	[illegible]	P. B. S.
50	[illegible]	[illegible]
51	[illegible]	[illegible]
52	[illegible]	[illegible]
53	[illegible]	[illegible]
54	[illegible]	[illegible]
55	[illegible]	[illegible]
56	[illegible]	[illegible]
57	[illegible]	[illegible]
58	[illegible]	[illegible]
59	Rakesh Kumar	[illegible]
60	Jadeja Sanjeet Sinh ટુંડા(કચ્છ)	[illegible]

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
61	Jadeja Sahdev Sinh (Deshalpar)	
62	Jadeja Vishvajeetsinh (Deshalpar)	
63	Jadeja Dekeh	
64		
65		
66		
67		
68		
69		
70		
71		
72		
73	Narendra. F. Jadeja	
74	V.M. Jadeja	

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
75	Shailendrasinh. S. Jadeja Vill. Deshalpar	Jadeja
76	હિલુભા. વી. જાડેજા ગામ - દેશલપર	જાડેજા હીપુભા વેપુભા
77	જાડેજા કુલદીપસિંહ મહાવીરસિંહ મારી ખાખર	
78	Khetsi Gelan	
79	અપાર્યા બાકી	
80	ભરત ધનજી ઠક્કર	ઠક્કર
81	Gopal Vanariya Moti Khakhar Mundra	
82	મેઘજી કરમણ ચાવડા	
83	રમેશભાઈ ખોના ગામ	
84	રામ ભગવાન	
85	રામ ભાઈ. ભગવાન	
86	રાજુ ઠાકર	
87	ભગવાન ભાઈ રામજી	
88	રામજી ભાલારભી - ટુંડા	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઇસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
89	JITUBHA NARAYNJi Mer Wic At. MOTA KANDAGRA	
90	Usmangani Shevasiya	
91	Jadeja Jaydevsinh L.	
92	Ibrahim Turk	Ibrahim Turk
93	[illegible]	
94	Jadeja Bahadursinh Mota Kandagra.	
95	Gadhvi Gopal B.	
96	[illegible]	
97	[illegible]	Ranjit
98	[illegible]	
99	[illegible] Bhavarsinh. R. Chauhan	B. V. Lodhi
100	Bhavu har . - Shivaraka.	
101	[illegible]	
102	[illegible]	

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે **કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત** ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
103	[illegible] ટુંડા	[illegible]
104	[illegible] ગામ ટુંડા	[illegible]
105	[illegible] - ટુંડા	
106	[illegible] - ટુંડા	
107	[illegible]	[illegible]
108	Ram giri sirgpagar	[illegible]
109	KARSHAN P. THAKR	[illegible]
110	Karansinh Jadeja - Nani Khakhar	K.J Jadeja
111	[illegible] ગામ ટુંડા	[illegible]
112	[illegible] ટુંડા	[illegible]
113	[illegible] ટુંડા	[illegible]
114	[illegible]	[illegible]
115	[illegible] - પાંચ	[illegible]
116	[illegible] - પાંચ	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
117	તપુભા હમીરજી ઓઢા-સિરાચા	
118	જીવરાજ પ્રભાતજી ઓઢા-સિરાચા	
119	રામરાંગાભાઈ ગામ:સરાચા	રામરાંગા
120	Naranbhai J. Jadeja Mota Kandagara	Jadeja
121	ગામ:સિરાચા ચોગાના ગ્રહવાપીત લાયુમા	ગ્રહવાપીત લાયુમા
122	લખુ પુંજા-સિરાચા	
123	મેગા વાગા - સિરાચા	મેગા વાગા
124	રબારી પબા પરંદ્રા ગામ પરંદ	પબા પરંદ્રા
125	રબારી રામજી ગામ વંઢ	
126	રબારી દેવા ભાઈ ગામ ૫	
127	વાઘેલા રામદેવસિંહ ગામ કોડારા	RR Vaghela
128	Dr. Vijay P. Jadeja Mota-Kandagara	
129	મહેન્દ્રસિંહ વેજોજી ગામ કોડારા	
130	પુંજા રાણાભાઈ કોડારા	

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
131	ગાંધી રામ દેવરાજ મોટા ટુંડા ગામ	
132	મંડેચા વીરમભાઈ મોટા કાંડાગરા	
133		
134	ગામ- મોટા ચાડીયા	
135	કુલદીપસિંહ મોડુભા જાડેજા	
136	ઠક્કર મુકેશ ધનજીભાઈ	
137	નવનીતભાઈ ઠક્કર. સમાચાર પત્ર	
138	Ripin Patel, Vadodara 9913261835	
139	મોટા કપાયા મહેશ્વરી કરસન વેલજી ગાંધી	કરસન
140	કિડાણા મહેશ્વરી ધરમા દેવજી માંડણ	ધરમા
141	મોટા કાંડાગરા મહેશ્વરી રતનલ વીજપાલ	રતનલ
142	કુમાર પોકે	કુમાર
143	કાના ભાઈ ગોકળ	
144	ગાંગજી ખીમજી ગોહિલ	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
145	ઇનો મારા મોંઘર - ટુંડરા	
146	ધાતો ભાગ દેવશેરભાઇ	
147	નઝમા યુનુસ નાનોમાંકર	
148	જાકબ મકુભાઇ નકુમા	
149	મકબૂલ ગફુલ. મુનારા	
150	પરેશ. બી. રાજગોર	Paresh. ટુંડા - કચ્છ
151	એન. એમ. ગોસ્વામી કે. વાડી ટુંડા ગા.પં.	
152	ઉમરા - વાંઝ	
153	રાજુલ ર - ટુંડરા	
154	ગાંધી બી. એસ. ટુંડરા	
155	રાજેન્દ્રસિંહ. આર. વાઢેર	
156	જગદીશ લાલજીભાઇ ગોસ્વામી	Jagdish A
157	ગોકળ રામ દેવરાજ	
158	હરખાનસિંહ ગોહિલ (ઓદરડા)	H.D. Gohil

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
159	ધનજાઈ ખી. ગઢવી, શેખડીયા	ધનબાઈ
160	Sheetal Vijyar, Kandagara	
161	Jeral Gadhvi, shekhadiya	D Gadhvi
162	Jadeja Arvindsinh Jaydevsinh	
163		
164	Kalpesh Rathod, Navinal	
165	Jadeja Pravin sinh, Navinal	
166	ગંગાબેન જરાજ, ચીરાયા	ગંગાબેન
167	ઉષાબેન રાજેશ મારાજ, ચીરાયા	ઉષાબેન
168	કુંતાબાઈ વૃજલાલ લોધીયા, સોંરાયા	કુંતાબેન લોધા
169	Thangavelu Hitesh. D.	Hitesh
170	લક્ષ્મીબેન હિંમેશ મહેશ્વરી	Laxmi
171	હિરજાઈ ધનજી મહેશ્વરી	
172	ગંગાબેન હરિભાઈ મહેશ્વરી	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
173	નૂતાર પ્રકાશભાઇ ત્રિવેદી	(N. Trivedi)
174	સુધિર પારીવાળા	
175	કલ્પેશ કોકારી	
176		
177	Sushajit Pal	
178	Chetan Trivedi	
179	Chirag Thakur	C. Thakur
180	Bikash Rusia	
181	Mukesh Patel	
182	Shivanagouda S-N	
183	Praveen Bhagat	
184	K S Vishnu Teja	
185	R N SHUKLA	
186	Mitin Jaiswal	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
187	[illegible]	
188	K. Ram M. Mer[illegible]	
189	HARI. S.	
190	Dilip. R. Gor	
191	[illegible]	
192	[illegible]	
193	[illegible]	
194	[illegible]	
195	Dharam R. Thacker	D.R.Thacker
196	Girish Mathu	
197	Padti Shah	
198	[illegible]	
199	Dinesh	
200	Prajapati Chirag	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
201	Rajendrasinh Jadeja	
202	Bharatsinh. Jadeja	BBJADEJA
203	Badursinh. Jadeja.	BS JADEJA
204	Rahulsinh. Jadeja.	
205	ગાંડુભા રાણુભા જાડેજા	ગાંડુભા રાણુભા
206	ગાંડુભા ખેંગારભા જાડેજા	સહી:સ્પષ્ટ
207	ગાંડુભા ભવાનસિંહ જાડેજા	ભવાનસિંહ
208	ગાંડુભા નિરમલસિંહ જાડેજા	નીરુભા ગાંડુભા
209	ગાંડુભા વિજયદીપસિંહ જાડેજા	S.P. Jadeja
210	ગાંડુભા શક્તિસિંહ જાડેજા	
211	ગાંડુભા ગંભીરસિંહ જાડેજા	
212	રમેશ ચંદ્રાવાડિયા	MUNDRA
213	ધા. રમે. સભ્યશ્રી	29/04.
214	દિનેશ	MCB

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
215	ચુકા ચુકા ચોરેલા ગામ સગારિયા	ચુકા ચુકા
216	ગજરાજસિંહ જાડેજા ગામ ટુંડારા	ગજરાજસિંહ જાડેજા
217	દરારસિંહ રણમલ ગામ જાખરા	
218	ચોરાણા દિનેશગિરી નાથુગિરી	
219	સાવરિયા	
220	જિજ્ઞેશ ગોસ્વામી - ટુંડારા	
221	ગોસ્વામી વિશ્રામ ઓમ - ટુંડારા	
222	ગોસ્વામી કુલ્યાણ એ - ટુંડારા	
223	ગઢવી રામ ખાસારીયા - ટુંડારા	
224	ગોસ્વામી રામ મ -	
225	ગોસ્વામી ગોપાલ ટુંડારા	
226	નારાયણ રેતાળા ગઢવી	
227	પરમારકરણાભી કુકાચાચે	
228	રબારી નાગા વેરા	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
229	Abbas, Navinal.	
230	પાદર અબ્બાજી બજાણા	
231	ફકીર ઈસ્માઇલ બાબુભાઈ	
232	ઈકબાલ ભાઈ બજાણા	
233	મોહમ્મદ ઉમર બજાણા	
234	[illegible]	
235	જયેશ રામજીભાઈ ખાવડિયા (સરપંચ-ટુંડા)	
236	કુભાર-મુખરૂદ્દ ...ચરાળ	
237	ભરત ના માંગ કાડાગરા	
238	ઈસ્માઈલ ઈસાકભાઈ કારા કુંડા	
239	OSMAN ISHAK NODHA	
240	Phulji Ramji Mota Kandagara.	
241	[illegible]	
242	બચુભાઈ રામજી ગોર ટુંડા	B.R.ગોર

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
243	ખુબાઈ હાજાભાઈ મીઠાણી ગામ ટુંડા	
244	પટેલ રંજુબહેન અમૃતલાલ	
245	હાર્દિક વ. પાટલ	
246	[illegible]	[illegible]
247	[illegible]	[illegible]
248	[illegible]	[illegible]
249	[illegible]	[illegible]
250	[illegible]	[illegible]
251	[illegible]	
252	Devendra sinh B. Jadeja	
253	[illegible]	
254	Javerdra Sinh	
255	Vinzoda Dinesh Gopalbhai	
256	Pradum H. [illegible]	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
257	વોકર ઝકરિયા ટુંડા	
258	Parchaj Lalji Chavda, Sirvache.	
259	ભેડુમા વીરાણા	ભેડુમા
260	ચાવડા મનોજકુમાર ગોપાલભાઈ મિસ્ત્રી	
261	મકવાણા વસ્તુભાઈ પરબત	વસ્તુભાઈ
262	દેવજી રામ સિરાચા	દેવજીરામ
263	Tunsi M. Virada Siracha	Tunsi M.
264	ગોસાંગ રાજેશ વાલજી	R. V. Matang
265	કોટક ધિરજલાલ નાથ	S. D. Dori
266	Gautam B. Bhanji	
267	વિરાણી ડરેશ. જે	
268	મારવાડા જુસબ વેરાજ	
269	મકવાણા જયદેવસિંહ સિરાચા	J. D. Jadeja
270	ટોપરાણી ભગવાનજી ટુંડા	

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
271	Jiveni Devu Rathu	
272	Ruvi Megh	
273	RABARI GOPAL VANDH	GOPAL
274	Ramu Rabari Vandh	
275	RABARI manoj ।।	M.V
276	પાલા, Vandh	પાલા.
277	Ramu Rubari Vandh.	Ramu
278	માડા રબારી માડાભાઈ	ગાડુ વાદ
279	Lakha Khima, Vandh	
280	Bhimshi Jesingbhai Mojel Bhujsid	
281	ગાડા લખમણ કાંડોરા	[illegible]
282	ગોકળ ગોવાભાઈ કરમટા	ગોવાભાઈ
283	D વી રબારી	વી રબારી
284	Rabari Shamji	

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
285	પેથા ભચા રબારી ટુંડા (ભાડું)	
286	[illegible] રબારી ટુંડા	
287	Chaunan Kirit sinh Jilubha Jadeja Ta Siracha	
288	Indrajitsinh Chauhan Shivacha	
289	Chauhan Dharmendrasinh.M Kirit Shivacha.	
290	Kiriji Sivacha.	
291	[illegible]	
292	[illegible]	
293	[illegible]	
294	[illegible]	
295	[illegible]	
296	[illegible]	
297	[illegible]	
298	[illegible]	

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
300	[illegible]	[illegible]
301	[illegible]	L. M Rupareli
302	[illegible]	[illegible]
303	[illegible]	[illegible]
304	[illegible]	[illegible]
305	Kuldipsinh [illegible] Tulsa	[illegible]
306	Indrasit Jadeja	[illegible]
307	[illegible]	[illegible]
308	Lakhan [illegible],	[illegible]
309	Lakhudan Rohadiya.	[illegible]
310	Lalaprasad Joshi	[illegible]
311	[illegible]	[illegible]

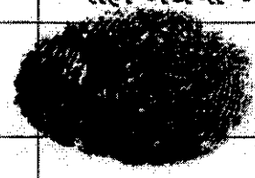
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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
312	Bharat Singh - Samudra T/C	
313	Punjabhai R. Makwana	
314	Shailesh Prajapati	

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે **કમ્યુનીટી પ્રીમાઇસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ**, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
315	ભાજાલાઈ રબારી, વડિ	
316	આમુલાઈ રબારી, વાઢ	
317	Jadeja Alaysinh Pratapsinh	

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તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
318	Rajendrasinh b. Chauhan sirachu	
319	Babubhai m. Desai	
320	Nanji P. Rathod-	
321	આશિષ ભાયજી સોલંકી ગુજરાત	આશિષ

1432

તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકે **કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી) ટુંડા પ્રાથમિક શાળાની સામે, ગામ:ટુંડા, તા:મુન્દ્રા, જિ:કચ્છ, ગુજરાત** ખાતે યોજાયેલ લોક સુનાવણી દરમ્યાન હાજર રહેલાં લોકોની યાદી નીચે મુજબ છે.

Sr. No. ક્રમાંક	Name and Address નામ અને સરનામું	Signature OR Thumb Impression સહી અથવા અંગુઠાનું નિશાન
322	જમ ઈસ્માઈલ મલી ગામ ટુંડા	જમ ઈસ્માઈલ મલી ટુંડા

Annexure B

A statement showing issues raised by the participants and responses by the representative of the project proponents during the Public Hearing

As per the Ministry of Environment, Forests and Climate Change, New Delhi, Government of India, Gazette Notification No. S.O.1533 dated 14/09/2006 and its amendments till date, Environmental Public Hearing was scheduled for M/s. Adani Enterprises Limited for proposed Greenfield Copper Refinery Plant (1.0 Million Tonnes per Annum – MTPA), which is covered under category "A" as mentioned in TOR, at Adani Ports and Special Economic Zone (Village Siracha and Navinal, Taluk Mundra, Dist. Kutch, Gujarat).

The Environmental Public Hearing was held on dated 29/04/2017 at 11.00 AM at Community Premises Centre (Samajwadi), opposite Tunda Primary School, Taluk Mundra, District Kutch, Gujarat.

Shri D. R. Patel (GAS), Additional District Magistrate and Resident Additional Collector, Kutch-Bhuj supervised and presided over the public hearing proceedings.

Shri K.B. Chaudhary, Regional Officer Shri, Kutch (East), Gujarat Pollution Control Board and as a representative of member secretary of Gujarat Pollution Control Board welcomed all participants present in the public hearing and with due permission of Additional District Magistrate and Resident Additional Collector initiated the procedure of the public hearing. He outlined about various provisions of E.I.A. Notification 2006 and briefed the procedural details for conducting this public hearing including actions taken by GPCB for wide publicity of this public hearing and the advertisement given in earlier local daily newspapers. He announced that as per the provision of notification, only locally affected persons will be allowed to represent in the public hearing while others having plausible stake may give their representation in writing which would be included in the proceedings.

With the due permission of the Additional District Magistrate and Resident Additional Collector, Regional Officer, Kutch (East), GPCB invited representatives of the project proponent to make the presentation of the proposed project in local Gujarati language.

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As the representative of the project proponent started presentation, Shri Naranbhai Gadhavi, Village Zarpara, Taluka Mundra, requested the presiding officer for an original copy of EIA report in English. Regional Officer, GPCB, with due permission of presiding officer, directed the representatives of the project proponent to provide copy of EIA report to Shri Naranbhai Gadhavi. Project proponent provided the said EIA copy to Shri Naranbhai Gadhavi.

After that technical representatives of project proponent of the industry gave an audio visual presentation in Gujarati which included introduction of the company, world statistics of Copper smelters and refinery, Copper plants in the world, use of Copper for the nation, Map of the site, Map of the study area, land use pattern of the study area, layout plan, environmental settings, resources necessary from the local area, process plant flow sheet, air environment, ambient air quality monitoring, mitigating measures for air pollution, water environment, assessment of impacts on water environment and mitigating measures, land environment, sampling locations, mitigating measures, solid waste management, noise environment, measures to attenuate noise, biological environment etc.

After the audio visual presentation by the representatives of the project proponent, Regional Officer, Kutch (East), GPCB, with the permission of the Additional District Magistrate, opened the forum for representations / objections / suggestions from the local affected people.

Regional Officer, Kutch (East), Gujarat Pollution Control Board informed to all the participants that before environmental public hearing written representations have been received from: (1) Shri Ravilal K. Maheshwari, Mundra. (2) Shri P.C. Gadhavi, Ex. President, Taluka Panchayat, Lakhpat, (3) Shri Mahesh Pandya, Paryavaran Mitra, Ahmedabad (4) Shri Gajendrasinh Jadeja, Sarpanch, Navinal (5) Shri Sanjaybhai S. Bapat, Mundra, (6) Shri Naran B. Gadhavi, Kheti Vikas Trust, Zarpara. Reply to these written representations given by the project proponent will be included in the proceedings.

The representations / objections / suggestions / opinions raised by the participants and responses by the representatives of the project proponent during the public hearing are as under:

Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
1	Shri Punshibhai Gadhavi Member of Taluka Panchayat, Mandvi Village: Mota Bhadiya Taluka: Mandvi	He represented that, • How many villages of the Mandvi and Mundra taluka are affected in this project? Provide the details about distance. I was a Sarpanch for a period of ten years and I made submissions during that time also but the company did not provide a proper reply. • At the time of making this report, how many numbers of villages have been visited by the company and were the local people present at that relevant point of time? • How does police behave with ladies of our village? The people of Nana Bhadiya, Mota Bhadiya and Kandagra village are sent back.	The representative of project proponent informed about his designation and qualification and then replied that, • The area of this project includes Siracha and Navinal villages. As per the guidelines under EIA Notification of Ministry of Environment, Forests and Climate Change, Government of India 16 villages within the 10 kilometre radius are included. Out of this, the monitoring is done in 8 villages.
2	Shri Dayabhai Viram Gadhavi Village –Mota Kandagra Taluka: Mundra Shri Rambhai Kanani Village –	He represented that, • All our questions shall be replied to in Gujarati language. The project representative does not reply in Gujarati language and therefore this means	The regional officer asked the project representative to translate the replies from Hindi to Gujarati language.

dpala

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Zarpara, Taluka: Mundra	that the local public will not receive employment. The project officer should provide his qualification and identification before giving reply in Gujarati. • How many villages are affected? What is the radius of affected area? How many people were met? How many villages were visited? • At the time of presentation the list of only 8 villages is shown. Why other villages are not included? Why is monitoring done in only 8 villages? Show us the list of 16 villages. Give the proof of 08 villages visited.	Representation of project Proponent replied that, • As per the guidelines under EIA Notification of Ministry of Environment, Forests and Climate Change, Government of India, 16 villages within 10KM radius are included. Names of villages where monitoring is carried out are mentioned in the EIA report. All the villages falling within the 10KM radius are covered as per the EIA notification. The date of lab testing report is also provided in the EIA report. The company has prepared the EIA report as per the guidelines. The EIA report was made available at five places.
		• The laboratory reports should be provided. How old are these reports? At which five places were the sampling done? Which organization has conducted the study? We should be provided with the analysis report of the company. Which laboratory has	• With the due permission of chairman the regional officer informed that the person is asking for monitoring reports and requested the representative of the project proponent to provide the same. Representation of project Proponent replied that,

Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		conducted the monitoring? Provide certificate of the same. • At which five places were the EIA reports placed? We have objection to the hearing and proposed project. We have objection as there will be impacts on environment.	• The Chapter no. 3 page no. 43 of the EIA report provides the entire information as to the analysis of air at 8 (eight) places. The monitoring is carried out by Government of India, NABET Accredited M/s VIMTA Labs, Hyderabad. The certificate is provided in the report. • As per the EIA notification of the Government of India, the draft EIA report is made available at following Five offices: 1. District Collector office, Kutch-Bhuj 2. Office of District Development officer, Kutch-Bhuj 3. District Industrial Center, Bhuj-Kutch, 4. Office of the Taluka Development officer, Mundra 5. Office of the Taluka Development officer, Mandvi • The executive summary of EIA report is provided in 14 villages. The monitoring is done in 8 villages. There is no provision as to keep the local public along with us during monitoring. We have come here to

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
			provide the replies to the objections related to the information provided under the EIA report. You will be heard and a proper reply will be provided. This will be included as part of public hearing proceedings and the final EIA report will be submitted to MoEF. • Analysis report will be provided after public hearing is completed.
3	Shri Punsibhai Gadhavi, Taluka Panchayat Member – Mandvi Village – Mota Bhadiya Taluka: Mandvi	• He represented that, when was the report submitted to Mandvi Taluka Panchayat? Is the report provided to community leaders? We oppose this public hearing.	• The regional officer has informed that the copy of report and CD is provided to Mandvi Taluka Panchayat office on 27.03.2017.
4	Shri Vishrambhai Gadhavi, Village – Zarpara Taluka: Mundra	He represented that, • The photographs of place and equipment used shall be shown from where the samples were collected. • You are showing the photographs of your proposed project, show the photographs of the monitoring carried out.	• The representative of the project proponent replied that, we have photographs of 8 locations and these will be provided.
5	Shri Dayabhai Viram Gadhavi Village – Mota	• He represented that the person providing the reply on behalf of	• The representative of the project proponent showed the photo ID-card

dpatel

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Kandagra Taluka: Mundra	the company must provide the company photo ID card, only then he will be allowed to reply. Our boys are not permitted to enter the company without an ID-card.	on LED screen.
6	Shri Gopalbhai Gilwa Village – Zarpara Taluka: Mundra	He represented that, • Give the information about how much carbon dioxide is emitted from the Thermal Power Plant at Mundra? Provide the figure of Carbon Dioxide that is emitted in 24 hours. • At the time when I went to Mr. Mukesh Saxena for job, he stated that the recruitment of job is done from Ahmedabad. I was kept as apprentice, after a period of 4 months, for duration of 12 months. Thereafter I was given the job as supervisor at the PowerMech Company. I have not been taken on roll in the company. I was shown my social category. The people coming from outside	The representative of the project proponent replied that, • The amount of carbon dioxide is 870 gram/kilowatt hour. 67,525 tonnes of CO_2 equivalent is emitted per day. • The representative of the project proponent replied that, you came directly to me and there was no recommendation for you. We kept you on training for a period of 12 months on apprentice. For this you were given a stipend of Rs. 12000 per month. During the apprentice a limited work and information is provided. The company gives you further work and information at the time when you become an employee from apprentice. You were in a

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		are given direct jobs while I was not kept on permanent job at any place. Therefore I left the job after 6 months and at present I run a shop. • I did not get the job as per my studies and thus provide job. Will I be given job at the new plant? • What is the duty time and salary of on roll employees?	list wherein there were 60 persons and out of which 15 were engineers. We gave you job on contract after the apprentice. You will be provided the list of the resident of Zarpara who have been given employment. • One should not expect that he shall get a job as per his wish. Intention of learning is important for any job. • The employee on contract has a service of 8 hours but the employee has to stay for longer hours when there is additional work load. No discrimination is done in the company. • The local hearing video copy may be provided by presiding officer.
7	Shri Dayabhai Viram Gadhavi, Village- Mota Kandagara, Taluka Mundra	• He represented that; provide video copy of local hearing.	
8	Shri Vishrambhai Gadhavi Village – Zarpara Taluka Mundra	• He represented that a person becomes an engineer by spending lacs of rupees and you give such replies to him!	
9	Shri Gopalbhai Gilwa Village – Zarpara Taluka Mundra	He represented that, • Adani Power has obtained the permission for Phase IV. Why have you installed FGD? The pollution load had increased in Mundra. • At Mundra one tonne Carbon Dioxide is produced per Megawatt. Adani Power and TATA Power emit CO_2 that is	The regional officer stated that, • This public hearing is for the Copper Refinery project and therefore the questions related to that issue only shall be asked. Your representations shall be noted down. Your representations and objections will be included as part of the proceedings. The CD will be submitted along with

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		much more than the capacity of Mundra. Then, why do you wish to bring this new plant?	the proceedings to Ministry of Environment, Forests and Climate change of Govt. of India. • The representative of the project proponent replied that, 0.87 Ton carbon dioxide is produced for 1 Mega Watt per hour. The FGD system is installed as per the clearance provided by Ministry of Environment, Forests and Climate change. This is installed for Sulphur Dioxide scrubbing. There is no statutory limit for carbon dioxide emissions.
10	Shri Dayabhai Gadhavi Village – Mota Kadagra Taluka Mundra	• He represented that, why are you not listening to us? Why don't you reply? Are the questions raised by us relevant or not?	
11	Shri Vishrambhai Gadhavi Village – Zarpara Taluka Mundra	• He represented that the company conducted the public hearing for power plant also in this manner. The promises that were made at that time have not been fulfilled and now you wish to establish a new project.	
12	Shri Gopalbhai Gilwa Village – Zarpara Taluka Mundra	• He represented that we have been informed to ask questions related to environment only. Should we not be provided with the platform to make representations on other questions?	
13	Shri Gajendrasinh Jadeja Sarpanch Navinal Village: Navinal Taluka Mundra	He represented that, • You were complained through email for cancellation of the public hearing on 11.04.2017 and a meeting was held with Mr. D R Patel. But no	The representative of the project proponent replied that: • As per the circular of MoEF&CC dated 31.03.2011, if the forest land cannot be avoided, the application shall be filed by project proponent

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		reply was given for the same. The project proponent has not complied with the terms of reference as per my complaint. How can the public hearing be conducted for this project when the process of forest clearance is still going on?	to obtain forest clearance. After this stage-I application, the project proponent can apply for TOR. • The TOR application is filed after the Stage-I application for forest clearance is applied. Thereafter the MOEF&CC provides the TOR to project proponent. Afterwards EIA can be made. After the entire process of EIA, the MOEF&CC checks the status of the application for forest clearance and the project is approved on that basis.
		• The project proponent has concealed the information in Form-1. As per the S.No. 16 and 26 of Basic Information of Form-1, with reference to the Gochar land, PIL no. 17/2011 judgment, the project proponent has mentioned that there is no pending PIL for this land. This information is not mentioned in Form-1.	• We have not concealed any information. The PIL has been disposed. The judgment is under review. The application is filed for the acquisition of forest land. Under the Form-1, it is stated that the non-forest land is of APSEZ and the application for forest land is under process.
		• In the S.No. 2 and 10 of Form-1, it is not mentioned that the Daneshwari River passes through through the forest land.	• In the EIA Report, maps are provided and Daneshwari river is shown in it.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
14	Shri Pravinsinh Bhurubha Chauhan Village: Siracha Taluka Mundra	He represented that, • As per the EIA report, you state that no perennial river is present within the project land. There is no perennial river in whole of Kutch. From the 2011, 2013 and the present Satellite image, it is clear that you have diverted the river. • Your hospital is also constructed on the river. It is clear from the Satellite image of year 1991. Show the CD of Satellite image to all. • I wish to show Figure No. 1 from the EIA report. The river is tampered with in the Figure.	
15	Shri Punshi Gadhavi Taluka Panchayat member, Mandvi, Village: Mota Bhadiya Taluka Mandvi Shri Dayabhai Gadhavi, Village: Mota Kandgara Taluka Mundra	He represented that, • What will Adani do for the education, health and fodder for cattle? A written submission is also done for this. • You have not given the reply to the previously asked question of Punshibhai Gadhavi. Provide reply to it.	• The representative of the project proponent replied that Adani Foundation is already carrying out development works in areas of education, health and other social sectors on the basis of the written representation of Punshi bhai. This will also be done for this project. A budget of 8 crores rupees per year is allotted for CSR activities. Particular focus shall be

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
			given to the villages that are affected.
16	Shri Asariya Lakha Gilwa Village Zarpara Taluka Mundra	• He represented that the company officers should make submissions in the local Gujarati language.	• It is noted down.
17	Shri Bharat Kalyan Sheda Village Zarpara Taluka Mundra	• He represented that the people residing here want clean environment and we don't need any project. Why do you want to establish this project here?	--
18	Shri Gopalbhai Gilwa Village Zarpara Taluka Mundra Shri Vishrambhai Gadhavi Village Zarpara Taluka Mundra	He represented that; • A total 12 crore ton of CO_2 is generated daily. Why is the FGD for phase-IV installed? • This plant will emit 30 lakh tons of Sulphuric acid so why do you want to establish this plant?	The representative of the project proponent replied that: • Adani Power produces 25 million ton of CO_2 per year and around 25 million ton is produced by TATA Power. In this manner the total CO2 produced is 50 million ton. • In the Adani Power Phase-IV, MoEF had stipulated a condition based on which the FGD system is fixed. • Sulphur Dioxide will be produced from Copper Smelter. In the Sulphuric Acid plant, the Sulphur Dioxide will be absorbed and Sulphuric Acid will be produced. The residual amount of Sulphur

Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
			dioxide from the proposed project will be within the limits stipulated by CPCB, Government of India.
19	Shri Gopalbhai Gilwa Village Zarpara Taluka Mundra	• He represented that, in one day, a total of 1,25,988 ton of CO2 is emitted in the atmosphere. The average temperature of emitted CO2 is 150 degree Celsius. Why should the new plant be approved even thereafter?	The representative of the project proponent replied that: • The average temperature is 120 to 130 degree Celsius. World level efforts are made to stop global warming. The power plant is based on Super Critical technology and produces lesser amount of CO2 in the atmosphere. Till date it is not found that the level of CO2 would have decreased on world level. The government of India has targeted to reduce CO2 emissions by 30 to 35% in comparison with the year 2005. The power plant that is based on old technology produces 1 to 1.5 Ton CO2 per Megawatts hour, while the plant based on new Super Critical technology produces a total of 0.8 ton CO2 per Megawatt hour.
20	Shri Rambhai Kanani Village Zarpara Taluka Mundra	He represented that, • Our agriculture is adversely impacted. The characteristics of the Male Date Seeds	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		seem to be transforming to that of Female Date Seeds. • We do not want this project. EIA report states that there is no living organism and only wild plants are present. No information is provided about river, vegetation and other living organisms. No ground reality is provided. 80% people of this area are dependent on agriculture. We do not want this project.	
21	Shri Vishrambhai Gadhavi Village Zarpara Taluka Mundra Shri Rambhai Kanani Village Zarpara Taluka Mundra	He represented that; • The cases of miscarriage in females and animals have increased. The reproductive system is getting affected. This project should be cancelled. Naranbhai, the president of the Kheti Vikas Seva Trust had made representation before the collector to cancel this public hearing. Then how can the public hearing be conducted? The interest of public is not being taken care at this place. • Whenever such	--.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		situations arise, it creates a situation of Maoist and Naxalist movements. We will fight for our rights. • We lead a life based on farming and animal husbandry. It is a question of our existence. These people have installed FGD just for namesake.	
22	Shri Vishrambhai Gadhavi Village Zarpara Taluka Mundra	He represented that; • Why is the chimney of Adani Power tilted? What is the height of Chimney? • It rains less due to this. A large amount of difference in rain is seen in Bhadiya and Zarpara village due to this. • Crores of tons of CO2 is emitted daily. Is there any limit to it?	The representative of the project proponent replied that: • The height of chimney of power plant of Adani Power having a capacity of more than 500 megawatts is 275 meters. The height of chimney is kept for the dispersion of gases in the air. There are no norms on limit of carbon dioxide emissions. • The pollution is diluted around 2000 times due to the height of chimney. There is no study done which suggests that due to power plant it would have rained less at any place. Rain is almost found same in both villages. • The estimate of CO2 in atmosphere at world level is around 350 to 400

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
			ppm. There is no statutory limit for this. As per the CAAQMS standard for Sulphur dioxide, the 24 hour average limit is 80 microgram/m^3.
23	Shri Rambhai Kanani Village Zarpara Taluka Mundra	• He represented that the wind direction is shown wrong.	• The representative of the project proponent replied that the wind direction is shown as per the winter season data. It is shown from South South West to North North West.
24	Shri Bharat Kalyan Seda Village Zarpara Taluka Mundra	• He represented that It is submitted that the reply be given in Gujarati	• Point noted
25	Shri Nanji Mithubhai Maheshwari	He represented that; • Show on LED screen the letter with	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Village: Mota Kandagra Taluka: Mundra	signatures and stamp of Sarpanch and Talati for the 8 affected villages that have been surveyed. • How will employment be provided in this plant?	
26	Shri Bahrat Kalyan Seda Village Zarpara Taluka Mundra	He represented that; Thousands of people are objecting. Show us the photographs of your visit in 16 villages.	--
27	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka Mundra	He represented that; • In the executive summary of page no. 2.1 the nearest village is shown as Mundra. Provide the list of all the affected 16 villages. Why is village Mundra included in affected villages?	The representative of the project proponent replied that: • Through this public hearing, all your representations will be provided to the MoEF. The company will work in a transparent way. Mundra is the closest town to the Project area. The land of Siracha and Navinal villages are covered in this project. • In the EIA report, the Annexure-7 contains demographic report. It contains list of 16 villages. This includes Siracha, Tunda, Mota Kandagra, Moti Khakhar, Nani Khakhar, Moti Bhujpur, Nani Bhujpur, Desalpar, Bharora, Zarpara, Pratapur, Mota Bhadiya, Dhrub, Tragadi, Nana Bhadiya, and

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		• What would be the time limit of this public hearing?	Navinal. In chapter 3 of the EIA report, details of all the villages are provided. The EIA report is made as per the MOEF guideline. • The presentation contains the details of the impacts on environment. Moreover these details are also included in the EIA report. EIA covers study of all the aspects and its management plan is also shown. • The regional officer stated that, the public hearing will be completed after all the representations are heard.
28	Shri Vishrambhai Gadhavi Village Zarpara Taluka Mundra	• He represented that when any company comes, it is required that 33% green belt shall be provided and as part of the same when Sunita Narayan committee visited, the plants were grown on both sides of the road. These plants do not exist at present.	• The representative of the project proponent replied that Respectable Sunita Narayan came in the year 2013. The green belt at present is much more than what was at the time of her visit. Even further plantation will be done.
29	Shri Gadhavi Kalyan Asariya Village Zarpara Taluka Mundra	• He represented that in the past, I came for training in Adani Foundation on behalf of the KSKV University. At that time in the river and other places,	• The representative of the project proponent replied that You both have asked different questions. One relates to village and the other relates to APSEZ.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		around 60 thousand trees were planted but these are not found at present.	
30	Shri Gajendrasinh Jadeja, Sarpanch Navinal Gram Panchayat Village: Navinal Taluka Mundra	He represented that; • The sr. no. 10 on page C1-4 of the draft EIA report states that, there is no archeological place at this site. However, at a distance of around 500 to 1000 meters from the proposed project site, the site of Navinal Archeological site is present. I have the report of the MS University which states that it relates to the Harappa civilization. • The fisheries harbour is not developed at Bhadreshwar. The access roads for the fishermen were closed and are not opened again.	The representative of the project proponent replied that: • There is no mention of such a site on the Archeological Survey of India Website. You shall be provided the list of notified site. • There was no permission to go to the Randh bunder (Bhadreshwar) at the time of Sunita Narayan committee visit. At present Foundation provides various facilities like water, electricity, etc. at that place. • After the visit of Sunita Narayan committee, the fishermen access roads were developed which are open even as on date.
31	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka Mundra	He represented that; • The road to Bharadi Mata has been opened after a lot of troubles. You did not spare any effort to close down	• The representative of the project proponent replied that the road leading to Bharadi Mata has been kept open. As on date, not just one but two

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		the road.	approach roads are available.
32	Shri Valji Bhai Tapariya Village Zarpara Taluka Mundra	He represented that; • In the production of copper plant, Sulphur is to be used and this will have acidic processes. • Environment will be impacted due to this. The effect of this Sulphuric acid is shown in radius of around 10 kilometre. This is around 20 to 25 kilometre as per the opinion of experts. • At a humanitarian level, the GPCB should also take interest in this considering its personal responsibility for longer terms. No one is against development. The effect of Copper Refinery is even more than Power Plant. The plant should be taken away from human population if its place can be moved. In the past, electricity was generated with atoms and this eradicated the entire lineage of people. The fishermen should also not be affected. The	The representative of the project proponent replied that: • No addition in the capacity of the Copper Smelter is envisaged for the refinery after the project approval. • The Copper Concentrate is processed in the Copper Smelter. Sulphur Dioxide is generated from it. It is captured and Sulphuric acid is produced. This Sulphuric acid is converted into Phosphoric Acid • The Sulphuric Acid will be converted to Phosphoric Acid in the Phosphoric Acid Plant. It will used in fertilizer plants. • Other than this, a by-product, Fluoro-Silicic Acid will be made which will be used in the making of toothpaste.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		government should take proper care and consider that no negative effect is found.	
33	Shri Vishrambhai Gadhavi Village Zarpara Taluka Mundra	He represented that; • Will you make a residential place near the plant and reside at that place? If that is the situation, we do not object. We reside in the farms outside. • Is there any power plant, at any other place, with such big capacity?	The representative of the project proponent replied that: • Many a times our high ranking officers reside at the guest house of power plant. Many copper plants in the entire world are present beside cities. We will also make guest house in our copper plant. • Yes, there are power plants of total 20 thousand Megawatt capacities at Singroli. Angul, Andhra Pradesh has 16 thousand Megawatts capacity power plants. Tuticorin at Tamilnadu has 12 thousand Megawatt capacity of power plants. These all are coal based power plants. Now the government of India approves all big power plants with FGD only.
34	Shri Naran Gadhavi Village Zarpara Taluka Mundra	He represented that • The highest officer of the district was addressed and a letter was written on 27/4/17 and it was mentioned	The representative of the project proponent replied that: • I give an elaborate reply to your question. With respect to the PIL no

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		that the land on which the copper plant is proposed is subjudice matter. The collector has not taken any decision till date. • It is mentioned under it that after the Honorable sitting principal judge and Sunita Narayan committee, two other committees also visited. First of all the committee of the Honorable sitting judge visited. The visit report was submitted to the high court. The report of this committee is subjudice. The second report (dated 05.11.2015 and 01.04.2016) one expert was called from Goa and another from Calcutta on the basis of the order passed by the Honourable Gujarat High Court. • The committee recommended that the 6 thousand acres of land should be returned to the government. No decision till date has been taken in this regard.	12/2011, the committee visited APSEZ and its report was kept on record of the Honorable High Court. The matter was disposed by the Honorable Gujarat High Court on 17.04.2015. • As per previous proceedings the contempt petition (no. 9124) dated 12.07.2011 was filed. Thereafter on 15.10.2015, the order was passed. The matter with reference to the Sunita Narayan committee report, was disposed off in the year 2015. As per the order passed by the Honorable Gujarat High Court there is no contempt order. The report was submitted by the committee including expert from Goa and Calcutta on 08.06.2016. That particular matter is pending before the Honorable High Court of Gujarat. The committee recommended that 100 hectare or more mangroves Plantation should be undertaken. The project area is not part of the disputed land. All the show cause notices have been disposed. The

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		• As for this the contempt of court proceedings shall be held against the competent officer. The map is also shown in the EIA report. Why is the public hearing been done, even if the matter is subjudice? • GPCB is also a party in this matter. On the basis of our complaint, the Sunita Narayan committee provided a report on 17.09.2015 to MoEF&CC, government of India. • Two maps have been submitted to the Gujarat High Court committee. These are on the record of the high court. You submitted the map with Topo sheet. These were for entire land. This includes your project. • As mentioned by you, the forest area is to come under the project. The High court committee has stated that, the land should be taken away from	recommendation is done in the survey by the committee. It is not an order. The company will accept the final order passed by the Honourable High Court. The land of the proposed project does not have any relation with this matter. The land under notified SEZ shall be used for this land. The MOEF will consider the matter that is pending before the High Court. The proposed project does not have any connection with this matter. • The MOEF has provided the direction to the company and the company is working on it. The report for this is submitted to the MOEF every 6 months. The matter you have stated is about the survey of the report of the committee. It is a recommendation and not a decision. The Gujarat High Court will consider the submissions of the company along with the committee report and the company will comply to the guidelines provided by the court thereafter. • The government of India

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		Adani and provided to the government. The 5333 hectares of forest area should be restored. • This matter is under consideration at the Gujarat High Court. Why is this case not mentioned in your EIA report?	will decide further course of action on your matter and our reply. • The representative of the project proponent replied that this proposed project does not have any connection with this case pending before the Honorable Gujarat High court. This is our submission.
35	Shri Bharubhai Ranshibhai Shankra Secretary, Kehti Vikas Seva Trust, Village Zarpara Taluka Mundra	• He represented that: Do thing that would be favorable for the people. Do not leave after taking money. I do not have any objection for the company to either come or not. Do all that is in the interest of people.	–
36	Shri Dayabhai Viram Gadhavi Village – Mota Kandagra Taluka: Mundra	• He represented that we will not let the permission be granted for a new plant. The regulations laid down by the GPCB, CPCB, MOEF&CC are violated by the company and the officers present at this place should inspect the matter. We do not want a new project.	–
37	Shri Bharat Kalyan Shetha Village – Zarpara	• He represented that the people here do not want this project to come. The people here	–

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Taluka: Mundra	want clean environment. The people do not want this progress; the people do not want the long term destruction, Kindly take note of this.	
38	Shri Anwarbhai Ibrahimbhai Vagher, Village – Navinal Taluka: Mundra	• He represented that no damage has been done to the fishermen access roads or any other things. Our access roads are not closed. The people from Patel community and our villagers do not have any objection for the plant to be established.	--
39	Shri Kadar Ismail Village – Navinal Taluka: Mundra	• He represented that our roads are open and we do not have any objection.	
40	Shri Gajendrasinh Jadeja Sarpanch, Navinal Gram panchayat Village – Navinal Taluka: Mundra	He represented that, • The fishermen of my village do not have proper knowledge. I can show the maps of forest department and other maps to confirm which access roads are closed down. The access road which is shown in the map belongs to forest dept. The fishermen access road to the sea passes through the project	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		site. • This is government road. It is not owned by you. I am talking about the road that has been made by the government for the fishermen.	
41	Shri Anwarbhai Ibrahimbhai Vagher/ Shri Kadar Ismail, Village – Navinal Taluka: Mundra	• He represented that our roads are open. Kotdi Bandar and Sodawadi Creek are open. We do not have any kind of objection.	--
42	Shri Pravinsinh Bhurubha Chauhan Village – Siracha Taluka: Mundra	• He represented that information be provided if the road from Navinal to Daneshwar, which existed, is closed down or not?	--.
43	Shri Asariya Lakha, Village – Zarpara Taluka: Mundra	• He represented that, it is the responsibility of the chairman to ascertain that no one comes for the purpose of praising someone. The proceeding should be as per instruction from chair. The purpose of this public hearing is to hear the representations of the affected people.	--.
44	Shri Gandrasinh Jadeja Sarpanch, Navinal Gram Panchayat,	• He represented that first of all compliance of existing environmental clearance for Power	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Village – Navinal Taluka: Mundra	and SEZ should be met and then this project should come.	
45	Shri Rambhai Kanani Village – Zarpara Taluka: Mundra	• He represented that the company has a strategy to bring some hired people after two hours of hearing and these people will take the entire hearing out of track.	--
46	Shri Gandrasinh Jadeja Sarpanch, Navinal Gram Panchayat, Village – Navinal Taluka: Mundra	He represented that • 102 hectare of land of the forest department will be used in this project. Adani had in the year 2004 made a demand of 1576.81 hectare of land but the forest department has not approved it till date. Navinal and Shiracha, both villages have claimed their rights under the Forests Rules. The people of Navinal and Shiracha graze their cattle and obtain livelihood. If this forest is given, where will the wild animals and grazing domestic animals go? And lastly when the remaining forest land, government land and Gochar land is given, where will the people, animals and birds go?	The representative of the project proponent replied that: • You know very well what is the land use of the 102 hectare of forest land and as per the report of the forest department, no major displacement would be required. The 33% green belt will be developed at the time when plant comes. As per the report of the forest department, no major displacement would be required. The land of this area will be used by the company for the development of green belt and specific care will be taken for the animals and birds. The animals shall be provided fodder through CSR activities. • The forest department will take all these aspects into consideration while providing clearance.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		• This is the last reserve forest of this area. Bharadi Mata is sand dunes. This is coastal and mangrove forest. This area is under the CRZ 1 area. There is no provision for approval of such land.	• Other than this, the Bharadi Mata reserve and coastal forest is situated near the project site. The animals obtain fodder from that place. The project will utilize 111 hectare of Navinal land. While 102 hectare of land of Shiracha will be used for development of green belt.
47	Shri Pravinsinh Bhurubha Chauhan, Village – Siracha Taluka: Mundra	He represented that, • The Dates, Deshi Babool, etc. trees present on the forest department land and located adjacent to the power plant have dried out due to smoke from stack and cooling tower. • Where will the animals like Nilgai, Jackal, fox and others go? They will come at our farms.	The representative of the project proponent replied that: • Even at present the land is under the forest department and the plants that you state are alive. No such thing has occurred. • This is not true and the forest department would have informed us if such a thing would have occurred.
48	Shri Rambhai Kanani Village – Zarpara Taluka: Mundra	• He represented that there is a difference between the EIA report and the presentation. The details mentioned in the Gujarati report are not actually true. There is difference in the description of environment. Under the project area, only Babool and peacock	• The representative of the project proponent replied that, the summary of the EIA report is shown as part of the presentation. The entire EIA report is not to be shown in the public hearing. In case if you have found any discrepancy in the EIA report, you may draw attention as to the same

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		are shown. But the actual situation is different. There are medicinal plants also at this place. The description of the nature is given but it is not ground reality.	in writing and this will be included under the public hearing proceedings and it will also be submitted to MoEF&CC, Government of India. Moreover EIA report is prepared based on the information obtained at that relevant point of time.
49	Shri Vishrambhai Gadhavi Village – Zarpara Taluka: Mundra	• He represented that the company has shown its video during the hearing. All good things are being projected. No information is provided about the side effects, risk, etc. from the project. The video of the person submitting representation shall be shown.	The chairman stated that, • Please submit your CD we will be include the same in proceedings. Note: It was tried to show the video of representor by mobile on LED screen however it could not be run due to any reasons.
50	Shri Pravinsinh Bhurubha Chauhan Village – Siracha Taluka: Mundra	• He represented that, I wish to show the CD related to the scams committed by the Adani Power and SEZ. It is mentioned under the Form-1 that there is no mangrove at this site but as per my view there are mangroves presents.	
51	Shri Rambhai Kanani Village – Zarpara Taluka: Mundra	• He represented that the people are facing problems from your existing plants and therefore people do not welcome your	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		project.	
52	Shri Usman Gani H Sheraseeya Village – Vakaner Taluka: Morbi	He represented that • How much water will be obtained for this project and from which place will it be taken? • Will you discharge salty water after desalination in the sea?	• The representative of the project proponent replied that, 32800 cubic meters of water will be required for this project which will be used after desalination of the sea water by APSEZ.
53	Shri Devendrasinh Jadeja Village – Mota Kardagra Taluka: Mundra	• He represented that we are in favour for the company to establish this plant. But what is the percentage of local public that will get employment? Provide in writing.	• The representative of the project proponent replied that the company will require around 3000 persons at the time of construction. We will try that maximum unskilled labour is employed from local people.
54	Shri Lakhubhai Rabari Village – Tunda Wandh Taluka: Mundra	He represented that, • The officer present at the time of construction of the project are transferred after the starting of operation of the project and therefore proper solution to our problems are not provided. • What kind of employment will be given to the unskilled people?	The representative of the project proponent replied that, • The feeling of the local public will be considered and problems will be properly solved. Efforts will be made to ensure that local public is provided employment to an extent possible. • Efforts will be made to ensure that unskilled people also get employment.
55	Shri Vishrambhai	• He represented that the company wishes to	• The representative of the project proponent replied

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Gadhavi Village – Zarpara Taluka: Mundra	bring project at this place for its own benefit not for the development of the local public.	that the company can establish industry at other place also but the decision to establish project at this place is for the development of Mundra.
56	Shri Valjibhai Tapariya Village – Zarpara Taluka: Mundra	• He represented that in the forthcoming projects and the existing projects, Adani and other voluntarily organizations should make an exchange center, the record of qualified persons should be prepared and the people should be taken on service as per the requirement of the company and their qualifications.	• The representative of the project proponent replied that, we are in process of making Adani Skill development center. Efforts will be made in future to create employment opportunities. Moreover linkages will be established with the employment exchange and the registered persons having appropriate qualification shall be given priority.
57	Shri Hussain Vasu Luhar Village – Tunda Taluka: Mundra	• He represented that how many people of Tunda village serve at Adani? I was also provided employment but was terminated without providing any reason.	• The representative of the project proponent replied that more than 100 persons of the Tunda village serve at Adani company. In the year 2012, a total of 35 persons were given employment on the basis of the representation of the Gram Panchayat. You were given much better salary increments as you were the resident of village. You are not terminated from service as on date.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
58	Shri Gulabsinh Babubha Jadeja Village – Mota Kandagara Taluka: Mundra	• He represented that we do not have any objection towards this project. Due to company we have progressed.	--
59	Shri Viram Naran Shekhara On behalf of Bharatiya Kisan Sangh Village: Zarpara Taluka: Mundra	He represented that • A large number of objections are represented during public hearing. If the company comes and if there are any chances of environmental degradation, then the government authority should consider it seriously. The work should not remain only on paper. • It should be considered that the local public are not receiving employment. • If the NGT can issue notice to even Shri Shri Ravishankar, then no one is over and above the environment. • Even in the past, before the establishment of the solar plant, the number of jobs were promised but the same is not observed. • The company should work for developing new sources of water.	• The representative of the project proponent replied that, we undertake all kind of work in a transparent manner. We are making efforts so that at least ten persons from each village receive employment. The suggestion of tissue culture laboratory for the development of agriculture is welcome and the relevant process will be considered for the same. We are ready to consider the requirements of the farmers through meeting with their committee, we shall do work on required issues, a 5 year plan will be undertaken with you and such opportunities will be undertaken that the employment opportunities are created through employment exchange. The company will work towards satisfaction of local people. Efforts will be made to provide the Drip Irrigation system for Date

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		• By ignoring agriculture and developing industries, how many days will we survive? Agriculture development should also take place. • Moreover development of education is also necessary. Also, the Adani Company should establish a laboratory at Mundra for Tissue culture development of date farming. So farmers concerns can be addressed.	farming. As part of CSR activities, provision of eight crores rupees every year has been done separately for this project.
60	Shri Dayabhai Gadhavi Village-Mota Kandagara Taluka: Mundra	He represented that • As per the page no. 8 of the EIA report, the impact of Sulphur Dioxide on environment is negligible. How is it possible? • Why do you not operate the ESP at night in the Adani Power?	The representative of the project proponent replied that, • In order to avoid harmful impacts to environment, concentration of Sulphur Dioxide emissions is regulated by stipulated norms. The emissions of Sulphur Dioxide will be within the prescribed limits after the erection of copper plant. • At the Adani Power, the ESP is always in operation when the plant is in operation.
61	Shri Ranjitsinh Jadeja President, Taluka Panchayat,	• He represented that, I hereby submit as a political leader that due to the establishment of the company,	-

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Mundra Taluka: Mundra	employment opportunities will be increased and the local people, taluka, state and entire country will develop.	
62	Mrs. Devalben Gadhavi Village – Shekhadiya Taluka: Mundra	• She represented that, it is submitted that by way of this project, care should be taken that the local ladies and other local public is given employment.	• The representative of the project proponent replied that, as for the employment of ladies, arrangement has been made so that 120 ladies will get employment. Moreover, we will sign an MOU with Welspun Company in order to provide proper training and employment to ladies so that their condition will improve.
63	Shri Ibrahim Turk Village – Dhurb Taluka: Mundra	• He represented that you are portraying this project as a green field project. But around 103 hectare of land of forest department is taken in this project. How can this project be termed as green field project?	• The representative of the project proponent replied that, any new project is stated to be green field project. There is no relation of word 'green field' with vegetation. It is only an English word.
64	Shri Hirabhai Patariya Sarpanch, Deshalpar Kanthi Gram Panchayat, Village – Deshalpar Kanthi Taluka Mundra	• He represented that this project is only 5 kilometers away from our village. Therefore it is submitted that our village should also be given priority in the manner that Navinal and Shiracha are given priority.	• The representative of the project proponent replied that, as discussed earlier, attempts will be made to employ 10 persons from each village.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
65	Shri Ibrahim Turk Village: Dhurb, Taluka – Mundra	He represented that • You are to take sea water for this project and therefore what would be the impacts of this activity on the marine ecology? Have you conducted any study in this regard? • What will be the impact of salinity ingress on agriculture? • There is increase in salinity and loss to agriculture in the Tunda, Kandagra and other such areas due to cutting of mangroves.	The representative of the project proponent replied that: • The NIO organization has conducted study for the Intake and Outfall channels per the rules and regulations of MoEF&CC. The 11 km long outfall channel will meet the sea near West port and will dilute the quality of outfall. Moreover it is always ensured that the water temperature does not exceed more than 5 degree higher than the sea water ambient temperature and the salinity does not exceed 57 PPT. • We had undertaken a study through M/s Gujarat Institute of Desert Ecology (GUIDE) for assessment salinity of underground water. The salinity in the underground water has increased not only in the project surrounding area but also in the entire Kutch area. This is due to lack of rain and over-drawl of ground water. • The industries of this area are not dependable on ground water.
66	Shri Natubha	• He represented that	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Jadeja Village: Shiracha, Taluka: Mundra	100 people of my village were employed by Adani Power Company. Hence, my village has received employment. Thus it is our submission that this plant should be established so that the employment is increased and the problem of unemployment of rest of our villagers is resolved.	
67	Shri Bharat Kalyan Seda Village: Zarpara Taluka: Mundra	He represented that • The water to be sourced from sea will be through pipeline of open canal? In case if you dig a canal, the farmers will be impacted. • He represented that a charge of Rs. 200 is levied on trucks at entry gate by Adani Company.	The representative of the project proponent replied that • The water to be used in this project will be obtained from existing intake channel. Thereafter, the desalinated water from APSEZ will be transferred through pipeline to proposed project. • The contractor that works in the area of the company or APSEZ are provided with zero amount gate pass for their trucks and therefore no charge is levied from them.
68	Shri Valji Sumar Gadhavi Village: Zarpara Taluka Mundra	• He represented that, I have been working with the Adani Company since the	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		last 15 years. My 50 trucks are working for this company. Rs. 200 charge is not charged for my trucks.	
69	Shri Kirtibhai Gor Village: Tunda, Taluka Mundra	• He represented that there was no such public hearing conducted for the solar project. Certain boys have received employment in this project. Around 50% of people from the bio-data sent by me have received employment. The persons that have completed B.E. should receive employment after the completion of apprenticeship and thus what are the plans of the company to employ such persons? Such projects are welcome. We are 100% in favour of the development but not at the cost of environment. I had written to the GPCB officer that large amount of emission is emitted from the chimney. If the emission that is emitted today comes out regularly, then it is acceptable. The letter is written to GPCB for	• The representative of the project proponent replied that for the protection of the environment, latest technology and equipment will be installed and operated in this project. Treatment plants for air and water both will be installed. The entire process will be as per the rules and regulations stipulated by the government so that environment will not be damaged due to this.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		emission. Also received reply from GPCB. The development should be such that no one suffers due to impacts on environment.	
70	Shri Dayabhai Gadhavi Village: Mota Kandagra, Taluka Mundra	• He represented that the project is entirely chemical based, which will be spread in water, air, noise, land, etc. and it will affect the agricultural land. I feel that such kind of project should be around 20 to 25 kilometers away from the residential area. What are the measures for protection from such kind of project?	• The representative of the project proponent replied that as part of this project, manufacturing of Copper from Copper concentrate will be through smelting and electrochemical process, the polluted water that comes out from this project will be sent to the RO plant after treatment in ETP. Therefore no polluted water will be released outside. Thereafter this water will be used again in the process. The rejects will be treated through multi effect evaporation and thus the water will be removed from it. Flue gases released from the process will be captured and converted to intermediate products through chemical process. It shall be ensured that no storage leakage is possible by performing the risk analysis and hazard identification. Thus, there

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
			will be minimal chances of water and air pollution.
71	Shri Lakhdirbhai Gilwa Village: Zarpara, Taluka Mundra	• He represented that the farming of Chickoo and Dates have suffered a lot due to existing projects. The ground water levels have gone down after establishment of these projects. It has impacted production of Chickoo and Dates and thus the farmers have strong objection against this project.	• The representative of the project proponent replied that: Adani Port and Adani Power do not use ground water. The new project will also not use ground water. Both these projects use sea water.
72	Shri Khengar Gilva Village: Zarpara, Taluka Mundra	• He represented that the plantation from Bhadreshwar to Tunda Vandh was removed after establishment of projects. Due to this reason, the wild animals like pigs and Nilgai enter our farms. Therefore it is our submission that please do something for the protection of the crops.	• The representative of the project proponent replied that prior to this also, support for drip irrigation is provided to the farmers from many villages since last three years. Special attention will be given to provide support for drip irrigation as and when required.
73	Ms. Shital Rajgor Village: Mota Kandagra, Taluka Mundra	She represented that we do not have any objection for the establishment of company. Ladies like us get employment. We are in favour of the company.	--
74	Shri Dayabhai Gadhavi Village: Mota Kandagra, Taluka Mundra	He represented that • What would be the concentration of Sulphur Dioxide and at	The representative of the project proponent replied that: • Sulphur Dioxide will enter the Sulphuric Acid plant

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		what height it will be released? • How sludge will be disposed? • How much quantity of Sulphur Dioxide will be released in air? What will be the density of Sulphur Dioxide?	directly from the Copper smelter. Acid will be made in this plant. After making acid, it will be scrubbed in tail gas scrubber and after that the gas will be released in air which will mainly contain oxygen and nitrogen. Concentration of Sulphur Dioxide will be below the prescribed limits by the Government of India. • Gypsum will be manufactured from gas scrubber using lime. This will be used in the cement industry. The flue gases will be released in atmosphere at a height of 100 meters. • As per CPCB norms, 1 kilogram Sulphur Dioxide will be released per ton of Sulphuric acid produced. The density of the flue gas will be same as the air. It will contain very less amount of Sulphur Dioxide. The same will be around 150 to 200 PPM. We will establish a plant that would be one of the best plants in the world.
75	Shri Ashariya Lakha Gilwa, Village: Zarpara, Taluka Mundra	• He represented that the average temperate keeps on increasing every year. In copper project 300 Megawatt	• The representative of the project proponent replied that there will be no increase in temperature due to this project. It

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		power will be required and you will generate steam that would be capable to produce 40 Megawatt of electricity and thus will this increase the temperate?	would be preferable to use steam for production of electricity instead of releasing it in air. Fuel consumption can be reduced. The electricity will be produced using steam as per rules and regulations. Thus the temperature outside the plant will not increase.
76	Shri Naran Gadhavi, Village: Zarpara, Taluka Mundra	• He represented that the objection is done because the effect of pollution will be same for all. We are talking about the impacts that are found on the environment, ground water, human health, mangroves, fishermen, cattle rearers, Dates crop, children, etc. should be discussed. We do not object to the development. We would welcome the development if proper environmental measures are taken care of. The objection is only against pollution and randomly placed electric lines. CRZ rules have been violated. Water has turned saline and its TDS has become more than 4500.	The representative of the project proponent replied that • Proper attention will be given to your representations. You have raised important points as an NGO and we have undertaken the appropriate actions as well. One should always talk as a responsible citizen. • We will undertake all kinds of development by following the rules and regulations and we hereby give assurance for the same. The guidelines will be considered while development of new plant.
77	Shri Paresh	• He represented that it	• The representative of the

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Rajgour Village Tunda, Taluka Mundra	is our expectation that the plant will be established by considering the rules framed by the Government of Gujarat and Central Government as well as considering the public interest.	project proponent replied that the company is responsible for maintaining public interest and environment. The company will operate the plant by considering the public interest and environment.
78	Shri Pravinsinh Bhurubha Chauhan Village: Siracha, Taluka Mundra	• He represented that TATA Power plant took Gochar land. They have entered into agreement to provide either green or dry fodder. Why you do not enter into such kind of written agreement?	The representative of the project proponent replied that: • In your case the Gujarat High Court has ordered to provide fodder for a particular duration and this duration is even now in effect. Thus there is no question of entering into any kind of agreement or contract as the order is passed by the High Court. • We are providing the dry and wet fodder to the villages having requirement on the basis of the order passed by the Honourable High Court. We are also providing fodder voluntarily to the villages from which the people have not gone to the courts.
79	Shri Viram Naran Sankhra (Member of Kishan Sangh)	• He represented that the issue is not limited to fodder, it is a request to maintain	--

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
	Village: Zarpara, Taluka Mundra	positive attitude from your side on permanent basis. So that such a public hearing would not even be required in the years to come. Such kind of submission is done.	
80	Shri Vishram Gadhavi, Village: Zarpara, Taluka Mundra	• He represented that, I am worried about my existence, the existence of my village, the existence of agriculture and therefore I have come to object. It is expected that you undertake your role in an unbiased manner.	--
81	Shri Naran Gadhavi, Village: Zarpara, Taluka Mundra	He represented that • Three reports have been found for the production of copper plant. Out of this 1) Regional Institute of technology, Jamshedpur, 2) Energy Laboratory and department of biology science Cambridge University, London and 3) Public Health report. Which reports contains the details of serious side effects of production of copper. Therefore provide the information that what diseases are possible	The representative of the project proponent replied that: • The reports that you are mentioning are related to plants that are very old. The plants with latest technology are even present in developed countries. The dust from the plant is collected and used in furnace. Moreover, the dust on the road is also collected by vacuum truck. At the places where the workers are required to work in dusty area, they will be provided personal protective equipment

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		due to the dust of copper? • As per the report, hair falls, stomach ache, cancer and other inhalation related diseases, etc. occur due to dust. How you will control the dust? How many teams will you have? How many doctors will be available? • The second question is that, how will you control the air emissions that will be released in the atmosphere? What is the facility that is done by you as for this? • The Sulphur Dioxide that is released in air will damage health and so what steps have been taken by the company?	(PPE). • Copper concentrate material contains 8 to 10% moisture and therefore there is very less chance of dust emissions. Even thereafter, if this dust goes into breathing, the material is inert and therefore there would not be any specific effect. The effect is just like the diseases that are caused by normal dust. • The Sulphur Dioxide will be used as intermediate product, its chemical process will be undertaken and Sulfuric acid will be made from it. Therefore, there is no question of the toxic gases releasing in the atmosphere. • The chemical process of these gases will be done and intermediate product will be developed. It shall be ascertained that no leakage is possible by performing the risk analysis and hazard identification. Thus, there will be minimal chances of air pollution. • After making Sulphuric

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
			acid, it will be scrubbed in tail gas scrubber and the gas will be released in air. The lime will be used during the gas scrubbing process and Gypsum will be made. This will be used in cement industry.
82	Shri Dayabhai Gadhavi Village: Mota Kandgara, Taluka Mundra	• He represented that what kind of storage would be done by the company for raw material and how raw material will be transferred?	• The representative of the project proponent replied that the company's copper concentrate storage will be entirely covered. The pipe conveyor will be used to transfer material from port to plant.
83	Shri Valjibhai Tapariya Village: Zarpara, Taluka Mundra	• He represented that with bottom of their hearts, everyone wishes that industries should come. Industries should take corrective actions when there are objections. Industries are welcome with the conservation of environment.	• The representative of the project proponent replied that all points that are represented here will be taken care of. We will also consider the benefits of common public on behalf of the company. We are 100% responsible for the common public as a developer. We will consider that properly.
84	Shri Mayur Aatu Maheswari Village: Tunda, Taluka: Mundra	He represented that • What is number of the employment opportunities provided to the local public by the existing industries? Why are the local people sacked from their jobs? A	• The representative of the project proponent replied that the list of the local persons working in the company will be sent within two days. We undertake the process of employing the local people in consultation

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		committee should be constituted so that the local public gets employment and an open discussion / meeting should be held between the company officers and committee for the purpose of providing employment to local public. This discussion should be done openly not behind closed doors. As per the rules of the government, the local public should receive 85% of employment. • Provide the list showing how many local persons have received employment / work in the existing industries.	with the Sarpanch and Gram panchayat. Even this process will be made further transparent. The main reason for termination of job is that the workers are irregular.
85	Shri Mithu Jakhu Maheshwari Village: Mota Kandagara, Taluka: Mundra...	He represented that • The preservation of water and environment should be made for farming. Farming gets affected due to sea water, Dates do not grow up. Water is not fit for drinking within the radius of 3 KM. Therefore the company should think about this loss. • The work for 3 storage area for Cowsheds is	• The representative of the project proponent replied that Considering your representation, without any pressure, the work will be done and efforts will be made to finish incomplete works.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		stopped in Kandagara. The representation has been made to restart the construction work of storage area. • The representation has been made for fair work.	
86	Shri Salu Kumbhar Village: Tunda, Taluka Mundra	• He represented that three Fishermen access roads towards sea have been closed, due to which we have to take 5 KM long route, we do not have vehicles, therefore, the demand has been made to open three routes.	• The representative of the project proponent replied that we will fully cooperate with fishermen and will make sure that no hindrance is made in the route of fishermen, if there is any obstacle, they can approach us any time.
87	Shri Kirtibhai Gor Village: Tunda, Taluka Mundra	• He represented that which water will be used in the upcoming plant?	• The representative of the project proponent replied that in the proposed plant, seawater will be used after removing salt (desalination).
88	Shri Dayabhai Gadhavi Village: Mota Kandagara, Taluka. Mundra	He represented that • As per the notification of Government of Gujarat / Government of India, 85% of people shall be employed from local areas, how many have you employed? • What steps have been taken to develop the unskilled people to give them the right opportunity?	• The representative of the project proponent replied that we are trying to provide employment to the local people to a great extent, but in the initial stage, due to the lack of requisite qualification, the company was facing problem to provide the employment. After the ITI has started and after the training of RTG is provided, the proportion

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
			of local employment has increased and will continue to increase.
89	Shri Hamir Rabari Village: Wandh, Taluka: Mundra	• He represented that one of my two handicapped children who cannot hear and the other one cannot speak. The representation had been made for their job.	• The representative of the project proponent replied that we had employed their children, but they said that one of their boys is working in the Tata Company; and they do not want to join here now.
90	Shri Dosabhai Gadhavi Bhurubha Chauhan, Village - Siracha Taluka: Mundra	• He represented that if the industry comes then damage will be done. We are not against the plant. You will fill the vacancy on contract basis. But, what will you do for farmers like us and our children? TDS analysis been carried out by me in the 2007 and 2012, the TDS was reached up to 2200, which is not fit for drinking. We used to get drinking water for borewell, now we have to buy water bottle. In the last 5 years 800 to 900 TDS has been increased. In fact, nothing has been done for the farmers; we demand that something is done for the farmer and farming. The fruits from our farm are not	• The representative of the project proponent replied that, we will work towards solving problems of farmers. Efforts will be made to open the Kishan School for the children of the farmers. The planning as to how the ground water level can be increased, has been made by Adani Foundation, along with Mr. Yogesh Jadeja to improve the water supply in 10 villages and for the purpose of employment, the children of farmer will be given priority for this purpose.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		worth eating.	
91	Shri Pravin Singh Bhurubha Chauhan, Village - Siracha Taluka: Mundra	• He represented that the power plant's intake channel, the outfall channel, and the water reservoir are *Kuchcha* or *Pucca*?	• The representative of the project proponent replied that, Outfall channel is Stone Masonry Lined, while the Reservoir is Clay Lined and Sheet Piling is done. This question is not about the proposed project.
92	Shri Khimraj Gadhavi Village – Zarpara Taluka: Mundra	• He represented that the people from village used to drink the water with high TDS and the company uses Narmada water for sprinkling on coal piles.	--
93	Shri Pravin Singh Bhurubha Chauhan Village - Siracha, Taluka: Mundra	He represented that • What does High water line, Low water line in the figure No. 1 in the E.I.A. report indicate? • Different CRZ maps are submitted in the Public Hearing for the years 1991, 2008, 2010 and 2017, which is the correct map out of those? If one map is correct out of four then this shows that the other three are false which indicates the	The representative of the project proponent replied that • CRZ maps are prepared by the institution recognized by the Government of India. Project proponent has no authority over it. Projects are approved on the basis of maps prepared by the authorized institution. • The map of proposed project is superimposed on CRZ map of the area prepared by an institution recognized by Government of India in 2011. • CZMP plans are prepared by the Government of India

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		Company has violated the rules of CRZ. • The tidal waters were reaching at a place in Siracha, now waters are not reaching there which shows that the company has violated the CRZ Act. • There is no clarification in the report about from where the Conveyor belt, Road, Railway line will pass and how they will be used in the plant. • Three sites in total were selected for the project, site number 2 is selected from that. What is your purpose behind it? • When you already own the site No. 1, why you have selected site No. 2? You have selected site No. 2 to get forest land.	which are not public domain. When any approval is required for CRZ by any project then the CRZ map is submitted to compare with CZMP and on that basis only approval is accorded. We do not agree with your opinion in this matter. • The project is proposed in notified SEZ area and part of the forest land. So the Roads, Railway line falling under APSEZ will be used. Conveyer belt will pass through the existing conveyor corridor; this matter is mentioned on Page No. C 2/6 Point No. 2.2.7 of EIA report. • Detailed information regarding this matter is mentioned in Chapter-5. • For analysis of three alternative sites for project, about 18 factors were examined. The site No. 2 was found to be more suitable, so it is selected. • We have submitted our reasons in EIA report. We do not agree with your view.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
94	Shri Dayabhai Gadhavi Village - Mota Kandagara Taluka: Mundra	• He represented that we have received report of VIMTA. This VIMTA is a Private organization which is favouring the company. We don't accept VIMTA's report.	• The representative of the project proponent replied that VIMTA is a NABET accredited agency.
95	Shri Vajjibhai Taparya Village – Zarpara Taluka: Mundra	• He represented that what area of land will be affected during Acidic Process in the plant? Where the Acidic Water and Chemicals will be released?	• The representative of the project proponent replied that the process of this Copper plant is not acidic, but along with production of Copper, Sulphur Dioxide will also be produced which will be used for making Sulphuric Acid. And, it will be transported through pipeline of suitable material and there is no possibility of leakage. The Tail Gas will be scrubbed in the scrubber by Lime Stone.

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
96	Shri Dayabhai Gadhavi Village - Mota Kandagara Taluka: Mundra	He represented that • Will waste material be generated from the plant? • What is the arrangement for waste material? • Is there any chance of any kind of blast? • In what manner will the finished product be taken out?	The representative of the project proponent replied that: • Lime will be used in the scrubber process and Gypsum will be made. This will be used in the cement industry. • Certain part of the waste material coming out of the plant will be sent to the CPCB authorized processor and other non-recyclable hazardous waste will stored in secured land field constructed as per guidelines of CPCB. • The finished goods in the form of Copper Plate will be transported in truck or container. Sulphuric acid will be transported in tanker. Chances of blast are not possible.
97	Shri Pravinsinh Bhurubha Chauhan, Village: Shiracha, Taluka: Mundra	He represented that • You have mentioned that you will make road from the waste. So what will do for making road from this waste? • What would be the constituents in raw material that would be stored? • Which chemicals will be contained in the waste that comes out from the plant and will	The representative of the project proponent replied that: • We will not make roads from waste. • The waste material coming out of the plant will contain Calcium, Silica and Arsenic. This waste material will be stored in secure land fill sites. • Mercury product is made from the waste material that contains mercury

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Sr. No.	Name and address of the representative	Point Represented	Chronological reply given by representative of project proponent
		mercury come out from this waste?	and material named Calomel is produced. This material will be exported. No process for mercury will be done in this plant.
98	Shri Naran Gadhavi Village: Zarpara, Taluka: Mundra	He represented that • What steps have been taken for reducing emissions and water conservation as per the gazette notification dated 07.12.2015 of MoEF&CC, Government of India? • What effect will this project produce on sea creatures that have direct connection with fishermen?	The representative of the project proponent replied that: • This question does not relate to this project. • No liquid will be discharged from this plant. • A total of 32800 cubic meter of water will be used in the plant and out of that 6448 cubic meters of polluted water will be produced. This will be treated in ETP, the water will be purified by process in RO plant and it will be again used in the plant. The rejects will be treated through the multi effect evaporation process. Therefore there is no question of discharge of any kind of liquid from this project.

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The Regional Officer, Kutch (East), Gujarat Pollution Control Board asked again to local affected people present in public Hearing to raise their additional objections or suggestions if any, but no additional objections or suggestions were received.

Then Regional Officer, Kutch (East), Gujarat Pollution Control Board summarized the entire proceedings of Environmental Public Hearing to the people present.

Finally, with due permission of Additional District Magistrate and Resident Additional Collector, Regional Officer, Gujarat Pollution Control Board concluded Public Hearing after expressing Thanks.

Place:
Community Premises Centre
(Samajwadi) Opposite Tunda Primary School,
Village: Tunda,
Taluka: Mundra
District: Kutch.
Date: 29/04/2017

K B Chaudhari,
Regional Officer,
and
as a representative of the Member Secretary,
Gujarat Pollution Control Board

Shri D.R. Patel (G.A.S)
Additional District Magistrate
and Resident Additional Collector,
and
as a representative of District Magistrate and Collector, Bhuj-Kutch

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પરિશિષ્ટ-બી-૧

લોકસુનાવણીમાં ભાગ લેનાર સહભાગીઓ દ્વારા ઉઠાવાયેલ મુદ્દા અને પ્રોજેકટના પ્રતિનિધી દ્વારા આપવામાં આવેલ પ્રત્યુતર

ભારત સરકારના વન, પર્યાવરણ અને જળવાયુ પરિવર્તન મંત્રાલય, નવી દિલ્હીના જાહેરનામાં ક્રમાંક એસ.ઓ. ૧૫૩૩ તા.૧૪/૦૯/૨૦૦૬ અને વખતો વખત થયેલ સુધારાઓ અન્વયે જણાવવાનું કે, મેસર્સ અદાણી એન્ટરપ્રાઇઝીસ લીમીટેડ, અદાણી પોર્ટસઅને સ્પેશિયલ ઇકોનોમિક ઝોનની જમીન ગામ સિરાચા અને નવીનાળ, તા.મુંદરા, જિ.કચ્છ, ગુજરાત દ્વારા સૂચિત ગ્રીનફિલ્ડ કોપર રીફાઇનરી ૧.૦ મીલીયન ટન પ્રતિવર્ષક્ષમતા ધરાવતા પ્રોજેકટની સ્થાપના માટેની સૂચિત પરિયોજના (પ્રોજેકટ)કેટેગરી "એ"અંતર્ગત તેઓની અરજીના અનુસંધાને તા.૨૯/૦૪/૨૦૧૭ ના રોજ સવારે ૧૧:૦૦ કલાકેકમ્યુનીટી પ્રીમાઇસીસ સેન્ટર (સમાજવાડી) ટુન્ડા પ્રાથમિક શાળાની સામે, ગામ ટુન્ડા તા.મુંદરા જિ.કચ્છ, ગુજરાત ખાતે પર્યાવરણીય લોક સુનાવણી આયોજીત કરવામાં આવી હતી.

સમગ્ર લોક સુનાવણીની કાર્યવાહી શ્રી ડી.આર.પટેલ (જીએએસ), અધિક જીલ્લા મેજીસ્ટ્રેટ અને નિવાસી અધિક કલેકટરશ્રી, કચ્છની સીધી દેખરેખ હેઠળ તથા અધ્યક્ષપણા હેઠળ કરવામાંઆવેલ.

શ્રી કે.બી.ચૌધરી, પ્રાદેશિક અધિકારી શ્રી, કચ્છ (પુર્વ),ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ તથા સભ્ય સચિવશ્રી ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડના પ્રતિનિધીશ્રીએ લોક સુનાવણીમાં ઉપસ્થિત સૌને આવકાર્યો,તેઓએ ઇ.આઇ.એ. નોટીફિકેશન ૨૦૦૬ અંતર્ગતવિવિધ જોગવાઇઓ અને લોક સુનાવણીની પ્રક્રિયા બાબતે સંક્ષિપ્તમાં માહિતી આપી. તેમણે પર્યાવરણીય લોક સુનાવણીની બહોળી પ્રસિધ્ધિ અંગે ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ દ્વારા કરાયેલ કાર્યવાહીની માહિતી આપી અને સ્થાનિક દૈનિક વર્તમાન પત્રોમાં આપેલ જાહેર ખબર વિશે જણાવેલ.તેમણે એમ જણાવ્યું કે નોટીફિકેશનની જોગવાઇઓ અનુસાર સ્થાનિક અસરગ્રસ્ત લોકો આ પર્યાવરણીય લોક સુનાવણીમાં રજુઆત કરી શકશે. જયારે અન્ય વ્યાજબી હિત ધરાવતા વ્યકિતઓ તેઓની રજુઆત લેખીતમાંકરી શકશે જેનો કાર્યસૂચિમાં સમાવેશ કરવામાં આવશે.

ત્યાર બાદ અધિક જીલ્લા મેજીસ્ટ્રેટશ્રીની પરવાનગીથી તેઓએ ઉદ્યોગના પ્રતિનીધીને સ્થાનિક ગુજરાતીભાષામાં સૂચિત પરિયોજના બાબતનું પ્રેઝન્ટેશન કરવા માટે જણાવ્યું.

પ્રોજેકટ પ્રતિનિધિ ધ્વારા પ્રેજન્ટેશન શરૂ થતાં જ શ્રી નારાણભાઈ ગઢવી, ગામ –ઝરપરા, તા. મુંદરા ધ્વારા અધ્યક્ષ સમક્ષ ઈઆઈએ રીપોર્ટની ઓરીજનલ એગ્રેજીમાં કોપી માંગવામાં આવેલ. પ્રાદેશિક

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અધિકારીશ્રી ધ્વારા અધ્યક્ષશ્રીની સંમતિથી પ્રોજેકટ પ્રતિનિધિને ઈઆઈએ રીપોર્ટની નકલ શ્રી નારાણભાઈ ગઢવીને આપવા જણાવેલ,જે નકલ પ્રોજેકટ પ્રતિનિધિએ તેમને આપેલ.

ત્યાર બાદ ઉદ્યોગના તકનીકી પ્રતિનીધી દ્વારા કંપનીનો પરિચય,કોપર સ્મેલ્ટર અને રીફાઇનરીના વિશ્વના આંકડા, વિશ્વમાં આવેલ કોપરના પ્લાન્ટ, રાષ્ટ્ર માટે કોપરનો વપરાશ, સ્થળનો નકશો, અભ્યાસ વિસ્તારનો નકશો, અભ્યાસ હેઠળના વિસ્તારની જમીનની વપરાશની પેટન, જમીનનો લે-આઉટ નકશો, પર્યાવરણીય સેટીંગ, સ્થાનિક વિસ્તાર માંથી જરૂર હોઇ તેવા સ્ત્રોતો પ્લાન્ટની ફલોસીટ, વાયુ પર્યાવરણ, એમ્બીયન્ટ એર કવાલીટી મોનીટરીંગ, વાયુ પર્યાવરણ માટેના શમનકારી પગલા, જળ પર્યાવરણ, તેમના નમુનાના સ્થળ, જળ પર્યાવરણ પર અંદાજીત અસર અને તેના નિવારણના પગલા, જમીન પર્યાવરણ, જમીનના નમુના માટેના સ્થળ, જમીન પર્યાવરણ વ્યવસ્થાપન માટેના પગલા, ઘન કચરાનું વ્યવસ્થાપન, ધ્વનિ પર્યાવરણ, ધ્વનિને ઘટાડવાના ઉપાયો, જૈવિક પર્યાવરણ વિગેરેનું સ્થાનિક ગુજરાતી ભાષામાં ઓડિયો વીઝયુઅલ પ્રેઝન્ટેશન આપવામા આવ્યું.

ઓડિયો વીઝયુઅલ દ્વારા પ્રજન્ટેશન પુર્ણ થયા બાદ,પ્રાદેશિક અધિકારી,કચ્છ (પુર્વ) ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડદ્વારા અધિક જિલ્લા મેજીસ્ટ્રેટશ્રીની મંજુરીથી સ્થાનિક અસર ગ્રસ્ત લોકોની રજુઆતો / વાંધાઓ / સૂચનો રજ કરવા માટે મંચ ખુલ્લો મુકવામાં આવેલ.

પ્રાદેશિક અધિકારી શ્રી, કચ્છ (પુર્વ), ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ દ્વારા ઉપસ્થિત જન સમુદાયને જણાવેલ કે, પર્યાવરણીય લોક સુનાવણી અગાઉ અન્ય વ્યાજબી હિત ધરાવતા (૧) શ્રી રવીલાલ કે.મહેશ્વરી,મુંદરા, (૨) શ્રી પી.સી.ગઢવી, માજી પ્રમુખશ્રી, તાલુકા પંચાયત, લખપત, (૩) શ્રી મહેશ પંડયા,પર્યાવરણ મિત્ર, અમદાવાદ, (૪) શ્રી ગજેન્દ્રસિંહ જાડેજા,સરપંચશ્રી, નવીનાળ, (૫) શ્રી સંજયભાઇ એસ. બાપટ, મુંદરા, (૬) શ્રી નારાણભાઇબી. ગઢવી, ખેતી વિકાસ ટ્રસ્ટ, ઝરપરાતરફથી લેખિતમાં રજુઆતો મળેલ છે. આ લેખિતમાં કરેલ રજુઆતોના પ્રશ્નો તથા પ્રોજેકટ પ્રપોનન્ટ તરફથી આપવામાં આવેલ લેખિતમાં જવાબોને આજની પ્રોસીડીંગમાં સમાવેશ કરવામાં આવશે.

પર્યાવરણીય લોક સુનાવણી દરમ્યાન હાજર રહેલ લોકો દ્વારા કરવામાં આવેલ રજુઆતો / વાંધાઓ / સૂચનો / અભિપ્રાયો તેમજ અરજદારના પ્રતિનિધિ દ્વારા આપવામાં આવેલ જવાબ નીચે મુજબ છે.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
૧	શ્રી પુનશીભાઈ ગઢવી તાલુકા પંચાયત સદસ્ય - માંડવી, ગામ - મોટા ભાડીયા તાલુકો – માંડવી	તેઓએ રજુઆત કરતા જણાવેલ કે, • આ પરિયોજનામાં અસર ગ્રસ્તોમાં માંડવી અને મુંદરા તાલુકાના કેટલા ગામો નો સમાવેશ થયેલ છે. તે જણાવો અને કેટલા અંતરમાં લીધેલ છે? હું દસ વર્ષ સરપંચ હતો ત્યારે પણ રજુઆત કરેલ, પણ કંપની દ્વારા યોગ્ય પ્રત્યુતર આપવામાં આવેલ નહી. • આ અહેવાલ બનાવવા માટે કંપની દ્વરા કેટલા ગામોનો પ્રવાસ / મુલાકાત કરવામાં આવેલ છે અને તે સમયે સ્થાનિક લોકો હાજર રહેલ કે નહીં? • અમારા ગામની બહેનો સાથે પોલિસ દ્વારા કેવું વર્તનકરવામાં આવે છે ? નાના ભાડીયા, મોટા ભાડીયા, કાંડાગરા ગામના લોકોને પાછા વાળવામાં આવેલ છે.	ઉદ્યોગના પ્રતિનિધિશ્રીએ પોતાનો હોદ્દો અને લાયકાત જણાવ્યા બાદ જણાવેલ કે, • આ પ્રોજેકટ વિસ્તારમાં સિરાચા અને નવીનાળ ગામોનો સમાવેશ થયેલ છે. ભારત સરકારના વન અને પર્યાવરણ વિભાગની ઇઆઇએની ગાઇડ લાઇન / જોગવાહી મુજબ ૧૦ કી.મી. ની ત્રીજયાના વિસ્તારના ૧૬ ગામોનો સમાવેલ કરવામાં આવેલ છે. જે પૈકી ૮ ગામોમાં મોનીટરીંગ કરવામાં આવેલ છે.
૨	શ્રી ડાયાભાઇ વીરમ ગઢવી, ગામ - મોટા કાંડાગરા તાલુકો-મુંદરા શ્રી રામભાઈ કાનાણી ગામ -ઝરપરા, તા. મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • અમારા તમામ પ્રશ્નોના જવાબ ગુજરાતીમાં આપવામાં આવે. પ્રોજેકટ પ્રતિનિધિ ગુજરાતીમાં જવાબ આપતા નથી એનો અર્થ એવો કે ગુજરાતી સ્થાનિક લોકોને રોજગારી નહી જ મળે. પ્રોજેકટના અધિકારી પોતાની લાયકાત અને ઓળખાણ રજુ કરે ત્યારબાદ જ ગુજરાતીમાં જવાબ આપે.	• પ્રાદેશિક અધિકારીશ્રી એ પ્રોજેકટ પ્રતિનિધિને હિન્દીમાં આપેલ જવાબ ગુજરાતીમાં ટ્રાન્સલેટ કરી જવાબ આપવા જણાવેલ.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		• અહીં પ્રોજેકટ લાવેલ છે તેમાં અસર ગ્રસ્ત તરીકે કેટલા ગામ છે, કેટલા કિ.મી. ની ત્રિજયામાં નકકી કર્યું છે, કેટલા લોકોને મળ્યા છો, કેટલા ગામનો પ્રવાસ કરેલ છે ? • પ્રેજન્ટેશન વખતે માત્ર ૮ ગામનો લીસ્ટ બતાવવામાં આવેલ છે. શું બીજા ગામોનો સમાવેશ કરવામાં આવેલ નથી ? મોનીટરીંગ માત્ર ૮ ગામોમાં જ કેમ કરવામાં આવેલ છે. ૧૬ ગામોના નામોનું લીસ્ટ રજુ કરો. આપે જે ૮ ગામ દર્શાવ્યા છે તેની વીઝીટ કરી છે તે સાબિત કરો. • લેબોરેટરી ના રિપોર્ટ આપવામાં આવે. આ રિપોર્ટ કેટલા સમય પહેલાં લીધેલ ? કઇ પાંચ જગ્યાના રિપોર્ટ કરવામાં આવેલ છે? કઇ સંસ્થા દ્વારા અભ્યાસ કરાયો છે ? તેના એનાલીસીસનો રિપોર્ટ અમને આપવામાં આવે. મોનિટરીંગ કઈ લેબોરેટરી ધ્વારા કરવામાં આવેલ છે? તેનું સર્ટીફિકેટ આપવામાં આવેલ.	ઉદ્યોગના પ્રતિનિધિશ્રીએ જણાવેલ કે, • ભારત સરકારના વન અને પર્યાવરણ વિભાગની ઇઆઇએની પ્રોસીઝર મુજબ ૧૦ કી.મી. ની ત્રીજયાના વિસ્તારના ૧૬ ગામોનો સમાવેલ કરવામાં આવેલ છે. જે મોનીટરીંગ કરવામાં આવેલ છે તેના ગામોના નામ ઇઆઇએ રિપોર્ટમાં રજુ કરવામાં આવેલ છે. ઇઆઇએ નોટીફીકેશન પ્રમાણે ૧૦ કી.મી. ની ત્રીજયામાં આવેલ તમામ ગામોનો સમાવેશ કરવામાં આવેલ છે. લેબ ટેસ્ટીંગ રિપોર્ટની તારીખ પણ ઇઆઇએ રિપોર્ટમાં દર્શાવેલ છે. કંપની દ્વારા ઇઆઇએ રિપોર્ટ માટેની માર્ગદર્શીકા મુજબ રિપોર્ટ બનાવવામાં આવેલ છે. ઇઆઇએ રિપોર્ટ પાંચ જગ્યા પર રાખવામાં આવેલ છે. • પ્રાદેશિક અધિકારશ્રીએ અધ્યક્ષશ્રીની મંજુરીથી પ્રોજેકટ પ્રતિનિધિને જણાવેલ કે, રજુઆત કરનારને મોનિટરીંગના રિપોર્ટ માંગ્યા છે જે પુરા પાડવામાં આવે. ઉદ્યોગના પ્રતિનિધિશ્રીએ જણાવેલ કે, • ઇઆઇએ રિપોર્ટના ચેપટર નં.૩ પાના નં.૪૩ માં ૮(આઠ) સ્થળો પર હવાના પૃથ્થકરણની સમગ્ર માહિતી દર્શાવવામાં આવેલ છે. ભારત સરકાર દ્વારા

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
		• કઇ પાંચ જગ્યાએ ઇઆઇએ રિપોર્ટ રજુ કરવામાં આવેલ. અમને આ સુનાવણી અને પ્રોજેકટ સાથે વાંધો છે. પર્યાવરણ પર અસર થશે તેની સામે અમોને વાંધો છે.	NABETAccrediated લેબોરેટરી મેસર્સ વીમ્ટા લેબ હૈદરાબાદ દ્વારા મોનીટરીંગ કરવામાં આવેલ છે. જેનું સર્ટીફીકેટ રિપોર્ટમાં રજુ કરવામાં આવેલ છે. • ભારત સરકારના ઇઆઇએ નોટીફીકેશન પ્રમાણે નીચે મુજબના પાંચ સ્થળોએ ડ્રાફટ ઇઆઇએ રિપોર્ટ ઉપલબ્ધ કરાવવામાં આવેલ છે. ૧. જિલ્લા કલેકટરશ્રીની કચેરી, કચ્છ-ભુજ. ૨. જિલ્લા વિકાસ અધિકારીશ્રીની કચેરી કચ્છ-ભુજ. ૩. જિલ્લા ઉદ્યોગ કેન્દ્ર, ભુજ- કચ્છ. ૪. તાલુકા વિકાસ અધિકારીશ્રીની કચેરી, મુંદરા. ૫. તાલુકા વિકાસ અધિકારીશ્રીની કચેરી, માંડવી. • ઇઆઇએની એકઝીકયુટીવ સમરીનો સારાંશ ૧૪ ગામોમાં આપવામાં આવેલ છે. જે ૮ ગામો છે તેમાં મોનીટરીંગ કરવામાં આવેલ. મોનીટરીંગ દરમ્યાન સ્થાનિક લોકોને સાથે રાખવા અંગે કોઇ જોગવાહી નથી. ઇઆઇએ રિપોર્ટમાં જે કંઇ વાંધા જનક માહિતી લાગતી હોય તો તેના જવાબ માટે અમે અહીંયા છીએ તમને સાંભળી અને યોગ્ય જવાબ આપવામાં આવશે અને તેનો

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			સુનાવણીની પ્રોસીડીંગમાં સમાવેશ કરવામાં આવશે અને ફાઈનલ ઈઆઈએ રીપોર્ટ વન અને પર્યાવરણ મંત્રાલયને રજુ કરવામાં આવશે. • એનાલીસીસ રિપોર્ટ હિયરીંગ પુરુ થશે ત્યારે તમને આપશું.
૩	શ્રી પુનશીભાઇ ગઢવી, તાલુકા પંચાયત સદસ્ય – માંડવી ગામ- મોટા ભાડીયા તાલુકો- માંડવી	• તેઓએ રજુઆત કરતા જણાવેલ કે,માંડવી તાલુકા પંચાયતમાં કયારે રિપોર્ટ આપવામાં આવેલ છે ? સામાજીક આગેવાનોને રિપોર્ટ આપવામાં આવેલ છે ?અમારો હિયરીંગ સાથે વિરોધ છે.	• પ્રાદેશિક અધિકારીશ્રીએ જણાવ્યું કે,માંડવી તાલુકા પંચાયત કચેરીમાં તા.૨૭/૦૩/૨૦૧૭ ના રોજ રિપોર્ટની કોપી અને સીડી આપવામાં આવેલ છે.
૪	શ્રી વિશ્રામભાઇ ગઢવી, ગામ- ઝરપરા તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • જે સ્થળેથી સેમ્પલ લેવામાં આવેલ છે તે સ્થળ અને સાધનોના ફોટોગ્રાફ બતાવવામાં આવે. • તમારો પ્રોજેકટ બનશે એમના ફોટોગ્રાફ તમે બતાવો છો તો જે મોનીટરીંગ કર્યુ છે તેના ફોટોગ્રાફસ બતાવો.	• ઉદ્યોગના પ્રતિનિધિશ્રીએ જણાવેલ કે, ૮ લોકેશનના ફોટોગ્રાફ અમારી પાસે છે, જે તમને આપવામાં આવશે.
૫	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ- મોટા કાંડાગરા, તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,જવાબ આપનાર અધિકારી દ્વારા કંપનીનું ફોટા સાથેનો આઇડી કાર્ડ દેખાડવામાં આવશે તોજ રજુઆત કરવા દેવામાં આવશે.અમારા છોકરાઓને આઇડી કાર્ડ વગર કંપનીમાં પ્રવેશવા દેવામાં આવતા નથી.	• ઉદ્યોગના પ્રતિનિધિ દ્વારા કંપનીનું આઇડી કાર્ડ એલઈડી સ્કીન પર બતાવવામાં આવેલ.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
૬	શ્રી ગોપાલભાઇ ગીલવા / ગામ- ઝરપરા તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • મુંદરામાં થર્મલ પાવર પ્લાન્ટ માંથી કેટલો કાર્બન ડાયોકસાઇડ નિકળે છે ૨૪ કલાકમાં કેટલા ટન કાર્બન ડાયોકસાઇડ નીકળે છે તે જણાવો. • હું નોકરી માટે જ્યારે મુકેશ સકસેના સાહેબ પાસે ગયો હતો ત્યારે જણાવાયું કે જોબની રીક્રુટમેન્ટ પ્રોસેસ અમદાવાદ થી થાય છે. ૪ મહિના પછી મને એપ્રેનટીસ તરીકે ૧૨ મહિના માટે રાખવામાં આવેલ ત્યાર બાદ પાવરમેક કંપનીમાં સુપરવાઇઝર તરીકે જોબ આપેલ હતી. મને કંપનીમાં ઓનરોલ લીધેલ નહીં. મને મારી ઓકાત બતાવવામાં આવી હતી. બહારથી આવેલ લોકોને ડાયરેકટ જોબ આપો છો. જયારે મને કયાંય કાયમી જોબમાં રખાયો નહીં. જેથી ૬ મહીના પછી મે જોબ છોડી દીધેલ અને હાલ દુકાન ચલાવું છું. • મને મારા અભ્યાસ પ્રમાણેની જોબ ન મળી, જોબ આપો. શું મને નવા પ્લાન્ટમાં નોકરી પર રાખવામાં આવશે ? • ઓનરોલનો ડયુટી ટાઇમ અને સેલેરી કેટલી છે.	ઉદ્યોગના પ્રતિનિધિશ્રીએ જણાવેલ કે, • કાર્બન ડાયોકસાઈડનું પ્રમાણ ૮૭૦ ગ્રામ/કીલોવોટ કલાક છે. ૬૭,૫૨૫ ટન કાર્બન ડાયોકસાઇડ ઇકવીવેલેન્ટ પ્રતિ દિવસ ઉત્સર્જીત થાય છે. • તમે ડાયકેરટ મારી પાસે આવ્યા હતા તમારા માટે કોઈ ભલામણ ન હતી. અમે તમને એપ્રેન્ટીસ માટે ૧૨ મહિનાની ટ્રેનીંગ માટે રાખેલ હતા. જે દરમ્યાન રૂા.૧૨૦૦૦ પ્રતી માસ સ્ટાઇફંડ આપવામાં આવતું હતું.એપ્રેન્ટીસ દરમ્યાન મર્યાદીત કાર્ય અને માહિતી આપવામાં આવતી હોય છે. જયારે એપ્રેન્ટીસ થી એમ્પ્લોઇ બને છે ત્યારે તેમને કંપની દ્વારા વધુ કાર્ય અને માહિતી આપવામાં આવે છે. તમે જે રજુઆત યાદીમાં હતા તેમા કુલ ૬૦ લોકો હતા જે પૈકી ૧૫ એન્જીનીયર હતા. અમારા દ્વારા તમને એપ્રેન્ટીસ બાદ કોન્ટ્રાકટ પર જોબ આપવામાં આવેલ હતી. ઝરપરા ગામના કેટલા લોકોને રોજગારી આપવામાં આવેલ છે. તેની યાદી તમને પુરી પાડવામાં આવશે. • જોબમાં એવી કોઇ અપેક્ષા ન રાખવાની હોય કે મને મારી ઇચ્છા મુજબની જોબ મળે. કોઇપણ કામ
૭	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ- મોટા કાંડાગરા, તાલુકો-મુંદરા	• લોકલ હિયરીંગ ની વીડીયોગ્રાફીની કોપી અમને મળવી જોઇએ.	

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
૮	શ્રી વિશ્રામભાઇ ગઢવી, ગામ - ઝરપરા તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,માણસ લાખોના ખર્ચે એન્જીનીયર બને છે. તેને તમે આવા જવાબ આપો છો.	પહેલા શીખવું પડે છે. • કોન્ટ્રાક પર રહેલ કર્મચારીની ૮ કલાકની નોકરી હોય છે. જો કયારેક કામગીરી વધારે હોય તો કર્મચારીએ રોકાવું પડે છે. કંપનીમાં કોઇપણ પ્રકારનો ભેદભાવ રખાતો નથી. • લોકલ હિયરીંગ ની વીડીયોગ્રાફીની સીડી સાહેબ પાસેથી મળશે.
૯	શ્રી ગોપાલભાઇ ગીલવા ગામ - ઝરપરા તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • અદાણી પાવરની ફેઝ ૪ ની પરીમશન મળેલ છે. તમે એફઝીડી શા માટે લગાડયું છે. મુંદરામાં પોલ્યુશન લોડ વધી ગયો હતો. • મુંદરામાં એક મેગાવોટ પર એક ટન કાર્બન ડાયોકસાઇડનું ઉત્સર્જન થાય છે. અહીં મુંદરામાં અદાણી પાવર અને ટાટા પાવર દ્વારા મુંદરાની કેપેસીટી કરતા વધારે CO2 ઉત્સર્જન થાય છે. તો આ નવો પ્લાન્ટ શા માટે લાવવા માંગો છો ?	પ્રાદેશિક અધિકારીશ્રીએ જણાવ્યુ કે, • આ લોક સુનાવણી કોપર રીફાઇનરી પ્રોજેકટ માટેની છે. તેને લગતા પ્રશ્નો રજુ કરવામાં આવે.આપની રજુઆતોની નોંધ લેવામાં આવશે. આપના વાધાં-રજુઆતો સુનાવણીની પ્રોસીડીંગમાં સામેલ કરવામાં આવશે અને તેને સીડી સાથે ભારત સરકારના વન,પર્યાવરણ, જળ વાયુ પરિવર્તન મંત્રાલય ને રજુ કરવામાં આવશે.
૧૦	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ –મોટા કાંડાગરા તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,આંખ આડા કામ કેમ કરો છો જવાબ કેમ નથી આપતા અમે જે મુદ્દા પુછયા છે તે યોગ્ય છે કે નહીં.	• ઉદ્યોગના પ્રતિનિધિ દ્વારા જણાવેલ કે, ૧ એક મેગા વોટ કલાક દીઠ ૦.૮૭ ટન કાર્બન ડાયોકસાઈડનું ઉત્સર્જન થાય છે. એફઝીડી સીસ્ટમ વન અને પર્યાવરણ મંત્રાલય ની મંજુરીને આધિન લગાવવામાં આવેલ છે. આ સલ્ફર ડાયોક્સાઇડ સ્કબિંગ માટે ઈન્સ્ટોલ થયેલ છે. કાર્બન ડાયોક્સાઇડ ઉત્સર્જન માટે કોઈ
૧૧	શ્રી વિશ્રામભાઈ ગઢવી ગામ - ઝરપરા તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,કંપની દ્વારા પાવર પ્લાન્ટ માટે પણ લોક સુનાવણી આવી રીતે કરવામાં આવેલ હતી.તે દરમ્યાન	

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
		આપેલા વચનો પુરા કરવામાં આવ્યા નથી અને નવો પ્રોજેકટ સ્થાપવા માંગો છો.	કાનૂની મર્યાદા નથી..
૧૨	શ્રી ગોપાલભાઇ ગીલવા ગામ - ઝરપરા તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,પર્યાવરણ ને લગતા પ્રશ્નો જ પુછવાના હોય છે. અમારા બીજા પ્રશ્નોની રજુઆત કરવા માટે પ્લેટફોર્મ તો પુરું પાડવું જોઇએ ને?	
૧૩	શ્રી ગજેન્દ્રસિંહ જાડેજા સરપંચ, નવીનાળ ગ્રામ પંચાયત, નવીનાળ, તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • આપને તા.૧૧/૦૪/૨૦૧૭ ના લોકસુનાવણી ૨૬ કરવા માટે ઇ-મેઇલથી કમ્પલેઇન કરેલ અને ડી.આર.પટેલ સાહેબની મુલાકાત લીધેલ હતી. પણ તેનો કોઇ જવાબ મળેલ નથી. મારી ફરીયાદ માં પોજેકટ પ્રપોનન્ટ દ્વારા ટર્મસ ઓફ રેફરન્સનું કમ્પ્લાઇન્સ કરવામાં આવેલ નથી. તેની રજુઆત કરવામાં આવેલ છે. આ પ્રોજેકટ ફોરેસ્ટ કલીયરન્સ પ્રકીયા માં હોય તો લોકસુનાવણી કઇ રીતે યોજી શકાય. • ફોર્મ-૧ પ્રોજેકટ પ્રપોનન્ટ દ્વારા માહિતી છુપવવામાં આવેલ છે. બેઝીક ઇન્ફર્મેશનના મુદ્દા નં-૧૬ અને	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • તા.૩૧/૦૩/૨૦૧૧ વન વિભાગના સર્કયુલર મુજબ ફોરેસ્ટ લેન્ડ એવોઇડ ના થાય તો તેના માટે પ્રોજેકટ પ્રપોનન્ટ દ્વારા ફોરેસ્ટ કલીયરન્સ માટે એપ્લીકેશન કરવાની હોય છે. આ સ્ટેજ-૧ એપ્લીકેશન કર્યા બાદ પ્રોજેકટ પ્રપોનન્ટ દ્વારા TOR માટેની એપ્લીકેશન કરી શકાય છે. • ફોરેસ્ટ કલીયરન્સની સ્ટેજ-૧ એપ્લીકેશન કર્યા બાદ TOR ની એપ્લીકેશન કરવામાં આવે છે. ત્યારબાદ MOEF દ્વારા TOR પ્રોજેકટ પ્રપોનન્ટને આપવામાં આવે છે. ત્યારબાદ ઇઆઇએ કરી શકાય છે. સમગ્ર ઇઆઇએ ની પ્રોસેસ કર્યા બાદ MOEF દ્વારા ફોરેસ્ટ કલીયરન્સનું એપ્લીકેશન સ્ટેટસ ચેક કરવામાં આવે છે અને તેના આધારે જ પ્રોજેકટની મંજુરી આપવામાં આવે છે. • અમે કઇ માહિતી છુપાવેલ નથી.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
		૨૬ માં પ્રોજેકટની જમીનમાં ગૌચર જમીન પર પીઆઈએલ નં. ૧૭/૨૦૧૧ ના જજમેન્ટનું રીવ્યું પ્રોજેકટ પ્રપોનન્ટ દ્વારા જણાવવામાં આવ્યુ છે કે આ જમીન પર કોઈ જ પીઆઈએલ ચાલુ નથી. જે માહિતી ફોર્મમાં લખવામાં આવી નથી. • ફોર્મ નં.૧ માં મુદ્દા નં.૨ અને ૧૦ માં ફોરેસ્ટ લેન્ડ માંથી દાનેશ્વરી નદી નીકળે છે તે દર્શાવવામાં આવેલ નથી.	પીઆઇએલ ડીસ્પોઝ થયેલ છે. જેનું જજમેન્ટ રીવ્યુંમાં છે. ફોરેસ્ટ લેન્ડ એકવીઝીશન માટેની એપ્લીકેશન કરેલ છે. ફોર્મ-૧ માં નોન ફોરેસ્ટ લેન્ડ એપીએસઇઝેડની છે અને ફોરેસ્ટ લેન્ડ માટેની એપ્લીકેશન પ્રક્રીયામાં છે જે બતાવવામાં આવેલ છે. • ઇઆઇએ રિપોર્ટમાં મેપ આપવામાં આવેલ છે. તેમાં દાનેશ્વરી નદી બતાવવામાં આવેલ છે.
૧૪	શ્રી પ્રવિણસિંહ ભુરૂભા ચૌહાણ ગામ- સિરાચા, તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • ઈઆઈએ રીપોર્ટ પ્રમાણે તમે કહો છો કે પ્રોજેકટ લેન્ડમાં કોઇ બારમાસી નદી આવતી નથી. કચ્છમાં કયાંય બારમાસી નદી નથી. ૨૦૧૧, ૨૦૧૩ અને અત્યારની સેટેલાઇટની ઇમેઝ પરથી સ્પષ્ટ છે કે તમે નદીને ડાયવર્ટ કરી છે. તમે દાનેશ્વરી નદીને ડાયવર્ટ કરેલ છે. • તમારી હોસ્પિટલ પણ નદી પર બાંધવામાં આવેલ છે. જે સેટેલાઇટ ઇમેજ ૧૯૯૧માં જોવાથી સ્પષ્ટ થશે. સેટેલાઇટ ઇમેજની સીડી બધાને બતાવો. • હું આ ઈઆઈએ રીપોર્ટનું ચિત્ર નં-૧ બતાવવા માંગુ છુ. તેમાં નદીઓ સાથે ચેડા કરવામાં આવ્યા છે.	--

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
૧૫	શ્રી પુનશી ગઢવી તાલુકા પંચાયત સદસ્ય માંડવી, ગામ - મોટા ભાડીયા, તાલુકો-માંડવી શ્રી ડાહ્યાભાઈ ગઢવી, ગામ- મોટા કાંડગરા તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • અદાણી લોકોના શિક્ષણ, સ્વાસ્થ્ય, પશુના ઘાસ-ચારા વગેરે માટે શું કરશે ? આ માટે લેખીત રજુઆત પણ કરવામાં આવેલ છે. • તમે અગાઉ પુછાયેલ પુનશીભાઈ ગઢવીના પ્રશ્નનો જવાબ આપેલ નથી. તેનો જવાબ આપો.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે,પુનશીભાઈની લેખિત રજુઆત પ્રમાણે અદાણી ફાઉન્ડેશન દ્વારા શિક્ષણ, સ્વાસ્થ્ય અને અન્ય સામાજીક વિકાસના કાર્યો કરવામાં આવી રહયા છે. જે આ પ્રોજેકટ માટે પણ કરવામાં આવશે. આ માટે ૮ કરોડ રૂપિયાનું બજેટ ફાળવવામાં આવેલ છે. જેમાં અસરગ્રસ્ટ ગામો પર વિશેષ ધ્યાન રાખવામાં આવશે.
૧૬	શ્રી આસરીયા લાખા ગીલવા, ગામ-ઝરપરા, તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,કંપનીના અધિકારીઓ સ્થાનિક ગુજરાતી ભાષામાં રજુઆત કરે.	• નોંધ લેવામાં આવેલ.
૧૭	શ્રી ભરત કલ્યાણ શેડા ગામ - ઝરપરા, તાલુકો- મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,અહીંના લોકોને શુધ્ધ પર્યાવરણ જોઇએ છે. કોઇ પ્રોજેકટ જોઇતો નથી. આ પ્રોજેકટ અહીં શુકામ નાખવા માંગો છો.	--
૧૮	શ્રી ગોપાલભાઇ ગીલવા ગામ- ઝરપરા તાલુકો-મુંદરા વિશ્રામભાઇ ગઢવી ગામ- ઝરપરા તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • રોજનો બાર કરોડ ટન CO2 ઉત્સર્જન થાય છે. એફજીડી ફેઝ-૪ શા માટે લગાડવામાં આવેલ છે. • 30 લાખ ટન સલ્ફયુરીક એસીડ આ પ્લાન્ટમાથી નિકળશે તો શા માટે આ પ્લાન્ટ લગાડો છો ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કેઃ • પ્રતિ વર્ષ ૨૫ મીલીયન ટન CO2 ઉત્સર્જન અદાણી પાવર દ્વારા થાય છે અને અંદાજીત ૨૫ મીલીયન ટન જેટલું ટાટા પાવર માંથી થાય છે. આમ કુલ મળી ૫૦ મીલીયન ટન CO2 નું ઉત્સર્જન થાય છે. • અદાણી પાવરના ફેઝ-૪ માં વન અને પર્યાવરણ વિભાગની શરત

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
			હતી જે ને આધિન એફજીડી સીસ્ટમ લગાડવામાં આવેલ છે. • સૂચિત પ્રોજેકટથી હવામાં સલ્ફર ડાયોકસાઇડનું પ્રમાણ ભારત સરકારના સીપીસીબી ના માનક માપદંડોની નિયત મર્યાદામાં જ રહેશે.સલ્ફર ડાયોકસાઈડ કોપર સ્મેલ્ટર અને રીફાઈનરીમાંથી ઉતપન્ન થશે. સલ્ફયુરીક એસીડ પ્લાન્ટમાં સલ્ફર ડાયોકસાઈડને શોષીને સલ્ફયુરીક એસીડ બનાવવામાં આવશે.
૧૯	શ્રી ગોપાલભાઇ ગીલવા ગામ- ઝરપરા તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,એક દિવસમાં ૧,૨૫,૯૮૮ ટન CO2 વાતાવરણમાં નિકળે છે. જેનું એવરેજ ટેમ્પ્રેચર ૧૫૦ ડીગ્રી સેલ્સીયસ છે. તેમ છતાં નવા પ્લાન્ટની મંજુરી શા માટે આપવી જોઈએ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • એવરેજ ટેમ્પ્રેચર ૧૨૦ થી ૧૩૦ ડીગ્રી સેલ્સીયસ હોય છે. ગ્લોબલ વોર્મીંગને રોકવા માટે વૈશ્વીક પ્રયાસો થઇ રહ્યા છે. સુપર ક્રીટીકલ ટેકનોલોજી આધારીત પાવર પ્લાન્ટ, વાતાવરણમાં ઓછું CO2 નું ઉત્સર્જન કરે છે. હજુ સુધી વૈશ્વીક સ્તરે CO2 ઉત્સર્જન ઓછું થયેલ જણાવેલ નથી. ભારત સરકાર દ્વારા વર્ષ ૨૦૩૦ સુધીમાં ૩૦ થી ૩૫% સુધી CO2 ઉત્સર્જન ઓછું કરવા માટેનું લક્ષ્યાંક વર્ષ ૨૦૦૫ ની સાપેક્ષમાં રાખેલ છે. જુની ટેકનોલોજી આધારીત પાવર પ્લાન્ટ ૧ થી ૧.૫ટન CO2 પ્રતિ મેગા વોટસ કલાક ઉત્સર્જન કરે છે. જ્યારે નવી ટેકનોલોજી આધારીત સુપર ક્રીટીકલ પ્લાન્ટ ૦.૮

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			ટનCO2 પ્રતિ મેગા વોટસ કલાક ઉત્સર્જન કરે છે.
૨૦	શ્રી રામભાઇ કાનાણી ગામ- ઝરપરા તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • અમારી બાગાયત ખેતીને નુકશાન થયેલ છે. ખારેકના નર બીજ ના લક્ષણો માદા જેવા થઇ રહ્યા છે. • અમે આ પ્રોજેકટ ઇચ્છતા નથી. ઇઆઇએ રિપોર્ટમાં એવું જણાવેલ છે કે કોઇ જીવ જંતુ નથી, ફકત બાવળ છે, નદીઓ, વનસ્પતિઓ તેમજ વન્ય જીવોની માહિતી આપેલ નથી. કોઇ ગ્રાઉન્ડ રીયાલીટી રજુ કરેલ નથી. આ વિસ્તારના ૮૦% લોકો ખેતી આધારીત જીવન જીવે છે. અમે આ પ્રોજેકટ લાવવા નથી ઇચ્છતા નથી ઇચ્છતા અને નથી ઇચ્છતા.	--
૨૧	શ્રી વિશ્રામભાઇ ગઢવી ગામ- ઝરપરા તાલુકો-મુંદરા શ્રી રામભાઇ કાનાણી ગામ – ઝરપરા, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • સ્ત્રીઓ અને પશુઓમાં મીસડીલેવરીના પ્રશ્નો વધ્યા છે. પ્રજનનતંત્ર ઉપર નુકસાન થાય છે. આ પ્રોજેકટને રદ કરવામાં આવે. નારણભાઈ ખેતી વિકાસ સેવા ટ્રસ્ટના પ્રમુખશ્રીએ કલેકટરશ્રીને લોકસુનાવણી રદ કરવા માટે રજુઆત કરેલ છે. તો પછી લોકસુનાવણી કઈ રીતે થઈ શકે? અહીયા લોકોના હીતને ધ્યાનમાં રાખવામાં આવેલ નથી. • આવી પરિસ્થિતી જયારે જયારે ઉત્પન્ન થાય છે ત્યારે માઓવાદી અને	--

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		નકશલવાદી જેવી પરિસ્થિતી ઉદ્ભવે છે. અમે હકવાદનો જંગ છેડીશું. • અમે ખેતી અને પશુપાલન પર આધારિત જીવન જીવીએ છીએ. અમારા અસ્તિત્વનો સવાલ છે. આ લોકોએ એફજીડી નામનું જ લગાડેલ છે.	
૨૨	શ્રી વિશ્રામભાઇ ગઢવી ગામ – ઝરપરા, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • અદાણી પાવરની ચીમની આડી કેમ છે ? તેની ઉંચાઇ કેટલી છે ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કેઃ • અદાણી પાવરના ૫૦૦ મેગા વોટસ થી વધારે ક્ષમતા ધરાવતા પ્લાન્ટની ચીમનીની ઉંચાઇ ૨૭૫ મીટર રાખવામાં આવેલ છે. ચીમનીની ઉંચાઇ હવામાં ગેસના ડીસ્પર્જન માટે રાખવામાં આવે છે. કાર્બન ડાયોકસાઈડ માટે કોઈ લીમીટ નથી.
		• આના કારણે વરસાદ ઓછો થયેલ છે. આ ચીમનીના કારણે ભાડીયા અને ઝરપરા ગામમાં વરસાદની માત્રામાં ઘણો તફાવત જોવા મળેલ છે.	• ચીમનીની ઉંચાઇને કારણે પ્રદુષણ ૨૦૦૦ ગણું ડાયલ્યુટ થાય છે. પાવર પ્લાન્ટના કારણે કોઇપણ જગ્યા પર વરસાદ ઓછો થયો હોય તેવું સર્વેક્ષણ થયેલ નથી. બંને ગામોમાં વરસાદ લગભગ સરખો જ જોવા મળેલ છે.
		• રોજનો કરોડો ટન CO2 ઉત્સર્જન થાય છે. તેની કોઇ સીમા કે મર્યાદા છે ?	• વાતાવરણમાં CO2 નો વૈશ્વીક સ્તરે પ્રમાણ ૩૫૦ થી ૪૦૦ પીપીએમ છે. જેના માટે કોઇ સીમા કે મર્યાદા નથી. સલ્ફર ડાયોકસાઇડ માટે નેશનલ એમ્બીઅન્ટ એર કવોલીટી ના સ્ટાન્ડર્ડ મુજબ માનક સ્તર ૮૦ માઇક્રો ગ્રામ / ઘન મીટર ૨૪

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			કલાકની એવરેજ પ્રમાણે છે.
૨૩	શ્રી રામભાઇ કાનાણી ગામ – ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,પવનની દિશા ખોટી બતાવવામાં આવેલ છે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે,પવનની દિશા શિયાળાની ઋતુના ડેટા પ્રમાણે દર્શાવવામાં આવેલ છે. જે સાઉથ સાઉથ વેસ્ટ થી નોર્થ નોર્થ ઇસ્ટ તરફ બતાવવામાં આવેલ છે.
૨૪	શ્રી ભરત કલ્યાણ સેડા ગામ – ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,ગુજરાતીમાં જવાબ આપવા રજુઆત કરેલ.	• નોંધ લીધેલ છે.
૨૫	શ્રી નાનજી મીઠુભાઇ મહેશ્વરી ગામ – મોટા કાંડાગરા, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • જે ૮ અસરગ્રસ્ત ગામોનો સર્વે કરેલ છે ત્યાંના સરપંચ તથા તલાટીના સહી સિકકા વાળો પત્ર એલઈડી સ્કીન પર બતાવો. • આ પ્લાન્ટમાંથી રોજગારી કેવી રીતે આપશો.	--
૨૬	શ્રી ભરત કલ્યાણ સેડા ગામ – ઝરપરા, તાલુકો –મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,હજારોની સંખ્યામાં લોકો વિરોધ કરે છે. ૧૬ ગામોની મુલાકાત લીધી હોય તેવા ફોટા રજુ કરો.	..
૨૭	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ - મોટા કાંડાગરા, તાલુકો –મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • કાર્યકારી સારાંશના પેજ નં.૨.૧ ના સૌથી નજીકનું ગામ મુંદરા દર્શાવેલ છે. અસરગ્રસ્ત ૧૬ ગામનો લીસ્ટ આપો. અસરગ્રસ્ત ગામમાં મુંદરાનો સમાવેશ કેમ કરવામાં આવેલ છે ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કેઃ • આ સુનાવણી દ્વારા તમારી બધી રજુઆત એમઓઇએફ સુધી પહોંચાડવામાં આવશે. કંપની દ્વારા પારદર્શક રીતે કાર્ય કરવામાં આવશે. પ્રોજેકટ વિસ્તારની નજીકનો ટાઉન મુંદરા છે. સિરાચા અને નવીનાળ ગામની જમીન આ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		• આ લોકસુનાવણીની સમય મર્યાદા કેટલી રહેશે?	પ્રોજેકટમાં આવે છે. • ઇઆઇએ રિપોર્ટમાં પરિશિષ્ટ – ૭માં ડેમોગ્રાફીક ડીટેલ આપેલી છે. જેમાં ૧૬ ગામનું લીસ્ટ આપવામાં આવ્યુ છે. આમાં સીરાચા, ટુન્ડા, મોટા કાંડાગરા, મોટી ખાખર, નાની ખાખર, મોટી ભુજપુર, નાની ભુજપુર, દેસલપર,ભોરારા, ઝરપરા, પ્રતાપપુર, ધ્રબ,ત્રગડી, નાના ભાડીયા, મોટા ભાડીયા, નવીનાળનો સમાવેશ થયેલ છે. જે ઈઆઈએ રીપોર્ટના ચેપટર-૩ માં અસરગ્રસ્ત બધાજ ગામોની વિગત આપેલ છે. ઇઆઇએ રિપોર્ટ એમઓઇએફની ગાઇડ લાઇન મુજબ બનાવવામાં આવેલ છે. • પ્રેઝન્ટેશનમાં જે પણ પર્યાવરણલક્ષી અસર થવાની છે તેની વિગત બતાવવામાં આવેલ છે. તથા આ જ વિગતો ઇઆઇએ રિપોર્ટમાં પણ સમાવેશ કરેલ છે. ઇઆઇએમાં તમામ બાબતોનો અભ્યાસ કરી તેનો મેનેજમેન્ટ પ્લાન દર્શાવવામાં આવેલ છે. • પ્રાદેશિક અધિકારી દ્વારા જણાવવામાં આવ્યું કે જયા સુધી જેની જેટલી રજુઆત હોય તે બધી જ સાંભળયા પછી જ લોકસુનાવણી પુરી થાય.
૨૮	શ્રી વિશ્રામભાઇ ગઢવી	• તેઓએ રજુઆત કરતા જણાવેલ કે,કોઇ પણ કંપની આવે ત્યારે	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે,માનનીય સુનીતા નારાયણ વર્ષ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
	ગામ - ઝરપરા, તાલુકો – મુંદરા	પ્લાન્ટના 33 % ગ્રીન બેલ્ટ જોઇએ જેના ભાગ રૂપે એપીએસઇઝેડની અંદર સુનીતા નારાયણની કમીટીની મુલાકાત વખતે રોડની બંને બાજુ વૃક્ષો ઉગાડવામાં આવેલ હતા. જે હાલમાં હયાત નથી.	૨૦૧૩ માં આવ્યા હતા. જેમની કમીટીની મુલાકાત વખતે જેટલો ગ્રીન બેલ્ટ હતો તેનાથી વધારે ગ્રીન બેલ્ટ હાલમાં છે અને હજુ વધુ પ્લાન્ટેશન કરવામાં આવશે.
૨૯	શ્રીકલ્યાણ આસરીયા ગઢવી ગામ - ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,હું ભુતકાળમાં કેએસકેવી યુનીવર્સીટી વતી અદાણી ફાઉન્ડેશનમાં ટ્રેનીંગમાં આવેલ ત્યારે નદીમાં અને બીજી જગ્યાએ ૬૦ હજાર જેટલા વૃક્ષોનું વાવેતર કરેલ જે અત્યારે હયાત નથી.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે,આપ બંનેના પ્રશ્ન અલગ છે. એક ગામનો છે અને એક એપીએસઇઝેડ નો છે.
૩૦	શ્રી ગજેન્દ્રસિંહ જાડેજા સરપંચ, નવીનાળ ગ્રામ પંચાયત, નવીનાળ, તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • ડ્રાફટ ઇઆઇએ રિપોર્ટ સી૧-૪ના મુદ્દા નં-૧૦ માં દર્શાવેલ છે કે અહીં કોઇ પુરાતત્વીય સ્થળ નથી. જયારે સુચિત પ્રોજેકટ વિસ્તારથી ૫૦૦ થી ૧૦૦૦ મીટરના અંતરે નવીનાળ પુરાતત્વીય વિભાગનો સ્થળ આવેલ છે. જેનો મારી પાસે એમએસ યુનિવર્સીટીનો રીપોર્ટ છે જે હડપ્પા સંસ્કૃતીને મળતો આવે છે. • ભદ્રેશ્વર ખાતે માછીમાર બંદર બનાવવામાં આવેલ નથી. માછીમારોના રસ્તા બંધ કરાયા હતા તે ખોલવામાં નથી આવ્યા.	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કેઃ • આર્કયોલોજીકલ સર્વે ઓફ ઇન્ડીયાની વેબસાઇટ પર આવી કોઇ સાઇટનો ઉલ્લેખ નથી. નોટીફાઇડ સાઇટનું લીસ્ટ તમને આપવામાં આવશે. • રંધ બંદર (ભદ્રેશ્વર) ઉપર સુનિતા નારાયણની કમીટીની મુલાકાતવખતે જવાની મંજુરી ન હતી. ત્યાં આજે ફાઉન્ડેશન દ્વારા વિવિધ વિકાસના કાર્યો જેવાકે પાણી, વીજળી વગેરે સુવિધા પુરી પાડવામાં આવેલ છે.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			• સુનિતા નારાયણ કમીટીની મુલાકાત બાદ માછીમારોને જવા માટે રસ્તા બનાવવામાં આવેલ જે આજે પણ ખુલ્લા છે.
૩૧	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ -મોટા કાંડાગરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,ભરાડી માતાનો રસ્તો કેટલી તકલીફ બાદ શરૂ થયેલ છે. આપે રસ્તો બંધ કરવા માટે કોઇ કસર છોડેલ નથી.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે,ભરાડીમાતા જવા માટેનો રસ્તો ખુલ્લો મુકવામાં આવેલ છે. આજની તારીખમાં ભરાડી માતા જવા માટે એક નહી પરંતુ બે રસ્તા ખુલ્લા છે.
૩૨	શ્રી વાલજીભાઇ ટાપરીયા ગામ - ઝરપરા, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • કોપર પ્લાન્ટના પ્રોડકશનમાં સલ્ફર / ગંધકનો ઉપયોગ થવાનો છે જેમાં એસીડીક પ્રકીયા થશે. આનાથી પર્યાવરણ પર અસર થશે. આ સલ્ફયુરીક એસીડની અસર અંદાજીત ૧૦ કીમી ત્રીજયામાં બતાવેલ છે જે નીષ્ણાંતોના અભિપ્રાય મુજબ ૨૦ થી ૨૫ કીમી સુધી થાય છે. • માનવતાના ધોરણે એમની અંગત જવાબદારી સ્વીકારી જીપીસીબીએ પણ આમા રસ લેવો જોઇએ અને લાંબાગાળાનું આયોજન હોવું જોઇએ. વિકાસ સાથે કોઈનો વિરોધ નથી. કોપર રીફાઇનરીની અસર પાવર પ્લાન્ટથી પણ વધારે હોય છે. જો પ્લાન્ટની જગ્યા બદલી શકાતી હોય તો માનવ વસ્તી થી દુર લઇ જવી જોઇએ. પહેલાના જમાનામાં અણુંથી વીજળી ઉત્પન્ન થતી જેની આડ અસરને કારણે લોકોની પેઢી ખલાસ	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • કોપર સ્મેલટરઅને રીફાઈનરી માટે પ્રોજેકટ પછી ઉત્પાદન ક્ષમતામાં કોઈ વધારો કરવામાં નહી આવે. • કોપર કોન્સન્ટ્રેટને કોપર સ્મેલટરમાં પ્રોસેસ કરવામાં આવે છે. તેમાંથી સલ્ફર ડાયોકસાઈડ બને છે. જેને કેપ્ચર કરી સલ્ફયુરીક એસીડ બનાવવામાં આવે છે. તે સલ્ફયુરીક એસીડમાંથી ફોસ્ફોરીક એસીડ બનાવવામાં આવશે. • કોપર સ્મેલટરમાં સલ્ફયુરીક એસીડમાંથી ફોસ્ફયુરીક એસીડમાં રૂપાંતરીત કરવામાં આવશે. જે ખાતર બનાવવાના પ્લાન્ટમાં ઉપયોગમાં લેવામાં આવશે. • આ ઉપરાંત બાય પ્રોડકટ તરીકે ફલોરોસીલીક એસીડ બનશે જે ટુથપેસ્ટ બનાવવા ઉપયોગમાં આવે છે.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		થઇ જતી હતી. માછીમારોને પણ અસર થવી ના જોઈએ. સરકારશ્રી ખાસ નજર રાખીને કોઈપણ આડઅસર ના થાય તેનું ધ્યાન રાખવું જોઈએ.	
૩૩	શ્રી વિશ્રામભાઇ ગઢવી ગામ - ઝરપરા, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • શું તમે લોકો કંપનીની બાજુમાં રેસીડન્ટ બનાવી ને રહેશો ? તો કોઇ વાંધો નથી. અમે લોકો તો વાડીમાં બહાર ખુલ્લામાં રહીએ છીએ. • બીજી કઇ જગ્યાએ આટલી મોટી ક્ષમતા ધરાવતા પાવર પ્લાન્ટ આવેલા છે ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, • અમારા જેટલા મોટા અધિકારીઓ આવે છે તે અહીં જ પાવર પ્લાન્ટના ગેસ્ટ હાઉસમાં કેટલીય વખત રહે છે. વિશ્વમાં ઘણા કોપરપ્લાન્ટ શહેરની બાજુમાં આવેલા છે. અમારા કોપરપ્લાન્ટની અંદર પણ ગેસ્ટ હાઉસ બનાવવામાં આવશે. • સીંગ્રોલીમાં ૨૦ હજાર મેગા વોટસની ક્ષમતાના પાવર પ્લાન્ટ આવેલ છે, આંધ્રપ્રદેશના અંગુલમાં ૧૬ હજાર મેગા વોટસની ક્ષમતાના પાવર પ્લાન્ટ આવેલ છે, તમિલનાડુના તુટીકોરીનમાં ૧૨ હજાર મેગા વોટસની ક્ષમતાના પાવર પ્લાન્ટ આવેલ છે. આ બધા કોલબેઝડ પાવર પ્લાન્ટ છે. હવે ગવર્મેન્ટ ઓફ ઈન્ડીયા દ્વારા બધા મોટા પ્લાન્ટને એફજીડી ની સાથે મંજુરી આપવામાં આવે છે.
૩૪	શ્રી નારાણ ગઢવી ગમા – ઝરપરા, તાલુકો - મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • આ જીલ્લાના સર્વોચ્ચ ઓફીસરને સંબોધીને ૨૭/૪ ના રોજ પત્ર લખેલ કે આ જે કોપર પ્લાન્ટ જે જમીન પર આવેલ છે તે સબજયુડીશીયલ	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કેઃ • આપના પ્રશ્નોનો વિસ્તૃત જવાબ આપુ છું. એપીએસસીઝેડ માં ૧૨/૨૦૧૧ ની પીઆઇએલના સંદર્ભમાં જે કમિટી આવેલ હતી

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		મેટર છે. આજની તારીખ સુધી કલેકટર સાહેબે કોઈ નિર્ણય લીધો નથી. • જેમાં જણાવેલ કે નામદાર સીટીંગ પ્રીન્સીપલ જજ અને સુનિતા નારાયણ કમિટી બાદ અન્ય બે કમિટી આવી હતી. એમાં સૌપ્રથમવાર નામદાર સીટીંગ જજ કમિટી આવી હતી. તેનો તપાસ રીપોર્ટ હાઇકોર્ટમાં સબમીટ કરેલો છે. એ કમિટીનો રીપોર્ટ સબજયુડીશ છે. બીજો રીપોર્ટ (તા.૫/૧૧/૨૦૧૫ અને ૧/૪/૨૦૧૬) ના રિપોર્ટ નામદાર ગુજરાત હાઇકોર્ટના ઓર્ડરથી એક નિષ્ણાત તબીબને ગોવાથી અને બીજાને કોલકતાથી બોલાવવામાં આવેલા. • કમિટીએ ૬ હજાર એકર જમીન પાછી સરકારશ્રી પાસે જવી જોઇએ તેવી ભલામણ પણ કરેલ છે. જેનો કોઇ નીર્ણય હજુ આવેલ નથી. • આ બાબતે જવાબદાર અધિકારી પર કન્ટેમ્પટ કોર્ટ કરવામાં આવશે. ઇઆઇએ રિપોર્ટમાં પણ મેપ દર્શાવેલ છે. સબજયુડીશ મેટર હોવા છતાં કેમ લોકસુનાવણી કરવામાં આવે છે ? જીપીસીબી પણ આ મેટરમાં એક પાર્ટી છે. • અમારી ફરીયાદ પરથી ભારત સરકારના વન અને પર્યાવરણ મંત્રાલય તરફથી	અને તેનો રિપોર્ટ નામદાર હાઇકોર્ટમાં રજુ કરવામાં આવેલ. જે મેટર તા.૧૭/૪/૨૦૧૫ના રોજ ગુજરાત હાઈકોર્ટ દ્વારા ડીસ્પોજ કરવામાં આવેલ. • આગળની પ્રક્રિયા દરમ્યાન ૧૨/૭/૨૦૧૧ માં કન્ટેમ્પટ પીટીશન (નંબર-૯૧૨૪) દાખલ કરવામાં આવેલ. ત્યાર બાદ ૧૫/૧૦/૨૦૧૫ ના રોજ ઓર્ડર બહાર પાડવામાં આવેલ. સુનિતા નારાયણ કમિટી દ્વારા જે રિપોર્ટ સબમીટ કરવામાં આવેલ તે મેટર ૨૦૧૫ માં ડીસ્પોઝ કરવામાં આવેલ. નામદાર ગુજરાત હાઇકોર્ટના ૨૦૧૫ ના ઓર્ડર મુજબ કોઇ કન્ટેમ્પટ ઓર્ડર આવેલ નથી. ગોવા અને કલકતાના નિષ્ણાંતોની કમિટી દ્વારા તા.૮/૬/૨૦૧૬ના રોજ જે રિપોર્ટ સબમીટ કરવામાં આવેલ છે. તે મેટર નામદાર ગુજરાત હાઇકોર્ટમાં પેન્ડીંગ છે. કમીટી દ્વારા ૧૦૦ હેકટર અથવા તેનાથી વધારે મેન્ગ્રુવ પ્લાન્ટેશન કરવાની ભલામણ કરવામાં આવેલ છે. જે પ્રોજેકટ એરીયાનો વિવાદીત વિસ્તાર નથી. તમામ શો કોઝ નોટીસ ડીસ્પોઝ કરવામાં આવેલ છે. કમીટીએ કરેલ સર્વેમાં ભલામણ કરવામાં આવી છે. જે કોઇ ઓર્ડર નથી. ગુજરાત હાઇકોર્ટ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
		તા.૧૭/૯/૨૦૧૫ ના સુનિતા નારાયણની કમિટીએ રીપોર્ટ આપ્યો. • ગુજરાત હાઈકોર્ટ કમિટીમાં બે મેપ સબમીટ કરેલા છે. જે હાઈકોર્ટના રેકર્ડ પર છે. તમારા દ્વારા ટોપોશીટ સાથેના મેપ સબમીટ કરવામાં આવ્યા હતા. જે સંપુર્ણ જમીનના હતા. જેમાં તમારો પ્રોજેકટ સામેલ છે. • તમે જે કહો છો તે પ્રમાણે ફોરેસ્ટ એરીયા આ પ્રોજેકટમાં આવવાનો છે. હાઈકોર્ટ કમિટીએ કહ્યુ છે કે આ એરીયા અદાણી પાસેથી લઈને સરકાર તાબે થવો જોઈએ. ૫૩૩૩ હેકટરનો ફોરેસ્ટ એરીયા રીસ્ટોર થવો જોઈએ. • આ મેટર ગુજરાત હાઈકોર્ટમાં વિચારાધીન છે. તેમ છતાં તમારા ઈઆઈએ રીપોર્ટમાં એ કેસનો ઉલ્લેખ શા માટે કરવામાં આવ્યો નથી.	દ્વારા જે પણ કોઇ ફાઇનલ ઓર્ડર કરવામાં આવશે. તે કંપનીને માન્ય રહેશે. સૂચિત પ્રોજેકટની જમીનને આ મેટર સાથે કોઇ સબંધ નથી. આ પ્રોજેકટ માટે નોટીફાઇડ એસઇઝેડની જમીનનો ઉપયોગ કરવામાં આવશે. અને જે મેટર હાઇકોર્ટમાં પેન્ડીંગ છે તેનો પણ એમઓઇએફ દ્વારા ધ્યાનમાં લેવામાં આવશે. સૂચિત પરિયોજનાને આ કેસ સાથે કઇ લેવા દેવા નથી. • કંપનીને એમઓઇએફ દ્વારા ડાયરેકશન આપવામાં આવેલ છે. જેના પર કંપની કામ કરી રહી છે. જેનો અહેવાલ દર ૬ મહીને એમઓઇએફમાં રજુ કરવામાં આવે છે. આપે જે વાત કરી એ કમિટીએ કરેલા રીપોર્ટનો સર્વે છે. જે ભલામણ છે ડીસીઝન નથી. ગુજરાત હાઈકોર્ટ કમિટીનો રીપોર્ટની સાથે કંપનીની રજુઆતનો અભ્યાસ કરશે ત્યારબાદ જે માર્ગદર્શન આપશે એ કંપનીને માન્ય રહેશે. • તમારા સવાલઅને મારા જવાબ નો અભ્યાસ ભારત સરકાર તેની રીતે કરશે. • ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, આ ગુજરાત હાઈકોર્ટના કેસને આ સુચિત પ્રોજેકટ સાથે કોઈ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
			લેવાદેવા નથી. એવું અમારુ સબમીશન છે.
૩૫	શ્રી ભારુભાઇ રાણશીભાઈ શાંખરા, મંત્રી, ખેતી વીકાસ સેવા ટ્રસ્ટ, ગામ - ઝરપરા તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, લોકોનો ભલું થાય તેવું કરજો. પૈસા લઇ ને પછી છોડી નહીં દેતા.કંપની આવે કે ન આવે તે માટે મને કોઇ વાંધો નથી. જે કઇ પણ કરો તે લોકોનો ભલુ થાય તેવું કરજો.	--
૩૬	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ - મોટા કાંડાગરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, અમે નવી કંપનીને પરવાનગી મળવા નહીં દઇએ. જીપીસીબી, સીપીસીબી, એમઓઇએફસીસી દ્વારા નકકી કરવામાં આવેલ ધારા-ધોરણોનો કંપની દ્વારા ઉલંઘન થઈ રહેલ છે તેની યોગ્ય તપાસ અહી આવેલ અધિકારીશ્રીઓ કરે. નવા પ્લાન્ટને અમે નહીં આવવા દઇએ.	--
૩૭	શ્રી ભરત કલ્યાણ શેડા ગામ - ઝરપરા તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, અહીના લોકો ઇચ્છતા નથી કે પ્રોજેકટ આવે.અહીયાના લોકોને શુધ્ધ વાતાવરણ જોઇએ છે. વિકાસ નથી જોઈતો લાંબા ગાળાનો વિનાશ પબ્લીકને નથી જોઈતો જેની આપ નોંધ લેશો	--
૩૮	શ્રી અનવરભાઇ ઇબ્રાહીમ વાઘેર, ગામ – નવીનાળ, તાલુકો –મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, અમારા માછીમારોના રસ્તાનો કે અન્ય કોઇ જાતનો નુકશાન થયેલ નથી. અમારા રસ્તા બંધ થયા નથી. અમારી સાથે અમારા પટેલ સમાજના	--

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		તેમજ અમારી સાથે આવેલ ગામનો લોકો ને કંપની આવે તેમાં અમોને કોઇ જાતનો વાંધો નથી.	
૩૯	શ્રી કાદર ઈસ્માઈલ ગામ – નવીનાળ, તાલુકો – મુદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, અમારા રસ્તા ખુલ્લા છે અમને કોઇ વાંધો નથી.	--
૪૦	શ્રી ગજેન્દ્રસિંહ જાડેજા સરપંચ, નવીનાળ ગ્રામ પંચાયત, ગામ – નવીનાળ, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • મારા ગામના માછીમારોને વધારે માહિતી નથી. હું વનિવભાગ અને અન્ય નકશાઓ બતાવું કે કયા રસ્તાઓ બંધ થયા છે. નકશામાં આ વન વિભાગનો રસ્તો છે પ્રોજેકટની અંદરથી માછીમારોનો દરિયાનો માર્ગ નિકળે છે. • આ ગર્વમેન્ટના રસ્તા છે. તમારા માલીકીનીના રસ્તા નથી. સરકાર દ્વારા માછીમારોને રસ્તા બનાવી દીધા છે તે રસ્તાની વાત છે.	--
૪૧	શ્રી અનવરભાઇ ઇબ્રાહીમ વાઘેર તથા શ્રી કાદર ઈસ્માઈલ બન્ને ગામ – નવીનાળ, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, અમારા જે રસ્તા છે તે ખુલ્લા છે. કોટડી બંદર અને સોદાવાડી ક્રીક બન્ને રસ્તા ખુલ્લા છે. અમોને અત્રેથી કોઇપણ જાતનો વાંધો નથી.	--
૪૨	શ્રી પ્રવિણસિંહ ભુરૂભા ચૌહાણ, ગામ -	• તેઓએ રજુઆત કરતા જણાવેલ કે, નવીનાળ થી દાનેશ્વર તરફ જે રસ્તો હતો તે બંધ થયો છે કે નહીં તે	--

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
	શીરાચા, તાલુકો – મુંદરા	જણાવો?	
૪૩	શ્રી આસરીયા લાખા, ગામ - ઝરપરા, તાલુકો –મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, માન. અધ્યક્ષશ્રીની જવાબદારી બને છે લોક સુનાવણીમાં કોઇ એ કોઇની તારીફ કરવા માટે આવી શકતા નથી. જે અધ્યક્ષ સ્થાનેથી સૂચના આપવામાં આવે. આ લોક સુનાવણી અસરગ્રસ્તોની રજુઆતોને સાંભળવા માટે છે.	--
૪૪	શ્રી ગજેન્દ્રસિંહ જાડેજા સરપંચશ્રી, નવીનાળ ગ્રામ પંચાયત, ગામ – નવીનાળ, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, પહેલા પાવરનું અને એસઈઝેડના એનવાયરમેન્ટ કલીયરન્સનું કમ્પલાઇન્સ થવું જોઇએ ત્યારબાદ આ પ્રોજેકટ આવવો જોઈએ.	--
૪૫	શ્રી રામભાઇ કાનાણી ગામ - ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપનીની એ રણનીતી હોય છે કે બે કલાક પછી કેટલાક ભાડુતી માણસો જાહેરમાં ઉભા કરવામાં આવે. જે સુનાવણીને અવળી દીશામાં દોરવા માટે હોય છે.	--
૪૬	શ્રી ગજેન્દ્રસિંહ જાડેજા સરપંચશ્રી, નવીનાળ ગ્રામ પંચાયત, ગામ – નવીનાળ,	તેઓએ રજુઆત કરતા જણાવેલ કે, • વન વિભાગની ૧૦૨ હેકટર જમીન આ પ્રોજેકટમાં આવે છે. સને ૨૦૦૪ માં અદાણી દ્વારા ૧૫૭૬.૮૧ હેકટર જમીન માંગણી કરવામાં આવી છે જેને હજી સુધી વન વિભાગની મંજુરી મળેલ નથી. નવીનાળ અને શીરાચા	ઉદ્યોગના પ્રતિનિધિશ્રીએ જણાવેલ કે, • ૧૦૨ હેકટર જમીન વનવિભાગની છે તેનો અત્યારે શું ઉપયોગ થાય છે તે તમે જાણો જ છો. ફોરેસ્ટ ડીપાર્ટમેન્ટના રીપોર્ટ મુજબ કોઇ મોટા ડીસ્બર્શમેન્ટની જરૂર નહીં પડે. પ્લાન્ટ આવશે ત્યારે 33%

dpamk

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
	તાલુકો – મુંદરા	એમ બન્ને ગામોએ વનવિભાગ અધિનિયમ અંતર્ગત દાવા મુકેલા છે. નવીનાળ અને શીરાચાના લોકો ત્યાં પશુઓ ચરાવે છે અને રોજગારી મેળવે છે. આ જંગલ આપવામાં આવશે તો આ જંગલ પર નભતા જંગલી પ્રાણીઓ કયાં જશે? પશુઓ જાનવર કયાં જશે ? છેલ્લી વધેલી વનવિભાગ, શ્રી સરકાર અને ગૌચરની જમીન પણ આપી દેવામાં આવશે તો પશુ, પક્ષીઓ અને લોકો કયા જશે ? • આ વિસ્તારમાં આ છેલ્લુ બચેલુ રીઝર્વ ફોરેસ્ટ છે. ભરાડી માતા સેન્ડ ડયુંન્સ છે. કોસ્ટલ અને મેન્ગુવ ફોરેસ્ટ છે. આ વિસ્તાર સીઆરઝેડ ૧ માં આવેલ છે ત્યાં કોઇ પણ પ્રકારની જમીનની મંજુરી મળવા પાત્ર નથી.	ગ્રીન બેલ્ટ નિયમોનુસાર વિકસાવવામાં આવશે. ફોરેસ્ટ ડીપાર્ટમેન્ટના રીપોર્ટના આધારે આ જમીનમાં કોઈ મોટું સ્થળાતર થશે એવું પ્રતિત થતું નથી અને તે વિસ્તાર ની જમીન કંપની દ્વારા ગ્રીન બેલ્ટ વિકસાવવા માટે ઉપયોગમાં લેવામાં આવશે અને પશુ પક્ષીઓ નું વિશેષ ધ્યાન લેવામાં આવશે અને સીએસઆર પ્રવૃતિ દ્વારાપશુઓને ઘાસચારો પુરો પાડવામાં આવશે • ફોરેસ્ટ ડીપાર્ટમેન્ટ દ્વારા આ બધી બાબતોને ધ્યાનમાં રાખી ફોરેસ્ટ કલીયરન્સ આપવામાં આવશે. • આ ઉપરાંત ભરાડી માતા રીઝર્વ અને કોસ્ટલ ફોરેસ્ટ આવેલ છે. જેમાં પશુ ઘાસચારો મેળવે છે. પ્રોજેકટમાં ૧૧૧ હેકટર નવીનાળની જમીનનો ઉપયોગ થશે. ૧૦૨ હેકટર શીરાચાની જમીનનો ગ્રીન બેલ્ટ વિકસાવવામાં ઉપયોગ થશે.
૪૭	શ્રી પ્રવિણસીંહ ભુરૂભા ચૌહાણ, ગામ - શીરાચા, તાલુકો - મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • પાવર પ્લાન્ટની બાજુમાં આવેલ જંગલ ખાતાની જમીન પર આવેલ ખારેક, દેશી બાવડ જેવા વૃક્ષો ચીમનીના ધુમાડા અને કુલીંગ ટાવરના કારણે સુકાઈ ગયા છે. • જંગલમાં વસતા રોજ (નીલગાય), શીયાળ, ભુંડ કે અન્ય પશુઓ કયાં	ઉદ્યોગના પ્રતિનિધિશ્રીએ જણાવેલ કે, • આજે પણ આ જમીન જંગલ ખાતા હસ્તક છે અને આપ જણાવો છો કે વૃક્ષો હયાત છે. • આ હકકીત સાચી નથી જો આવું બનેલ હોત તો જંગલખાતા તરફથી અમોને જાણ કરવામાં આવી હોત.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
		જશે ? એ અમારી વાડીમાં આવશે.	
૪૮	શ્રી રામભાઈ કાનાણી ગામ - ઝરપરા, તાલુકો –મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ઈઆઈએ રીપોર્ટ અને પ્રેજન્ટેશનમાં તફાવત છે અને ગુજરાતી રીપોર્ટમાં જે વિગત દર્શાવેલ છે તે વાસ્તવમાં નથી. પર્યાવરણનો જે વર્ણન કરેલ છે તેમાં વિભિન્નતા છે. પ્રોજેકટ વિસ્તારમાં ફકત બાવળ અને મોર જ બતાવવામાં આવેલ છે. જયારે વાસ્તવિક પરિસ્થિતી કાંઈક અલગ જ છે. અહી ઔષધી વનસ્પિતિ પણ આવેલ છે. અહીની પ્રકૃતિનું વર્ણન કરવામાં આવેલ છે તે જમીનની વસ્તવિકતા નથી. અહી પ્રોજેકટ વિસ્તારમાં ગ્રાઉન્ડલેવલની વાસ્તવીકતા જોવા મળતી નથી.	• ઉદ્યોગના પ્રતિનિધિશ્રીએ જણાવેલ કે, ઇઆઇએ રીપોર્ટ બને છે તેનો સારાંશ પ્રેજન્ટેશન સ્વરૂપે બતાવવામાં આવે છે. સંપર્ણ ઈઆઈએ રીપોર્ટ લોકસુનાવણીમાં બતાવવાનો રહેતો નથી. તમારા ધ્યાને ઈઆઈએ કોઈ વિસંગતતા જોવા મળેલ હોય તો આપની રજુઆત આપ લેખિતમાં આપી શકો છો જે લોક સુનાવણીની પ્રોસીડીંગમાં સામેલ થશે અને ભારત સરકારની મીનીસ્ટ્રીમાં જશે. વધુમાં અહીના સમય મુજબની પ્રાપ્ય માહિતીની આધારે ઈઆઈએ રીપોર્ટ બનાવવામાં આવે છે.
૪૯	શ્રી વિશ્રામભાઈ ગઢવી ગામ – ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપનીએ સુનાવણીમાં પોતાનો વિડીયો બતાવે છે. તેમા બધી વસ્તુ સારી સારી બતાવવમાં આવી છે પ્રોજેકટથી શુ આડ અસર, જોખમ વિગેરે ની વિગતો જણાવેલ નથી. રજુઆત કર્તાનો વિડીયો બતાવવામાં આવે.	અધ્યક્ષશ્રી ધ્વારા જણાવવામાં આવેલ કે, • તમારી પાસે રહેલ સીડી અત્રે જમા કરાવો જેને અમો પ્રોસેડીંગમાં સામેલ કરશું. • (નોંધ : મોબાઇલ મારફત રજુકરનારનો વીડીયો એલ.ઇ.ડી સ્કીન પર ચલાવવાનો પયત્ન કરેલ પરંતુ કોઇ કારણોસર ચલાવી શકાયો ન હતો.)
૫૦	શ્રી પ્રવિણસીંહ ભુરૂભા ચૌહાણ, ગામ - શીરાચા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, હું અદાણી પાવર અને એસઈઝેડ ધ્વારા જે ગોટાડા કરવામાં આવેલ છે તેની સીડી બતાવવા માંગું છું. ફોર્મ ૧ માં બતાવવમાં આવેલ છે કે, અહી કોઈ મેન્ગ્રુવ નથી. પરંતુ હકીકતમાં અહીં મેન્ગ્રુવ છે.	

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
૫૧	શ્રી રામભાઈ કાનાણી , ગામ - ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, તમારા અગાઉના જે પ્લાન્ટો છે તે દ્વારા થતું નુકશાન લોકો ભોગવી રહ્યા છે જેથી તમારા પ્રોજેકટ લોકોને સ્વીકાર્ય નથી.	--
૫૨	શ્રી ઓસ્માણ ગની સેરશીયા ગામ- વાંકાનેર, તાલુકો – મોરબી	તેઓએ રજુઆત કરતા જણાવેલ કે, • આ પ્રોજેકટ માટે કેટલુ પાણી લેવાના છો અને કયાંથી પાણી લેવામાં આવશે ? • ડીસેલીનેશન કરીને ખારૂ પાણી દરીયામાં છોડશો ?	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, આ પ્રોજેકટમાં ૩૨૮૦૦ ઘન મીટર પાણીની જરૂરીયાત રહેશે જે એપીએસઈઝેડ દ્વારા દરિયાના પાણીનું ડીસેલીનેશન કરીને ઉપયોગ કરવામાં આવશે.
૫૩	શ્રી દેવેન્દ્રસિંહ જાડેજા ગામ - મોટા કાંડાગરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપની આવે તેમા અમો સહમત છીએ પરંતુ કેટલા ટકા સ્થાનિક લોકોને કેટલી રોજગારી મળશે ? લેખિતમાં આપો	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, કંપનીના બાંધકામના સમયે અંદાજે ૩૦૦૦ લોકોની જરૂર પડશે જેમાં શકય તેટલા સ્થાનિક અનસ્કીલ લેબરને કામ આપવાનો પ્રયત્ન કરવામાં આવશે.
૫૪	શ્રી લખુભાઈ રબારી ગામ – ટુંડા – વાંઢ તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • પ્રોજેકટ ચાલુ થાય છે ત્યારે જે અધિકારીઓ હોય છે તે પ્રોજેકટ ચાલુ થવા બાદ બદલી થઇ જાય છે જેથી અમારા પ્રશ્નોનું યોગ્ય નિરાકરણ આવતું નથી. • અનસ્કીલ લોકોને શું રોજગારી આપવામાં આવશે ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, • સ્થાનિક લોકોની ભાવનાઓને ધ્યાનમાં રાખવામાં આવશે અને પ્રશ્નોનું યોગ્ય નિરાકરણ કરવામાં આવશે. વધુમાં વધુ સ્થાનિક લોકોને રોજગાર મળે તેવા પ્રયત્નો કરવામાં આવશે. • અનસ્કીલ લોકોને પણ રોજગારી મળે તેવા પ્રયત્નો કરવામાં આવશે.
૫૫	શ્રી વિશ્રામભાઈ ગઢવી ગામ – ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપની પોતાના ફાયદા માટે અહીં પ્રોજેકટ લાવવા માંગે છે નહી કે સ્થાનિક લોકોના વિકાસ માટે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, કંપની ઇચ્છે તો અન્ય બીજી જગ્યાએ પણ ઉદ્યોગ સ્થાપી શકે પરંતુ મુંદરાના વિકાસ અર્થે અહીં

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			પ્રોજેકટ સ્થાપ્વાનો નિર્ણય લેવામાં આવેલ છે.
૫૬	શ્રી વાલજીભાઈ ટાપરીયા ગામ - ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, આવનાર કંપનીમાં તેમજ હાલ ચાલુમાં છે તેવી કંપનીઓમાં નોકરી રાખવા માટે અદાણી અને અમુક સ્વૈચ્છિક સંસ્થાઓ સાથે મળી એક સમિતી બનાવી એક એકસચેન્જ સેન્ટર બનાવો. એમા કવોલીફાય વ્યકિતઓ હોય તેની નોંધણી કરો અને કંપનીની જરૂરીયાત અને લાયકાત પ્રમાણે નોકરી રાખવામાં આવે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, અમારા ધ્વારા અદાણી સ્કીલ ડેવલોપમેન્ટ સેંટર બનાવવાની પ્રકીયા ચાલુમાં છે. અને ભવિષ્યમાં એના ધ્વારા રોજગારી વધારવા પ્રયત્ન કરવામાં આવશે. વધુમા, રોજગાર કચેરી સાથે સંપર્ક રહી તેમા રજીસ્ટર્ડ યોગ્ય લાયકાત વાળા લોકોને પ્રાથમિકતા આપવામાં આવશે.
૫૭	શ્રી હુસેન વાસુ લુહાર ગામ – ટુન્ડા, તાલુકો- મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, અદાણીમાં ટુંડા ગામના કેટલા કર્મચારીઓ છે ? મને પણ રોજગારી આપવમાં આવેલ પરંતુ, કોઈપણ કારણ વગર નોકરી માંથી છુટો કરી દેવામાં આવેલ.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, અદાણી કંપનીમાં ટુંડા ગામના અંદાજીત ૧૦૦ થી વધારે વ્યક્તિઓ કામ કરે છે. તમોને ૨૦૧૨માં ગ્રામ પંચાયતની રજુઆતથી કુલ ૩૫ લોકોને નોકરી આપવામાં આવેલ. ગામના રેહવાસી હોવાના નાતે તમોને અન્ય કરતા વધારે પગાર વધારો પણ આપવામાં આવેલ. આજની તારીખે પણ તમોને નોકરી માંથી કાઢવામાં આવેલ નથી.
૫૮	શ્રી ગુલાબસિંહ બબુભા જાડેજા ગામ - મોટા કાંડાગરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપની આવે એમા અમોને કોઇ વાંધો નથી. કંપની આવી છે તેમા અમારો વિકાસ થયો છે.	--
૫૯	શ્રી વીરમ	તેઓએ રજુઆત કરતા જણાવેલ કે,	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
	નારાણ શાંખરા ભારતીય કિશાન સંઘ વતી, ગામ – ઝરપરા, તાલુકો – મુંદરા	• લોકસુનવણીમાં ઘણા વિરોધ પણ થાય છે આગળ પયાર્વરણના ટેકનીકલ મુદા પર વાત થઇ ગયેલ છે. અને જો પર્યાવરણને કોઇ નુકશાન થતુ હોય તો તે અંગે સરકારી તંત્ર ગંભીરતા દાખવે. માત્ર કાગળો ઉપર કામ ન થાય. • સ્થાનિક લોકોને રોજગારી મળતી નથી તેને ધ્યાને લેવાય • જો એનજીટી ધ્વારા શ્રી શ્રી રવીશંકરને નોટીશ આપવામાં આવતી હોય તો પર્યાવરણથી ઉપર કોઈ નથી • ભુતકાળમાં પણ સોલાર પ્લાન્ટ આવ્યા પહેલા જેટલી માત્રામાં લોકોને રોજગારી અંગેની બાંહેધરી આપવામાં આવી છે તેનું પાલન થયેલ નથી • પાણીના નવા સ્ત્રોતો ઉભા કરવા માટે કંપનીએ કાર્ય કરવા જોઇએ • ખેતીને ઇગ્નોર કરીનેઉદ્યોગ કેટલા દીવસ ચલાવી શકશો. ખેતીનો પણ વિકાસ કરવો જોઇએ • તેમજ શિક્ષણ ક્ષેત્રે સુધારો આવશ્યક છે. વધુમાં અહીનું ખારેક પર થતી અસર બાબતે ટીસ્યુ કલચર અંગેની લેબોરેટરી અદાણી કંપની ધ્વારા મુંદરામાં બનાવવામાં આવે જેથી ખેડૂતની સમસ્યા પર પુરતુ ધ્યાન આપી શકાય.	કે, અમારા તરફથી દરેક કામ પારદર્શક રીતે થાય તે બાબતે ધ્યાન આપવામાં આવશે દરેક ગામ માંથી ઓછામાં ઓછા દસ દસ લોકોને રોજગારી મળે તેવો પ્રયત્ન કરવામાં આવશે. ખેતીના વિકાસ માટે ટીસ્યુકલ્ચર લેબોરેટરીનું સુચન આવકાર્ય છે અને એ દિશામાં કંપની સ્તરે જરૂરથી પ્રક્રિયા હાથ ધરવામાં આવશે અમે ખેડુતસમિતી સાથે બેઠક કરી તેમની જરૂરીયાતો સમજવા તૈયાર છીએ અને જરૂરીયાતના મુદ્દાઓ પર કામ કરવામાં આવશે અને તમારી સાથે ૫ વર્ષ નો પ્લાન બનાવવામાં આવશે રોજગારી માટે ઈમ્પ્લોયી એક્ષચેન્જ થી રોજગારી મળે તેવી તકો ઉભી કરવામા આવશે કંપની ધ્વારા લોકોની નારાજગી દુર કરવામાં આવશે. ખારેક માટે ડ્રીપ ઇરીગેશન પધ્ધતિ પુરી પાડવા માટેના પયત્નો કરવામાં આવશે. સીએસઆર પ્રવૃતિ માટે અલગથી આ પ્રોજેકટ માટે વર્ષેઆઠ કરોડ રૂપિયાની જોગવાઈ કરવામાં આવેલ છે.
૬૦	શ્રી ડાયાભાઇ	તેઓએ રજુઆત કરતા જણાવેલ કે,	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે,

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
	વીરમ ગઢવી ગામ- મોટા કાંડાગરા, તાલુકો-મુંદરા	• ઈઆઈએ રીપોર્ટ ના પાના નંબર – ૮ માં જણાવ્યા મુજબ સલ્ફર ડાયોકસાઇડ ની પર્યાવરણ ઉપર નજીવી અસર થશે સલ્ફરડાયોકસાઈડ થી વાયુમાં નજીવી અસર કેવી રીતે થાય છે એવું કઈ રીતે કહી શકાય ? • તમારાધ્વારાઅદાણીપાવરમાંઈએસ પીકેમરાત્રેચલાવવમાંનથીઆવતું ?	• પર્યાવરણના નિયમોમાં સલ્ફર ડાયોકસાઈડ માટે નિશ્ચિત પ્રમાણ નકકી કરવામાં આવેલ છે. જેથી પર્યાવરણને કોઇપણ પ્રકારની નુકશાન કારક અસરો ન પહોંચે. કોપર પ્લાન્ટ લાગ્યા પછી સલ્ફર ડાયોકસાઈડના ઉત્સર્જન નિયત માપદંડની મર્યાદામાં જ રહેશે. • અદાણી પાવરમાં જયારે પ્લાન્ટ ચાલુ હોય ત્યારે ઈએસપી હંમેશા ચાલુ જ રહે છે.
૬૧	શ્રી રણજીતસિંહ જાડેજા પ્રમુખ, તાલુકા પંચાયત, મુંદરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપનીઓ આવે તો રોજગારી પ્રાપ્ત થશે અને સમગ્ર વિસ્તારના લોકો, તાલુકો, રાજય અને દેશનો વિકાસ થશે એવી રાજકીય અગ્રણી તરીકે રજુઆત કરૂ છું.	--
૬૨	શ્રીમતી દેવલબેન ગઢવી ગામ – શેખડીયા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, આ પ્રોજેકટ આવવાથી સ્ત્રીઓને તેમજ સ્થાનિક વ્યકિતઓનું રોજગારીનું ધ્યાન રાખવા તેમજ સ્થાનિક બહેનોને કામ મળી રહે તે ધ્યાન રાખવામાં આવે તેવી રજુઆત કરવામાં આવેલ છે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, બહેનોને રોજગારી માટે આ પ્રોજેકટમાં ૧૨૦ મહિલાઓને રોજગારી મળે તેવી વ્યવસ્થા કરવામાં આવેલ છે. વધુમાં, અમો વેલસ્પન કંપની સાથે એમઓયુ કરવાના છીએ જેથી બહેનોને યોગ્ય તાલીમ અને રોજગારી મળે તેથી તેમની સ્થિતિ સુધરી શકે.
૬૩	શ્રી ઇબ્રાહીમ તુર્ક ગામ – ઘ્રબ, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, આ પ્રોજેકટને તમે ગ્રીન ફીલ્ડ પ્રોજેકટ બતાવો છો પરંતુ આ પ્રોજેકટમાં ૧૦૩ હેકટર વન વિભાગની જમીનમાં આવે છે જેથી	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, કોઈપણ નવા પ્રોજેકટને ગ્રીન ફીલ્ડ પ્રોજેકટ કહેવામાં આવે છે આ વિસ્તારમાં કોપરને લગતો કોઈ પ્રોજેકટ ન હોઈ આ પ્રોજકટને

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		ગ્રીન ફીલ્ડ પ્રોજેકટ કઈ રીતે કહી શકાય ?	ગ્રીન ફીલ્ડ પ્રોજેકટ ગણવામાં આવે છે. ગ્રીન ફીલ્ડ શબ્દ વનસ્પતિ સાથે કોઈ સંબંધ નથી. જે માત્ર અંગ્રેજી શબ્દ છે.
૬૪	શ્રી હીરાભાઇ પાતારીયા સરપંચ, દેશલપર(કંઠી) ગ્રામ પંચાયત, ગામ - દેશલપર(કંઠી), તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, આ પ્રોજેકટ અમારા ગામથી માત્ર ૫ કીમીના અંતરે આવેલ છે. જેથી નવીનાળ અને શીરાચાને અગ્રતા આપવામાં આવે છે તેની સાથે અમારા ગામને પણ પ્રથમ અગ્રતા આપવામાં આવે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, અગાઉ થયેલ ચર્ચા મુજબ દરેક ગામ માંથી દસેક વ્યકિતઓને રોજગારી આપવાનો પ્રયત્ન કરવામાં આવશે
૬૫	શ્રી ઈબ્રાહીમ તુર્ક ગામ - ધ્રબ, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • આ પ્રોજેકટ માટે આપ દરિયાનું પાણી લેવાના છો તો તે અંગે દરિયાઈ પ્રજાતિ પર એની શુ અસર પડશે? તેનો કોઈ અભ્યાસ કરેલ છે? • પાણીની ખારાશ વધવાને લીધે ખેતી પર શું અસર પડશે ? • મેન્ગ્રુવના કપાવવાથી ટુન્ડા, કાંડાગરા અને આજુબાજુના વિસ્તારોમાં ખારાશ વધી છે અને ખેતીને નુકશાન થયેલ છે.	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • ઈન્ટેક અને આઉટ ફોલ ચેનલ માટે એનઆઈઓ સંસ્થા મારફતે અભ્યાસ કરવામાં આવેલ છે અને પર્યાવરણ મંત્રાલયની મંજુરીથી તેના ધારાધોરણો મુજબ ખાસ કરીને આઉટ ફોલ ચેનલ ૧૧ કીમી લાંબી દૂર વેસ્ટપોર્ટના બેસીનમાં ડાઇલ્યુટ થઈને દરિયામાં મળશે. તેની સાથે પાણીના તાપમાન કરતાં ૫ ડીગ્રીથી વધારે ના હોવું જોઈએ તથા ક્ષાર ૫૭ પીપીટી થી વધારે ના હોવું જોઈએ. તેની તકેદારી રાખવામાં આવે છે. • ભુર્ગભ જળમાં પાણીની ખારાશ વધવા બાબતે અમોએ ગાઈડ સંસ્થા મારફતે એક અભ્યાસ હાથ ધરેલ હતો જે મુજબ સેલીનીટી વધતી જણાતી નહોતી. માત્ર

ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
			વિકાસ થતા વિસ્તારમાં નહી પરંતુ સમગ્ર કચ્છ વિસ્તારમાં ભુગર્ભ જળની ખારાશ વધી રહી છે. તેની પાછળનું મુખ્ય કારણ આ વિસ્તારમાં વરસાદના અભાવે વધારે ભુગર્ભજળનું ખેંચાણ જણાવવામાં આવ્યું છે. • આ ક્ષેત્રના ઉદ્યોગો ભુગર્ભજળ પર આધારિત નથી.
૬૬	શ્રી નટુભા જાડેજા ગામ - શીરાચા તાલુકો- મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,અદાણી પાવર કંપની આવી છે તો મારા ગામના ૧૦૦ લોકોને રોજગાર મળેલ છે. જેથી મારા ગામમાં રોજગારી આવી છે. જેથી આ પ્લાન્ટ આવવો જોઇએ જેથી રોજગારી વધે અને આમરા ગામના બાકી રહેતા બેરોજગાર લોકોનો પ્રશ્ન હલ થઇ જાય એવી અમારી રજૂઆત છે.	--
૬૭	શ્રી ભરત કલ્યાણ સેડા ગામ – ઝરપરા, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • આ પ્લાન્ટમાં ઉપયોગ થનાર પાણી દરિયામાંથી લેશો એ પાઇપલાઈન થી લેશો કે કેનાલ ખોદીને લેવાના છો ? જો કેનાલ ખોદીને લેવાના હશો તો ખેડુતોને નુકશાન થશે? • અદાણી કંપની વાળા ટ્રકો માટે એન્ટ્રીગેટ પર ૨૦૦ રૂપિયાની માંગણી કરવામાં આવેલ છે.	પ્રોજેક્ટ પ્રોપોનન્ટના પ્રતિનિધીશ્રીએ જવાબમાં જણાવેલ કે, • આ પોજેક્ટમાં ઉપયોગ થનાર પાણી હાલની ઈન્ટેક ચેનલમાંથી મેળવવામાં આવશે. ત્યારપછી, એપીએસઈઝેડમાંથી ડીસેલિનેટેડ પાણી સૂચિત પાઈપલાઈન મારફતે તબદીલ કરવામાં આવશે. • જેટલા કોન્ટ્રાકટર કંપનીના અથવા એપીએસઈઝેડ ના એરીયામાં કામ કરે છે તેઓના ટ્રકોનો ઝીરો એમાઉન્ટના ગેટ પાસ બનેલા છે

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			કોઇ ચાર્જ વસુલ કરવામાં આવતો નથી.
૬૮	શ્રી વાલજી સુમાર ગઢવી ગામ - ઝરપરા તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, હું અદાણી કંપની સાથે ૧૫ વર્ષ થી કામ કરૂ છું મારી ૫૦ ટ્રકો આ કંપનીમાં કામ કરે છે મારી પાસેથી ટ્રકો માટે ૨૦૦ રૂપિયાની માંગણી કરવામાં આવેલ નથી.	--
૬૯	શ્રી કીર્તીભાઇ ગોર ગામ - ટુંડા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, અગાઉ આવેલ સોલાર પ્રોજેકટમાં આવી કોઇ લોકસુનાવણી થયેલ નથી. આ પ્રોજેકટમાં કેટલાક છોકરાઓને રોજગારી મળી, મે જે બાયોડેટા સબમિટ કર્યા હતા એમાંથી ૫૦ % લોકોને રોજગારી મળી. જે લોકો બી.ઈ. થયેલ છે તેઓને નોકરી મળવી જોઇએ. એપ્રેન્ટીસ પુરૂ કર્યા પછી તેમના માટે કંપની શુ કરવા માંગે છે. આવા પ્રોજેકટો આવકારીએ છીએ, વિકાસ ૧૦૦ ટકા થવો જ જોઈએ પરંતુ પર્યાવરણના ભોગે નહી. મે જીપીસીબીના અધિકારીઓને પત્ર લખ્યા હતા કે આ વિસ્તારમાં બાકીના દિવસે ચીમનીમાથી ધુમાડો ખુબ જોવા મળે છે. આજ ના દિવસ જેવા ધુમાડો નિકળે તો ચાલે. ધુમાડા બાબતે જીપીસીબી ને લેટર લખેલ છે. જેના રિસીવડ થયેલા જવાબ પણ મળ્યા છે. પર્યાવરણના કારણે કોઇને નુકશાન ન થાય તેવો વિકાસ કરવો જરૂરી છે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, આ પ્રોજેકટમાં પર્યાવરણના પ્રોટેકશન માટે અદ્યતન ટેકનોલોજીના સાધનો લગાવવામાં આવશે અને ચલાવવામાં આવશે. તે પાણી અને હવા બન્ને માટે ટ્રીટમેન્ટ પ્લાન્ટ લગાવવામાં આવશે અને સમગ્ર પ્રકિયા સરકારશ્રીએ નકકી કરેલ ધારા ધોરણો મુજબ હશે. જેનાથી પર્યાવરણને નુકશાન થશે નહી.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
૭૦	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ- મોટા કાંડાગરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, સંપુર્ણ કેમીકલ આધારીત પ્રોજેકટ છે જે કેમીકલ પાણી, હવા, ધોધાંટ, જમીન વિગેરેમાં ફેલાશે અને ખેતી લાયક જમીનોને નુકશાન કરશે. મને એવું લાગે છે કે આવા પ્રોજેકટ ૨૦ થી ૨૫ કીમી સુધીના રહેણાંક વિસ્તારથી દુર હોવા જોઈએ. આવા પ્રોજેકટ સામે પ્રોટેકશન માટે શુ વ્યવસ્થા છે ?	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, આ પ્રોજેકટમાં કોપર કોન્સન્ટ્રેટ માંથી કોપર બનાવવાની પ્રક્રિયા માટે સંપુર્ણ પણે ઇલેકટ્રોકેમીકલ પ્રોસેસ કરવામાં આવે છે. આ પ્રોજેકટ માંથી દુષિત પાણી નિકળશે તે પાણીને ઇટીપી માં પ્રક્રિયા કરી તે પછી આરઓ પ્લાન્ટમાં મોકલવામાં આવશે. જેથી કોઇ પણ પ્રકારનું દુષિત પાણી બહાર છોડવામાં આવશે નહિ. ત્યારબાદ તે પાણીનો ફરીથી આ પ્રોજેકટમાં ઉપયોગ કરવામાં આવશે. ત્યાર બાદ બાકી બચતા રીજેક્ટ માટે પણ મલ્ટી ઇફેકટ ઇવોપરેશન થી પાણી દુર કરવામાં આવશે. આ પ્રક્રિયામાં બનતા વાયુઓની રાસાયણીક પ્રક્રિયા કરી ઇન્ટરમીડીયટ પ્રોડકટ બનાવવામાં આવશે અને આ પ્રક્રિયાનું સંપૂર્ણ રીસ્ક એનાલીસીસ અને હેઝાર્ડ આઇડેન્ટીફિકેશન કરી કોઇપણ પ્રકારનું સ્ટોરેજ લીકેઝ ન થાય તેની તકેદારી રાખવામાં આવશે. આમ, હવા અને પાણીના પ્રદુષણની શકયતા પણ નહીવત છે.
૭૧	શ્રી લખધીરભાઇ ગીલવા ગામ - ઝરપરા,	• તેઓએ રજુઆત કરતા જણાવેલ કે, આગાઉ આવેલ પ્રોજેકટો થી બાગાયત ખેતી જેવી કે, ચીકુ અને ખારેકની ખેતીને મોટુ નુકશાન થયેલ	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, અદાણી પોર્ટ તથા અદાણી પાવર કયાંય પણ ભુ-જળનો ઉપયોગ કરતું નથી, અને નવા

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
	તાલુકો - મુંદરા	છે. કંપની આવવાથી પાણી પાતાળ ઉંડા થઇ ગયેલ છે ચીકુ અને ખારેકમાં માલ આવેલ નથી ખેડૂતોને આ પ્લાન્ટનો સખત વિરોધ છે.	આવનાર પ્રોજેકટ પણ ભુ-જળનો ઉપયોગ કરશે નહી. આ બન્ને પ્રોજેકટમાં દરિયાના પાણીનો ઉપયોગ કરવામાં આવે છે.
૭૨	શ્રી ખેંગાર ગીલવા ગામ - ઝરપરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ઉદ્યોગો આવવાના કારણે ભદ્રેશ્વર થી ટુંડા વાંઢ સુધી જાડીઓ કપાઇ ગઇ છે. જેથી જંગલી જાનવરો જેવા કે, સુવર અને નીલગાય વિગેરે સ્થાંળતર કરી અમારા ખેતરોમાં આવી ગયેલ છે. જેથી ખેડુતોના ખેતીના પાક સામે રક્ષણ મેળવવા કાંઇક કરજો.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, અગાઉ પણ ખેડુતોને ડ્રીપ ઈરીગેશન માટે છેલ્લા ત્રણ વર્ષથી ઘણા ગામોમાં સહાય કરવામાં આવેલ છે અને હજુ પણ આસપાસના ગામોમાં જયાં પણ જરૂર હશે ત્યાં ડ્રીપ ઈરીગેશનમાં સહાય કરવા વિશેષ ધ્યાન આપવામાં આવશે.
૭૩	કુ. શીતલ રાજગોર ગામ - મોટા કાંડાગરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપની આવવાથી અમને કોઇ વાંધો નથી. અમારા જેવી બહેનોને રોજગારી મળે છે. અમો કંપનીની તરફેણમાં છીએ.	--
૭૪	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ- મોટા કાંડાગરા, તાલુકો-મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • સલ્ફર ડાયોકસાઈડની માત્રા કેટલી હશે અને કેટલી ઉંચાઈએથી છોડવામાં આવશે? • સ્લજનો નિકાલ કેવી રીતે કરશો?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • કોપર સ્મેલ્ટરમાંથી સલ્ફર ડાયોકસાઈડ જે સીધી સલ્યુરીક એસીડ પ્લાન્ટમાં જશે. જે પ્લાન્ટમાં એસીડ બનશે. એસીડ બન્યા પછી ટેલગેસ સ્કબરમાં સ્કબ કરવામાં આવશે તેના પછી ગેસને હવામાં છોડવામાં આવશે. જેમાં મુખ્યત્વે ઓકસીજન અને નાઈટ્રોજન રહેશે. જેમાં સલ્ફર ડાયોકસાઈડની માત્રા રહેશે તે ભારત સરકારની માનક થી નીચે રહેશે. • ગેસની સ્કબર પ્રક્રિયા દ્વારા

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
			લાઇમનો ઉપયોગ કરીને જીપ્સમ બનાવવામાં આવશે જેનો ઉપયોગ સિમેન્ટ ઈન્ડસ્ટ્રીઝમાં કરવામાં આવશે. હવામાં જે વાયુઓ છોડવામાં આવશે જે ૧૦૦ મીટરની ઉંચાઈએથી છોડવામાં આવશે.
		• તેમજ કેટલા પ્રમાણમાં સલ્ફર ડાયોકસાઇડ હવામાં છોડાશે ?સલ્ફર ડાયોકસાઇડની ડેન્સીટી શુ હશે ?	• જે સીપીસીબી દ્વારા સલ્ફર ડાયોકસાઇડ ની માનક ૧ કિગ્રા સલ્ફર ડાયોકસાઈડ પ્રતિ ટન સલ્ફયુરીક એસીડ રહેશે. જે ગેસ હવામાં છોડવામાં આવશે તેની ડેન્સીટી હવા જેટલી જ હશે. અને તેમાં સલ્ફર ડાયોકસાઈડની માત્રા ખૂબ જ ઓછી લગભગ ૧૫૦ થી ૨૦૦ પીપીએમ જેટલી હશે. અમે જે પ્લાન્ટ લગાવીશુ એ દુનિયાનો સૌથી સારી ગુણવત્તાવાળો પ્લાન્ટ હશે.
૭૫	શ્રી આશારીયા લાખા ગીલવા, ગામ - ઝરપરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, દર વર્ષે સરેરાશ તાપમાન વધતુ જાય છે. આ કોપર પ્લાન્ટમાં 300 મેગાવોટ પાવર વપરાશે જેની ભઠીની વરાળ માંથી ૪૦ મેઘાવોટ વિજળી ઉત્પન્ન થશે આ પ્રોજેકટથી તાપમાનમાં વધારો થશે કે કેમ?	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, આ પ્રોજેકટ આવવાથી તાપમાનમાં કોઇ વધારો થશે નહી. ગરમ વરાળ હવામાં છોડવા કરતાં તેનો ઉપયોગ વીજળી બનાવવામાં આવે જે વધારે યોગ્ય છે. બળતણનો વ્યય થતો અટકાવી શકાય છે. નિયત ધારા ધોરણો મુજબ વરાળનો ઉપયોગ કરી વિજળી બનાવવામાં આવશે. જેથી પ્લાન્ટની બહાર તાપમાનનો વધારો થશે નહિ.
૭૬	શ્રી નારાણ	• તેઓએ રજુઆત કરતા જણાવેલ કે,	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કેઃ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
	ગઢવી, ગામ - ઝરપરા, તાલુકો - મુંદરા	પ્રદુષણ અસર બધા ઉપર સરખી થાય છે તે બાબતની રજુઆત હોવાથી વિરોધ કરવામાં આવે છે. એનાથી જે પર્યાવરણને, ભુગર્ભ જળ, હ્યુમન હેલ્થને, મેંગ્રુવ, માછીમારો પર, પશુપાલકો પર, ખારેક ઉપર, બાળકો ઉપર જે અસરો થઈ રહી છે એની વાત કરીએ છીએ. અમારો વિરોધ વિકાસ સાથે નથી, પરંતુ પર્યાવરણનો ખ્યાલ રાખીને વિકાસ કરશો તો તમને આવકારીશુ. અમારો વિરોધ છે તો માત્ર પ્રદુષણ અને આડેધડ નંખાતી વીજ લાઇનો સામે છે. સીઆરઝેડના નિયમોનું ઉલ્લંઘન થાય છે. પાણી ખારા થાય છે અને તેના ટીડીએસ ૪૫૦૦ થી વધારે થઇ ગયેલ છે.	• તમારી વાતોને પુરતું ધ્યાન આપવામાં આવશે એનજીઓ તરીકે ખૂબ સારી વાતો કરી છે અને અમો તે રીતે સુધારો કરેલ છે. એક જાગૃત નાગરિક તરીકે વાત કરવી જ જોઈએ. • અમારા તરફથી જે કાંઈ વિકાસ કરવામાં આવશે તે નિયત માપદંડોને ધ્યાને રાખીને જ કરવામાં આવશે તેની ખાત્રી આપીએ છીએ અહી દર્શાવેલ માપદંડોને ધ્યાને રાખીને જ નવા પ્લાન્ટનો વિકાસ કરવામાં આવશે.
૭૭	શ્રી પરેશ રાજગોર ગામ- ટુંડા, તાલુકો –મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ગુજરાત સરકાર અને કેન્દ્ર સરકારના નિયમો મુજબ પર્યાવરણને ધ્યાનમાં રાખી અને લોકહિત ધ્યાનમાં રાખી કંપની આવે એવી અમને આશા છે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, લોકહિત તેમજ પર્યાવરણની જાળવણી એ કંપનીની જવાબદારી છે અને કંપની પોતાની જવાબદારી નિભાવીને લોકહિતની જાળવણી સાથે પર્યાવણરને ધ્યાને લઇ પ્લાન્ટનો વિકાસ કરવામાં આવશે.
૭૮	શ્રી પ્રવિણસિંહ ભુરૂભા ચૌહાણ, ગામ - શીરાચા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ટાટા પાવર પ્લાન્ટ એ ગૌચર જમીન લીધી અને લીલો ઘાસચારો કે સુકો આપે છે જેની માટે લેખિત કરાર કરી આપેલ છે. તો આપના તરફથી ઘાસચારા માટે કોઇ લેખિત કરાર કેમ	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • આપના કીસ્સામાં હાઇકોર્ટ દ્વારા નિયત સમય માટે ઘાસચારો પુરો પાડવા હુકમ કરવામાં આવેલ છે જેની મુદ્દત હજુ ચાલુ છે. આમ, હાઇકોર્ટનો હુકમ હોઇ કોઈ લખાણ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		કરી આપવામાં આવતો નથી ?	કે કરાર કરવાની આવશ્યકતા રહેતી નથી. • ગુજરાત હાઈકોર્ટના હુકમથી જરૂરીયાત વાળા ગામોને તંગીના સમયમાં લીલો તેમજ સુકો ચારો અમારા તરફથી આપવામાં આવે છે જે ગામના લોકો કોર્ટમાં નથી ગયેલ તેવા ગામોમાં પણ અમો સ્વેચ્છાએ ઘાસચારો પુરો પાડીએ જ છીએ
૭૯	શ્રી વીરમ નારાણ સાંખરા (કિશાન સંઘ સભ્ય) ગામ - ઝરપરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ઘાસચારા પુરતી વાત નથી તમારા સકારાત્મક વાતાવારણ કાયમ જાળવા રાખવા વિનંતી. જેથી આવા લોકસુનાવણીની જરૂર પણ આવતા વર્ષોમાં નહી રહે.	--
૮૦	શ્રી વિશ્રામ ગઢવી ગામ - ઝરપરા તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે,મને મારા અસ્તિત્વની ચીંતા છે મારા ગામના અસ્તીત્વ, ખેતી ના અસ્તીત્વ માટે વિરોધ કરવા આવેલ છું. આપ નિષ્પક્ષ રીતે આપની ભુમીકા ભજવો તેવી અપેક્ષા છે.	--
૮૧	શ્રી નારાણ ગઢવી ગામ - ઝરપરા તાલુકો - મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • કોપર પ્લાન્ટના પ્રોડકશન બાબતે ત્રણ રીપોર્ટ મળેલ છે. જેમાં ૧) રીઝનલ ઈન્સ્ટીટયુટ ઓફ ટેકનોલોજી -જમશેદપુર, ૨) એનજીં લેબોરેટરી એન્ડ ડીપાર્ટમેન્ટ ઓફ બાયોલોજી સાયન્સ કેમ્બ્રીજ યુનિવર્સીટી - લંડન અને ૩) પબ્લીક હેલ્થ રીપોર્ટ. જેમાં	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • આપના જે રીપોર્ટ રજુ કરવામાં આવેલ છે તે ખૂબ જ જુના સમયના પ્લાન્ટના છે. આજ ની અદ્યતન ટેકનોલોજી સાથેના પ્લાન્ટ વિકસીત દેશોમાં પણ છે પ્લાન્ટમાં નિકળતી ડસ્ટ એકઠી કરી તેનો ફરનેશમાં ઉપયોગ કરવામાં આવે

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		આ કોપરના ઉત્પાદનના કારણે થતી ગંભીર અસરો વિશે જણાવેલ છે જે મુજબ કોપરની ડસ્ટથી કયા પ્રકારના રોગ થાય છે તે જણાવો. • રીપોર્ટમાં જણાવ્યા મુજબ ડસ્ટથી વાળ ખરી જવાનું, પેટના દર્દ, કેન્સર તથા શ્વાસની બિમારી વિગેરે જેવા રોગો થાય છે. એ ડસ્ટને તમે કેવી રીતે કન્ટ્રોલ કરશો? તમારી કેટલી ટીમ હશે?ડોકટરોની કેટલી વ્યવસ્થા કરવામાં આવશે? • બીજો પ્રશ્ન એ છે કે જે વાયુઓ હવામાં છોડવામાં આવશે એ તમે કેવી રીતે કન્ટ્રોલ કરશો? અને એના માટે તમારે શું વ્યવસ્થા કરવામાં આવી છે? • હવામાં છોડાતા સલ્ફર ડાયોકસાઇડ જેવા વાયુઓ સ્વાસ્થયને નુકશાન કરતા બનશે તે માટે કંપની શું પગલા લેશે ?	છે તેમજ રોડ પરની ડસ્ટ પણ વેકયુમ ટ્રકો દ્વારા એકઠી કરી લેવામાં આવે છે. જયાં જયાં કામદારોને ડસ્ટ એરીયામાં કામ કરવાનું થાય ત્યારે ડસ્ટ સામેના વ્યકિતગત સુરક્ષાના સાધનો (પીપીઈ) નો ઉપયોગ કરી કામ લેવામાં આવશે. • કોપર કોન્સનટ્રેટ મટીરીયલ્સ ૮ થી ૧૦ ટકા ભેજવાળું હોવાથી તેમાથી ડસ્ટ ઉડવાની સંભાવના નહિવત છે તેમ છતાં આ ડસ્ટ શ્વાસોશ્વાસમાં જાય તો આ મટીરીયલ ઇનર્ટ પ્રકારનું હોવાથી કોઈ વિશેષ અસર કરતું નથી. સામાન્ય ડસ્ટની જેમ થતા રોગો જેવી જ અસર કરે છે. • સલ્ફર ડાયોકસાઈટનો ઇન્ટરમીડીયટ પ્રોડકટ તરીકે ઉપયોગ કરી તેની રાસાયણીક પ્રકિયા કરી સલ્ફયુરીક એસીડ બનાવવામાં આવશે જેથી ઝેરી વાયુઓને વાતાવરણમાં જવાનો પ્રશ્ન રહેતો નથી. • આ પ્રકિયામાં બનતા વાયુઓની રાસાયણીક પ્રકિયા કરી ઇન્ટરમીડીયટ પ્રોડકટ બનાવવામાં આવશે અને આ પ્રકિયાનું સંપૂર્ણ રીસ્ક એનાલીસીસ અને હેઝાર્ડ આઇડેન્ટીફિકેશન કરી કોઇપણ પ્રકારનું લીકેઝ ન થાય તેની તકેદારી રાખવામાં આવશે. આમ,

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			હવાના પ્રદુષણની શકયતા પણ નહીવત છે. • સલ્ફયુરીક એસીડ બન્યા પછી ટેલગેસ સ્કબરમાં સ્કબ કરવામાં આવશે તેના પછી ગેસને હવામાં છોડવામાં આવશે. ગેસની સ્કબર પ્રક્રિયા ધ્વારા લાઇમનો ઉપયોગ કરીને જીપ્સમ બનાવવામાં આવશે જેનો ઉપયોગ સિમેન્ટ ઈન્ડસ્ટ્રીઝમાં કરવામાં આવશે.
૮૨	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ- મોટા કાંડાગરા, તાલુકો-મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, કંપનીનું રો-મટરીયલ સ્ટોરેજ કેવા પ્રકારનું રહેશે તેમજ મટીરીયલ્સ કઇ રીતે આવશે. સમય મર્યાદા અમને પણ નડે છે અમારી રજુઆતોનો તટસ્થ પણે નિર્ણય લેવા વિનંતી. આનો મતલબ એ નથી કે અમે તમને પરમીશન આપીએ છીએ . અમો કોર્ટ સુધી પણ જઇશું. આ પ્રોજેકટ નહી આવવા દઇએ, નહીં આવવા દઇએ અને નહીં આવવા દઇએ.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, કંપનીનું કોપર કોન્સન્ટ્રેટ સ્ટોરેજ સંપુર્ણરીતે કર્વડ શેડ રહેશે. મટીરીયલ લાવવા માટે પાઇપ કન્વેયરનો ઉપયોગ પોર્ટથી પ્લાન્ટ સુધી કરવામાં આવશે.
૮૩	શ્રી વાલજીભાઇ ટાપરીયા ગામ - ઝરપરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ઉદ્યોગો આવે તે બધા અંદરથી ઇચ્છે છે. ઉદ્યોગો સાથે કોઇ વાંધાઓ હોય તેને સુધારા કરવા જોઈએ પર્યાવરણનું જતન સાથે ઉદ્યોગો આવે તે આવકાર્ય છે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, અહી રજુ થયેલ તમામ મુદ્દાઓ પર ધ્યાન આપવામાં આવશે. કંપની તરફથી જન સાધારણની ચિંતા અમો પણ કરીશું ડેવલોપર તરીકે જન સાધારણની જવાબદારી ૧૦૦ % છે. તે સમજપુર્વક નિભાવીશું
૮૪	શ્રી મયુર આતુ	તેઓએ રજુઆત કરતા જણાવેલ કે,	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
	મહેશ્વરી ગામ - ટુંડા તાલુકો - મુંદરા	• જે ઉદ્યોગો આવ્યા છે તેમા સ્થાનિક લોકોને કામ / રોજગારી કેટલાને મળેલ છે? તેમજ સ્થાનિક લોકોને શા માટે નોકરી માંથી કાઢી નાખવામાં આવે છે? તેમજ સ્થાનિક લોકોને કામ / રોજગારી મળે તે માટે સમિતી રચવી જોઇએ અને સ્થાનિક લોકો રોજગારી માટેનું લીસ્ટ બનાવી સમિતી તથા કંપનીના અધિકારીશ્રીઓ સાથે ખુલ્લી ચર્ચા / મીટીંગ થવી જોઇએ બંધ બારણે ના થવી જોઇએ. સરકારશ્રીના નિયમો પ્રમાણે ૮૫ ટકા રોજગારી સ્થાનિક લોકોને મળવી જોઇએ. • જે ઉદ્યોગો આવ્યા છે તેમા સ્થાનિક લોકોને કામ / રોજગારી કેટલાને મળેલ છે? તેનું લીસ્ટ આપશો	કે, સ્થાનિક લોકો કંપનીમાં કામ કરે છે તેનું લીસ્ટ બે દિવસમાં મળી જશે. સ્થાનિક લોકોને કામ પર રાખવાની પ્રક્રિયા અમે લોકો સરપંચ અને ગ્રામ પંચાયતોના માર્ગદર્શન હેઠળ કરતા હોઈએ છીએ તેમ છતાં આ પ્રક્રિયા હજુ વધારે પારદર્શકતાથી કરવામાં આવશે. નોકરીમાંથી છુટા કરવાનું મુખ્ય કારણ એ છે કે કામદારો અનિયમીત હોય છે.
૮૫	શ્રી મીઠુ જખુ મહેશ્વરી ગામ - મોટા કાંડાગરા, તાલુકો -. મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • ખેતી માટે પાણી અને પર્યાવરણની જાળવણી કરવી જોઇએ તથા દરીયાના પાણી લઇ આવવાથી ખેતીને નુકશાન છે, ખારેકો થતી નથી, ૩ કિ.મી. ની ત્રિજયામાં પાણી પીવાલાયક રહ્યું નથી. જેથી નુકશાની માટે કંપની વિચાર કરે તે જરૂરી છે, • કાંડાગરાની અંદર ગૌશાળા માટે ૩ ગોડાઉનની કામગીરી અટકાવામાં આવી છે, જે ગોડાઉનની બનાવવાની કામગીરી ચાલુ કરવામાં આવે તેવી રજુઆત કરેલ છે. • નિષ્પક્ષ કામગીરી કરવાની રજુઆત	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, તમારી વાત ધ્યાને લઈ કોઈના પણ દબાણમાં આવ્યા વગર કામગીરી કરવામાં આવશે અને અધુરા રહી ગયેલા કામો પુરા કરવાનો પ્રયત્નો કરીશું.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		કરવામાં આવેલ છે.	
૮૬	શ્રી સલુ કુંભાર ગામ - ટુંડા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, માછીમારોનો દરીયાઇ ત્રણ રસ્તાઓ બંધ કરેલ છે, અમોને પાંચ કીમી ફરીને જવું પડે છે, અમારી પાસે વાહનો નથી, જેથી અમો માછીમારોના ત્રણ રસ્તાઓ ખુલ્લો કરવાની માંગણી કરવામાં આવેલ છે.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, માછીમારો માટે અમારા તરફથી પુરેપુરો સહકાર રહેશે માછીમાર ભાઈઓને તેમના આવવા-જવાના રસ્તામાં કોઈપણ પ્રકારની અડચણ કરવામા ના આવે તેની તકેદારી રાખવામાં આવશે, તેમ છતાં આવી કોઈ અડચણ ઉભી થાય તો અમોને ગમે ત્યારે જાણ કરી શકો છો.
૮૭	શ્રી કીર્તીભાઇ ગોર ગામ - ટુંડા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, આવનારા પ્લાન્ટમાં કયા પાણીનો ઉપયોગ કરવામાં આવશે?	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, આવનારા પ્લાન્ટમાં દરિયાઈ પાણીનો ક્ષાર રહીત (ડીસેલીનેશન) કરીને ઉપયોગમાં લેવામાં આવશે
૮૮	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ - મોટા કાંડાગરા, તાલુકો - મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • ગુજરાત સરકાર/ભારત સરકારના પરિપત્ર મુજબ સ્થાયી લોકોને ૮૫% રોજગારી મળવા બાબતે અત્રેના સ્થાનિક કેટલા લોકોને રોજગારી આપવામાં આવેલ છે ? • જે અનસ્કીલ્ડ લોકોને ડેવલોપ કરી એને યોગ્ય તક આપવા માટે શું પગલા ભર્યા?	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, આમારા તરફથી સ્થાનિક લોકોને રોજગારી આપવાની પુરી કોશીશ કરવામાં આવે છે પરંતુ શરૂઆતના તબક્કે કંપનીને આવશ્યક એવી લાયકાતના અભાવ હોવાથી કંપનીમાં રોજગારી આપવામાં મુશ્કેલી પડતી હતી પરંતુ, આઈટીઆઈ આવી ગયા પછી અને આરટીજીની તાલીમ લીધા પછી સ્થાનિક રોજગારીનું પ્રમાણ વધ્યુ છે અને વધતુ રહેશે.
૮૯	શ્રી હમીર રબારી ગામ - . વાંઢ,	• તેઓએ રજુઆત કરતા જણાવેલ કે, મારા બે વિકલાંગ બાળકો એક જે સાંભળી નથી શકતા અને બીજો	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે, એમના બાળકો માટે આમારા તરફથી નોકરીએ રાખવામાં

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
	તાલુકો - મુંદરા	બોલી નથી શકતા. તેના માટે નોકરી આપવા બાબતની રજુઆત કરવામાં આવેલ છે.	આવેલ હતા પરંતુ તેમણે જણાવેલુ કે, તેમના છોકરાઓ પૈકી એક ટાટા કંપનીમાં કામ કરતા હોઈ, હાલ તેઓ અહીં જોડાવવા ઈચ્છતા નથી.
૯૦	શ્રી ડોસાભાઈ ગઢવી ગામ - મોટા કાંડાગરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ઉદ્યોગ આવશે તો હાની તો થશે જ. પ્લાન્ટ સામે અમને વાંધો નથી. તમો કોન્ટ્રકટ બેઝ દ્વારા રોજગાર આપી દેશો પરંતુ, અમારા જેવા ખેડૂતો અને તેમના બાળકો માટે શું કરશો ? મારા દ્વારા ૨૦૦૭ અને ૨૦૧૨ માં પાણીનો ટીડીએસ રીપોર્ટ કરાવ્યો તેમા ટીડીએસ ૨૨૦૦ સુધી પહોંચી ગયેલ છે જે પાણી પીવા લાયક રહેલ નથી. પહેલા અમો બોર માથી પાણી પીતા હતા. હવે પીવાના પાણીની બોટલ લેવી પડે છે. છેલ્લા ૫ વર્ષમાં ૮૦૦ થી ૯૦૦ ટીડીએસ વધી ગયેલ છે. હકીકતમાં ખેડૂતો માટે કંઈ કરવામાં આવેલ નથી ખેડૂત તથા ખેતી માટે કાંઇક કરે તેવી અમારા હકકની માંગણી કરીએ છીએ. અમારી વાડીના ફુટ ખાવા લાયક નથી રહ્યા.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, અમો કંપની તરફથી ખેડૂત માટેની મુશ્કેલીઓ નિવારવા માટેની કામગીરી કરીશું ખેડૂતના બાળકો માટે કિશાન સ્કુલ ખોલવા માટેના પ્રયત્નો કરવામાં આવશે. ભુર્ગભ જળનું પ્રમાણ કઇ રીતે વધારી શકાય તેના માટે અદાણી ફાઉન્ડેશન દ્વારા ભુર્ગભ જળના નિષ્ણાંત શ્રી યોગેશ જાડેજા સાથે રહી ૧૦ ગામોમાં ભુર્ગભ જળ સુધારવા માટેના આયોજન કરવામાં આવેલ છે તેમજ રોજગાર માટે પણ ખેડૂતના બાળકોને પ્રાથમિકતા આપવા પ્રયત્ન કરવામાં આવશે.
૯૧	શ્રી પ્રવિણસિંહ ભુરૂભા ચૌહાણ, ગામ - શીરાચા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, પાવર પ્લાન્ટની ઈનટેક ચેનલ, આઉટ ફોલ ચેનલ અને પાણીનું તળાવ કાચુ છે કે પાકું ?	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, આઉટ ફોલ ચેનલ સ્ટોન મેશનરી લાઈન છે જયારે તળાવ કલે લાઈન છે અને શીટ પાયલીંગ કરેલ છે. આ પ્રશ્ન હાલ આવનાર પ્રોજેકટનો નથી.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
૯૨	શ્રી ખીમરાજ ગઢવી ગામ - ઝરપરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, ગામડા વાળા ટીડીએસ વાળું પાણી પિવે છે અને કંપની માં કોલસા ઉપર નર્મદાના પાણીનો ઉપયોગ કરવામાં આવે છે.	--
૯૩	શ્રી પ્રવિણસિંહ ભુરૂભા ચૌહાણ ગામ - શીરાચા, તાલુકો – મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • ઈ.આઈ.એ રીપોર્ટમા ચીત્ર નં. ૧ મા હાઇ વોટર લાઇન, લો વોટર લાઇન શુ સુચવે છે ? • વર્ષ ૧૯૯૧, ૨૦૦૮, ૨૦૧૦ અને ૨૦૧૭ની લોક સુનવણીમાં અલગ અલગ સીઆરઝેડ નો નકશાઓ રજુ થયેલ છે જેમાં સાચો નકશો કયો ? જોચારમાંથીએકનકશોસાચોહોયતોત્ર ણનકશાખોટાછેજેસૂચવેછેકેકંપનીધ્વા રાસીઆરઝેડનાનિયમોનોભંગકરવામાં આવેલછે. • શીરાચામાં પહેલા જયાં ભરતીના પાણી આવતા હતા ત્યાં હવે નથી આવતા જે દર્શાવે છે કે, કંપની ધ્વારા સીઆરઝેડ એકટનો ભંગ કરવામાં આવે છે ? • આ પ્લાન્ટમાં કન્વેયર બેલ્ટ, રોડ કે રેલ્વે લાઇન રોડ કયાંથી નિકળશે અને તેનો ઉપયોગ કેવી રીતે કરશે તેની રીપોર્ટમાં સ્પષ્ટતા કરવામાં	પ્રોજેક્ટ પ્રોપોનન્ટના પ્રતિનિધીશ્રીએ જવાબમાં જણાવેલ કે, • સીઆરઝેડ મેપ ભારત સરકારં ધ્વારા પ્રમાણિત સંસ્થા ધ્વારા બનાવવામાં આવે છે જેના પર પ્રોજેકટ પ્રપોનેન્ટ નો અધિકાર હોતો નથી પ્રમાણિત સંસ્થા ધ્વારા બનાવવામાં આવેલ મેપના આધારે પ્રોજેકટને મંજુરી આપવમા આવે છે. • ૨૦૧૧ માં ભારત સરકારશ્રી ની માન્ય સંસ્થા ધ્વારા બનાવવામાં આવેલ એરીયાનો સીઆરઝેડ મેપ સૂચિત પ્રોજેકટના મેપને સુપર ઈમ્પોઝ કરે છે. • ભારત સરકાર ધ્વારા સીઝેડએમપી પ્લાન બનાવવામાં આવે છે. જે જાહરે જનતાને આપવામાં આવતા નથી. જયારે કોઈ પણ પ્રોજેકટ ધ્વારા સીઆરઝેડ માટે મંજુરી માંગવાંમા આવે છે ત્યારે તેમના ધ્વારા રજૂ કરાયેલ સીઆરઝેડ મેપને સીઝેડએમપી સાથે સરખામણી કરવામાં આવે છે અને તેના આધારે જ પ્રોજેકટ ને મંજુરી

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
		આવેલ નથી. • આ પ્રોજેકટ માટે કુલ ત્રણ જગ્યાઓ પસંદ કરવામાં આવેલ. જે પૈકી બે નંબરની જગ્યા પસંદ કરવા પાછળનો તમારો શુ ઉદેશ છે ? • તમોને એક નંબરની જગ્યા મળી ચુકી છે તો બે નંબરની જગ્યા કેમ પસંદ કરી ? તમોને ફોરેસ્ટની જમીન લેવા માટે બે નંબરની જગ્યા પસંદ કરવામાં આવેલ છે.	આપવામાં આવે છે. અમે તમારા આ વિચાર સાથે સંહમત નથી • આ પ્લાન્ટ એપીએસઈઝેડ નોટીફાઈ એરીયા માં આવે છે સાથે સાથે ફોરેસ્ટનો વિસ્તાર પણ આવેલ છે. જેથી હાલ એમપીએસઝેડમાં આવતા રસ્તા, રેલ્વે લાઇનનો ઉપયોગ કરવામાં આવશે. કન્વયેર બેલ્ટ હાલે જે ચાલુ કન્વયેર કોરીડોર છે તેજ વિસ્તારમાંથી પસાર કરવામાં આવશે આ બાબતનો ઉલ્લેખ ઈઆઈએ રીપોર્ટ માં પાના નં. સી ૨/૬ મુદ્દા નંબર ૨.૨.૭ માં કરવામાં આવેલ છે. • ઈઆઈએ રીપોર્ટમાં આ બાબતે વિસ્તૃત માહિતી ચેપ્ટર ૫માં આપવામાં આવેલ છે. • ત્રણ જગ્યાઓના એનાલીસીસ માટે લગભગ ૧૮ પરિબળોના આધારે ચકાસણી કરવામાં આવેલ હતી જેના આધારે બે નંબરની જગ્યા વધુ અનુકૂળ જણાતા તેની પસંદગી કરવામાં આવેલ છે. • અમે અમારી પસંદગીના કારણો ઈઆઈએ રીપોર્ટમાં રજુ કરેલ છે. અમો તમારી વાત સાથે સહમત નથી.

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
૯૪	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ - મોટા કાંડાગરા, તાલુકો – મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, વીમ્ટાનો રીપોર્ટ અમોને મળેલ છે. આ વીમ્ટા એક પ્રાઇવેટ સંસ્થા છે જે કંપનીને તરફેણ કરવાવાળી સંસ્થા છે અમને વિમટા નો રીપોર્ટ માન્ય નથી.	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે,વીમ્ટાએ NABET દ્વારા પ્રમાણિત સંસ્થા છે.
૯૫	શ્રી વાલજીભાઇ ટાપરીયા ગામ - ઝરપરા, તાલુકો - મુંદરા	• તેઓએ રજુઆત કરતા જણાવેલ કે, પ્લાન્ટમાં એસીડીક પ્રકીયા દરમ્યાન જે કેટલી જમીનને અસર કરશે તે દરમ્યાન એસીડીક પાણી તેમજ રસાયણો કયા છોડવામાં આવશે ?	• ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવ્યું કે, આ કોપર પ્લાન્ટની પ્રક્રિયા એસિડીક નથી પરંતુ કોપરના ઉત્પાદનની સાથે સલ્ફર ડાયોકસાઈડ ઉત્પન્ન થશે જેમાંથી એસીડ બનાવવામાં આવશે અને તેનુ પરિવહન પાઈપ દ્વારા કરવામાં આવશે અને તેની કોઈપણ રીતે બહાર નિકળવાની સંભાવના નથી. જે સલ્ફર ડાયોકસાઈડ નિકળશે જેમાથી એસિડ બનાવવામાં આવશે. જે ટેઈલ ગેસ નિકળશે તેને સ્કબરમાં લાઈમ સ્ટોન્સ દ્વારા સ્કબ કરવામાં આવશે.
૯૬	શ્રી ડાયાભાઇ વીરમ ગઢવી ગામ - . મોટા કાંડાગરા, તાલુકો - મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • પ્લાન્ટમાં વેસ્ટ મટીરીયલ નિકળશે ? • વેસ્ટ મટીરીયલ્સ માટે શું વ્યવસ્થા છે ? • કોઈ બ્લાસ્ટની સંભાવના રહે છે ? • ફીનીશ્ડ પ્રોડકટ કઈ રીતે બહાર નીકળશે ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • સ્લજની સ્કબર પ્રક્રિયા દ્વારા લાઇમનો ઉપયોગ કરીને જીપ્સમ બનાવવામાં આવશે જેનો ઉપયોગ સિમેન્ટ ઈન્ડસ્ટ્રીઝમાં કરવામાં આવશે. • પ્લાન્ટમાંથી નિકળતા વેસ્ટ મટીરીયલ્સ માંથી કેટલોક ભાગ સીપીસીબી દ્વારા પ્રમાણિત પ્રોસેસર સંસ્થાને મોકલવામાં આવશે અને

ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ ધ્વારા અપાયેલ પ્રત્યુતર
			સંપુર્ણ બિનઉપયોગી વેસ્ટ માટે પ્લાન્ટ સાઈટ પર સીપીસીબી ના માર્ગદર્શન મુજબ ખાસ એચડીપીઈ લાઈનર લગાવીને સંગ્રહ કરવામાં આવશે. • ફીનીશ્ડ પ્રોડકટમાં કોપર પ્લેટ સ્વરૂપે ટ્રક અથવા કન્ટેઈનરમાં પરિવહન કરવામાં આવશે અને સલ્ફયુરીક એસિડ યોગ્ય પાઈપ દ્વારા પરિવહન કરવામાં આવશે જેથી બ્લાસ્ટ થવાની સંભાવના રહેતી નથી.
૯૭	શ્રી પ્રવિણસિંહ ભુરૂભા ચૌહાણ, ગામ - શીરાચા, તાલુકો - મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • આપે જે જણાવ્યું છે કે વેસ્ટમાંથી રોડ બનાવીશું, રોડ બનાવવા માટે શું કરવાના છો? • કાચો માલ જે સ્ટોર કરવામાં આવશે અને તેની અંદર કયા કયા મટીરીયલ હશે? • પ્લાન્ટમાંથી નીકળતા વેસ્ટ કયા કયા કેમીકલોની સમાવેશ થાય છે અને શું આ વેસ્ટ માંથી મરકયુરી નિકળશે ?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • અમે વેસ્ટમાંથી રોડ બનાવવાના નથી. • પ્લાન્ટના વેસ્ટ મટીરીયલ્સમાં કેલ્શીયમ, સિલીકા તેમજ આર્સેનિક હશે.આ વેસ્ટ મટીરીયલ્સને સીકયોર લેન્ડફીલ્સ સાઈટમાં સ્ટોર કરવામાં આવશે. • જે વેસ્ટમાંથી મરકયુરી નીકળી રહ્યુ છે તેની મરકયુરી પ્રોડકટ બને છે અને કેલોમલ તરીકે મટીરીયલ બને છે. તેવા મટીરીયલને એક્ષપોર્ટ કરવામાં આવશે. આ પ્લાન્ટ ખાતે મરકયુરી માટે કોઈ

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ક્રમ	રજુઆત કરનારનું નામ અને સરનામું	રજુઆત કરેલ મુદ્દા	ઉદ્યોગના પ્રતિનિધિ દ્વારા અપાયેલ પ્રત્યુતર
			પ્રક્રિયા કરવામાં આવશે નહિ.
૯૮	શ્રી નારાણ ગઢવી ગામ - ઝરપરા, તાલુકો - મુંદરા	તેઓએ રજુઆત કરતા જણાવેલ કે, • ભારત સરકારના વન અને પર્યાવરણ મંત્રાલય દ્વારા તારીખ-૦૭/૧૨/૨૦૧૫ ના રોજ ગેઝેટ નોટીફીકેશન પ્રમાણે એમીશન ઘટાડવા માટે અને પાણીના વપરાશ માટે શું પગલા લીધેલ છે? • આ પ્રોજેકટથી દરિયાઇ જીવો ઉપર શું અસર થશે. જે સીધી રીતે માછીમાર જોડે સંબંધિત છે?	ઉદ્યોગના પ્રતિનિધીશ્રીએ જણાવેલ કે: • આ સવાલ આ પ્રોજેકટને લગતો નથી. • આ પ્લાન્ટમાંથી કોઈપણ પ્રકારનો પાણીનો લીકવીડ ડીસ્ચાર્જ કરવામાં આવશે નહી. • કુલ ૩૨૮૦૦ કયુબીક મીટર પ્લાન્ટમાં પાણીનો ઉપયોગ કરવામાં આવશે જેમાંથી ૬૪૪૮ કયુબીક મીટર દૂષિત પાણી ઉત્પન્ન થશે. જેને ઈટીપીમાં ટ્રીટ કર્યા પછી અને આરઓ પ્લાન્ટ દ્વારા પ્રક્રિયા કરી પાણીને શુદ્ધ કરવામાં આવશે અને તેનો ફરીથી પ્લાન્ટમાં ઉપયોગ કરવામાં આવશે બાકી બચતું દુષિત પાણી મલ્ટીઈફેકટ ઈવોપરેશન પ્રોસેસ દ્વારા પ્રક્રિયા કરવામાં આવશે. આમ, આ પ્રોજેકટમાંથી કોઈપણ પ્રકારનું લીકવીડ ડિસ્ચાર્જ થવાનું ન હોઈ પ્રશ્ન ઉપસ્થિત થતો નથી.

પ્રાદેશિક અધિકારી શ્રી, કચ્છ (પુર્વ),ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડના પ્રતિનિધીએ સૂચિત પરિયોજના માટે અન્ય કોઇવાંધા / સૂચનો / રજુઆતો હોય તો જણાવવા કહ્યું. પરંતુ અન્ય કોઇ વધારાની રજુઆત કરાયેલ ન હતી.

પ્રાદેશિક અધિકારી શ્રી, કચ્છ (પુર્વ), ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ દ્વારા પર્યાવરણીય લોકસુનાવણીની સમગ્ર કાર્યવાહીનો સારાંશ ઉપસ્થિત જનસમુદાયને જણાવવામાં આવેલ.

પ્રાદેશિક અધિકારી શ્રી, કચ્છ (પુર્વ), ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ દ્વારા અંતમાં પર્યાવરણીય લોકસુનાવણીને અધિક જિલ્લા મેજીસ્ટ્રેટશ્રી અને નિવાસી અધિક કલેકટરશ્રીની પુર્વ મંજુરી મેળવી આભાર સહ સંમાપ્ત જાહેર કરવામાં આવેલ.

સ્થળ:કમ્યુનીટી	કે.બી.ચૌધરી	ડી.આર.પટેલ(જી.એ.એસ.)
પ્રીમાઇસીસ સેન્ટર	પ્રાદેશિક અધિકારી	અધિક જીલ્લા મેજીસ્ટ્રેટશ્રી અને
(સમાજવાડી)	અને	નિવાસી અધિક જિલ્લા કલેકટરશ્રી
ટુન્ડા પ્રાથમિક શાળાની	સભ્ય સચિવશ્રી,	અને
સામે,	ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડનાં	જિલ્લા મેજીસ્ટ્રેટશ્રી અને જિલ્લા કલેકટરશ્રી
ગામ : ટુન્ડા	પ્રતિનિધી	કચ્છ-ભુજનાં પ્રતિનિધિ
તાલુકો : મુંદરા		
જીલ્લો : કચ્છ.		
તારીખ : ૨૯/૦૪/૨૦૧૭		

Annexure C

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Representations Received Before and During the Public Hearing

Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
1	Shri Ravilal K. Maheswari (Advocate & Notary, B.A., L.L.B), Adarsh Tower, Mundra- Kutch (In Gujarati)	Before	C-Q-1
2	(A) Shri P.C Gadhavi, Ex. President, Taluka Panchayat, Lakhpat (in English) (B) Shri P.C Gadhavi, Ex. President, Taluka Panchayat, Lakhpat (in Gujarati)	Before	C-Q-2
3	Shri Mahesh Pandya, Paryavaran Mitra, Ahmedabad (In English)	Before	C-Q-3
4	Shri Gajendrasinh Jadeja (Sarpanch), Navinal Village, Mundra Taluka, Kutch District, Gujarat (In English)	Before	C-Q-4
5	Shri Sanjay S. Bapat, Adarsh Tower, Mundra, Taluka: Mundra- Kutch (In Gujarati)	Before	C-Q-5
6	A) Shri Naran B. Gaghavi, (President) Keti Vikas Seva Trust. (In Gujarati) B) Copy of Same representation was submitted during Public Hearing also.	Before	C-Q-6
7	Shri Debi Goenka, (Executive Trustee), Conservation Action Trust, 5 Sahakar Bhavan, 1st Floor Lbs Marg, Narayan Nagar, Ghatkopar (West) Mumbai (In English)	Before	C-Q-7
8	Shri Dharmesh Mistri, Block no: 14, house no. 1340, Narmada Apartment, Opp. Mamlatdar office, Bharuch (In Gujarati)	Before	C-Q-8

Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
9	Shri Nagshi Punshi Gadhvi (On Behalf Of Sonbaiben Punshi Gadhvi), Sarpanch, Mota Bhadiya, Taluka-Mandvi (In Gujarati)	During	C-Q-9
10	Shri Abdreman Jusab Turk, Drub Village Sarpanch (In Gujarati)	During	C-Q-10
11	Siracha Gram Panchayat Village: Siracha Tal. Mundra-Kachchh. (In Gujarati)	During	C-Q-11
12	Shri Punshi Khetshi Turiya, Gadhavi. Membershri, Taluka Panchayat Mandvi Kachchh, Post Mota Bhadiya, Tal. Mandvi, Kutch (In Gujarati) Addressed to: District Collector	During	C-Q-12
13	Shri Punshi Khetshi Turiya, Gadhavi. Membershri, Taluka Panchayat Mandvi Kachchh, Post Mota Bhadiya, Tal. Mandvi, Kutch (In Gujarati) Addressed to: Executive Director/ COO – SEZ	During	C-Q-13
14	Shri Valbai Shamji, Sarpanch, Nana Kapaya Juth Gram Panchyat Cluster Villages: Nana Kapaya, Borana Tal. Mundra – Kachchh (In Gujarati)	During	C-Q-14
15	Shri Bairajba Lakhubha Jadeja, Sarpanch, Village – Tragadi, Mandvi, Kachchh (In Gujarati)	During	C-Q-15
16	Shri Atul Pandya, President, Rotary Club Of Mundra, Kutch (In Gujarati)	During	C-Q-16

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Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
17	Shri Karvan-E- Mustafa, Medical and Educational Trust, Near Jama Masjid, Mundra (In Gujarati)	During	C-Q-17
18	Letter from Lions Club Of Mundra, Poonam Arcade, 1st Floor, Baroi Road, Mundra, Kutch (In Gujarati)	During	C-Q-18
19	Shri R. M. Sama, Mystical Corporation, All Type Of Civil Works And Material Supply, Office No.5, Rajiv Complex, Baroi Road, Mundra (In Gujarati)	During	C-Q-19
20	K.G.N. Construction, R.C.C. Construction – R.C.C. Alivation Load Bearing, Village Tragadi, Tal. Mandvi, Kutch (In Gujarati)	During	C-Q-20
21	Shri Daya Ranshi Gadhvi, Civil Contractor And Supplier, Village- Zarpara, Ta. Mundra, Kutch (In Gujarati)	During	C-Q-21
22	Shri Gadhvi Kalyan, President, Shri Butbhavani khedut mandal, Mota Bhadiya, Tal. Mandvi – Kachchh (In Gujarati)	During	C-Q-22
23	Mithani Enterprise, Civil Contractor And Manpower Supply, M-2, Golden Arcade, near Zero Point, Adani Port Road, Mundra-Kutch (In Gujarati)	During	C-Q-23
24	Shri M. L. Baraiya, Director, Vivekanand Rural Development Institute, N.H.No.8a, Near Jain Ashram, Mandvi, Kutch (In Gujarati)	During	C-Q-24

Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
25	Shri Salim Mamad (President), Ekta Machhimar Seva Vikas Samiti Tragadi Bundar, Gundiyali, Tal. Mandvi, Kutch (In Gujarati)	During	C-Q-25
26	Shri Dayabhai Gadhvi, Kandagara, Kutch (In Gujarati)	During	C-Q-26
27	Shri Ashariya Lakha Gilva, Kapuriya Wadi, Village: Zarpara, Mundra Kutch (In Gujarati)	During	C-Q-27
28	Shri Girish D. Nagda (C.E.O), Bhagwan Mahavir Pashu Raksha Kendra, Pragpur Road Junction, Tal. Mundra 370415, Kutch, Gujarat (In Gujarati)	During	C-Q-28
29	Shri Naran B. Gadhavi, (President), Kheti Vikas Seva Trust, Village Zarpara, Tal: Mundra, Dist-Kutch (In English)	During	C-Q-29
30	Shri Mahesh Pandya, Paryavaran Mitra, 502, Raj Avenue, Bhaikaka Nagar Road, Nr. Thaltej Cross Road, Thaltej, Ahmedabad (In English)	During	C-Q-30
31	Shri Ibrahim Abdulkadar Turk, Jamadarwadi, At Post Dhrab Ta Mundra Dist, Kutch (In English)	During	C-Q-31
32	Shri Debi Goenka, (Executive Trustee), Conservation Action Trust, 5 Sahakar Bhavan, 1st Floor LBS Marg, Narayan Nagar, Ghatkopar (West) Mumbai through Sh. Maheshwari Mithubhai Jakhubhai, Mundra	During	C-Q-32
33	Shri Chauhan Pravinsinh Bhurubha, Pramukh, Van Adhikar Samiti, Village: Siracha, Tal.	During	C-Q-33

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Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
	Mundra, Dis. Kutch (In English)		
34	Shri Chauhan Pravinsinh Bhurubha, Village: Siraya, Tal. Mundra, Dis. Kutch (In Gujarati)	**During**	**C-Q-34**
35	Shri Vijay K Gadhavi, President, Kutch Charan Sabha, Mandvi Naliya Road, Mandvi –Kutch (In Gujarati)	**During**	**C-Q-35**
36	Shri Usmangani H. Sheraseeya (Secretary), National Fisherfolk Forum, At Post Kankot, Taluka Vakaner, District Morbi (In Gujarati)	**During**	**C-Q-36**
37	Shri Vijay K Gadhavi, Mandvi –Kutch (In Gujarati)	**During**	**C-Q-37**
38	Shri Chauhan Pravinsinh Bhurubha, Village: Siracha, Tal. Mundra, Dis. Kutch (In Gujarati)	**During**	**C-Q-38**
39	Shri Jadeja Jaypalsinh (In Gujarati)	**During**	**C-Q-39**
40	Shri Turk Husen Ibrahim Nathani, Village Dhrab (In Gujarati)	**During**	**C-Q-40**
41	Shri Turk Mohammad Hanif Abdul Kadar Jamadar, Village- Dhrab (In Gujarati)	**During**	**C-Q-41**
42	Shri Turk Ismail Abdul Rashid Jamadar, Village- Dhrab (In Gujarati)	**During**	**C-Q-42**
43	Shri Jadeja Gajendrasinh Bhimaji, Sarpanch - Navinal, Tal: Mundra Kutch (In Gujarati)	**During**	**C-Q-43**
44	Chauhan Pravinsinh Bhurubha, Village: Siracha Taluka: Mundra District: Kutch (In Gujarati)	**During**	**C-Q-44**

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રવિલાલ કે મહેશ્વરી
(એડવોકેટ અને નોટરી: ગુજરાત હાઈકોર્ટ)
૧૫,ગ્રાઉન્ડ ફ્લોર,આદર્શ ટાવર,
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(૨)

તા.૪/૪/૨૦૧૭

(બાય સ્પીડ પોસ્ટ)

Gujarat Pollution Control Board
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R. O., Kutch (East)
06 APR 2017
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પ્રતિ,
અધિકૃત અધિકારીશ્રી,
ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ,
પ્રાદેશિક કચેરી, કચ્છ(પૂર્વ),
રૂમ નં.૨૧૫–૨૧૬ બીજે માળે,કંડલા પોર્ટ ટ્રસ્ટ
વહીવટી બિલ્ડીંગ સેકટર ૦૮,
ગાંધીધામ કચ્છ.

વિષય :– મે.અદાણી એન્ટરપ્રાઈઝ લી.અદાણી પોર્ટ અને સ્પેશિયલ ઈકોનોમિક ઝોનની જમીન ખાતે ગામ સીરાચા અને નવીનાળ તા.મુંદરા જિ. કચ્છ દ્વારા ઝોન ફીલ્ડ કોપર રીફાઈનરી પ્લાન્ટ–૧ મેટીપીએના ઉત્પાદન માટેના પ્રોજેકટ કેટેગરી–એ સબંધીત પર્યાવરણની લોક સુનાવણી સબંધે ટીકા–ટીપ્પણી તેમજ સદરહુ પ્રોજેકેટ સબંધે પર્યાવરણ સબંધીત વાંધાઓ.

આથી અમોને અમારા અસીલશ્રીઓ ૧) આતુ માલશી મહેશ્વરી તથા ૨) દામજી માલશી મહેશ્વરી,રહે. ગામ ટુંડા,તા.મુંદરા કચ્છવાળા તરફથી તા.૨૬/૩/૨૦૧૭ના કચ્છમિત્ર સમાચાર પત્રમાં પ્રસિધ્ધ થયેલ ઉપરોકત વિષય વાળી જાહેરાત સબંધિત તેઓની ટીકા ટીપ્પણી અને વાંધોઓ લેખિતમાં પાઠવવા અમોને નીચેની વિગતે સૂચનાઓ મળેલ છે.

૧) અમારા અસીલશ્રીઓ પ્રોજેકટનાં ગામ તેમજ આજુબાજુના ગામોનાં અસરગ્રસ્ત ગામોના રહેવાસીઓ છે.

૨) MSIACના નિયમો અનુસાર માવન આરોગ્ય/પશુ/વનસ્પતિ અને પાણીના પ્રવાહો માટે જોખમી ચીજવસ્તુઓ કે સમાગ્રીનદ વપરાશ આ પ્રોજેકટમાં કરવામાં આવશે જેની લોકો અને પર્યાવરણ ઉપર ગંભીર અસર થશે તે માટે કંપની શું પગલા લેશે અને રક્ષણ માટે કંપની પાસે કયા ઉપાયો છે.

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૩) ઉત્પાદિત પ્રક્રિયામાંથી નીકળતો ધૂમાડો તેમજ પ્લાન્ટ અને સબંધિત સામગ્રી સહિતની બાંધકામ પ્રવૃતિઓમાંથી નિકળતા ધૂમાડો અને ધૂળ કે દૂર્ગંધ કે અન્ય કોઈ સ્ત્રોતથી થતો ધૂમાડાથી પ્રોજેકટની આજુબાજુના ગામોનાં રહેવાસીઓ અને જાનવરોના આરોગ્ય અને પર્યાવરણને ગંભીર નુકસાન પહોંચશે તે માટે કંપની કાયદા મુજબ કે અન્ય કયા પગાલ લેશે અને રક્ષણ માટે કંપની પાસે કયા ઉપાયો છે તેની વિગતવાર સ્પષ્ટ જણાવવા.

૪) જોખમી ચીજવસ્તુના સંગ્રહ હેરફેર ઉપયોગ કે ઉત્પાદન વખતે વિસ્ફોટ,ગળતર, આગ વિગેરેથી કે કુદરતી આફતોથી માનવ રક્ષણ માટેની કંપની દ્વારા કઈ જોગવાઈ કરેલ છે. અને કયા પગલા લેશે તેની વિગતવાર જણાવવું. કારણ કે, (અગાઉ આજ કંપનીના અન્ય પ્રોજેકટોમાં થોડા સમય પહેલા બોઈલર ફાટવાને કારણે અનેક માવત્ત/કામદારોને ગંભીર ઈજાઓ થયેલ હતી.) આ આ કંપની દ્વારા અગાઉ પણ સુરક્ષાના નિયમોનો ભંગ કરેલ છે.

૫) આ પ્રોજેકટ જે જમીનો ઉપર આવેલ છે તે જમીનો પૈકી સીરાચા–નવીવાળ ગામની જંગલની જમીન કુલ્લ ૧૫૭૬.૮૧ હેકટર જમીન કંપનીને મળવાની માંગણી ફાઈલ નં.૮–૦૪/૨૦૧૬ એસ.સી. થી કેન્દ્ર સરકારમાં પેન્ડીગ છે.અને કેન્દ્ર સરકારે હાલે ગુજરાત સરકારને અભિપ્રાય માટે પરત મોકલેલ છે. જેમાં પણ સ્પષ્ટ ઉલ્લેખ કરેલ છે કે, આ કંપનીને જંગલની જમીન અગાઉ આપેલ છે. જેથી બીજી વધારે જમીન આપી શકયા નહી. આમ જંગલની જમીનો બિન જંગલ હેતુ માટે બહુજ ઓછી અને ગંભીર પ્રકારના કેસમાંજ આપી શકાય તેવી જંગલ કાયદાની જોગવાઈ રહેલ છે.આમ જંગલની જમીન કંપનીને મંજૂર થયેલ નથી જે જમીન મંજૂર ન કરવા માટે જાહેર જનતાના પ્રતિનિધીશ્રી મહેશ મોહનલાલ દેસાઈ તરફથી કેન્દ્ર સરકાર અને ગુજરાત સરકારને લેદિત વાંધોઓ આપી જમીન મંજૂર ન કરવા રજૂઆત કરેલ છે. આમ ટૂકમાં જંગલની જમીન કંપનીને મંજૂર થયેલ નથી. તેમ છતાં આ પ્રોજેકટની કામગીરી ચાલુ કરેલ છે. જેનો વિગતવાર તમામ મુદાઓ ઉપર કંપની ખુલાસો કરે.

૬) અગાઉ આજ કંપીનને અન્ય પ્રોજેકટો સંબંધે પર્યાવરણ વિભાગ દ્વારા શો કોઝ નોટીસો પણ પાઠવવામાં આવેલ છે અને સુનિતા નારાયણની ટીમના રિપોર્ટ ઉપર પ્રોજેકટના એક ટકા લેખે પર્યાવરણની શરતોનો ભંગ કરતાં રૂપિયા બે સો કરોડનો દંડ પણ કરવામાં આવેલ છે. જેથી આ કંપની પર્યાવરણની શરતોનો ભંગ નહી કરે તેની ખાતરી શું. અને દંડની રકમ પણ કંપનીએ ભરપાઈ કરેલ નથી. આમ આ કંપની પર્યાવરણની શરતોનું ખુલ્લે આમ ભંગ કરે છે. માટે પર્યાવરણ સંબંધિત મંજૂરીઓ આપવી નહી. અને આ પેરેગ્રાફના મુદા બાબત કંપની વિગતવાર ખુલ્લાસો કરે.

૭) પ્રોજેકટની અન્ય રેવેન્યુની જમીનો ઉપર મહેસૂલી લેણું જમીન મંજૂરી હુકમો ઉપર ભરવાપાત્ર સ્ટેમ્પ ડયુટીની રકમો બાકી રહેલ છે. જયારે આ કંપની જણાવે છે કે અમોને મુકિત છે

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(૩) તા. ૨૪/૩/૨૦૧૭

પરંતુ ગુજરાત સ્પેશિયલ ઈકોનોમિક ઝોન એકટ ૨૦૦૪ ની કલમ ૨૧ મુજબ SEZ ડેવલપ થઈ ગયા બાદ SEZ ના ડેવલેપર અન્ય યુનિટના માલિક વચ્ચે જયારે લીઝ ઉપર જમીન આપવાનો કરાર થાય તે વ્યવહાર ઉપર સ્ટેમ્પ ડ્યુટી માફ છે. જેનો ખોટું અર્થઘટન કરી જમીન મંજૂરી હુકમો ઉપર આ કંપનીએ જે જમીન ઉપર પ્રોજેકટ આવેલ તેની સ્ટેમ્પ ડ્યુટીની રકમો ભરપાઈ કરેલ નથી. તેનો કંપની વિગતવાર ખુલ્લાસો કરે,કાયદાની જોગવાઈઓ મુજબ ખુલાસો કરે.

૮) આ પ્રોજેકટની અન્ય મહેસૂલની જમીનો ઉપર મહેસૂલ અધિનિયમની કલમ ૬૭ (એ) મુજબ જયારે એક હેતુમાંથી બીજા હેતુમાં જમીન ટ્રાન્સફર થાય એટલે કે બિનખેતીના હેતુમાં ટ્રાન્સફર કરવામાં આવે ત્યારે પ્રતિ મીટરના રૂા. ૬/– લેખે રૂપાંતર વેરો ભરપાઈ કરવાનો હોય છે. જે આ કંપની દ્વારા કલેકટરશ્રી દ્વારા મેળવેલ જમીનો અને તાલુકા વિકાસ અધિકારીશ્રી પાસેથી મેળવેલ બિનખેતીની મંજૂરીઓ ઉપર ટ્રાન્સફરના વ્યવહારની રૂપાંતર વેરાની કરોડો રૂપિયાની રકમો કંપનીએ ભરેલ નથી. જે અંગે સરકારશ્રીના ઓડિટ ડિપાર્ટમેન્ટ કેગ દ્વારા પણ ઓડિટ કરવામાં આવેલ છે અને તે રકમો ભરપાઈ કરવા કલેકટરશ્રીએ કંપનીને અનેક નોટીસો આપેલ છે તેમ છતાં પણ કંપનીએ આ મહેસૂલી લેણાંની રકમ ભરપાઈ કરેલ ન હોઈ તે જમીન ઉપર મહેસૂલી લેણું બાકી હોઈ પ્રોજેકટ ચાલુ થઈ શકે નહી આ બાબતે કંપની વિગતવાર ખુલ્લાસો કરે.

૯) પ્રોજેકટનો ઘન કચરો(જોખમી કચરા વ્યવસ્થાપન નિયમો) અનુસાર કંપની તેની શું વ્યવસ્થા કરશે ?

૧૦) કોપર સ્મેલ્ટર પ્રોજેકટ યોજનના સમયગાળા દરમિયાન કયા કયા વેરા ભરપાઈ કરવામાં આવશે ? અને કરવેરાની વાર્ષિક અંદાજિત રકમ કેટલી રહેશે જે જણાવવું.

૧૧) કોપર સ્મેલ્ટર પ્રોજેકટને કારણે પાંચ હજાર કઈ કઈ નોકરીઓનો સર્જન થશે તેમાં કેટલી નોકરીઓમાં સ્થાનિક અસરગ્રસ્ત લોકોને નોકરીમાં રાખવમાં આવશે ?

૧૨) સમાજની પ્રાથમિક આવસ્યકતાઓ, સ્વાથ્યસેવાઓ,શૈક્ષણિક સુવિધાઓ,રસ્તાઓની સુવિધાઓ વિગેરેનું કંપનીએ શું આયોજન કરેલ છે ? અરસગ્રસ્ત લોકો/ ગામના સામાજિક માળખાને સુધારવા માટે કંપનીનું આયોજન શું છે તે જણાવાવું.

૧૩) પર્યાવરણ સંરક્ષણ પગલા માટે કંપની કેટલું ફંડ ફાળવશે અને તેનો ઉપયોગ કેવી રીતે કરશે

—૪

1546

RAVILAL K MAHESHWARI
Advocate & Notary ,B.A., L.L.B.
15, Ground Floor, Adarsh Tower,
Mundra - Kutch.
Mob :97124 37738.

રવિલાલ કે મહેશ્વરી
(એડવોકેટ અને નોટરી: ગુજરાત હાઈકોર્ટ)
૧૫,ગ્રાઉન્ડ ફલોર,આદર્શ ટાવર,
મુંદરા–કચ્છ.
મો : ૯૭૧૨૪ ૩૭૭૩૮

1334

(૪) તા. ૪/૪/૨૦૧૭

? તે જણાવવું.

૧૪) આ કંપની દ્વારા અગાઉ પણ અન્ય પ્રોજેકટોની એન્વાયરમેન્ટ કલીયરંસ તેમજ કોસ્ટલ રેગ્યુલેશન ઝોનની શરતો મુજબ મેન્ગ્રોવ્સને કાપવા નહી અને ક્રીકોને પુરવી નહી તેવી શરતોનો ખુલ્લે આમ ભંગ કરેલ હોઈ, કંપનીને પર્યાવરણ વિભાગ દ્વારા કંપનીને શો કોઝ નોટીસો પાઠવવામાં આવેલ છે દંડ કરવામાં આવેલ છે. ત્યારે આ પ્રોજેકટની પર્યાવરણ મંજૂરીની શરતોનો પણ પાલન કરવામાં નહી આવે અને આ પ્રોજેકટથી આજુબાજુના વિસ્તારોમાં પર્યાવરણ સંબંધિત ગંભીર સમસ્યાઓ ઉભી થશે, જેથી કંપનીને પર્યાવરણ સંબંધિત ઈસી અને એનઓસીઓ તેમજ અન્ય મંજૂરીઓ ન આપવા અને આ પ્રોજેકટ સામે અમારા અસીલશ્રીઓનો સ્પષ્ટ વાંધો છે.

તા.૪/૪/૨૦૧૭
મુંદરા કચ્છ

રવિલાલ કે.મહેશ્વરી તે
૧) આતુ માલશી મહેશ્વરી
તથા ૨) દામજી માલશી મહેશ્વરીના
એડવોકેટ,મુંદરા કચ્છ

અમારા મારફતે
રવિલાલ કે.મહેશ્વરી
એડવોકેટ
ઓ.૧૫,ગ્રાઉન્ડ ફલોર,
આદર્શ ટાવર,મુંદરા કચ્છ

(TRANSLATED)

1547

RAVILAL K MAHESHWARI
Advocate & Notary, B.A., L.L.B.
15, Ground Floor, Adarsh Tower,
Mundra-Kutch
Mobile 9712437738

Date: 04.04.2017

(by speed post)

To,
Authorised officer
Gujarat Pollution control Board,
Regional office, Kutch (East)
Room no. 215-216, 2nd floor, Kandla Port Trust,
Administrative building Sector 09,
Gandhidham-Kutch

Gujarat Pollution Control Board RECEIVED ON R.O. Kutch (East) 06 APR 2017-05-06	
2288	50

Subject: With regard to objections for the environmental public hearing for Green Field Copper Refinery Plant-1 MTPA production project Category-A upon the land at M/s Adani Enterprises limited Adani Port and Special Economic Zone village Siracha and Navinad, Taluka Mundra, District Kutch.

Hereby I have been instructed to provide written remarks and objections to the above mentioned advertisement published in the Kutch Mitra daily newspaper dated 26.03.2017, for and on behalf of my clients 1) Aatul Malshi Maheshwari and 2) Damji Malshi Maheshwari, residing at village Tunda, taluka Mundra, district Kutch.

1. My clients are the residence of the village on which the project shall be made and the villages around the project.

2. This project will use hazardous substances and material that will be for the human health/animals/vegetation and water flow as per the rules of the MSIAC and this shall cause a serious effect to environment. What steps will be taken by the company for this and what are the solutions as for this with the company?

3. A serious damage shall occur to the health of humans and animals along with environment of the village around the project as there shall be emission from the plant, there shall be emission or dust from the related construction activities and other such places. What steps shall be taken as per legal in case if any damage

can be done.

4. What are the provisions laid down by the company for protection from blast, liquification, fire, etc. during the production? Provide the details that the company shall take. This is because (prior to this a boiler had blasted in a project of this very company and many humans/workmen had suffered serious injuries) This company has violated the rules for protection prior to this also.

5. The project is planned on the land and out of this the sanction is sought from the government of India and the same is pending before the government by file no. 8-04/2016 for land totaling of 1576.81 heacter and located at the Siracha-Navinal village. This file is returned by the central government to the Gujarat government for the purpose of opinion. It is specifically mentioned in it that this company has been provided with forest land prior to this also. Therefore additional land cannot be given. In this manner the forest land can be given in rare cases and in very serious requirement, as per the forest laws. In this manner the land of the company is not approved and the representative of the common public named Mahesh Mohanlal Desai has submitted objections before the Central government and Gujarat government and it is submitted that the land should not be approved. In short, the forest land is not provided to the company yet the work for project has been started. The company should provide explanation to all points in a detailed manner.

6. Prior to this, the environment department had issued show cause notices to other project of this company and on the basis of the report submitted by Sunita Narayan team, the company was asked to pay penalty of Rs. Two hundred crores i.e. 1% amount of project, for breach of environmental condition. Thus, what is the assurance that this company shall not violate the conditions for environment laid down by the environmental law? Moreover the company has also not paid the amount of penalty. In this manner the company has openly breached the conditions for environment. As for this the environment related approval should not be given. Further the company should give a detailed explanation as for this issue.

7. As for the other revenue land of the project, the amount of stamp duty is pending as per the land approval orders. Meanwhile the company states that, they have exemption. But the fact is that as per the section 21 of the Gujarat Special Economic Zone Act 2004, the exemption on stamp duty is on transaction that is carried out, between the developer and unit owner for lease, after the development of SEZ. This has been wrongly interpreted by the company and thereby the amount of stamp duty payable based on the land approval orders, for the land on which the project is brought, has not been paid. The company should provide a detailed explanation as to this. It should provide explanation as per the provision of law.

8. As for the other revenue land of the project, as per the section 67(a) of the Revenue act, when the land is transferred for other purpose i.e. to non-agricultural purpose,

provided for the land by the collector and taluka development officer. As for this the audit has also been conducted by the CAG being the audit department of government. The collector issues number of notices to the company for paying the above mentioned amount but the company has not paid this revenue amount. The amount of revenue is outstanding for this land and therefore project cannot be initiated. The company should provide a detailed explanation as to this. 154

9. What arrangement will have the company undertake for the hazardous waste (as per Hazardous and Other Wastes Rules) coming from the project?

10. What taxes would be paid during the duration of Copper Smelter Project scheme? What would be the approximate annual tax amount?

11. While kind of five thousand jobs shall be created due to Copper Smelter project? How many local persons shall be employed in these services?

12. What arrangement has the company made for the primary requirement of the community such as health services, educational facilities, roads facilities, etc? What is the preparation of the company for improvement in the social structure of the affected individuals/villages?

13. How much fund would the company allot for environmental conservation and in what manner will it be used?

14. Even prior to this, the company had for another project clearly violated the conditions laid down under the environment clearance and costal regulations zone and thereby had violated the condition of not cutting mangroves and filling creek. The company has been issued show cause notices by the environmental department and penalty has also been paid. Thus even the environmental conditions laid down for this project shall also not be complied with, serious problems as to environment shall emerged around the project area and therefore our clients want that the Examination-in-Chief and NOC along with other approvals should not be provided to the company. Thus my clients have clear objections against this project.

Date: 04.04.2017

Sd/- illegible
Ravilal K. Maheshwari
Advocate on behalf of 1) Aatu Maleshi Maheshwari and 2) Damji Malshi Maheshwari
Advocate, Mundra Kutch

Through me,
Ravilal K. Maheshwari
Advocate
O.15, Ground floor,
Adarsh Tower, Mundra-Kutch.

C-Q-2 (A)

પી.સી. ગાઢવી

વિપક્ષ પક્ષનો નેતા

ભૂતપૂર્વ પ્રમુખ, તાલુકા પંચાયત, લખપત

P.C. Gadhavi

Leader of Ruling Party

EX President, Taluka Panchayat, Lakhpat

Date

6th April 2017

To,
The Member Secretary
Gujarat Pollution Control Board
Gandhinagar

Subject : **Objection application against Proposed Greenfield Copper Refine plant by Adani Enterprise Ltd.**

Respected Sir,

Refer to the newspaper notification published by your department on the Environmental Clearance sought by Adani Enterprise Ltd. to establish 1 unit of Greenfield Copper Refinery plant at Mundra in Kachchh district. Refer to this, a public hearing meeting on environment is scheduled on 29-04-2017 regarding EIA report of the proposed plant. Herewith we request to arrange to take note of our objections and presentations, described point wise as under, and to respond in written.

1. Project is cost of the proposed project is estimated to Rs 10000 crores and Rs.900 crores is allocated towards environment maintenance. Thus less then 10% of the project cost is allocated towards most important & vital subject – Environment. We request to provide us the information that as per norms OR as per the GPCB and Forests Acts what percentage of the project cost should be allocated towards environment mainanance? And it is very important that the proposer should be asked to allocate more amount towards Environment maintenance if the above allocation of Rs.900 crores (9% of the project cost) is less than the regulatory provisions.

2. The land where the project is proposed is owned by APSEZ and APSEZ acquired the land from the government for industrial use long back. President of APSEZ allotted this land to Adani Enterprise Ltd. without any kind of consideration, lease contract or sub-lease. As per the order of the honorable High Court of Gujarat, the ownership should be considered changed when any company transfers the land to other company OR its sister concern to use and stamp duty @ 1% of the market price of the land should be deposited with the superintendent of stamps office. So here, (1) Has company obtained the land by taking due regulatory approvals and (2) Has it paid the stamp duty as per the norms? What actions would be taken if the company defaults in these two matters?

: Office :

han Appartment, First Floor, Opp. Commerce College, College Road, V.R. Nagar, Bhuj-Kutch

E-mail : pcgadhavi530@gmail.com | M. 98791 81530

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4. Some portion of the selected land of proposed project falls under Forests. And is a residence of lots of monkeys, which are declared protected vide the regulations of the Indian Forests Act and is our national animal too. They get feed from nearby agricultural areas in daytime and come back in the land portion in the night time as feel unsecured in nearby areas. None of these measures have also been taken in EIA report of this proposed project and steps to be taken to protect monkeys are also mentioned, but these steps are not much clear and need to be discussed in detail we request to clarify on these preventive steps.

4. It is also mentioned that the daily water requirement of 12.8 MLD for the proposed plant will be supplied from the utilization plant established in APSEZ. So any such utilization plant exists in APSEZ ? And, if yes, what is the capacity and where this water is being used also need to be clarified.

5. It is mentioned that the polluted water generated by proposed plant will be treated and be used to grow trees and to develop green belt. But we have doubts that hazardous chemicals mixes in treated sea water while use in plant and to using such water to grow trees and develop Greenbelt, where proposed greenbelt land is also not saline, needs some more clarification.

6. We request to provide us the map of all the lands of the proposed project and of 209 acres land kept reserved to develop greenbelt. Because we doubt that many natural springs exist in these lands and as per norms land can't be level by handling these natural springs. Greenbelt plantation is not possible in many out of this 209 acres land which is kept reserved for greenbelt plantation. DFCB, in consultation with Forests Dept., should choose the lands for greenbelt plantation where trees really can be grown and greenbelt can be developed and the proposer should be asked to provide decrescent land to develop greenbelt. Because it seems that the company is allocating only those non-usable lands instead of good fertile land to develop greenbelt, like it provides land where trees cant be grown OR where land is now usable due to natural river/spring flow passes OR where old ponds, lakes located. Thus company tries to save its good land and allocating only bad land towards very important & vital issue of Environment.

7. It is also mention that Disaster Management system will be set up in the proposed project and high standard risk emission equipments will be used. This point also should be dealt in detail as the oxygen plant to be established in the proposed project will also be operated automatically and possibility is that this may create risk for local community resides surrounding. So, clarification is also important that as per norms how far such plant should be located from the community AND what type of safety guarantee is given by the company if any accident occurs in future AND whether the company obtained all necessary regulatory permissions to establish such plant ?

8. It is mentioned that the total 256.58 hectors land is required and be used to establish the proposed project. Currently 154.08 hector land is available with APSEZ and rest 102.58 hectors land is of Forests Department, will be used. For this whether the company obtained necessary permissions ? Whether local regulatory offices granted NOC ? Whether the

permission is obtained to use forests land for industrial purpose from the authorized regulatory ? And if the forests land is yet not allotted to the company, how this environment public hearing for environment clearance is called before allocation of land?

9. If the company demanded just 16 hectors forest land, whether the Forests Department demanded for alternate lands for alternate forestation against allocation of above said lands and whether Revenue Department clearly intended to provide alternate land for alternate forestation ? If Forests Department has not demanded alternate land OR Revenue Department has not yet responded positively on alternate forestation land demand, how Forests Department can be linked with proposed project? So, land portion based on anticipation of due forest land permission should be removed from the total land requirement detailed matter of the proposed project.

10. APSEZ president allocated the portion of 154.16 hector of land by written statement for the proposed project, but no details of land demand proposal for the proposed project, by the proponent, is mentioned. So details of land demand proposal should be made public and also inform that why permission is not obtained from the Development Commissioner appointed by the central government for ALL administration purpose at APSEZ?

11. Details of local road development are also mentioned in the EIA report of the proposed project. Internal & external roads for the use of company are developed by APSEZ. Toll booth is established on the state owned highway and toll it being collected from the vehicles entering into APSEZ form this toll booth near Mokha chokdi. It seems that nothing is being done for maintenance of internal rural, panchayat or state roads by the company. Many of these internal rural, panchayat, state roads falling under proposed project area are in very poor condition and need maintenance. It is also important to make clear that among these roads which roads company intend to maintain and what new facilities company intend to develop?

12. Health services provided by APSEZ in last 10 years by adopting hospitals, health sub centers, FSW centers in local Mundra, Mandvi area, if any, should also be provided as details of providing health services in local areas also dealt in the proposed project. Company also should clarify on health service facilities provided in these two talukas or anywhere in Kutch, if any.

13. It is informed that 5000 direct new and many indirect employment chances will be generated by the proposed project. Then separately how many skilled, semi skilled and unskilled jobs will be created and clarity also necessary on how many unemployed will be employed from the affected local area. Whether local youths will be trained and employed permanently in the company is also important because lots of localities work in APSEZ on contract basis or through private work contractors on daily wages.

14. Proposed project is intended to be completed within 30 months. Please clarify that from when these 30 months will be counted, 30 months after this environment public hearing OR 30 months after obtaining all necessary regulatory approvals?

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[redacted]

Yours sincerely,

Copy to:-

Hon'ble Development Commissioner,
SEZ Mundra, Kutch

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C-Q-2 (B)

પી. સી. ગઢવી

શાસક પક્ષના નેતા

માજી પ્રમુખ, તાલુકા પંચાયત, લખપત

P.C. Gadhavi

Leader of Rulling Party

EX President, Taluka Panchayat, Lakhpat

Ref No. :

Gujarat Pollution Control Board
RECEIVED ON
R. O., Kutch (East)
12 APR 2017
2338 | SO

Date : તા. ૬–૪–૨૦૧૭

પ્રતિ,
પ્રાદેશિક અધિકારી સાહેબશ્રી,
ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ (પૂર્વ વિભાગ)
રૂમ નં. ૨૧૫–૨૧૬, બીજો માળ, કંડલા પોર્ટ ટ્રસ્ટ,
વહીવટી બિલ્ડીંગ, સેકટર–૦૮, ગાંધીધામ–કચ્છ.

વિષય : મે. અદાણી એન્ટરપ્રાઈઝ લી. દ્વારા સ્થાપાનાર સુચિત ગ્રીનફિલ્ડ કોપર રિફાઈન્ડ પ્લાન્ટ સંદર્ભે વાંધા અરજી સ્વીકારવા અંગે.

માન. સાહેબશ્રી,

સવિનય જયભારત સાથે જણાવવાનું કે, આપની કચેરીના માધ્યમથી એક અખબારી યાદીમાં ગુજરાત રાજયના કચ્છ જિલ્લાના મુંદરા મધ્યે અદાણી એન્ટરપ્રાઈઝ દ્વારા A.P.S.E.Z. માં ગ્રીનફિલ્ડ કોપર રિફાઈન્ડ યુનીટ–૧ સ્થાપવા માટે અદાણી એન્ટરપ્રાઈઝ લી. દ્વારા પર્યાવરણીય મંજુરી માંગવામાં આવેલ છે તે સંદર્ભે સુચિત પ્લાન્ટના ઈ.આઈ.એ. રીપોર્ટ સંદર્ભે જાહેર પર્યાવરણીય લોકસુનાવણી આગામી તા.૨૯–૪–૨૦૧૭ ના રાખવામાં આવેલ છે ત્યારે આ સુચિત પ્રોજેકટ સંબંધે અમારા વાંધાઓ તેમજ રજુઆત નીચે મુજબ મુદાવાઈઝ લખી મોકલાવેલ છે તેનો લોકસુનાવણીમાં સમાવેશ કરી લેખીત પ્રત્યુતર પાઠવવા વિનંતી છે.

(૧) સુચિત પ્રોજેકટનું કુલ મુડીરોકાણ રૂા.૧૦ હજાર કરોડ આકારવામાં આવેલ છે જયારે આ પ્રોજેકટ સંબંધી પર્યાવરણીય સુરક્ષા તેમજ જાળવણી અર્થે અંદાજિત ૯૦૦ કરોડ રૂપિયાની રકમનો અંદાજ કરવામાં આવ્યો છે ત્યારે કુલ મુડીરોકાણની ૧૦% રકમ પણ પર્યાવરણ જેવા મહત્વના વિષય માટે ખર્ચ કરવામાં નહી આવે ત્યારે ખરેખર આ પ્રોજેકટ સંબંધી કેટલી રકમ પર્યાવરણીય જાળવણી હેતુ અનામત રાખવાની હોય અથવા GPCB તેમજ ફોરેસ્ટ એકટ મુજબ પ્રોજેકટના કુલ મુડીરોકાણની કેટલા ટકા રકમ પર્યાવરણની જાળવણી હેતુ વાપરવાની હોય છે તેની સ્પષ્ટ જાણકારી આપશો તેમજ કંપની દ્વારા સુચિત પ્લાન્ટ માટે પર્યાવરણ હેતુ ૯% રકમની જોગવાઈ કરવામાં આવી છે તે જો ઓછી હોય તો કંપનીને તેટલી રકમ વધારવા કહેવામાં આવે તે જરૂરી છે.

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(૨) સુચિત પ્રોજેકટ જયાં સ્થાપવાનો છે તે જમીન A.P.S.E.Z. ની છે અને A.P.S.E.Z. દ્વારા સરકારશ્રી પાસેથી વર્ષો પહેલા ઔદ્યોગીક વપરાશ હેતુ મેળવાયેલ છે અને આ જમીન સુચિત પ્રોજેકટ સ્થાપવા અદાણી એન્ટરપ્રાઈઝ લી. પાસેથી કોઈપણ પ્રકારની અવેજની રકમ, ભાડા પટે આપવાનો કરાર કે સબલીઝ આપવાની પ્રક્રિયા કર્યા વિના પ્રેસીડેન્ટ A.P.S.E.Z. દ્વારા ફાળવી દેવાઈ છે ત્યારે કોઈપણ એક કંપની અન્ય કંપનીને અથવા તેની ભગીની કંપનીને જમીન વપરાશ હેતુ આપે અથવા તેના નામે ટ્રાન્સફર કરે તેવા સંજોગોમાં નામદાર હાઈકોર્ટના હુકમ મુજબ તે જમીન ફેરફારને પાત્ર ગણવામાં આવી છે અને આવી જમીનની હાલની બજાર કિંમત પ્રમાણે ૧% રકમ સુપ્રિન્ટેન્ડેન્ટ ઓફ સ્ટેમ્પસની કચેરીમાં સ્ટેમ્પ ડયુટી તરીકે ભરવાની હોય છે ત્યારે આ કંપની દ્વારા જમીન ટ્રાન્સફર અંગે જમીન ફાળવનાર ઓથોરીટી સમક્ષ માંગણી કરી મંજુરી મેળવેલ છે કે કેમ? તથા સ્ટેમ્પ ડયુટી ભરવાના કિસ્સામાં સ્ટેમ્પ ડયુટી ભરેલ છે કે કેમ? તે જણાવશો તથા આ બંને કિસ્સામાં આવી કોઈ કાર્યવાહી ન થવાના કિસ્સામાં કંપની સામે શું પગલા લેવામાં આવશે?

(૩) સુચિત પ્રોજેકટ માટે કંપની દ્વારા જે સ્થળની પસંદગી કરાઈ છે તે તે જમીનનો અમુક ભાગમાં વન વિભાગની જમીન આવે છે પરંતુ આ વિસ્તારમાં ભારતીય વન અધિનિયમની જોગવાઈ મુજબ જેને રક્ષીત ગણવામાં આવ્યા છે અને ભારતના રાષ્ટ્રીય પક્ષી તરીકે માન્યતા આપવામાં આવી છે તે મોર પક્ષીઓ અહીં મોટા પ્રમાણમાં વસવાટ કરે છે કારણ કે દિવસે તેઓ આજુબાજુના ખેતીલાયક વિસ્તારમાં જઈ ત્યાં ભરણપોષણ કરી આવે છે પરંતુ ત્યાં રાત્રીના સમયે અસુરક્ષીતતા અનુભવતા હોઈ તેઓ રાત્રે આ વિસ્તારમાં પરત ફરી રાત્રી રોકાણ કરે છે અને સુચિત પ્રોજેકટ માટે બનાવાયેલ ઈ.આઈ.એ. રીપોર્ટમાં પણ મોર પક્ષી વિશે ઉલ્લેખ કરાયેલ છે તેમજ મોર પક્ષીના રક્ષણ માટે યોગ્ય પગલા ભરવામાં આવશે તેવું જણાવેલ છે પરંતુ તેમાં જણાવેલ કારણો ઘણા અસ્પષ્ટ છે અને અમારી દ્રષ્ટિએ અપુરતા પણ છે ત્યારે આ બાબતે યોગ્ય ખુલાસો કરવા વિનંતી છે.

(૪) સુચિત પ્રોજેકટ માટે વપરાશમાં લેવામાં આવનાર પાણી જેની દૈનિક જરૂરીયાત 32.8 MLD છે તે પાણી A.P.S.E.Z. માં બનાવાયેલ યુટીલાઈઝેશન પ્લાન્ટમાંથી લેવામાં આવશે તેવું જણાવેલ છે પરંતુ હાલમાં A.P.S.E.Z. માં કોઈ આવો પ્લાન્ટ અસ્તિત્વ ધરાવે છે કે કેમ? અને જો આવો પ્લાન્ટ ઉપલબ્ધ હોય તો તેની પાણી સંગ્રહ શકિતની કેપેસીટી અને હાલમાં તે પાણી કયાં કયાં વપરાય છે તેની વિગતો આપવી જરૂરી છે.

(૫) સુચિત પ્રોજેકટમાં વપરાશ બાદ ગંદા પાણીને શુધ્ધિકરણ કરી બાદમાં તેને પ્લાન્ટના ગ્રીનબેલ્ટ વિસ્તારમાં વૃક્ષો ઉછેરવા માટે વાપરવામાં આવશે તેવું જણાવેલ છે પરંતુ અમને એવી શંકા છે કે દરિયાઈ ખારા પાણીને શુધ્ધ કરી પ્લાન્ટમાં વપરાશ કર્યા બાદ તેમાં અતિગંભીર પ્રકારના રસાયણો અને જોખમી કચરો ભળે છે અને જે વિસ્તારમાં વૃક્ષ વાવેતરની કામગીરી કરવાની છે તે જમીન પણ થોડીક ક્ષારયુકત છે ત્યારે આ પાણી વૃક્ષો ઉછેરવા માટે વપરાશમાં લેવાનું કારણ યોગ્ય લાગતું નથી ત્યારે આ બાબતે ખુલાસો કરવો જરૂરી બની જાય છે.

(૧૪) સુચિત પ્રોજેકટને ૩૦ માસમાં પુરો કરવાનો આયોજન કરેલ છે ત્યારે આ પ્રોજેકટને પર્યાવરણીય લોકસુનાવણી બાદ ૩૦ મહિનામાં પુરો કરવામાં આવશે કે ત્યારબાદ તમામ પ્રકારની મંજુરીઓ મળ્યેથી ૩૦ માસનો સમયગાળો ગણવામાં આવશે તેની સ્પષ્ટતા કરશો.

(૧૫) સુચિત પ્રોજેકટ જયાં સ્થપાઈ રહયો છે તે વિસ્તાર ઔદ્યોગીક ગીચતા ધરાવતો વિસ્તાર છે આ વિસ્તારમાં અગાઉ અનેક પ્રકારના નાના મોટા ઉદ્યોગો આવેલા છે, તેમજ આ વિસ્તારની નજીક પણ ઘણા બધા ઉદ્યોગો આવેલા છે તેમજ પોર્ટ સેકટરનો વિકાસ થવાથી અહી નાના મોટા વાહનોની અવર જવર ખુબ જ મોટી સંખ્યામાં છે તેથી અહી ઔદ્યોગીક પ્રદુષણનું પ્રમાણ વધારે માત્રામાં છે ત્યારે આ વિસ્તારમાં આ એકમ સ્થાપવાથી આ વિસ્તારમાં હવા પ્રદુષણ, જળ પ્રદુષણ વિગેરે વધવાની ભારે શકયતા છે ત્યારે આ વિસ્તારમાં આ નવા ઉદ્યોગ આવવાથી નજીકની ખેતીવાડીને ભારે નુકશાન થશે, ભૂગર્ભજળ દુષીત બનશે તેમજ લોકોના સ્વાસ્થ્ય પર પણ તેની અવળી અસર પડવાની પુરેપુરી સંભાવના છે ત્યારે આ વિસ્તારમાં આ ઉદ્યોગ પ્રજા તેમજ પર્યાવરણના હીતમાં જોખમી સાબીત થશે ત્યારે આ અંગે સ્પષ્ટ ખુલાસો કરવાની જરૂર છે.

આમ અમારી ઉપરોકત રજુઆત પરત્વે સત્વરે તપાસ હાથ ધરી અમોને તે પ્રશ્નોના પ્રત્યુતર લેખીતમાં પાઠવવા તેમજ અમારી આ તમામ પ્રશ્નાવલીનો સમાવેશ પર્યાવરણીય લોકસુનાવણીની મિનિટસમાં કરવા વિનંતી છે.

આપનો વિશ્વાસુ,

નકલ રવાના :–
કલેકટર સાહેબશ્રી, ભુજ–કચ્છ.

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Ref: PM/MP/2784/2017 **Date: 24/04/2017**

C-Q-3

To,
Member Secretary
Gujarat Pollution Control Board
Gandhinagar

Sub: Environmental Public Hearing of M/s. Adani Enterprises Limited Village(s) :Siracha and Navinal, Taluka: Mundra, District: Kutch is scheduled on 27th April 2017

Sir,

We have studied the draft EIA report of the above-mentioned project. Following are our observation/comments/questions regarding project and draft EIA report.

1. What was the previous land use of the land for proposed project? Has Industry obtained NA permission for the land? Please provide the document.
2. How the required land for the project is acquired? Was it a government or private land?
3. When was environmental clearance for this project in Form I applied?
4. What is the status of NOC application to GPCB for this project?
5. What is the status of Forest & CRZ clearance for this project? Please provide a copy of both of these clearances.
6. How many mangrove trees will be uprooted due to this project? What is exact restoration plan for mangrove trees which would be displaced due to this project?
7. What type of precautionary measures are to be taken to avoid negative impact of construction activities on marine environment, water quality, inter tidal and sub tidal habitat and sediment quality ?
8. Please give exact dates of ambient air quality, surface water, ground water, noise monitoring and soil quality monitoring.
9. How will the project proponent plan to get coal – pet coke, met coke as a fuel in regular basis? Please provide any agreement made with the supplier.
10. What is the regular monitoring plan that shall be carried out for odor control by the projectproponent?
11. Please justify domestic water requirement.
12. Please provide complete details of each ETP Units.
13. Is there any cost-benefit analysis carried out for proposed project's benefits vs loss of ecosystem including flora, fauna and vegetation?
14. Please give name of registered recycler to whom nickel sludge, arsenic bearing sludge, used oil and oil sludge will be sent for disposal.
15. How many local people will getemployment through this project?
16. What will be action plan for socioeconomic development of an area by project proponent?

$50 26/4/2017

PARYAVARAN MITRA

(Regd No. E/20934/Ahmedabad)

502, Raj Avenue, Bhaikaka Nagar Road, Nr. Thaltej Cross Road, Thaltej, Ahmedabad - 380 059

Phone . (079) 26851321

Email : paryavaranmitra@yahoo.com Website : http://paryavaranmitra.org.in

17. What activities industry will take up as a part of CSR and what will be the budget for it?
18. Please give detail list of people who will be responsible for implementation of EMP?
19. We request you to consider inspection report of the Committee headed by Ms. Sunita Narain that was constituted by MoEF for M/s Adani Port and SEZ Ltd, Mundra which submitted its report in April 2013 before granting environmental clearance.
20. We also request you to consider all the Supreme Court's pending and disposed cases that are filed against Adani Group of companies.

Yours truly,

Mahesh Pandya

CC: 1. Collector, Kutch
2. Regional officer, GPCB Kutch

(C-Q-4

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11th April 2017

K.C. Mistry
Member Secretary
Gujarat Pollution Control Board (GPCB)
ParyavaranBhawan, Sector 10 A,
Gandhinagar, Gujarat
Email: membersecretarygpcb@gmail.com; ms-gpcb@gujarat.gov.in

Subject: Cancellation of public hearing scheduled for 29.4.2017 and rejection of EIA related to Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in MundraTaluka, Kutch, Gujarat

Dear Sir,

This is with reference to the public hearing for the above mentioned copper refinery project scheduled for 29.4.2017 in Mundrataluka, Kutch [Attached as Annexure 1]. We would like to present to you certain facts and request you to immediately cancel the public hearing and reject the EIA on clear legal grounds.

Non compliance of ToR and violation of MoEFCC circular dated 31.11.2011

- Section 5 (i) of the Terms of Reference (ToR) issued for the project on 21st June 2016, clearly indicates that the project proponent has to provide a copy of the*"Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable)."*[Attached as Annexure 2]
- Further as per the EDS by MoEFCC uploaded on the website athttp://environmentclearance.nic.in/auth/FORM_A_PDF.aspx?cat_id=1A/GI/IND/5300 4/2016&pid=Newand accessed on 8.4.2017, it is clearly indicated that "Forest Clearance Under Process". The file is under process in file number 8-04/2016-FC. A copy of this web page is attached with this letter. [Attached as Annexure 3]
- In the EIA report on Page No. AI-14, it has also been stated that the forest clearance is pending at the level of the central government [Attached as Annexure 4]

This clearly indicates the project proponent is yet to obtain forest clearance and **has not complied with the Terms of Reference (ToR)**, making the EIA report liable for rejection.

In this regard we would also like to bring your attention to (attached) to an Office Memorandum of the **MoEFCC dated 31.11.2011** which clearly emphasizes the need for forest clearance prior to either appraising or granting environmental clearance. In the case of greenfield projects like the copper refinery**Section III (iii) of this circular**[Attached as Annexure 5] clearly states that:*"In case of any green field project, which involves diversion of forest land, the project proponents are advised to re-examine the requirement of forestland and submit the proposal without forestland for consideration of the EAC. Otherwise, the proponent should submit the proposal for TORs under the EIA Notification, 2006 only after applying the stage-1 forestry clearance for the forestland involved inthe project."*

As you are aware **Section 8 (vi) of the EIA notification, 2006** clearly states: *"Deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis..."*

We therefore request you to take immediate action by:

1. Cancelling the public hearing scheduled for 29.4.2017 in Mundra
2. Reject the application attracting the Section 8 (vi) of the EIA notification.

We look forward to your immediate action and cooperation in this regard.

Sincerely,

Gajendrasinh Jadeja,
Sarpanch, Navinal Village,
MundraTaluka, Kutch District
Gujarat

CC:

1. ShriArvindAgarwal, Chairman, GPCB, Gujarat (chairman-gpcb@gmail.com)
2. Regional Officer, GPCB, Gujarat (collector-kut@gujarat.gov.in)
3. M.A. Gandhi, District Collector, Kutch (rogpcb.eastkutch@gmail.com)
4. M.K.Singh, Joint Secretary, MoEFCC New Delhi (mk.singh65@ias.nic.in)

માંડવીમાં ચોરી બાબતે ત્રાડકે આપતા ઠેકેદાર ઉપર વોચમેન દ્વારા હુમલો

ભુજ, તા. ૨૫ : માંડવી મામલેદાર બાંધકામ સાઇટ ઉપરથી નાની-મોટી ચોરીનો અવાનવાર બનાવો બનતા હોવાનું અનુમાન હોઇ ગત રમઝાનીલાલ છેડા (ઉ.વ.૪૮) ભુજ તેમના વોચમેન અને તેના પુત્રને ચોરી કરતા ઝડપી પાડયા હતા. તેમણે અગાઉ ચોરી કર્યાનું કબૂલ્યું હતું.

માંડવીમાં લાલ બંગલા પાસે આવેલ સરકારી આ મકાન બની રહ્યું છે. આજુબાજુથી ખાતે નજર રાખવા માટે વોચમેન તરીકે રેમાબાઇ ભોજા ચૌહાણ રહેતા હોઇ ત્યાં ચોરી કરવા આવેલા ઠેકેદાર સંચાલક છેકર્ન સારવાર માટે ભુજ ખસેડાયા હતા. તેમણે અગરબત્તી અને તેના પુત્ર સામે ફરિયાદ નોંધાવી હતી.

આરોપી અગરબત્તી કબ્રસ્તાન સામે ઉપર ચોરીકર તરીકે રેમાબાઇ હતો. તે નાની-મોટી ચોરી કરતો હોવાથી તે બંનેને ઠપકો આપતાં હુમલો કર્યાનો હતો તેવું ફરિયાદમાં જણાવાયું છે.



કોટડા ચકારમાં મેગા મેડિકલ કેમ્પ હેઠળ ૪૫૦ દર્દીની થઇ તપાસણી

ભુજ, તા. ૨૫ : તાલુકાના કોટડા (ચકાર) ખાતે એકેડેમિક એક્ટિવિટીસી હોસ્પિટલ, ભુજ અને વોચમેન વિદ્યાર્થી એજ્યુકેશન મેગા મેડિકલ ફ્રી કેમ્પ યોજાયો હતો. ભુજના તબીબો ડો. નયના ગોર, ડો. પ્રવેશ ઠક્કર, ડો. તારક ભગી, ડો. વિજય સોલં, ડો. ડોલર (૧૪૮૨મી યોજનાના મેગા તબીબો દ્વારા ૪૫૦ દર્દીની તપાસણી તથા નિદાન કરાયું હતું.

ભાજપ કાર્યકરોને કેમ ભાજપી ઉમેદવારનું જ ચિત્રણ નથી ?

ભાજપ કાર્યકરોને કેમ ભાજપી ઉમેદવારનું જ ચિત્રણ નથી ?

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F. No. J-11011/113/2016-IA.II(I)
Government of India
Ministry of Environment, Forest and Climate Change
(I.A. Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Aliganj,
New Delhi - 110003
E-mail: satish.garkoti@nic.in
Tel: 011-24695316

Dated: 21st June, 2016

To

M/s Adani Enterprises Limited,
Sambhaav House,
Judges Bungalow Road, Bodakdev ,
Ahmedabad, Gujarat-380015.

Subject: Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat - prescribing of ToRs regarding.

Sir,

This has reference to your online application No. IA/GJ/IND/53004/2016 dated 21st April, 2016 along with the application in prescribed format (Form-I), copy of pre-feasibility report and proposed TORs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at S.No. 3(a), under category 'A' of the Schedule of EIA Notification, 2006 and appraised at the Central level.

2.0 M/s. Adani Enterprises Limited proposes to install a new manufacturing unit for 10 LTPA copper project. It is proposed to set up the plant for Copper Cathode based on Pyrometallurgical process technology and Electro-refining process. The proposed unit will be located at Adani Port Special Economic Zone (APSEZ) land (Siracha and Navinal Villages), Mundra Taluka, Kutch District, Gujarat State. The proponent has provided 3 sites for the project and proposed to set up the plant at Site-II. The land required for the project is 256.58 ha, out of which 154.18 ha is for industrial use and 102.38 ha is forest land. It has been informed that state government has recommended the forest diversion proposal to the Central Government. The proponent has also informed that the merits for selecting Site-II for the project inter-alia include proximity to west port from where major raw material will be imported, major part of land is within the notified SEZ and also the forest land diversion proposal is forwarded by the State government to Central Government. The proposed site lies between 22°48'55.78" N Latitude and 69°34'32.02" E Longitude. There are no national parks/ wildlife sanctuary within 10 km radius. The project area falls under Seismic Zone V. The estimated project cost is Rs. 10,000 Crore and the estimated environment protection cost is Rs. 900 crores. Employment generation from proposed project will be about 2000 direct employment and about 5000 indirect employment. The proposed capacity for different products for new site area as below;

Name of Unit	No. of Units	Capacity of each Unit	Production Capacity
Copper Smelter plant	2	4.5 LTPA	9 LTPA
Copper Refinery plant	2	5.0 LTPA	10 LTPA

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Continuous cast copper rod plant	2/3	2.5/ 1.67 LTPA	5 LTPA
Copper scrap melting facility	2	0.5 LTPA	1 LTPA
Sulphuric acid plant	2	15 LTPA	30 LTPA
Phosphoric acid plant	2	2.5 LTPA (100% P_2O_5)	5 LTPA (100% P_2O_5)
Aluminium Fluoride plant	2	15,000 TPA	30,000 TPA
Selenium Recovery plant	2	144 TPA	288 TPA
Precious metal recovery plant (Gold)	2	25 TPA	50 TPA
Precious metal recovery plant (Silver)	2	250 TPA	500 TPA
Oxygen (Industrial) Plant (95% Purity)	2	45,000 TPM	90,000 TPM
Waste heat recovery boiler	2	25 MW	50 MW

3.0 The electricity load required is 300 MW, out of this, 40 MW will be generated from internal process steam by waste heat recovery; whereas the remaining 260 MW power will be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd. Company has also proposed to install 6 DG Set of 1200 - 2000 KVA Each, as a backup facility.

4.0 Proposed raw material requirement for project are Copper concentrate and Rock phosphate. Requirement would be fulfilled by importing as well as from domestic market. Fuel consumption will be mainly Furnace Oil, LPG/NG and Coal for process requirement. Water Consumption for the proposed project will be 32,800 KLD desalinated water and waste water generation will be nil outside the project boundary. Domestic waste water will be treated through Sewage treatment plant and industrial waste water generated will be treated in the Effluent Treatment Plant & through reverse Osmosis plant and reused in the process. ETP Sludge shall be disposed as per applicable hazardous waste management rules.

5.0 The above proposal was considered by the Expert Appraisal Committee (Industry) during its 6th meeting held on 3rd – 4th May, 2016 for prescribing TORs for undertaking detailed EIA/EMP study.

6.0 Based on the information furnished and presentation made by the project proponent, the Committee recommended prescribing following specific TORs for undertaking detailed EIA and EMP study in addition to the generic TOR enclosed at **Annexure I read with additional TORs at Annexure-2.**

i. The Public Hearing for the project should be conducted by Gujarat Pollution Control Board
ii. The issues raised during public hearing and commitment of the project proponent on the same along with time bound action plan to implement the commitment and financial allocation thereto should be clearly provided.
iii. The project proponent should carry out social impact assessment of the project as per the Office Memorandum No. J-11013/25/2014-IA.I dated 11.08.2014 issued by the Ministry regarding guidelines on Environment Sustainability and CSR related issues. The social impact assessment study so carried out should form part of EIA and EMP report.
iv. Plan for management of Arsenic bearing sludge should be submitted.

v. Hazardous management plan for handling of all hazardous material including minerals, products and waste, like H_2SO_4 and Arsenic sludge should be prepared by the project proponent and submitted.

7.0 The undersigned is directed to inform that the Ministry of Environment, Forest and Climate Change (MoEFCC) after accepting the recommendation of the EAC (Industry), hereby decided to accord ToRs for the above project.

8.0 It is requested that the draft EIA Report may be prepared in accordance with the above mentioned specific TORs and enclosed generic TORs and additional TORs and thereafter further necessary action including conduct of public consultation may be taken (if required) for obtaining Environment Clearance in accordance with the procedure prescribed under the EIA Notification, 2006 as amended.

9.0 The TORs are valid for a period of three years from today i.e 21.06.2016 and will expire on 20.06.2019. However, this period could be further extended by a maximum period of one year provided an application is made by the project proponent at least three months before the expiry of the validity period, together with updated Form-I, based on proper justification.

21/06/2016

(Dr. Satish C. Garkoti)
Scientist 'F'

Copy to:-

1. The Secretary, Department of Environment, Government of Gujrat.
2. The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, E-5 Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal – 462016.

(Dr. Satish C. Garkoti)
Scientist 'F'

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ANNEXURE-I

GENERIC TERMS OF REFERENCE (TOR) IN RESPECT OF INDUSTRY SECTOR

1. Executive Summary
2. Introduction
   - i. Details of the EIA Consultant including NABET accreditation
   - ii. Information about the project proponent
   - iii. Importance and benefits of the project

3. Project Description
   - i. Cost of project and time of completion.
   - ii. Products with capacities for the proposed project.
   - iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
   - iv. List of raw materials required and their source along with mode of transportation.
   - v. Other chemicals and materials required with quantities and storage capacities
   - vi. Details of Emission, effluents, hazardous waste generation and their management.
   - vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
   - viii. Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided
   - ix. Hazard identification and details of proposed safety systems.
   - x. Expansion/modernization proposals:
     - a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report.
     - b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

4. Site Details
   - i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
   - ii. A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet (including all eco-sensitive areas and environmentally sensitive places)
   - iii. Co-ordinates (lat-long) of all four corners of the site.
   - iv. Google map-Earth downloaded of the project site.

v. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

vi. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.

vii. Landuse break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)

viii. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area

ix. Geological features and Geo-hydrological status of the study area shall be included.

x. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)

xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.

xii. R&R details in respect of land in line with state Government policy

5. **Forest and wildlife related issues (if applicable):**

i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable).

ii. Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (*in case of projects involving forest land more than 40 ha).*

iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.

iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.

v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.

vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife

6. **Environmental Status**

i. Determination of atmospheric inversion level at the project site and site-specific micro-metebrological data using temperature, relative humidity, hourly wind speed and direction and rainfall.

ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with – min.,

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max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

iv. Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.

v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC.

vi. Ground water monitoring at minimum at 8 locations shall be included.

vii. Noise levels monitoring at 8 locations within the study area.

viii. Soil Characteristic as per CPCB guidelines.

ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.

x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.

xi. Socio-economic status of the study area.

7. Impact Assessment and Environment Management Plan

i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.

ii. Water Quality modelling – in case, if the effluent is proposed to be discharged in to the local drain, then Water Quality Modelling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain.

iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.

iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.

v. Details of stack emission and action plan for control of emissions to meet standards.

vi. Measures for fugitive emission control

vii. Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.

viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.

ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.

x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.

xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.

xii. Action plan for post-project environmental monitoring shall be submitted.

xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.

8. Occupational health

i. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.

iii. Annual report of heath status of workers with special reference to Occupational Health and Safety.

iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

9. Corporate Environment Policy

i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.

ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.

iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.

iv. Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

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10. Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.

11. Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

12. 'A tabular chart with index for point wise compliance of above TORs.

13. The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports along with Public Hearing Proceedings (wherever stipulated).

The following general points shall be noted:

i. All documents shall be properly indexed, page numbered.
ii. Period/date of data collection shall be clearly indicated.
iii. Authenticated English translation of all material in Regional languages shall be provided.
iv. The letter/application for environmental clearance shall quote the MOEF file No. and also attach a copy of the letter.
v. The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report.
vi. The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report
vii. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MOEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry shall also be followed.
viii. The consultants involved in the preparation of EIA-EMP report after accreditation with Quality Council of India (QCI) /National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA-EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIA-EMP Report as well as on the cover of the Hard Copy of the Presentation material for EC presentation.
ix. TORs' prescribed by the Expert Appraisal Committee (Industry) shall be considered for preparation of EIA-EMP report for the project in addition to all the relevant information as per the 'Generic Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006. Where the documents provided are in a language other than English, an English translation shall be provided. The draft EIA-EMP report shall be submitted to the State Pollution Control Board of the concerned State for conduct of Public Hearing. The SPCB shall conduct the Public Hearing/public consultation, district-wise, as per the provisions of EIA notification, 2006. The Public Hearing shall be chaired by an Officer not below the rank of Additional District Magistrate. The issues raised in the Public Hearing and during the consultation process and the commitments made by the project proponent on the same shall be

x. included separately in EIA-EMP Report in a separate chapter and summarised in a tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the Ministry for obtaining environmental clearance.

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ANNEXURE-2

METALLURGICAL INDUSTRY (FERROUS AND NON-FERROUS)

1. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (material and energy balance).
2. Emission from sulphuric acid plant and sulphur muck management.
3. Details on installation of Continuous Emission Monitoring System with recording with proper calibration system
4. Details on toxic metals including fluoride emissions
5. Details on stack height
6. Details on ash disposal and management
7. Complete process flow diagram describing process of lead/zinc/copper/ aluminium, *etc.*
8. Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation
9. Details on Holding and de-gassing of molten metal from primary and secondary aluminum, materials pre-treatment, and from melting and smelting of secondary aluminium
10. Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
11. Trace metals in waste material especially slag.
12. Plan for trace metal recovery
13. Trace metals in water

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Format for Executive Summary

Executive summary of the report in about 8-10 pages incorporating the following:

i. Project name and location (Village, Dist, State, Industrial Estate (if applicable)

ii. Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC.

iii. Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)

iv. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.

v. Measures for mitigating the impact on the environment and mode of discharge or disposal.

vi. Capital cost of the project, estimated time of completion

vii. Site selected for the project – Nature of land – Agricultural (single/double crop), barren, Govt/private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note – in case of industrial estate this information may not be necessary)

viii. Baseline environmental data – air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population

ix. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.

x. Likely impact of the project on air, water, land, flora-fauna and nearby population

xi. Emergency preparedness plan in case of natural or in plant emergencies

xii. Issues raised during public hearing (if applicable) and response given

xiii. CSR plan with proposed expenditure.

xiv. Occupational Health Measures

xv. Post project monitoring plan

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Annex - 3

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APPENDIX I

(See Paragraph-6)

FORM 1

Note : If space provided against any parameter is inadequate,Kindly upload supporting document under 'Additional Attachments if any' at the last part of the Form1. Please note that all such Annexures must be part of single pdf document.

(I) Basic Information

S.No.	Item	Details
	Whether it is a violation case and application is being submitted under Notification No. S.O.804(E) dated 14.03.2017 ?	No
1.	Name of the Project/s Brief summary of project Proposal Number Project Cost (in lacs)	Proposed 10 LTPA Copper Project Annexure-Brief summary of project IA/GJ/IND/53004/2016 1000000
2.	S. No. in the schedule Project Sector	3(a) Metallurgical industries (ferrous & non ferrous) Industrial Projects - 1
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number or wells to be drilled	Proposed Production Capacity: a. Copper Smelter Plant - 9 LTPA b. Copper Scrap Melting Facility - 1 LTPA c. Copper Refinery Plant - 10 LTPA d. Continuous Cast Copper Rod Plant - 5 LTPA e. Sulphuric Acid Plant - 30 LTPA f. Phosphoric Acid Plant - 5 LTPA g. Aluminum Fluoride Plant - 30,000 TPA h. Selenium Recovery Plant - 288 TPA i. Precious Metal Recovery Plant i. Gold – 50 TPA ii. Silver – 500 TPA j. Oxygen (Industrial) Plant – 90,000 TPM (95% Purity) k. Waste Heat recovery boiler b ha,
4.	New/Expansion/Modernization	New
5.	Existing Capacity/Area etc.	-1 ha.
6.	Category of project i.e. 'A' or 'B'	A
7.	Does it attract the general condition? If yes, please specify	No
8.	Does it attract the specific condition? If yes, please specify	No
9.	Location of the project Shape of the project land Uploaded GPS file Uploaded copy of survey of India Toposheet Plot/Survey/Khasra No. Town / Village State of the project	Mundra, Gujarat Block (Polygon) Annexure-GPS file Annexure-Survey of india toposheet APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), un-surveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL Siracha and Navinal Gujarat

Details of State of the project

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S.no	State Name	District Name	Tehsil Name
(1.)	Gujarat	kutch	Mundra

10.	Nearest railway station along with distance in kms	Adipur/Gandhidham, 65 km
	Nearest airport along with distance in kms	Bhuj, 55 km
11.	Nearest Town/City/District Headquarters along with distance in kms	Mundra , 22 km
12.	Village Panchayats, Zila Parishad, Muncipal Corporation, Local body (Complete postal address with telephone nos. to be given)	
13.	Name of the Applicant	Santosh
14.	Registered Address	Adani House, Near Mithakali Circle, Navrangpura, Ahmedabad 380009, Gujarat
15.	**Address for correspondance:**	
	Name of the Company	ADANI ENTERPRISES LTD
	Name of the Applicant	Santosh
	Designation (Owner/ Partner/ CEO)	Head Env and Authorised Signatory for AEL
	Pin code	380015
	E-mail	prasad.suryarao@adani.com
	Telephone No.	079-26565555
	Fax No.	079-25555500
	Copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User Agency .	NIL
16.	Details of Alternative Sites examined, if any. Location of these sites should be shown on a toposheet	Yes
	Uploaded details	Annexure-Uploaded details
17.	Whether part of Interlinked projects?	No
18.	Whether separate application of Interlinked project has been submitted?	N/A
19.	If Yes, MoEF file number	N/A
	Date of submission	N/A
20.	If No, Reason	N/A
21.	**Whether the proposal involves Approval/ Clearance under: if yes, details of the same and their status to be given**	
	(i) Whether the proposal involves approval/clearance under the Forest (Conservation) Act,1980?	Yes
	Status	Forest Clearance Under Process
	MoEF file number	8-04/2016-FC
	MoEF file number	1576.81ha.
	(ii) Whether the proposal involves approval/clearance under the wildlife (Protection) Act,1972?	No
	(iii) Whether the proposal involves approval/clearance under the C.R.Z notification, 2011?	No
22.	Whether there is any Government Order/Policy relevent/relating to the site?	No

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23.	Whether any Forest Land Involved? Area of Forest land Involved (hectares)	 N/A
24.	Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	No
	(a) Name of the Court	N/A
	(b) Name of the Sub court	N/A
	(c) Case No.	N/A
	(d) Orders/directions of the court, if any and relevance with the proposed project	N/A

(II) Activity

1 Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S.No	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Permanent change in land cover and topography will occur due to construction of the proposed industry. Further, forest land of 253 acres (102.38 ha) is also involved which will be converted for industrial use. Forest Clearance is under pursuance, file number is 8-04/2016-FC.
1.2	Clearance of existing land, vegetation and buildings?	Yes	Some shrubs / weeds (mainly prosopis juliflora) present at the site shall be cleared.
1.3	Creation of new land uses?	Yes	381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Permanent change in land cover and topography will occur due to construction of the proposed industry. Further, forest land of 253 acres (102.38 ha) is also involved which will be converted for industrial use. Forest Clearance is under pursuance, file number is 8-04/2016-FC.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	Yes	Will be done prior to construction
1.5	Construction works?	Yes	Construction of manufacturing plants and related ancillary facilities will be carried out
1.6	Demolition works?	No	Not envisaged
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	The temporary labour colony will be constructed for construction workers.
1.8	Above ground buildings, structures or earthworks including linear structures,cut and fill or excavations and fill or excavations	Yes	Construction of manufacturing plants and related ancillary facilities will be carried out.
1.9	Underground works including mining or tunneling?	No	Not envisaged
1.10	Reclamation works?	No	Not envisaged

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1.11	Dredging?	No	Not envisaged
1.12	Offshore structures?	No	Not envisaged
1.13	Production and manufacturing processes?	Yes	Covered in Pre-feasibility report
1.14	Facilities for storage of goods or materials?	Yes	There will be storage of Copper Concentrate and Rock Phosphate in covered sheds, storage and handling area, other required raw materials & chemical, Furnace Oil, LPG/ NG for process requirement and HSD for DG set as power backup.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	Solid waste management and effluent treatment will be provided and the details are given in the Pre-Feasibility Report.
1.16	Facilities for long term housing of operational workers?	No	About 2000 operation workers will be employed. No separate township has been planned for Copper complex. The house for O&M personnel would be provided at APSEZ existing township by augmenting the township, which is around 30 km away from the proposed Copper Complex.
1.17	New road, rail or sea traffic during construction or operation?	Yes	New approach road will be constructed.
1.18	New road, rail, air water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	Yes	New approach road will be constructed. In addition, conveyor belt for transfer of Copper Concentrate and Rock Phosphate from existing Adani West Port to the site will be built.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	Not anticipated.
1.20	New or diverted transmission lines or pipelines?	Yes	New transmission line shall be constructed for construction and operational power tapping from APSEZ Ltd through M/s. Mundra Utility Pvt Ltd.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No	Not envisaged
1.22	Stream crossings?	Yes	Natural drainage passing through the site will be suitably trained and maintained. There will not be any diversion. Further, conveyer for Copper Concentrate and Rock Phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required.
1.23	Abstraction or transfers of water from ground or surface waters?	No	Desalinated water will be supplied by APSEZ Ltd.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	Not envisaged
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Existing approach road to site shall be initially used for movement of personal and transport. For permanent and long term movement of personal and transport of material, new approach road construction or strengthening of existing approach road shall be done as submitted above in Sr. No. 1.17. During operational phase, Copper Concentrate and Rock Phosphate supply will be through conveyor belt and transportation of products through Trucks/ Trailers and tankers etc.
1.26	Long-term dismantling or decommissioning or restoration works?	No	Not envisaged
1.27	Ongoing activity during decommissioning which could have an impact on the	No	Not envisaged

	environment?		
1.28	Influx of people to an area in either temporarily or permanently?	Yes	Approximately 3000 persons will be employed during construction phase and about 2000 people will be employed during operation phase.
1.29	Introduction of alien species?	No	Not envisaged
1.30	Loss of native species or genetic diversity?	No	Not envisaged
1.31	Any other actions?	No	Not envisaged

2 Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	The total land required for Copper project is 634 acres (256.57 ha). Identified land area is not an agricultural land but part of land already designated/recorded as Industrial Land under APSEZ and presently undeveloped. Remaining part of the above land is reserve forest land (253 acres (102.38 ha)), which has been applied for forest clearance.
2.2	Water (expected source & competing users) unit: KLD	Yes	Total 32,800 KLD desalinated water will be sourced from APSEZ Ltd.
2.3	Minerals (MT)	Yes	Total Copper Concentrate consumption for Copper plant is about 32 LTPA and will be imported from Chile/ Brazil/ Canada/ Australia, etc. and also from domestic market as available. Total Rock Phosphate consumption for Phosphoric Acid Plant is about 17.5 LTPA and will be imported from Morocco/ Jordan/ Egypt/ Australia, etc. and also from domestic market as available.
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	Yes	Construction material such as sand, steel, aggregates, etc. will be used. However, the quantification of these materials will be done during detailed engineering stage. These materials will be sourced from local areas.
2.5	Forests and timber (source – MT)	No	Not envisaged
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT),energy (MW)	Yes	Construction phase: The construction power need of around 20 MW would be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd. Operational phase: The estimated power demand for the Copper Smelter plant is 300 MW. Out of this, 40 MW will be generated from internal process steam by heat recovery. Whereas, the remaining 260 MW power will be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd.
2.7	Any other natural resources (use appropriate standard units)	Yes	Silica Sand – 320,000 TPA Quartz – 144,000 TPA Limestone – 80,000 TPA

3 Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate

			quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies	Yes	A detailed risk assessment will be done for the hazardous installations as per applicable Acts and Rules and Emergency plan will be drawn up.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. Insect or water borne diseases)	No	Not envisaged
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	Approximately 3000 persons will be employed during construction phase and approx. 2000 people will be employed during operation phase and it would generate employment opportunities for local people and indirect employment also.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	No	Not envisaged
3.5	Any other causes	No	Not envisaged

4 Production of solid wastes during construction or operation or decommissioning (MT/month)

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	
4.2	Municipal waste (domestic and or commercial wastes)	Yes	Canteen waste will be vermi-composted and used as manure for green belt development. Other municipal waste, if any, will be properly collected and disposed off as per the provision of Municipal Waste Rules.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	The hazardous waste such as spent oil, batteries etc. will be generated which will be disposed as per HW rule. Sludge from ETP will be disposed as per Hazardous waste management rule. Details are mentioned in the PFR Report
4.4	Other industrial process wastes	Yes	Approx. average 5,500 TPD Copper Slag (Iron Silicate/ Ferro Sand) from Copper Smelting Process will be generated. Approx. average 7,000 TPD of Phospho Gypsum from Phosphoric Acid Plant will be generated. The Copper Slag (Iron Silicate/ Ferro Sand) will be utilized in Road/ Embankment Making, Land development, Cement Manufacturing, Shot Blasting, etc. & Phospho Gypsum will be used largely in Cement Manufacturing and as fertilizer.
4.5	Surplus product	Yes	Covered in Pre-feasibility report
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Sewage sludge will be used as manure and Sludge from ETP will be disposed as per Hazardous Waste Management Rules.
4.7	Construction or demolition wastes	Yes	All the construction waste will be re-used for filling up in low lying areas on which soil cover will be given and will be used for as filler materials in landscaped areas.
4.8	Redundant machinery or equipment	Yes	For each equipment there would be always redundant machinery or equipments to cater during the Break-down/Planned maintenance

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4.9	Contaminated soils or other materials	No	Not envisaged
4.10	Agricultural wastes	No	Not envisaged
4.11	Other solid wastes	No	Not envisaged

5 Release of pollutants or any hazardous, toxic or noxious substances to air(Kg/hr)

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	Exhaust emissions from vehicles and equipment deployed during the construction and operational phases result in marginal emissions of SO2, NOX and CO.
5.2	Emissions from production processes	Yes	The emissions will be reduced with the latest environmental technology and will be well within the permissive levels, as: Sulphur Dioxide (SO2): Wet Scrubbers and dispersed through adequate stack height. Hydrogen Fluoride (HF): Scrubbing and dispersed through adequate stack height. Particulate Matter: Bag Filters, ESP, Wet Scrubbers and Cyclones.
5.3	Emissions from materials handling including storage or transport	Yes	Copper concentrate and Rock phosphate will be transported through closed conveyor system. Bag filters will be installed as required. Other raw material and chemicals required for the production processes will be transported with covered truck to ensure that no dust is generated during transportation.
5.4	Emissions from construction activities including plant and equipment	Yes	Fugitive dust is envisaged from transportation of sand, soil etc. during construction activity. These will be transported with covered truck to ensure that no dust is generated during transportation.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	Please refer S. No. 5.4. There will be no odour generation substances.
5.6	Emissions from incineration of waste	No	Not envisaged
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	Not envisaged
5.8	Emissions from any other sources	No	Not envisaged

6 Generation of Noise and Vibration, and Emissions of Light and Heat:

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	All the equipment would be designed on enclosure type so that noise level will be restricted within the permissible limit of exposure.
6.2	From industrial or similar processes	Yes	The other sources of noise will be large rotating machines (e.g., compressors, turbines, pumps, electric motors, air coolers, and fired heaters). But regular maintenance of the equipment will help in reducing

			these noise levels. Acoustic enclosures & anti-vibration pads will be provided. Necessary PPEs will be provided to employees. The green belt proposed at the periphery of the plant. General recommendations for noise management are provided in the General EHS Guidelines.
6.3	From construction or demolition	Yes	During construction stage, the noise level would be kept within the permissible limit.
6.4	From blasting or piling	Yes	Blasting is not envisaged. Piling work will be carried out for different foundation requirements. Sufficient protection to workers will be provided. Vibrations are expected during initial construction stage.
6.5	From construction or operational traffic	Yes	The noise levels from traffic will be maintained well within norms specified by CPCB / GPCB. Minor noise will be generated during the construction phase.
6.6	From lighting or cooling systems	No	Not envisaged
6.7	From any other sources	No	Not envisaged

7 Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	Yes	Minor spills/leakage of liquids occurs on rare occasions, typically during normal maintenance activities. Appropriate system available to route the spills/leakage liquids for treatment. No contamination of land or water because of appropriate flooring.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	Yes	Treated wastewater from STP and ETP will be reused for Horticulture/Gardening. ETP sludge will be sent to authorized disposal facility.
7.3	By deposition of pollutants emitted to air into the land or into water	No	Not envisaged
7.4	From any other sources	No	Not envisaged
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	Not envisaged

8 Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	Petroleum Products (e.g. Furnace Oil, Diesel & LPG) and Met Coke & Pet Coke would be stored in plant Battery Limit. Appropriate fire-fighting arrangement would be set up on the site. No other hazardous substances are envisaged to be used including use of explosives in the Copper Smelter Plant projects. Proper approval and design of storage &handling systems as

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			per "Indian Explosive Act" would be taken. Risk assessment study will be carried out.
8.2	From any other causes	No	Not envisaged
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	Yes	Earthquakes and floods can occur. Earthquake risks: The project site falls in seismic zone-V as per IS 1893 (Part-I): 2002. The plant facility will be designed as per the BIS requirements for earth quake resistant. Flood risk: Chances of occurrence of flood is minimal due to Evacuation of floodwater through natural drainage and drainage system, as the terrain in the study area is flatter with gentle slope towards SW direction.

9 Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: • Supporting infrastructure (roads, power supply,waste or waste water treatment, etc.) • housing development • extractive industries • supply industries • Other	Yes	The proposed plant will result in considerable growth of service sector, which will lead to supporting and ancillary development in the region. There will be a possibility of extractive and supply industries in the region.
9.2	Lead to after-use of the site, which could have an impact on the environment	No	Not envisaged
9.3	Set a precedent for later developments	Yes	Ancillary industries and extractive industries may develop as a consequence.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	Existing Coastal Gujarat Power Ltd. (CGPL) (5x800 MW), Adani Power Limited (4620 MW) and proposed Copper Smelter plant will have cumulative effect. Cumulative impact assessment will be included in the detailed EIA study.

(III) Environmental Sensitivity

S.No	Areas	Name/Identity	Aerial distance (within 15km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	No	Nil
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yes	Reserve Forests: Dandedri RF (within project area) Mundra Mangrove RF (south of project area) Navinal RF (0.5 km, E) Mundra Dhoa RF (0.7 km, SE) Water Bodies Kotri creek (0.5 km, S) Kharl Nadi (1.9 km, W) Gulf of Kachchh (3.9

			km, S) Nagavanti Nadi (4.7 km, E) Phot Nadi (8.7 km, ENE)
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Yes	Mundra Mangrove RF (south of project area)
4	Inland, coastal, marine or underground waters	Yes	Gulf of Kachchh (3.9 km, S) Kotri creek (0.5 km, S)
5	State, National boundaries	No	Nil
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	Nil
7	Defence installations	No	Nil
8	Densely populated or built-up area	Yes	Mundra (22 km)
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Yes	Hospitals, schools, places of worship and other general community facilities exist in the study area.
10	Areas containing important, high quality or scarce resources.(ground water resources,surface resources,forestry,agriculture,fisheries,tourism,minerals)	Yes	Kotri creek (0.5 km, S) Khari Nadi (1.9 km, W) Gulf of Kachchh (3.9 km, S) Nagavanti Nadi (4.7 km, E) Phot Nadi (8.7 km, ENE)
11	Areas already subjected to pollution or environmental damage.(those where existing legal environmental standards are exceeded)	No	Nil
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects	Yes	The project area falls under seismic zone-V as per IS: 1893 (Part-1): 2002.

(IV) Proposed Terms of Reference for EIA studies

1	**Uploaded Proposed TOR File**	Annexure-TOR file
2	**Uploaded scanned copy of covering letter**	Annexure-scanned copy of covering letter
3	**Uploaded Pre-Feasibility report(PFR)**	Annexure-PFR
4	**Uploaded additional attachments(only single pdf file)**	NIL

(V) Undertaking

I hereby give undertaking that the data and information given in the application and enclosures are true to be best of my knowledge and belief and I am aware that if any part of the data and information found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost.

V. (i)	**Name of Applicant**	Santosh
	Designation	Head Env and Authorised Signatory for AEL
	Name of Company (Applicant Name should not be given here)	ADANI ENTERPRISES LTD
	Address	Adani House, Near Mithakali Circle, Navrangpura, Ahmedabad 380009, Gujarat

ANNEXURE-I
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference(TOR)	Compliance
	green field projects)	
	xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company). Balance 253 acres is forest land for which State Govt. has recommended for Forest Clearance (FC) and is at Central Government file number is 8-04/2016-FC.
	xii. R&R details in respect of land in line with state Government policy	There is no Resettlement and Rehabilitation involved in the project.
5	**Forest and wildlife related issues (if applicable)**	
	i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable).	Forest land of 253 acres (102.38 ha) is also involved which will be converted for Industrial use. State Govt. has recommended for Forest Clearance (FC) and is at Central Government, file number is 8-04/2016-FC.
	ii. Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).	Land use map based on 5 m resolution showing the forest land is shown in Figure-3.3.2 of Chapter-3.
	iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted	State Govt. has recommended for Forest Clearance (FC) and is at Central Government file number is 8-04/2016-FC.
	iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.	There are no National Parks, Sanctuaries, Biosphere Reserves within 10 km radius study area. Toposheet showing the 10 km radius study area map on 1:50,000 scale is shown in Figure-1.2 of Chapter-1
	v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.	As per the primary data collected and also from the secondary data sources, Peacock belongs to Sch-I as per Wildlife Protection Act, 1972. Conservation measures are provided in Section-4.2.7.3 of Chapter-4.
	vi. Copy of application submitted for clearance under the Wildlife (Protection) Act,1972, to the Standing Committee of the National Board for Wildlife	Not applicable
6.	**Environmental Status**	
	i. Determination of atmospheric	Report is enclosed as Annexure-VIII.

Annex-5 1584

No. J-11015/200/2008-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110003.
Telefax: 24362434

Dated the 31st March, 2011

Office Memorandum

Sub: Consideration of projects for grant of environmental clearance under EIA Notification, 2006 which involve forestland – Procedure to be followed – Regarding.

Ref: Office Memorandum no. J-11013/41/2006-IA.II(I) dated 2nd December, 2009 regarding Procedure for consideration of proposals for grant of environmental clearance under EIA Notification, 2006, which involve forestland and or wildlife habitat.

The issue regarding consideration of proposals especially mining project for grant of environmental clearance under EIA Notification, 2006, which also involve diversion of forestland has been under consideration for quite some time and circulars / guidelines have been issued in the past in this regard from time to time. In this regard, reference is also invited to para 8 (v) of the EIA Notification, 2006 reads as follows:

"Clearances from other regulatory bodies or authorities shall not be required prior to receipt of applications for prior environmental clearance of projects or activities, or screening, or scoping, or appraisal, or decision by the regulatory authority concerned, unless any of these is sequentially dependent on such clearance either due to a requirement of law, or for necessary technical reasons."

According to the above provision, the environmental clearance under EIA Notification, 2006 is independent of other clearances and submission of clearances under other relevant Acts and Rules as may be applicable to a project is not a pre-requisite for obtaining environmental clearance except in specific cases where it is sequentially dependent on such clearance either due to requirement of law or for necessary technical reason. This aspect was earlier discussed and deliberated and the office memorandum dated 2nd December, 2009 referred to above was an outcome of the same.

However, in view of the complexity of the issues involved, the matter has been considered further in the Ministry and in supersession of the earlier instructions, it has now been decided to adopt the following procedure for consideration of such projects.

I. Projects in Pipeline:

(A) Projects received for TORs and yet to be considered by EAC:

In case of the proposals which have been received for prescribing TORs and involve forestland, in part or in full, and are yet to be considered by the EAC, during consideration of such proposals, clarifications will be obtained from the project proponent regarding feasibility of undertaking the project only in non forestland. In case, the project proponent confirms to undertake the project in non forest area only, the proponent may be advised to submit the revised proposal by deleting the forestland involved in the project. In case, it is not possible to undertake the project without involving diversion of forestland, the project proponent will be asked to first apply for stage-I forestry clearance for the forestland involved in the project and thereafter submit the proposal for obtaining terms of reference as per the procedure prescribed under EIA Notification, 2006.

(B) Projects for which TORs have already been prescribed but the proposal for environmental clearance is yet to be submitted:

In case of the proposals, which involve forestland, in part or in full, and for which TORS have already been prescribed, the project proponents are advised to ensure that the requisite stage-I forestry clearance has been granted and its copy is submitted along with their application / proposal for environment clearance. Alternatively, the proponent should delete from their land requirement, the forestland involved in the project and the proposal so amended without any forestland may be submitted for appraisal by the EAC.

In case of projects where forest diversion (Stage I Clearance) has been approved for part of the total forestland involved in the project, the proposal will be considered only for the land for which forest diversion has been approved and the non forestland, if any. For the purpose, the onus of demonstrating that the project activities will be limited to that much area only would lie with the project proponent and necessary supporting documents will be submitted in this regard.

(C) Projects submitted for environmental clearance based on the TORs prescribed by EAC:

The proposals already submitted for environmental clearance will be appraised by the EAC on their merit and in case of involvement of forestland, the proponent will be asked either to delete the forestland and submit the revised proposal or approach the EAC after the stage-I forestry clearance for

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the forestland involved in the project has been granted, till which time the proposal will stand delisted.

In case of projects for which diversion of forestland has been granted for part of the forestland, the proposal will be appraised taking into account that much of land only (land for which FC granted + Non forestland) for the project activities and the proponent should demonstrate the viability of the project with requisite supporting documents.

(D) Projects already considered by EAC and recommended for grant of environmental clearance:

In accordance with the recommendations of EAC, such projects will be processed on file for obtaining approval of the MEF for grant of environment clearance. After MEF has approved, a communication will be sent to the project proponent informing that the Competent Authority has approved the project; however, the formal environmental clearance will be issued only after the stage-I forestry clearance for the forestland involved in the project has been obtained and submitted. For the purpose, a maximum time limit of one year will be provided to the proponent during which time the proposal will be kept in abeyance. In case, the formal forestry clearance is not submitted within this time frame, the proposal will stand rejected and the process for obtaining environmental clearance will have to be initiated, de-novo, as per the procedure prescribed under EIA Notification, 2006.

II. Expansion Projects:

(i) Mining Projects involving enhancement of production by increasing the depth and or number of shifts, without any increase in lease area and having already obtained the forestry clearance for the forestland involved in the mine lease, shall be considered on merit and decision taken.

(ii) The Expansion projects involving horizontal spread with additional land requirement will be dealt with as green field projects, if additional forestland is to be diverted.

III. Greenfield Projects:

(i) If any green field project does not envisage any diversion of forest land, it would be considered as per the provisions of EIA Notification, 2006.

(iii) In case of any green field project, which involves diversion of forest land, the project proponents are advised to re-examine the requirement of forestland and submit the proposal without forestland for consideration of the EAC. Otherwise, the proponent should submit the proposal for TORs under the EIA Notification, 2006 only after

applying the stage-I forestry clearance for the forestland involved in the project.

(iii) All cases of grant / renewal of EC for any abandoned mine or sick project under revival etc. would be considered as a green field project for appraisal under EIA Notification, 2006 and the procedure mentioned above will be followed.

This issues with the approval of the Competent Authority.

(Dr. S.K. Aggarwal)
Director

To

1. All the Officers of IA Division
2. Chairpersons / Member Secretaries of all the SEIAAs/SEACs

Copy to:-

1. PS to MEF
2. PPS to Secretary (E&F)
3. PPS to SS(JMM)
4. Advisor (NB)
5. Website, MoEF
6. Guard File

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26-4-17

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C-Q-5

રાજય મસ. બાપટ
૧૬, આદેશ ટાવર
મુ. મુદરા
તા. મુદરા- કચ્છ
મો. ૯૦૯૯૦૮૫૭૯૬
તા. ૨૫/૦૪/૧૭

પ્રતિશ્રી
કે.સી.મીસ્ત્રી સાહેબ
મેમ્બર સેક્રેટરી, ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ
પર્યાવરણ ભવન - ગાંધીનગર

25 APR 2017
25
18125 25

વિષય:- તા. ૨૯/૦૪/૨૦૧૭ના રોજ અદાણી એન્ટરપ્રાઈઝીસ લીમીટેડ ના ગ્રીન ફીલ્ડ કોપર રીફાઇનરી પ્લાન્ટ ની પબ્લીક હીયરીંગ રદ કરવા બાબત .

જયભારત સહ ઉપરોક્ત વિષય અનુસંધાને જણાવવાનું કે, ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડની વેબસાઈટ પરથી મળેતી માહિતી અનુસાર , તા. ૨૯/૦૪/૨૦૧૭ના રોજ મુદરા તાલુકાના સિરાચા ગ્રામ ખાતે અદાણી એન્ટરપ્રાઇઝીસ લી. ના ગ્રીન ફીલ્ડ કોપર રીફાઇનરી પ્લાન્ટ માટે જન સુનાવણીનુ આયોજન કરવામાં આવેલ છે. આ કપની દ્વારા કરવામા આવેલ ફાઇટ ઇ.એસ્.એ. મુજબ રહેલી કેટલીક વિગતો નીચે મુજબ છે

માનનિય સાહેબ શ્રી ,

અદાણી એન્ટરપ્રાઇઝો લી.ના ગ્રીન ફીલ્ડ કોપર રીફાઇનરી પ્લાન્ટ માટે મેસર્સ વિમટા લેબ લીમીટેડ , હૈદરાબાદ દ્વારા ઓકટોબર ૨૦૧૬થી ડીસેમ્બર ૨૦૧૬ એમ ત્રણ માસ દરમ્યાનની એક સીઝન દરમ્યાન જ અભ્યાસ કરવામાં કરવામા આવેલ છે અને તેનાં આધાર પર ઇ.આઇ.એ. ઇ.આઇ.એ. તૈયાર કરવામા આવેલ છે
વર્ષ દરમ્યાન ૩ મુખ્ય ઋતુઓ હોય અને દરેક સીઝનમાં વાતાવરણ , પાણીનાં સ્તર, ભૌગોલીક સ્તર પરેની સ્થિતી અને આ દરેક સમયે રેંગાધોગીક સામગ્રીની અસર પણ અલગ અલગ રહેવાની જયારે અહી માત્ર ૩ જ મહીના માટે અભ્યાસ કરીને

RO ને અપીલ કરવી

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ઇ.આઇ.એ. તૈયાર કરવામાં આવેલ છે આથી આ એકમ દ્વારા થનાર કામગીરીની પર્યાવરણ પર થનારી અસરો અંગેનો અભ્યાસ અધૂરો તેમજ ખામીયુકત છે,

આ વિસ્તારમા પહેલાથી જ ઘણા ઔદ્યોગીક એકમો આવેલા છે , તેમજ દરિયા કીનારાથી ખૂબ જ નજીકમા આવેલ હોય તેની અસરો દરિયાઇ પર્યાવરણ પર પણ થવાની શકયતાઓ છે. આસપાસમાં વેરોવા, મડફલેટનો વિસ્તાર , નદીઓ, તેમજ નવીનાળ રીઝર્વ ફોરેસ્ટ અને સીરાચા ખાતે આવેલ વન વિસ્તાર આવેલો છે, જયારે આવા સંવેદનશીલ વિસ્તારમા આ પ્રોજેકટ આવી રહેલો હોય તેની પર્યાવરણ પર થનારી અસર અંગેનો અભ્યાસ એ અધૂરો છે, થનારી અસરો અંગેનો અભ્યાસ 3 મહીનામાં પૂર્ણ કરીને થનારી અસરો અંગેની માહિતી છૂપાવવાનો પ્રયાસ કરવામાં આવેલો છે .

કાર્યકારી સમીક્ષા મા મુદા નંબર-૧ મા જણાવવામાં આવેલ છે તેમ આ પ્રોજેકટ માટે કુલ ૨૫૬.૮ હેકટર જમીનની આવશ્યકતા રહેલ છે જેમાંથી ૧૫૪.૫૮ હે. જમીન એ.પી.એસ.ઇ.ઝેડ. (અદાણી ગ્રુપ કંપની) ની માલીકીની છે તેમજ ૧૦૨.૩૮ હે. વન્ય જમીન પણ સાંકળવામા આવેલ છે .

ઇ.આઇ.એ.કાર્યકારી સમીક્ષા મા મુદા નંબર ૨.૨ માં સ્પષ્ટ જણાવવામાં આવેલ છે, કે વન્ય જમીન માટે રાજય સરકાર દ્વારા ભલામણ કરવામાં આવેલ છે. પરંતુ હજુ સુધી આ જમીન તેમને ફાળવવા મા આવેલી નથી આથી જો યોજના માટે આવી જમીન હોય જ નહી તે પહેલા જ તેવા વિસ્તાર પર એકમની સ્થાપના માટે પર્યાવરણીય સહમતી પત્ર મેળવવા માટેની પ્રકીયા કરવામાં આવી રહી છે, તે સ્પષ્ટ રીતે અધૂરી માહિતી આપે છે,

ઉપરોકત બાબતોને ધ્યાન પર લઇ આપ સાહેબને જણાવવાનુ કે, જયાં સુધી આ ક્ષતી પૂર્તી કરવામાં ના આવે ત્યાં સુધી હાલનો ઇ.આઇ.એ. નો અધૂરો અને ખામી ભરેલો માનીને ૨૯/૦૪/૨૦૧૭નાં રોજ કરવામાં આવી રહેલ જનસુનાવણીન રદ કરવામાં આવે .

" પર્યાવરણનાં ભોગે કોઇ પણ વિકાસ એ વિકાસ નહી , વિનાશની નીશાની છે"

આપેક્ષા સહ

સંજય એસ.બાપટ

1590

C-Q-5
(TRANSLATED)

Sanjay S. Bapat
19, Adarsh Tower
Mundra
Taluka: Mundra- Kutch
Mo. 9099085796

Date: 25/04/17

To,

K. C. Mistry Sir
Member Secretary,
Gujarat Pollution Control Board
Environment Department – Gandhinagar

Subject: Regarding canceling of the public hearing on Adani Enterprise Limited, setting up of Greenfield Copper Refinery Plant.

This is to inform regarding the above mentioned subject that as per the information gathered from the website of Gujarat Pollution Control Board, a public hearing for the Greenfield Copper Refinery Plant, which is being established by Adani Enterprise Limited on 29/04/2017. Some facts regarding the E.I.A. drafted by the company are as follows.

Respected Sir,

A study about the Greenfield Copper Refinery Plant of Adani Enterprise Limited was done only for the three months from October 2016 to December 2016 by M/s Vimta Lab Limited, Hyderabad, and on the basis of it the E.I.A. has been prepared.

There are mainly three seasons in a year and in every season the effect of the industrial activity on the environment, water level, and geography are different. But here the E.I.A. was prepared after the three months study only. Thus, this study of the environmental effects is incomplete/insufficient and faulty.

There are already many industrial projects in this region. Moreover, these projects are close to the coastline so there are possibilities that they can have effects on the coastal environment also. There are mangroves, mudflat, rivers, Navinal Reserve Forest and Siracha forest area in this region. Thus, when a new project is coming up in such an environmentally sensitive region, this three-month study is insufficient. It seems that by completing the study on the future effects of this project, they have tried to hide the facts of the future effects.

In the point no.1 of the official report it has been mentioned that 256.8 hectare land is required for this project. Out of which 154.18 hectare of the land is owned by the APSEZ (Adani Group) and remaining 102.38 hectare is forest land.

In the point no. 2.2 of the EIA report, it has been mentioned that the state government has recommended for the forest land, but this land has not been allotted to the company therefore it is clear that the procedure for obtaining the environmental clearance for this land is being done with incomplete information.

Taking the above mentioned matters in consideration, you are requested that unless and until the requirements are fulfilled, this E.I.A. should be considered incomplete and faulty and the public hearing to be held on 29/04/2017 should be cancelled. "The development that destroys the environment is the sign of the destruction not the development."

Expecting your cooperation,

Sanjay Bapat

Jay Javan Jay Kisan Jay Vigyan

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Kheti Vikas Seva Trust

(Regd No: Gujarat/2016/Pending)
Vill: Zanpura, Tal: Mandvi, Dist: Kutch-370465

C-Q-6

Name: Gadhavi, President, Kheti Vikas Seva Trust

Ref. No:

Date: 27/04/2017

પ્રતિ,

શ્રી અધિક્ષક અધિકારી

વિષય:-

વિષય : કચ્છ જિલ્લાના મુંદ્રા તાલુકાના દરિયા કાંઠે આવેલા ગામ બારોઈ ખાતે હયાત પોર્ટ-ઓથોરિટી ઉપરાંત કાર્યરત અને પ્રસ્તાવિત ઔદ્યોગિક એકમ દ્વારા પ્રોજેક્ટ દરમ્યાન અને કાર્યરત થયા બાદ પર્યાવરણ અને વન વિભાગના નિયમોનું ઉલ્લંઘન થવા બાબત.

Ref:-

1. final report of the High Court's committee on Mangroves as per order dated 5.11.2013 and 01.04.2016 in CA(For Direction) No.9124/2011 in writ petition (PIL) No. 122/2011

2. final report of the High courts committee Headed by retiring principal District Judge Bhuj kutch dated 24.7.2015

3. final report of the Ministries of Environment forest and climate change on Adani Port and SEZ(Sumita Narain Report) 2015

4. Office Memorandum No.J-11013/23/2014-IA.I Government of India Ministry of Environment &Forest Dated 11th August 2014

મહાશય શ્રી/શ્રીમતી સાહેબ,

આ સાથે આપ સાહેબને ઉપરોક્ત વિષયને અનુલક્ષીને ખેતી વિકાસ સેવા ટ્રસ્ટ(K.V.S.T.) ના તરફ થી તારીખ 27.04.17 ના રોજ આપવામાં આવેલ ફરિયાદ અરજી અંગે આપ સાહેબ દ્વારા કરવામાં આવેલ કાર્યવાહી અંગે જાણ કરવા વિનંતી છે.

આપનો વિશ્વાસુ,

ગામ:- બારોઈ, તા:- મુંદ્રા, જિ:- કચ્છ

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આ આવે છે તેમજ તેના માટે ભારત સરકાર પાસેથી C R Z ની મંજૂરી લેવામા આવેલ નથી આથી આ બોબર પ્રોજેક્ટ માટેની લોકસુનવણી રદ કરવામા આવે.

માનનીય સાહેબ ઉપરોક્ત વિષયે જણાવવાનું કે અમે વર્ષ 2011 મા અદાણી પોર્ટ અને અદાણી પાવર ના દ્વારા જે મુન્દ્રા તાલુકાના દરિયાઈ અને આ વિસ્તાર મા જે પર્યાવરણના કાયદાઓનું ભંગ કરવામા આવે છે તેની વિરોધ એક જાહેર હિતની અરજી WPPIL-12/2011 નામદાર ગુજરાત હાઇકોર્ટમા કરવામા આવેલ હતી અને તેમા અદાણી કંપનીના દ્વારા જે પર્યાવરણ અને માનવીય નિયમોનું ભંગ થાય છે તે બંધ કરવામા આવે તેવી વિનંતિ કરવામા આવેલ હતી અને જેમા નામદાર હાઇકોર્ટ અદાણી ને મુન્દ્રા તાલુકા ના દરિયાઈ વિસ્તારમા આવેલ મેંગ્રો ના જંગલ નું જે નાશ કરવામા આવ્યું હતું તે બંધ કરવાનું હુકમ કરવામા આવેલ હતું. ત્યારબાદ પણ અદાણીના દ્વારા આ હુકમનું સતત ઉલ્લંઘન કરવામા આવ્યું જેની સામે અમે કોર્ટના હુકમની અનાદર થાય છે તે બાબતે C A N-912/2011 ના નામે એક નવી અરજી દાખલ કરવામા આવી જેમા નામદાર હાઇકોર્ટે અનેક પ્રકારના હુકમો અદાણી ની સામે કર્યા અને ત્રણ સમિતિઓ બનાવીને આ સમગ્ર કંપનીઓની તપાસ કરવામા આવી જેમા નામદાર હાઇકોર્ટે તારીખ 05.11.2015 ના તેમજ 01.04.2016 ના રોજ અમારી અરજી ઉપર જેના ન.C A 912/2011 મા ઓર્ડર કરીને એક નિષ્ણાત સમિતિ બનાવવામા આવેલ હતી જેમા આ સમિતિમા ગોવા ના પર્યાવરણવિદ ડો.સદીફ અદાનરીસ અને કલકતાના ડો.પુર્ણેશ માજી નો સમાવેશ કરવામા આવેલ હતો અને આ સમિતિના T O R પણ નામદાર ગુજરાત હાઇકોર્ટ ના દ્વારા નક્કિ કરવામા આવેલ હતા જેમા આખાય અદાણી S E Z નું સ્થળ નિરીક્ષણ કરીને અદાણીના પર્યાવરણમા ઉલ્લંઘનનું વિસ્તૃત રિપોર્ટ સોપવાનું કહેવામા આવ્યું આ સમિતિ એ તમામ આ વિસ્તારની મુલાકાત લઈને પોતાનો રિપોર્ટ તૈયાર કર્યો અને વિસ્તૃત રિપોર્ટ નામદાર ગુજરાત હાઇકોર્ટમા 08.06.2016 ના રોજ રજૂ કર્યો સમિતિ પોતાના રિપોર્ટ મા અદાણી મુન્દ્રા ના દરિયાઈ વિસ્તાર ઉપર જે પર્યાવરણના નિયમોનું ભંગ કર્યો છે એવું સાબિત કર્યો છે અને અદાણીને તેના બદલામા ૨૦૦ હેક્ટર જેટલા વિસ્તારમા મેંગ્રોનું વાવેતર કરવાનું જણાવ્યુ છે તેમજ ગુજરાત સરકારના દ્વારા કંપનીને જે

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6000 ઉપર જે જમીન આપવામાં આવેલ છે તે પાણી કરવાર લાઇને તેમજ આ જમીન આપવામા નિયમોનુ ભુક્કા નીકળ પાયા ઉપર ઉલ્લંઘન થયેલ છે જેથી આ અંગેની પાણી લાઇને સરકાર બાને તેમજ જંગલ ખાતાને પાછી આપવામા આવે એવિ અભ્યાસુ કરવામા આવેલ છે. (રિપોર્ટ આ સાથે સામેલ છે)

ગ્રામસેવક સહિત આગેવાન કાર્યકરોએ આ સમિતિને પોતાનુ રિપોર્ટ સુપ્રત કરેલ છે તેમા આ સમિતિ જે જમીન આવી કરવાનુ કહ્યુ છે તેમા જ અદાણી કંપની પોતાનુ કબ્જા દિકાણની પોજરડ સ્થાપિત કરવાનુ ક્ષ ૨૫ આ જણાવેલ છે તેમજ આ સમિતિની રચનાજ સદ્યામણી બાને આ રિપોર્ટ આગેવાન કાર્યકરોએ આ વિચારણીય છે (સબમીટેડ) છે ત્યારે આવી જનસુનવણી જેરબાયકેસર અને ગુજરાત કાર્યકરોની આગેરી આ દબાણ સમાન છે જેથી આ સમગ્ર કાર્યવાહી તાત્કાલિક બંધ કાય તેમજ 29.4.2017 ની પર્યાવરણની મંજુરી બાને ની જન સુનવણી રદ કરવામા આવે. તેમજ જો આ સુનવણી તેના નિર્ધારિત સમય અને તારીખ ઉપરજ યોજુ કરવામા આવશે તો આ સમગ્ર બાબત આગેવાન ગુજરાત કાર્યકરોની આગેવાન હશે તેની નોંધ લેવામા આવે એવિ અમારી આપને વિનંતિ છે.

ગ્રામસેવક સહિત રિપોર્ટમા જણાવ્યા મુજબ તા. ૧૫ જુન વર્ષ 2011 ના અદાણી પોર્ટ બાને અદાણી પાવર લી.ના જમીન સંપાદનના કામોને બંધ કરવા અને આ જમીનના સંપાદનનુ કોઇ નાણાકીય વળતર [illegible] ને ચૂકવવા અંગે [illegible] ના રોજ આગેવાન ખેડૂતોને [illegible] પાણી બાને કરોડોની કરીને કલેક્ટરની [illegible] આગેવાન કાર્યકરો [illegible] ના રોજ આગેવાન ખેડૂતોને [illegible] બાને [illegible] આગેવાન કાર્યકરો [illegible] ના રોજ આગેવાન ખેડૂતોને [illegible] પાણી

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જજ સાહેબ શ્રેટીગ્રાફી અને વિડીયોગ્રાફી સાથે લિવાદિત છે તેવુ જણાવેલ છે તેમજ આ સમગ્ર રિપોર્ટ પણ નામદાર હાઇકોર્ટ ના વિચારધીન (અંદર સબજ્યુડિશ) છે ત્યારે આજ જમીન ઉપર સમાંતરથી રિપોર્ટો નામદાર ગુજરાત હાઇકોર્ટના વિચારધીન છે તો બધી જ હકીકતો અદાણી કંપનીના બારા છુપાવવામા આવેલ છે અને ના તો આ હકીકતો MOEF&CC ને જણાવેલ છે કે ના તો EAC ને જણાવેલ છે જે અતિ ગંભીર બાબત છે જેથી આપ આ લોકસુનવણી ના ચેરમેન છો અને જિલ્લાના ડિસ્ટ્રિક્ટ મેજિસ્ટ્રેટ છો એ હેતુની રુએ અદાણીની આ લોકસુનવણી તાત્કાલિક ધોરણે રદ કરવામાં આવે એવિ અરજ છે અને અમે આપને આ સમગ્ર હકીકતોથી વાકેફ કરીએ છીએ, આમ આ બધીજ હકીકતો નામદાર ગુજરાત હાઇકોર્ટ ના વિચારધીન છે ત્યારે એજ જમીન ઉપર કોપર રિફાઇનરી માટે લોકસુનવણી થાય તે અતિ ગંભીર બાબત તો છે જ પણ કાયદાના પણ વિરુદ્ધ અને નામદાર ગુજરાત હાઇકોર્ટ ના કામમા દખલ સમાન લેખાસે જેથી આ લોકસુનવણી રદ કરવામા આવે એવિ નમ્ર અરજ છે.

માનનીયશ્રી સાહેબ ઉપરોક્ત સદર્ભ નંબર સાથે જણાવવાનું કે વર્ષ 2011 મા અદાણી પોર્ટ અને અદાણી પાવર ના બારા જે મુન્દ્રા તાલુકાના દરિયાઇ અને આ વિસ્તાર મા જે પર્યાવરણના કરાકારખાનુ ચાલ થાય છે તેની સામે સ્થાનિક માછીમારો વતી અને પર્યાવરણ પ્રેમીઓ મા ભારે આક્રોશ ફેલાયો હતો અને તેથી અદાણી પોર્ટ અને અદાણી પાવરને મુન્દ્રા વિસ્તારમા બાંધકામ " કામગીરી કરવા માટે વિવિધ સરતો સાથે પરવાનગીની મંજૂરી આપવામા આવેલ છે જેમાનુ મુખ્ય કારણ અદાણી ના બન્ને પોર્ટ પ્રોજેક્ટમા પરવાનગીની સરતોનુ ભંગ કરવામા આવતુ હોવાથી અને સ્થાનિક લોકો દ્વારા રજુઆત કરેલ હતી અને અદાણીના આ પ્રોજેક્ટ થી થતી હાનિ અટકાવવામા આવે તેવી વિનંતિ કરવામા આવેલ હતી, ત્યાર બાદ ભારત સરકારના બારા જાહેરાત પર્યાવરણવિદ મુનિલા નાયરના નેતૃત્વમાં એક પાંચ સદસ્યોની સમિતિ અદાણીની તપાસ કરવા માટે બનાવવામા આવી અને આ સમિતિ પોતાનુ રિપોર્ટ ભારત સરકારને 18 એપ્રિલ 2013 ના રોજ સોંપેલ છે અને અદાણીના બન્ને પોર્ટ પ્રોજેક્ટમા ભારેલ નિયમો અને સરતોનુ ઉલ્લંઘન કરેલ છે તેવુ પોતાની રિપોર્ટ મા જણાવેલ છે અને અદાણી નુ નોંધ

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પોર્ટ ની પર્યાવરણ નું લાઈસન્સ રદ કરવાની તેમજ ૨૦૦ કરોડ નું ES કરવાની અને અનેક પ્રકારની વિસ્તૃત ભલામણો કરવામા આવેલ છે તેમજ મુદ્રા મા હવે જે કોઈપણ પ્રિજેક્ટ ને મજૂરી આપતા પહેલા આ વિસ્તારની કેરિંગ કેપેસિટી નું અધ્યાન કરવુ એ અતિ જરૂરી છે અને આ અધ્યાન વગર કોઈપણ પ્રોજેક્ટને મંજૂર કરવામા આવે નહી પણ અહી આવા કોઈપણ જાતના અધ્યાન વગર આ કોસ્ટ પર રિફાઈનરીની લોકસુનવણી રાખવામા આવેલ છે જે સમિતિ ની ભલામણો વિરુદ્ધ છે આથી આ લોક સુનવણી રદ કરવામા આવે આવી અમારી ને નમ્ર અરજ છે અને વિશાળ લોક હિત માટે આ લોક સુનવણી રદ થાય તે અતિ જરૂરી છે.

નીચમા સહેજ ઉપરોક્ત સદર્ભે ન.૪ સારે જણાવવાનું કે ભારત સરકારના વન અને પાચરવર્ણ મંત્રાલય ના દ્વારા Office Memorandum No.J-11013/5/2014-IA I Government of India Ministry of Environment & Forest Dated-11the August 2014 નો રોજ મંત્રાલય દ્વારા એ માટે સૂચનો કરેલ છે અને કંપની એક્ટ 2013 મુજબ દરેકમાં રિપોર્ટ ના કોરપોરેટ સોસિયલ રિસ્પોન્સિબિલિટી નું ખર્ચ અને કઈ બાબતોનુ નુ વિસ્તૃત અહેવાલ હોવુ જરૂરી છે પરંતુ અહી અદાણી પોતાના ધંધાકીય અહેવાલ અહેવાલ મા બાબતે કોઈ માહિતી આપેલ નથી જે કંપની એક્ટ 2013 અને ભારત સરકારના 11 ઓગસ્ટ 2014 ના પરિપત્ર નુ ભંગ છે અને EIA Notification મુજબ Section 135 of the Company Act 2013 deals with corporate social responsibility and Schedule- VII of the Act lists out the activities which may be included by companies in their CSR Policies. And this is also violation of Corporate Social Responsibility Policy Rules, 2014 આમ અદાણી પોતાના અહેવાલ મા કંપીકરી છુપાવેલ છે જે કંપીકરેલુ ઉલ્લેખ કરવુ એ બદલાની રીતે કરવિયા છે અદાણી કપની આ બાબતે કંપીકરી થી માહિતીગાર હોવા છતાય પણ ત્યાર માહિતી છુપાવેલ છે આમ કરીને અદાણી ભારત ના કાયદાનું ખુલ્લા ભંગ કરેલ છે જેથી આ લોક સુનવણી રદ કરવી અતિ જરૂરી છે અને ફરી પાછા બધાકારી કંપીકરી પ્રસ્થાપિત થાય તે અતિ જરૂરી છે.

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પ્રસ્તાવીત યોજના માટે કુલ્લ 256.58 હેક્ટર (634 એકર) જમીનની જરૂરીયાત છે જે પૈકી આ યોજના માટે 154.1
હેક્ટર (381 એકર)ની ઓળખ કરાયેલી જમીન APSEZ (અદાણી ગ્રુપ કુપની)ની માલિકીની છે અને તેને સ્થાનિક
જમીન ઉપયોગ યોજના અનુસાર ઔદ્યોગિક હેતુ માટે આગાઉથી આપવવામા આવેલી છે. ઉપરાત 102.3
હેક્ટર (253 એકર) વન્ય જમીન પણ સાકળવામા આવેલી છે જેને ઔદ્યોગિક ઉપયોગ માટે તબદિલ કરવ
આવસે અને . રાજ્ય સરકારે વન્ય મુજરી (F.C) માટે મૂચિત કરેલ છે અને તે કેન્દ્ર સરકાર પાસે છે (જેના કાઇ
નબર છે 8-04/2016-FC). આ યોજના માટે કોઇ જ સ્થળાતર કે પુનસ્વસવાટની પ્રક્રિયા સકડાયેલ નથી. વાસ
રીતે આ લોકસુનવણી કચ્છ અને જે પ્રોજેક્ટ માટે થવાની છે તેની પાસે કચ્છ સુનથિ જગલ ખાતા દ્વિ જમી
મડેલ નથી અને જે 253 એકર જગલ ખાતાની જમીન માટે અદાણી માગણી કરેલ છે તે તેમને મડેલ ના
અને આ જમીન વન વિભાગ 1980 બાદ પોતાના હસ્તગત કરી હતી જેનો હેતુ ત્યા વૃક્ષો નુ વાવેતર કરી
ગીન બેલ્ટ ઊભો કરવાનુ અને જગલની વિકાસ કરવાનુ તેમજ આ પ્રકારની કામગીરીથી સ્થાને આગાડ વધ
અટકાવીને હાર નું પ્રમાણ ઘટાડવુ ,વન્ય પ્રાણિઓને રહણુ,આશ્રય અને સરિસૃપ પાડી રહે એવુ રહેલ હતુ
આ જગલ આખોય ઘણીબધી ઔષિધીઓ અને દેશી બાવડશી ભરપૂર છે તેમજ આજુબાજુના પશુપાલકો ને
રાખવામા ખૂબ જ મોટી બુમિકા આ જગલ ભિલાવે છે. તેમજ આમ કરતા ગુજરાત સરકાર અને અદાણી ગ્રુપ
2006 ના વનઅધિકાર કાયદાનુ ભગ કરેલ છે આ વનઅધિકાર કાયદામા ગ્રામ સભાની મજૂરી જરૂરી છે તથુ પણ
કરવામા આવેલ છે તેમ છતાય કપનીના ખરા આ જગલની જમીન માટે ગ્રામ સભાની મજૂરી લેવામા આવેલ
નથી જે 2006 ના વન અધિકાર કાયદાનુ અને નામદાર સુપ્રીમ કોર્ટ ના ઓરિસા ના વેદાતા કેસ પર પોતે
માટે જે જજમેન્ટ આપવામા આવેલ છે તેનુ પણ ભગ સમાન છે જેથી આવા ઉપયોગી જગલ વિસ્તારનો ના
કરીને અતિ મૂલ્યવાન કોસ્ટલ રેગ્યુલેશન ઝોન વિસ્તારમા કરવુ એ અતિ ગુરુત્વાકર્ષક અને સ્થાનિક લોકોના હકો ઉપર
તરાપ સમાન છે. ગુજરાત સરકાર અગાઉ જ અદાણીને 14 ગામની ગોચર જમીન આપી દીધી છે જેથી
વિસ્તારના લોકો અને પશુપાલકો પહેલાથી જ ગોચર જમીનના અભાવે તકલીફોનુ સામનો કરી રહ્યા છે અને
પશુપાલકો પોતાના પશુઓને જગલ વિસ્તારની આ જમીનોમા ચારીને પોતાનુ ગુજરાન ચલાવે છે ત્યારે અદા
આ જમીનો પણ લઈને આ વિસ્તારના પશુપાલકો ઉપર મરણતોલ કરકો મારવા માગે છે આ વિસ્તાર ના લોકો
મૂળ નિવાશી છે અને મૂળનિવાશી લોકોના અધિકારોનુ રક્ષણ થવુ જોઇએ તેમજ ભારત સરકાર પણ અત્યારત સ

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ના અધિકારોનું રક્ષણ થવું જોઈએ એ અતિ જરૂરી છે માટે આ અદાણીના કોપર રિફાઇનરી ની લોકસુનવણી
કરવામા આવે એવિ નમ્ર અરજ છે.

નનીય સાહેબ સહર્ષ જણાવવાનુ કે આ જે અદાણી કોપર રેફાઇનરી માટેની જમીન પસદકરવામા આવેલ છે
જમીન CRZ પેકીની છે અને તે માટે રાજ્ય સરકારના વન અને પર્યાવરણ મત્રાલય પાસેથી CRZ
ક્લીરિયેન્સ પણ લેવામા આવેલ નથી અને સીઆરઝેડ નોટિફિકેશન 2011 મુજબ આ પ્રોજેક્ટ મીઆર
એરિયામા આવે છે જેથી તે માટે સીઆરઝેડ ની મજૂરી જરૂરી હોય છે પરતુ કપની તે માટે કઈ પણ કર્યુ
અને સીધેસીધુ પર્યાવરણની મજૂરી માગવામા આવેલ છે જે નિયમો વિરુદ્ધ છે આથી આ અદાણીના કોપ
રિફાઇનરી માટેની લોકસુનવણી રદ કરવામા આવે એવિ નમ્ર અરજ છે.

આમ ઉપરોક્ત બાબતે કલેક્ટરશ્રી ધ્યાનમા રાખીને અદાણીના ગ્રીનફિલ્ડ કોપર રિફાઇનરી માટે ની
લોકસુનવણી જે આગામી તારીખ 29.04.2017 ના રોજ ૧૦૦ ગામ મુકામે યોજવાની જાહેરાત
કરવામા આવેલ છે તે કાયદા વિરુદ્ધ છે અને ગુજરાત હાઇકોર્ટ ના સવોચ્ચઅધિકાર મેટર છે તે
ધ્યાનમાં રાખી રદ રહેલ છે તેથી આ લોક સુનવણી રદ કરવા આવે એવિ આપશ્રીને નમ્ર અર

સહકારની અપેક્ષા સહ

આપનો વિશ્વાસુ

નારણભાઈ ગઢવી

મુખ્ય પેટ્રી વિકાસ સેવા ટ્રસ્ટ

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Dat

વિષયઃ-

1. ગુજરાત હાઇકોર્ટ ની સમિતિનું રિપોર્ટ – Annexure - A

2. ડિસ્ટ્રિક્ટ પ્રિલિપલ જજ સાહેબ નું રિપોર્ટ Annexure - B.

3. વન અને પર્યાવરણ મંત્રાલય નું પરિપત્ર Annexure – C

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(Copy of same representation presented during public hearing)

Jay Javan Jay Hind Jay kishan

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પ્રતિ,

પ્રશ્રી કલેક્ટર સાહેબ

કચ્છ –ભૂજ

વિષય : કચ્છ જિલ્લાના મુંદ્રા તાલુકાનાં સિરાયા અને નવીનાળ ગામે અદાણી પોર્ટ સ્પેશિયલ ઇકોનોમિક જોનની જમીન ખાતે પ્રસ્તાવિક ગ્રીનફિલ્ડ કોપર રિફાઇનરી પ્રોજેકટ ની લોક સુનવણી રદ કરવા બાબત

સંદર્ભ-

1. final report of the High Court's committee on Mangroves as per order dated 5.11.2015 and 01.04.2016 in CA(For Direction) No-9124/2011 in write petition (PIL) No- 12/2011

2.final report of the High courts committee Headed By seating principal District Judge Bhuj kutch dated 24.7.2015

3.final report of the Ministries of Environment forest and claimant change on Adani Port and SEZ(Sunita Narain Report) 2013

4.Office Memoranum No.J-11013/25/2014-IA.I Government of india Ministry of Environment &Forest Dated-11the August ,2014

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શ્રીમાન કલેક્ટર સાહેબ

જય ભારત સાથે ઉપરોક્ત વિષય સાથે જણાવવું કે મેસર્સ અદાણી એંટરપ્રાઇઝીસ લિમિટેડ(A E L) ના દ્વારા મુંદ્રા તાલુકાનાં સિરાચા અને નવીનાળ ગામની 634.12 એકર જમીનમાં ગ્રીનફિલ્ડ કોપર રિફાઇનરી સ્થાપિત કરવાના છે અને આ પ્રસ્થાવિત પ્રોજેકટની પર્યાવરણની મંજૂરી માટે આગામી 29 એપ્રિલના રોજ ટૂંડા મુકામે લોકસુનવણી રાખવામા આવેલ છે.પ્રસ્થાવિત અદાણી ના કોપર રિફાઇનરી પ્રોજેકટ માટે જે E IA રિપોર્ટ બનાવવામાં આવેલ છે અને તેમાં જે પ્રસ્થાવિત પ્રોજેકટ માટે સ્થડ બતાવવામાં આવેલ છે તે અતિ વિવાદિત છે અને આ આખોય વિસ્તાર C R Z એરિયા મા આવે છે તેમજ તેના માટે ભારત સરકાર પાસેથી C R Z ની મજૂરી લેવામાં આવેલ નથી આથી આ કોપર પ્રોજેકટ માટેની લોકસુનવણી રદ કરવામાં આવે.

માનનીય સાહેબ ઉપરોકત સદર્ભ ન.1 સાથે જણાવવાનું કે અમે વર્ષ 2011 મા અદાણી પોર્ટ અને અદાણી પાવર ના દ્વારા જે મુદ્રા તાલુકાનાં દરિયાઈ અને આ વિસ્તાર મા જે પર્યાવરણના કાયદાઓનું ભંગ કરવામાં આવે છે તેની વિરોધ એક જાહેર હિતની અરજી WPPIL-12/2011 નામદાર ગુજરાત હાઇકોર્ટમા કરવામાં આવેલ હતી અને તેમાં અદાણી કંપનીના દ્વારા જે પર્યાવરણ અને માનવીય નિયમોનું ભંગ થાય છે તે અટકાવવામાં આવે તેવી વિનતિ કરવામાં આવેલ હતી અને જેમાં નામદાર હાઇકોર્ટ અદાણી ને મુદ્રા તાલુકા ના દરિયાઈ વિસ્તારમાં આવેલ મેંગ્રો ના જંગલ નું જે નાશ કરવામાં આવતું હતું તે બધ કરવાનું હુકમ કરવામાં આવેલ હતું. ત્યારબાદ પણ અદાણીના દ્વારા આ હુકમનું સતત ઉલ્લગન કરવામાં આવ્યું જેની સામે અમે કોર્ટના હુકમનો અનાદર થાય છે તે બાબતે C A N- 9124/2011 ના નામે એક નવી અરજી દાખલ કરવામાં આવી જેમાં નામદાર હાઇકોર્ટ અનેક પ્રકારના હુક્મો અદાણી ની સામે કર્યા અને ત્રણ સમિતિઓ બનાવીને આ સમગ્ર હકીકતોની તપાસ કરવામાં આવી જેમાં નામદાર હાઇકોર્ટ તારીખ 05.11.2015 ના તેમજ 01.04.2016 ના રોજ અમારી અરજી ઉપર જેના ન.C A 9124/2011 મા ઓર્ડર કરીને એક નિસણાત સમિતિ બનાવવામાં આવેલ હતી જેમાં આ સમિતિમાં ગોવા ના પર્યાવરણવિદ ડો.ક્લોદ અલવરીશ અને કલકતાના ડો.સુબ્રોતો માઇતી નો સમાવેશ કરવામાં આવેલ હતો અને આ સમિતિના T O R પણ નામદાર ગુજરાત હાઇકોર્ટ ના દ્વારા જ નિરધારીત કરવામાં આવેલ હતા જેમાં આખાય અદાણી S E Z નું સ્થડ નિરીક્ષણ કરીને અદાણીના પર્યાવરણ ના ઉલ્લગનનું વિસ્તૃત રિપોર્ટ સોપવાનું કહેવામા આવ્યું આ સમિતિ બે વખત આ વિસ્તારની મુલાકાત લઈને પોતાનો રિપોર્ટ તૈયાર કર્યો અને વિસ્તૃત રિપોર્ટ નામદાર ગુજરાત હાઇકોર્ટઆમા 08.06.2016 ના રોજ રજૂ

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આજ જમીન ઉપર સમગ્રલક્ષી રિપોર્ટો નામદાર ગુજરાત હાઇકોર્ટના વિચારધીન છે તે બધી જ હકીકતો અદાણી કંપનીના દ્વારા છુપાવવામા આવેલ છે અને ના તો આ હકીકતો MOEF&CC ને જણાવેલ છે કે ના તો EAC ને જણાવેલ છે જે અતિ ગભીર બાબત છે જેથી આપ આ લોકસુનવણી ના ચેરમેન છો અને જિલ્લાના ડિસ્ટ્રિક્ટ મેજિસ્ટ્રેટ છો એ હોદાની રૂએ અદાણીની આ લોકસુનવણી તાત્કાલિક ધોરણે રદ કરવામાં આવે એવિ અરજ છે અને અમે આપને આ સમગ્ર હકીકતોથી વાકેફ કરીએ છીએ. આમ આ બધીજ હકીકતો નામદાર ગુજરાત હાઇકોર્ટ ના વિચારધીન છે ત્યારે એજ જમીન ઉપર કોપર રિફનરી માટે લોકસુનવણી થાય તે અતિ ગભીર બાબત તો છે જ પણ કાયદાના પણ વિરુદ્ધ અને નામદાર ગુજરાત હાઇકોર્ટ ના કામમાં દખલ સમાન લેખાસે.જેથી આ લોકસુનવણી રદ કરવામાં આવે એવિ નમ્ર અરજ છે.

માનનીયમા સાહેબ ઉપરોકત સદર્ભ ન.૩ સાથે જણાવવાનું કે અમે વર્ષ 2011 મા અદાણી પોર્ટ અને અદાણી પાવર ના દ્વારા જે મુદ્રા તાલુકાનાં દરિયાઈ અને આ વિસ્તાર મા જે પર્યાવરણના કાયદાઓનું ભંગ થાય છે તેની સામે ભારત સરકારના વન અને પર્યાવરણ માત્રાલય મા એક અરજી કરેલ હતી અને તેમાં અદાણી પોર્ટ અને અદાણી પાવરને મુદ્રા વિસ્તારમા ઓધ્યોગિક કામગીરી કરવા માટે વિસ્તૃત સરતો સાથે પરયાવર્ણની મજૂરી આપવામાં આવેલ છે પરંતુ મુન્દ્રામા અદાણી ના દ્વારા મોટા પ્રમાણમા પરયાવર્ણની સરતોનું ભંગ કરવામાં આવતું હોવાથી અમે ભારત સરકાર પાસે રજૂઆત કરેલ હતી અને અદાણીના આ પ્રિજેક્ટ થી થતી હાનિ અટકવવામાં આવે તેવી વિનતિ કરવામાં આવેલ હતી. ત્યાર બાદ ભારત સરકારના દ્વારા જાણીતા પરયાવર્ણવિદ્ધ સુનિતા નારાયણ ના નેતૃત્વમાં એક પાંચ સદ્શ્યોની સમિતિ અદાણીની તપાશ કરવા માટે બનાવવામાં આવી અને આ સમિતિ પોતાનું રિપોર્ટ ભારત સરકારને ૧૮ એપ્રિલ ૨૦૧૩ ના રોજ સોપેલ છે અને અદાણીના દ્વારા મોટા પ્રમાણમા થયેલ નિયમો અને સરતોનું ઉલ્લગન થયેલ છે તેવું પોતાની રિપોર્ટ મા જણાવેલ છે અને અદાણી નું નોર્થ પોર્ટ ની પર્યાવરણ નું લાઈસ્ન્શ રદ કરવાની તેમજ ૨૦૦ કરોડ નું દડ કરવાની અને અનેક પ્રકારની વિસ્તૃત ભલામણો કરવામાં આવેલ છે તેમજ મુદ્રા મા હવે જે કોઈપણ પ્રિજેક્ટ ને મજૂરી આપતા પહેલા આ વિસ્તારની કેરિંગ કેપેસિટી નું અધ્યાન કરવું એ અતિ જરૂરી છે અને આ અધ્યન વગર કોઈપણ પ્રોજેક્ટને મંજૂર કરવામાં આવે નહીં પણ અહી આવા કોઈપણ જાતના અધ્યાન વગર આ કોપર રિફાઈનરીની લોકસુનવણી રાખવામા આવેલ છે જે સમિતિ ની ભલામણો વિરુદ્ધ છે આથી આ લોક સુનવણી રદ

કર્યો. સમિતિ પોતાના રિપોર્ટ માં અદાણી મુન્દ્રા ના દરિયાઈ વિસ્તાર ઉપર જે પર્યાવરણના નિયમોનું ભંગ કર્યો છે એવું સાબિત કર્યો છે અને અદાણીને તેના બદલામાં 200 હેક્ટર જેટલા વિસ્તારમાં મેંગ્રોનું વાવેતર કરવાનું જણાવ્યુ છે તેમજ ગુજરાત સરકારના દ્વારા કપનીને જે 6000 એકર જે જમીન આપવામાં આવેલ છે તે પાછી સરકાર લાઈલે તેમજ આ જમીન આપવામાં નિયમોનું ખુબજ મોટા પાયા ઉપર ઉલ્લગન થયેલ છે જેથી આ બધીજ જમીનો પાછી લઈને સરકાર ખાતે તેમજ જગલ ખાતાને પાછી આપવામાં આવે એવિ ભલામણ કરવામાં આવેલ છે. (રિપોર્ટ આ સાથે સામેલ છે)

કલેકટર સાહેબ નામદાર હાઇકોર્ટને આ સમિતિએ પોતાનું રિપોર્ટ સોપેલ છે તેમાં આ સમિતિ જે જમીન ખાલી કરવાનું કહ્યું છે તેમાં જ અદાણી કંપની પોતાનું કોપર રિફાઇનરી પ્રોજેકટ સ્થાપિત કરવાનું E IA મા જણાવેલ છે તેમજ આ સમિતિની સંમગ્રહ ભલામણો અને આ રિપોર્ટ નામદાર હાઇકોર્ટ ના વિચારધીન છે (સબજયુડિશ) છે ત્યારે આવી જનસુનવણી ગેરકાયદેસર અને ગુજરાત હાઈકોર્ટની કામગીરી મા દખલ સમાન છે જેથી આ સમગ્ર કારયવાહી તત્કાલિક બંધ થાય તેમજ 29.4.2017 ની પર્યાવરણની મજૂરી માટે ની જન સુનવણી રદ કરવામાં આવે. તેમજ જો આ સુનવણી તેના નિર્ધારિત સમય અને તારીખ ઉપર જ ચાલુ કરવામાં આવસે તો આ સમગ્ર બાબત નામદાર ગુજરાત હાઇકોર્ટ નો અનાદર હસે તેની ગભીર નોધ લેવામાં આવે એવિ અમારી આપને વિનતિ છે.

માનનીયમા સાહેબ ઉપરોકત સદર્ભ ન.૨ સાથે જણાવવાનું કે અમે વર્ષ 2011 મા અદાણી પોર્ટ અને અદાણી પાવર ના દ્વારા જે મુન્દ્રા તાલુકાનાં દરિયાઈ અને આ વિસ્તાર મા જે પર્યાવરણના કાયદાઓનું ભંગ નામદાર ગુજરાત હાઇકોર્ટ તારીખ ૦૯.૦૭.૨૦૧૫ ના રોજ નામદાર પ્રિન્સિપલ ડિસ્ટ્રિક્ટ જજ સાહેબને આખેય અદાણી પોર્ટ અને એસઇઝેડ ની વિડીયો ગ્રાફી અને ફોટોગ્રાફી કરીને હકીકત લક્ષી રિપોર્ટ નામદાર હાઇકોર્ટને સોપવા હુકમ કરેલ તેમજ નામદાર પ્રિન્સિપલ ડિસ્ટ્રિક્ટ જજ સાહેબ તારીખ ૨૪.૭.૨૦૧૫ ના રોજ પોતાની રિપોર્ટ અને વિડિઓગ્રાફી/ફોટોગ્રાફી સાથેની સીડી સીલબંધ કવરમાં નામદાર ગુજરાત હાઇકોર્ટ ને સોપેલ છેઅને નામદાર પ્રિન્સિપલ જજ સાહેબ ની રોપોર્ટ મા પણ અદાણીએ નિયમોનું મોટા પ્રમાણમા ઉલ્લગન કર્યું છે તેવું સાબિત કરેલ છે તેમજ જે જમીન ઉપર અદાણી પોતાનું કોપર રિફાઇનરી પ્લાનટ સ્થાપિત કરવા માગે છે તે જમીન ને પણ નામદાર પ્રિન્સિપલ જજ સાહેબ ફોટોગ્રાફી અને વિડીયોગ્રાફી સાથે વિવાદિત છે તેવું જણાવેલ છે તેમજ આ સમગ્ર રિપોર્ટ પણ નામદાર હાઇકોર્ટ ના વિચારધીન (અંદર સબજ્યુડિશ) છે ત્યારે

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કરવામાં આવે આવી અપક્ષી ને નમ્ર અરજ છે અને વિસાળ લોક હિત માટે આ લોક સુનવણી રદ થાય તે અતિ જરૂરી છે.

માનનીયમા સાહેબ ઉપરોકત સદર્ભ ન.4 સાથે જણાવવાનું કે ભારત સરકારના વન અને પાયરવર્ણ મંત્રાલય ના દ્વારા .Office Memoranum No J-11013/25/2014-IA.I Government of india Ministry of Environment &Forest Dated-11the August ,2014 ના રોજ મંત્રાલય ઇઆઇએ માટે સૂચનો કરેલ છે અને કંપની એક્ટ 2013 મુજબ ઇઆઇએ રિપોર્ટ મા કોરપ્રેટ સોસિયલ રિસ્પોન્સિબ્લિટી નું ખર્ચ અને ફંડ ના આયોજન નું વિસ્તૃત અહેવાલ હોવું જરૂરી છે પરંતુ અહી અદાણી પોતાના ઇઆઇએ અહેવાલ અહેવાલ મા આવી કોઈ માહિતી આપેલ નથી જે કંપની એક્ટ 2013 અને ભારત સરકારના 11 ઓગ્સ્ટ 2014 ના પરિપત્ર નું ભંગ છે અને EIA Notification અને Section 135 of the Companay Act 2013 deals with corporet social responsibility and Schudule-VII of the Act lists out the activities which may be included by companies in their CSR Policies. And this is also violation of Corporate Social Responsibility Policy Rules, 2014. આમ અદાણી પોતાના અહેવાલ માં હકીકતો છુપાવેલ છે જે હકીકતોનું ઉલ્લેખ કરવું એ કાયદાની રીતે ફરજિયા છે અદાણી કંપની આ બધીજ હકીકતો થી માહિતીગાર હોવા છતાય પણ તમામ માહિતી છુપાવેલ છે આમ કરીને અદાણી ભારત ના કાયદાનું ખુલ્લમ ખૂલા ભંગ કરેલ છે જેથી આ લોક સુનવણી રદ કરવી અતિ જરૂરી છે અને ફરી પાછા કાયદાની હકીકતો પ્રસ્થાપિત થાય તે અતિ જરૂરી છે.

માનનીય સાહેબ આ અદાણીના કોપરા રિફાઇનરી પ્રોજેકટ માટે જમીનની નિચ્ચે મુજબ આવસ્યકતા રહે છે: પ્રસ્તાવીત યોજના માટે કુલ્લ 256.58 હેક્ટર (634 એકર) જમીનની જરૂરીયાત છે જે પૈકી આ યોજના માટે 154.18 હેક્ટર (381 એકર)ની ઓળખ કરાયેલી જમીન APSEZ (અદાણી ગ્રૂપ કુંપની)ની માલિકીની છે અને તેને સ્થનિક જમીન ઉપયોગર યોજના અનુસાર ઔધ્યોગિક હેતુ માટે આગાઉથી આપવવામા આવેલી છે. ઉપરાત, 102.38 હેક્ટર (253 એકર) વન્ય જમીન પણ સાકળવામા આવેલી છે જેને ઔધ્યોગિક ઉપયોગ માટે તબદિલ કરવામાં આવસે અને . રાજ્ય સરકારે વન્ય મુંજૂરી (E C) માટે સૂચિત કરેલ છે અને તે કેન્દ્ર સરકાર પાસે છે [જેના ફાઇલ નબર છે 8-04/2016-FC]. આ યોજના માટે કોઇ જ સ્થળાતર કે પુનસવસવાટની પ્રક્રિયા સંકડાયેલ નથી. વાસ્તવિક રીતે આ લોકસુનવણી જ્યાં અને જે પ્રોજેકટ માટે થવાની છે તેની પાસે હજી સૂનધિ જંગલ ખાતા નિ જમીન મડેલ નથી અને જે 253 એકર જંગલ ખાતાની જમીન માટે અદાણી માગણી કરેલ છે તે તેમને મડેલ નથી અને આ જમીન વન વુભાગ 1980 બાદ પોતાના હસ્તગત કરી હતી જેનો ઉદેશ્ય તેમાં વૃક્ષ્હો નું વાવેતર કરીને ગ્રીન બેલ્ટ ઊભો કરવાનું અને જંગલનો વિકાશ કરવાનું તેમજ આ પ્રકારની કામગરીથી રણને આગડ વધતું અટકાવીને ક્ષાર નું પ્રમાણ ઘટાડવું ,વન્ય પ્રાણિઓને રક્ષણ,આશ્રય અને ચરિયાણ માડી રહે એવું રહેલ હતું .અને આ જગલ આખોય ઘણીબધી ઓશિધીઓ અને દેશી બાવડથી ભરપૂર છે તેમજ

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આજુબાજુના પર્યાવર્ણ ને સુધ રાખવામા ખૂબ જ મોટી ભૂમિકા આ જગલ નિભાવે છે. તેમજ આમ કરતાં ગુજરાત સરકાર અને અદાણી કંપની 2006 ના વનઅધિકાર કાયદાનું ભંગ કરેલ છે આ વનધિકાર કાયદામાં ગ્રામ સભાની મજૂરી જરૂરી છે તેવું પ્રસ્થપિત કરવામાં આવેલ છે તેમ છતાયા કંપનીના દ્વારા આ જગલનિ જમીન માટે ગ્રામ સભાની મજૂરી લેવામાં આવેલ નથી જે 2006 ના વન અધિકાર કાયદાનું અને નામદાર સુપ્રીમ કોર્ટ ના ઓરિશા ના વેદનતા કોપર પ્રોજેકટ માટે જે જજમેંટ આપવામાં આવેલ છે તેનું પણ ભંગ સમાન છે જેથી આવા ઉપયોગી જગલ વિસ્તાર નો નાશ કરીને અતિ પ્રદુષિત કોપર રિફાઇનરી સ્થાપિત કરવું એ અતિ નુકશાનકારક અને સ્થાનિક લોકોના હક્કો ઉપર તરાપ સમાન છે. ગુજરાત સરકાર જ્યારે અગાઉ જ અદાણી ને 14 ગામની ગોચર જમીન આપી દીધી છે જેથી આ વિસ્તારના લોકો અને પશુપાલકો પહેલાથી જ ગોચર જમીનના અભાવે તકલીફોનું સામનો કરી રહ્યા છે અને આ પશુપાલકો પોતાના પશુઓને જગલ વિસ્તારની આ જમીનોમાં ચારીને પોતાનું ગુજરાન ચલાવે છે ત્યારે અદાણી આ જમીનો પણ લઈને આ વિસ્તારના પશુપાલકો ઉપર મરણતોલ ફટકો મારવા માંગે છે આ વિસ્તાર ના લોકો મૂળ નિવાશી છે અને મૂળનિવાશી લોકોના અધિકારોનું રક્ષણ થવું જોઇએ તેમજ ભારત સરકાર પણ સાયુકત રાસ્ટ્ર સંગ ના મૂળનિવાશીઓના અધિકારોના રક્ષણ કરવામાં આવસે તે ઘોષણા પત્ર ઉપર સહી કરેલ છે અને અને સયુકત રાસ્ટ્ર સંગના મૂળનીવાશી ચાર્ટર નું અનુમોદન કરવાવાળા દેશોમાં સામેલ છે જેથી આ મૂળનીવાશી લોકો ના અધિકારોનું રક્ષણ થવું જોઈએ એ અતિ જરૂરી છે માટે આ અદાણીના કોપર રિફાઇનરી ની લોકસુનવણી રદ કરવામાં આવે એવિ નમ્ર અરજ છે.

માનનીય સાહેબ સહવિશેસ જણાવવાનું કે આ જે અદાણી કોપર રેફાઇનરી માટેની જમીન પસદકરવામાં આવેલ છે તે જમીન C R Z પૈકીની છે અને તે માટે ભારત સરકારના વન અને પર્યાવરણ માત્રાલય પાસેથી C R Z નું ક્લીરિએન્શ પણ લેવામાં આવેલ નથી અને સીરઆરઝેડ નોટિફિકેશન 2011 મુજબ આ પ્રોજેકટ સીઆરઝેડ એરિયામાં આવે છે જેથી તે માટે સીઆરઝેડ નિ મજૂરી જરૂરી હોય છે પરંતુ કંપની તે માટે કઈ પણ કર્યું નથી અને સીધેસીધું પર્યાવરણની મંજૂરી માગવામાં આવેલ છે જે નિયમો વિરુદ્ધ છે આથી આ અદાણીના કોપર રિફાઇનરી માટેની લોકસુનવણી રદ કરવામાં આવે એવિ નમ્રહ અરજ છે.

આમ ઉપરોકત બધીજ હકીકતોને ધ્યાનમાં રાખીને અદાણીના ગ્રીન્ફિલ્ડ કોપર રિફાઇનરી માટે ની લોકસુનવણી જે આગામી તારીખ 29.04.2017 ના રોજ ટૂંડા ગામ મુકામે યોજવાની જાહેરાત કરવામાં આવેલ છે તે કાયદા વિરુદ્ધ છે અને ગુજરાત હાઇકોર્ટ માં સબજ્યુડિશ મેટર છે તે વિસ્તારમાં થઈ રહેલ છે તેથી આ લોક સુનવણી રદ કરવાં આવે એવિ આપશ્રીને નમ્રહ અરજ છે

સહકારની અપેક્ષા સહ

1605

નારાણભાઇ ગઢવી

૨૧/૫/૧૭

પ્રમુખ ખેતી વિકાસ સેવા ટ્રસ્ટ

જરપરા તાલુકા મુંદ્રા કચ્છ

મો-9913203921

બિડાણ-

1.ગુજરાત હાઇકોર્ટ ની સમિતિનું રિપોર્ટ

2. ડિસ્ટ્રિક્ટ પ્રિસિપલ જજ સાહેબ નું રિપોર્ટ

3. વન અને પર્યાવર્ણ મંત્રાલય નું પરિપત્રહ

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C-Q-6
(TRANSLATED)

Kheti Vikas Seva Trust

(R.G. No. : Gujarat/2030/Kutch)

Vill: Zarpar, Tal: Mundra, Dist- Kutch-370405

Narn B, Gadhavai, President, Kheti Vikas Seva Trust

Ref. No.

Date: 29/4/2017

To,

The Collector,

Kutch- Bhuj

Subject: For Cancelling the public hearing of Proposed Greenfield Copper Refinery Project at the land of Adani Port Special Economic Zone at the villages Siracha and Navinal, Tal. Mundra, Dis. Kutch

Reference-

1. Final report of the high court's committee on Mangroves as per order dated 5.11.2015 and 01.04.2016 in CA (For Direction) No.- 9124/2011 in writ petition(PIL) No. 12/2011
2. Final report of the high courts committee headed by seating principal District Judge Bhuj Kutch dated 24.7.2015
3. Final report of the Ministries of Environment forest and claimant charge on Adani Port and SEZ (Sunita Narain Report) 2013
4. Office Memorandum No. J-11013/25/2014-IA.I Government of India Ministry of Environment & forest Dated- 11th August 2014

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Honourable Collector,

Jaybharat, with reference to the above with due respect it is to state that M/S Adani Enterprises Ltd. (A.E.L) is going to establish Greenfield Copper Refinery in the 634.12 Acre land of villages Siracha and Navinal of Mundra Taluka. A public hearing is being held at village Tunda on next 29th April for Environmental Clearance of the proposed project. The EIA report prepared for the proposed Refinery Project of Adani and site shown in the EIA report for the proposed project are very much disputed and the whole area is covered under CRZ and no permission is obtained from the Government of India for CRZ for the same. Therefore the public hearing for the copper project should be cancelled.

Honourable Sir, With reference to the reference cited at 1 above it is to inform you that we have filed a Public Interest Litigation in the year 2011 bearing No. WPPIL -12/2011 in the Hon. High Court Of Gujarat in protest against the violations of Environmental laws by Adani Port and Adani Power in the Sea area and this areas of Mundra Taluka. And it was requested there in to prevent violations of rules of Environment and Human rights by Adani Company and Hon. High Court was pleased to direct Adani to stop destruction of Mangrow forest situated in the sea region of Mundra Taluka , thereafter also Adani continuously violated this order , for that a new application bearing No. CAN -9124/2011 was filed for contempt of the court order in which Hon. Court issued various orders against Adani and formed three committees and all these issues were investigated and Hon.Court has formed Expert Committee on the basis of orders 05.11.2015 and 01.04.2016 on our application No. CA 9124/2011. Dr. Kalod Alvaris, Environment Expert of Goa and Dr. Subroto Maiti of Calcuttaa were included in the committee. And TOR of the committee was finalized by the High Court of Gujarat itself. In which it was directed to submit the detailed report of violations of environment by Adani after observation of the site of whole ADANI SEZ. This committee had visited this area prepared its report and submitted detailed report before Hon. Gujarat High Court on 8.06.2015.

Committee has proved in its report that Adani has violated the rules of environment on the sea areas of Mundra and it is informed to Adani to grow Mangrow in about area of 200 hector and that 6000 acre land allotted to the company may be taken back by Gujarat Government . And there are rampant violations of rule in allotting this land. So it is recommended that all these lands to be taken back vesting in the government and returned to the Forest Department.(Report is enclosed herewith) .

Hon. Collector sahib, the committee has submitted its report to the Hon. High court. The committee has recommended to vacate the land but in the same land Adani Company is going to establish its Copper Refinery Project as shown in EIA. As all the recommendations and this report being under consideration of the court (subjudice) the public hearing is illegal and interference in the working of High Court of Gujarat. Therefore, these all procedures should stop immediately and the public hearing 29.4.2017 for environmental clearance should be cancelled. In spite of that if the public hearing is held on the pecified date and time these whole matter would be considered contempt of court of Hon. Gujarat High court, it should be seriously noted that. We bring this to your kind notice with request.

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Honourable Sir, With reference to the reference cited at 2 above it is to inform you that in the year 2011 for violations of Environmental laws by Adani Port and Adani Power in the Sea area and this areas of Mundra Taluka, Hon.Gujarat High Court has directed on dated 09.07.2015 to the Hon. Principal District Judge to carry out videography and photography of whole Adani Port and SEZ and to submit factual report to the Hon. High Court, and Hon. Principal District Judge has submitted CD of their report and videography/photography in the sealed cover on dated 24.07.2015 to the Hon. High Court. And in the report of Hon. Principal Judge it is proved that there are rampant violations of rules by Adani and also on the land on which Adani is going to establish its Copper Refinery Plant, is informed by Hon. Principal District Judge along with videography and Photography that, is disputed land. And the whole report is pending with (subjudice) Hon. High Court. When overall report of whole the matter is pending with Gujarat High Court all these matters are concealed by the Adani Company. These facts are informed neither to MOEF&CC nor to EAC which is a very serious matter. Therefore you being the Chairman of the Public hearing and the District Magistrate of the district on the basis of these designations it is our prayer that the public hearing may please be cancelled on immediate basis, and we are informing you with all these facts. As such as these facts are under consideration of High Court of Gujarat and if the public hearing for refinery takes place on the same land it is a very serious matter it would not only be against law but would be interference in the working of Hon. Gujarat High Court. Therefore it is our humble request that the public hearing may please be cancelled.

With reference to the reference cited at 3 above it is to inform you that we have filed an application in the department of environment and forest of Government of India in the year 2011 in protest against the violations of Environmental laws by Adani Port and Adani Power in the Sea area and this areas of Mundra Taluka and in which the permission is granted with detailed conditions to AdaniPort and Adani Power to carry out industrial activities in the areas of Mundra but as Adani is violating environmental conditions in large scale we have submitted our representation to the Government of India and has requested to prevent the damages occurring due to the project of Adani. There after a committee of five environment experts was formed by Government of India under the leadership of well known environmentalist Sunita Narayan to investigate Adani and this committee has submitted its report to Government of India on 18 April2013 and have reported and informed in the report that large scale violence's of rules and conditions are done by Adani and various detailed recommendations are made including to cancel the Environmental license of North Port and to impose penalty of 200 crores and before giving any permission to any project in Mundra it is very necessary that study of carrying capacity of this area is undertaken and no project should be sanctioned without this study. But here public hearing for Copper Refinery is held without any such study. Therefore it is our humble request that the Public Hearing may please be cancelled. It is very necessary looking to the Public Interest at large that this public hearing may be cancelled.

Hon. Sir, with reference to the reference No. 4 it is to inform that Environment and Forest Ministry of Government of India has issued instructions vide Office Memorandum No. J-11013/25/2014-IAI Government of India Ministry of Environment and Forest Dated 11th August, 2014 to ministry for EIA and according to Company's Act 2013 it is essential to have detailed report in EIA regarding management of expenses and fund of Corporate Social Responsibility. But Adani has not given any such information in its EIA report which is violation of The Company's Act and circular dated 11th August 2014 of Government of India. And EIA notification and Section 135 of The Company's Act 2013 deal with the corporate social responsibility and Schedule –VII of the Act lists out activities which may be included by

companies in their CSR policies. And this is also violation of Corporate Social Responsibility Policy Rules, 2014. As such Adani has concealed the facts in their report which are essential to be mentioned as per Law . Adani Company was knowing all these facts in spite of that has concealed all these facts. As such Adani has openly violated the law of India, therefore it is very essential that this public hearing shall be cancelled and it is very essential that facts of law are reinstated.

Hon. Sir, for the copper refinery project of Adani, requirement of land is as under.

Total 256.58 Hector(634 Acre) of land is necessary for the project proposed. Out of that land of 154.18 Hector (381 Acre) demarked land is in ownership of APSEZ (of Adani Group Company) and it has been allotted before in the scheme of local land use scheme for industrial purpose .Moreover, 102.38 Hector (253 Acre) forest land is also included which will be converted in to industrial use and state government has proposed for the forest land conversion (EC) and it is lying in the Central Government.(Its file No. are 8.04/2016-FC). There is no process involved for migration or rehabilitation for this scheme.

In fact the public hearing is to be held on the place of proposed project , the land from forest department is not allotted to the company till now. And the land of 253 Acre of forest department which Adani has requested is not granted to them. And this land was occupied by the forest department after 1980 the object was to create green belt growing trees over there and to develop the forest and to prevent the progress of the desert and to decrease salinity by such types of activities, make available protection , shelter and grazing to the wild animals. And this whole forest is full of various herbal medicines and inland Acacia(deshi bawal) and this forest is playing an important role in keeping the Environment clean. And as such Government of Gujarat and Adani Company have violated The Forest Rights Act 2006. In the Forest Rights Act it is established that the approval of Gram Sabha is essential in spite of that approval of Gram Sabha is not taken by the company. It is violation of Forest Rights Act 2006 and also the judgment of Hon. Supreme Court delivered in Vedant Copper Project of Orissa. So, establishing very much polluting copper refinery destroying such useful forest area is very much detrimental to local people and grabbing rights of local people. Government of Gujarat has already allotted **pasture** land of 14 villages to Adani so the people of these areas are suffering difficulties from lack of pasture land and these cattle breeders are getting their livelihood grazing their cattle in these areas of forest. While Adani is willing to give fatal blow on cattle breeders grabbing lands from these areas. These people are indigenous people of these areas and protection must be given to the rights of indigenous people and Government of India has signed charter of UN regarding protection of rights of indigenous people and is one of the country ratifying the charter of indigenous people of United Nations. So rights of these indigenous people must be protected. It is very necessary. Therefore, it is humbly requested that, the public hearing of Copper Refinery of Adani must be cancelled.

Hon. Sir, it is further submitted that the land selected for Copper Refinery Project of Adani is land included in the CRZ. And no clearance is obtained from the ministry of Environment and Forest of Government of India, and according to CRZ notification 2011 this project is coming under CRZ area. So sanction of CRZ is necessary but company has done nothing for that and directly asked for Environmental clearance. It is against the rules. Therefore, it is humbly requested that, the public hearing of Copper Refinery of Adani must be cancelled.

Considering all the above facts, the public hearing of Greenfield Copper Refinery Project of Adani declared to be held on the next date 29.04.2017 at village Tunda is against Law. And the matter is

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subjudice in the High Court of Gujarat and hearing is to be held in that area, therefore, it is humbly requested that, the public hearing of Copper Refinery of Adani must be cancelled.

Expecting co-operation,

Signed 29/4/17

President Kheti Vikas Seva Trust

Jarpara Taluka Mundra Kutch

Mo. 99132 03921

Enclosure:

1. Report of Gujarat High Court Committee
2. Report of the District Principal Judge sahib
3. Circular of Ministry of Environment and Forest

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C-Q-7

Praveen Anant

To: Vishnu Teja
Subject: FW: Conservation Action Trust
Attachments: Conservation Action Trust 05 May 2017.docx

.....Email from Conservation Action Trust.....

From: KISHOR MISTRY <membersecretarygpcb@gmail.com>
Date: 29 April 2017 at 11:04:16 AM IST
To: gpcbpublichearing@gmail.com

Subject: Fwd: Comments, questions and suggestions for the Public Hearing on the 29th April 2017 for "the proposed greenfield copper refinery project at Adani port special economic zone land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat"

---------- Forwarded message ----------
From: Shweta Bhatt <shweta1@cat.org.in>
Date: Fri, Apr 28, 2017 at 12:21 PM
Subject: Comments, questions and suggestions for the Public Hearing on the 29th April 2017 for "the proposed greenfield copper refinery project at Adani port special economic zone land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat"
To: gpcbchairman@gmail.com, chairman-gpcb@gujarat.gov.in, membersecretarygpcb@gmail.com, ms-gpcb@gujarat.gov.in, gpcb-kut@gujarat.gov.in, collector-kut@gujarat.gov.in, add-collector-kut@gujarat.gov.in, dcmundra45@gmail.com, cnpandey@gmail.com, jkishwan@gmail.com, pantnc@gmail.com, arunpandey79@gmail.com, sv.godavarthi@gmail.com, saha.energy@gmail.com, ahupadhy@rediffmail.com, regupta.bhu@gmail.com, garkoti@nic.in, sk.smree66@nic.in, spiderconch@gmail.com, secy-moef@nic.in
Cc: Debi Goenka <debi@cat.org.in>

CONSERVATION ACTION TRUST

5, Sahakar Bhavan, 1st Floor, LBS Road, Narayan Nagar, Ghatkopar (W),
Mumbai – 400086
Work: 022 – 25122422/23

Comments, questions and suggestions for the Public Hearing on the 29th April 2017 for "the proposed greenfield copper refinery project at Adani port special economic zone land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat"

1. Please furnish full details of the existing land use of the site proposed for the project.

2. Please furnish the detailed land use of the proposed site as per the approved CZMP.

3. Please furnish a copy of the CZMP of this area approved by MoEF.

4. Has the project proponent carried out mapping of the CRZ area and the HTL – LTL line, buffer area, as well as mud flats, sand dunes, and corals on 1:4000 scale on the CZMP approved by MoEF? If yes, kindly furnish a colour copy.

5. Please furnish a satellite imagery of 1991 of the proposed project area.

6. Please give full land use details and categories of the proposed project area. Please mention how much area is under CRZ I - A, CRZ I, CRZ II, CRZ III and CRZ IV.

7. Does the proposed project area falls under ecologically sensitive and or geomorphologically important area, as per the CRZ Notification 2011?

8. Please specify what are the ecologically sensitive areas and or geomorphologically important areas observed at the proposed site and in the study area, along with the area details (in hectares).

9. Please furnish information on whether mangroves and mud flats are present at the site and the area (in hectares) covered by mangroves and mud flats.

10. Please furnish information at the distance which mangroves and mud flats are observed from the proposed project site.

11. Please furnish details of salt pans and aquaculture ponds within the study area, and their distances from the project site.

12. Please furnish details regarding the fishermen residing and/or fishing in the study area.

13. As per the study area map, the project area not only covers mudflats, it is also falls within the Mundra mangrove reserve forests. It is also in proximity of the Danderi reserve forests, Navinal reserve forest and the Mundra Dhoa reserve forest. Please explain why such an ecologically important area has been selected for this project.

14. As per the information submitted for "Site Alternatives" in the Form I, Site I has no forest area, whereas the proposed Site 2 has 253 acres of forest land that the project proponent has proposed for diversion. Please explain the rationale behind selecting the site which has forest area and explain why the site that does not have forests has not been selected.

15. It is also stated in Form I that mangroves are not present on the site. However, a bare perusal of the google earth images shows that

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the mangroves exist along the southern boundary of the proposed project. Also, the proposed conveyor belt from the port to the proposed site passes through the mangroves. This can also be observed from the "FIGURE 3.3.2 Landuse/Land Cover Map Based on Satellite Data" of the draft EIA report. Why has this been not mentioned in the Form I? Please explain.

16. The proposed area has been illegally reclaimed by the APSEZ. Entire land use and land cover has been changed due to this. Please give information on the land use and cover as was during 1991 and also before the SEZ clearances were granted. Please also furnish a copy of the permissions issued by the State and Central Government agencies permitting the reclamation and destruction of mangroves.

17. Is the project proponent going to destroy the remaining mangroves of this area as well?

18. Please explain on what basis is the alternative site 1 rejected.

19. The Table-3.3.2 – "Land use breakup details in 10 km radius" clearly mentions presence of mudflats, mangroves and the reclaimed area in the study area.
As per this table only 5.27% of the land in the study area is built-up, whereas 11% of the study area is wetland. Why is the site being selected for this proposal?

20. Please explain why the land with scrub vegetation has been categorised as wasteland.

21. Item 21 of Form I under Basic Information states that the proposal involves approval/clearance under the Forest (Conservation) Act, 1980. However, under point 23 "Whether any Forest Land Involved? Area of Forest land Involved (hectares)" it is stated as "N/A". The Draft EIA report has mentioned at many instances the presence of 3 reserved forests and the Mundra mangrove forests. Please explain why such misleading information has been provided in Form 1.

22. In form 1, the query under point 24 is "Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?" The project proponent has replied has "No". It is important to point out here that at-least two court cases are going on the APSEZ land – SLP 28788 of 2016 in the Supreme Court and WP (PIL) 12 of 2011 in the High Court of Gujarat. Please explain why this was not disclosed in the Form 1.

23. What action has been taken by the APSEZ as per the recommendations of the Claude Alvares led "Committee on Mangroves" in the Civil Application 9124 of 2011 under the PIL 12 of 2011? Please furnish the details of the actions taken by the project proponent.

24. The Form 1, under "II Activity" states that no reclamation is envisaged. It is a well-known fact that the entire area has been reclaimed by the Adani group. This has been also stated in the Sunita Narain report. What measures have been taken to restore the area to

its original state? How much mangrove plantation has been undertaken? Please furnish with the location details, along with coordinates and site photographs.

25. The Form 1 also mentions "construction of new approach road". However, the document on Alternative sites state that "Widening of existing Road" would be required for this site. Why is there such discrepancy in the information being provided?

26. Where would this proposed new approach road and / or the widening of the existing road come? Please furnish details along with the map showing the proposed new approach road and or widening of the road.

27. Please furnish details on the impacts and mitigation measures of proposed new approach road and/or widening of the road.

28. The Form 1 also mentions construction of new transmission lines. Please show location of the new transmission lines on colored map. Has the area required for this mentioned in the Draft EIA report? Please mention the impact of the transmission lines and the mitigation measures for same. How much forest land is involved? Are these transmission lines passing through CRZ areas? Why can't the existing transmission lines be upgraded?

29. For stream crossings, the Form 1 mentions that "Natural drainage passing through the site will be suitably trained and maintained. There will not be any diversion. Further, conveyer for Copper Concentrate and Rock Phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required." The Adani group has already reclaimed large swathes of mudflats, mangroves and creeks in this area. Now the APSEZ wants to further "suitably train and maintain" the natural drainage. Please furnish details on the impacts of this and mitigation measures of same. Please also explain how this can be permitted in view of the fact that the reclamation has been carried out illegally without valid Environmental, CRZ and Forest Clearances. Please furnish copies of these clearances, if any.

30. Further, there is already pollution in the area due to the coal dust and fly-ash and emissions of the power plant. There have been numerous complaints regarding this from the villagers of this area. Additional conveyor for Copper Concentrate and Rock Phosphate will further deteriorate the environment. Please give details on the impact of and mitigation measures of the conveyor for Copper Concentrate and Rock Phosphate, along with the impacts of the existing power plants.

31. It is mentioned in Form 1 that "Approximately 3000 persons will be employed during construction phase and about 2000 people will be employed during operation phase". Also, please mention if the employment will be given to the locals or to outsiders.

32. What kind of residential and cooking facilities will be provided for the construction workers?

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33. What sanitation facilities will be provided for them during the construction phase?

34. How many locals have been employed so far by the APSEZ? Please furnish details. Please furnish how many are temporary and how many with permanent jobs.

35. Under the "Environment Sensitivity", the Form 1 states that "Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value" are not present within 15 kms. However, mangroves are about 167 meters away from the boundary of the proposed project. Moreover, there are 3 reserved forest and the Mundra mangrove forest in the proposed project area. Mangroves are protected as per the Indian legislation. Please explain why this was not mentioned in the Form 1.

36. Moreover, the 15 kms area covers the villages Tragadi. As per some of the reports Tragadi is turtle nesting sites. Why this has not been mentioned in the Form 1? Please explain. Have the impacts of the proposed project and related activities been studied for the turtle nesting? What are the mitigation measures for same? Please furnish full details of same.

37. Please give details on the pagadiya fishing along the APSEZ area. How many fishermen are engaged in this? How many have been impacted due to the APSEZ? Please furnish full details.

38. What compensation has been provided to fishermen who earlier used to fish by this technique, but had to stop due to the APSEZ? Please furnish full details.

39. How many fishing boats are present in the area? Please furnish full details.

40. From where would the sand be obtained for the proposed construction?

41. The proposed TOR document mentions under Land Use that - "The existing land use pattern in the study area of 10 km radius around the project will be established through the literature review of published Census records and latest available satellite imagery. Based on this review, the land use pattern is categorized into the following five categories:

1. Forest;
2. Irrigated and agricultural Land;
3. Un-irrigated agricultural land;
4. Culturable wasteland; and
5. Land not available for cultivation, which includes built-up areas."

Why are the mudflat areas and the mangroves not mentioned? Also, please demarcate the culturable wasteland and share a coloured map of the same.

42. The brief summary as well as the pre-feasibility report mentions

that "There is no significant vegetation or habitation in the project site. The nearest significant features from the project site are 4620 MW Adani Power Plant and Tata Power (Western side of project area), and West Port of APSEZL (South – west direction from project)." Kindly explain why the mangrove vegetation or the three reserve forest areas and mangrove forest areas not significant.

43. The pre-feasibility report also mentions that "Land for different corridors (Power/ Road/ Raw Material Conveyor) would be additional." Please furnish full details of the land required and the existing land use for these corridors. Please furnish the existing land use, whether any eco-sensitive areas, forest lands, mangroves, beaches, etc. exist in these corridors. Please also furnish a coloured map of the proposed corridor area.

44. Why has information on the above-mentioned corridors not provided in the Draft EIA? Please explain.

45. The pre-feasibility report mentions that "From South West to North East majority of area is of APSEZL where west port is also located.. The land is having undulations and minor grading will be required." Kindly provide details on how the grading would be carried. What material would be used for this? From where would it be sourced? Please furnish full details.

46. How many creeks are present in the study area? Please furnish a coloured map and a satellite image showing the creeks.

47. The pre-feasibility report states that "Since the entire land is vacant, hence no displacement and rehabilitation of local population is envisaged". What about the fishermen? How many of fishermen are engaged in fishing in this area? Please furnish full details.

48. How many fisher-folk/local people will be given permanent jobs in the proposed project?

49. What kind of jobs will be given?

50. Will they be imparted appropriate training?

51. Would the job be permanent or temporary?

52. How many salt pans exist in the study area. Please furnish full details.

53. From where will be the coal sourced for "addition in the concentrate for effective smelting"? What will be the ash content, Sulphur content mercury content and radioactivity of the coal proposed to be used? How will it be transported? What is the quantity of the coal envisaged to be stored? What are the ash utilization plan? Please furnish a detailed report on same. What are the mitigation measures for the SOx, particulate matter, arsenic, heavy metals, mercury, radionuclides emissions?

54. Are there any studies conducted on the long-term radioactivity of

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the ash? Kindly furnish the same if any. What are the mitigation measures proposed for the same?

55. Please share details of the water circulation system proposed as mentioned in the Pre-feasibility report. Please show the layout on map of this proposed water circulation system. Please also share details of the land cover of this proposed area. Why has this not been mentioned in the Draft EIA?

56. The very first criterion for site selection is "Away from environmentally sensitive areas". However, this project falls under the reserve forest and mangrove areas. Please explain.

57. Under section 6.4.2 "Merits & demerits" of the pre-feasibility report why the presence of reserve forests and mangrove forest not mentioned under "Site-II (East of APL)"

58. How much green belt plantation has been undertaken by APSEZ so far? Please provide with the total area, the co-ordinates and the photographs of same.

59. What plant species have been planted in the green-belt in the APSEZ?

60. Are all the species proposed to be planted for the current proposal indigenous?

61. Where is the sewage treatment plant proposed? Please show the location on the map.

62. Where would the sludge from the sewage treatment plant be disposed of?

63. Is there any facility proposed for the recycling and reuse of the sludge on site? Kindly provide the details along with the location on the map for the same if any.

64. The pre-feasibility report states that the "rejects from the secondary RO plant will be discharged into sea through the outfall channel of APSEZ's desalination plant." Please explain the impacts and mitigation measures of same.

65. What will be the composition of the rejects from the secondary RO plant? Kindly provide the detailed analysis report for the same with the concentration of each constituent.

66. What are the "latest environment technologies" that would be used to treat the gaseous emissions before they are discharged in to the atmosphere?

67. Please furnish a copy of the guidelines on "utilization of Copper Slag".

68. Please furnish a copy of the guidelines on "utilization of Phosphogypsum".

69. Please give full details of the location of the land fill sites for storage of Hazardous Cake and Scrubber Cake as well as a Map

showing their locations.

70. Please furnish area details and location map of ETP cake land fill.

71. As per the draft EIA report almost 40% of the forest area is proposed to be converted to industrial use. Why is forest land required for this project?

72. As per the Draft EIA section 3.9.6 - "Endemic Flora Species and Threatened Flora of Navinal Area - Important threatened plant species reported from the region are Dipcadi erythraeum, Helichrysum cutchicum, Heliotropium rariflorum, Pavonia ceratocarpa, Convolvulus stocksii, Commiphora wightii.

Gujarat State Biodiversity Board proposes to declare the area as Biodiversity heritage site and as the site is close to Mundra SEZ, it deserves more protection." Despite this, please explain why this site is being selected for this project?

73. Isn't it ironical that the project proponent proposes to build the proposed copper refinery with environment friendly technology while destroying 102.38 hectares of forests only for this particular project? The project proponent may please explain the logic behind doing this.

74. The area identified for securing the hazardous cake and scrubber cake has not been specified. Neither has the area identified for intermediate/emergency storage of copper slag and phosphogypsum. As mentioned in the Draft EIA, area of 30 acres and 105 acres respectively has been mentioned for the said activities. Please give the location for these. Please also give the land use category of this areas. Have the clearances for this land been obtained? Please share the Forest, CRZ and environment clearances of same.

75. What will be the composition of the hazardous cake? Kindly provide the detailed analysis report for the same with the concentration of each constituent.

76. As per the table 2.9, ETP Cake contains heavy metals. What will be the impact of its disposal on the ground water table? What are the mitigation measures for the same?

77. Also, the project proponent is proposing to do away with 253 acres of forest area and then develop 209 acres of greenbelt/green cover. Kindly explain this.

78. The draft EIA report states that "The proposed copper refinery project of AEL is a one of the important projects. AEL believes that the copper refinery project would add significant value to Indian economy. The project will not only help ensuring by becoming self-sufficient in terms of copper, phosphoric acid and sulphuric acid for India but will also drive macroeconomic growth." This growth driven approach of Adani has been detrimental to the environment of Mundra. Moreover, the project would be detrimental as it will lead to

air pollution and will impact the health of people residing in the vicinity.

79. The draft EIA report mentions that "The proposed project would have few adverse impacts on the environment. However, with proper and judicious implementation of the mitigation and environment management measures, the impacts can be minimized and can be maintained well within the permissible limits specified by the regulatory authorities." The approach of Adani group and the indifference towards protection and conservation of environment has been reported time and again. The proposed project will not only lead to further reclamation of mangroves and mudflats, it will also be detrimental to the mangroves and the reserve forests in this area.

80. The draft EIA report mentions that the "Mangroves are situated about 4.5 km near Kotri creek area/ SSW direction, distributed along the networks of creek system." The Google earth imagery dated 19.11.2015 clearly shows that mangroves exist at mere 167 metres from the proposed project. Why has this not been mentioned in the Draft EIA report? Please explain. Moreover, the project also falls under the Mundra mangrove forests. This too has been not mentioned here. Please explain.

81. Please furnish with the details of the APSEZ. How much area has been acquired under the APSEZ at Mundra and how much was permitted under the clearances?

82. Please furnish with all the CRZ, EC, Forest and wildlife clearances of the APSEZ, Mundra.

83. Has the APSEZ undertaken any mangrove plantation? Kindly furnish details of each location wherein the mangrove plantation has been undertaken, along with the area under plantation so far, locations' latitude-longitude, site photographs prior to plantation and post plantation, agency implementing the plantation and the compliance so far. Also furnish with the pre and post plantation satellite images of all the locations.

84. Please mention the area details for mangroves that have been destroyed so far for the APSEZ. Please furnish a 1991 and current satellite data.

85. Please furnish with the details of much of mudflats, sand dunes, creek, salt pans have been reclaimed so far.

86. Please furnish with the complaints received for the existing projects, specifically regarding to the destruction of mangroves and violation of the CRZ Notification in the APSEZ area.

87. What action has been taken and what is the status and / or compliance of the show cause notices issued by the MoEF and the GPCB regarding the violation of the environmental clearances and the pollution in the APSEZ? Kindly furnish with the details and relevant documents.

88. Has Cumulative impact analysis been conducted for the proposal on local livelihood? What are the findings of this study? Which all companies/projects have been undertaken under this study?

89. What is the carrying capacity of this area to undertake the proposed project with respect to already existing projects? Has any carrying capacity study been conducted? Details thereof may please be furnished.

90. Have there been any complaints/grievances from the fishing community? Kindly furnish with same.

91. Please furnish full details of the environmental clearance and the CRZ clearance, Environmental clearances, Forest clearances and the Wildlife clearances received for the existing APSEZ, Mundra

92. Please furnish details of the CRZ clearance, Environmental clearances, Forest clearances and the Wildlife clearances received for all the facilities existing in the APSEZ.

93. How much land was reclaimed for the existing APSEZ after 20th February 1991?

94. How has the APSEZ impacted the livelihoods of local fisher folk communities?

95. What will be the impact of the additional transport of raw materials and the finished products on the road, rail and the SEZ infrastructure? Please furnish with details of same.

96. Please furnish details of the transportation – road, railway limes, as well sea borne, impacts and mitigations studies conducted for the proposal.

97. The proposed area falls under Seismic Zone V. What are the mitigations measures to handle the situation due to earthquake?

98. Please furnish full details of the field visits conducted to undertake the ecological study including copies of the field notes. Please mention full details of the team members, their qualifications, and the number of man days spent on the ecological data collection.

99. Has the project proponent carried out Social impact assessment report? If yes please furnish if any.

100. Please furnish the latitude-longitude coordinates of the corners/boundaries of the entire APSEZ, Mundra.

101. What are the existing facilities for the parking, washing, repairs and maintenance of trucks and other heavy equipment?

102. What facilities are provided for the drivers and cleaners?

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103. What will be the impact of the water/sewage discharged into the creeks and gulf of Kachchh on the overall salinity of the water? Has any such report been conducted?

104. Please furnish No Objection Certificates, Consents, from the State Pollution Control Board for the projects involving discharge of effluents, solid wastes, and sewage waste under Environmental Protection Act 1986.

105. Has the project proponent carried out mangrove conservation plan? If yes then furnish full details with photographs and maps showing the mangrove conservation areas, along with details of the cost of mangrove conservation.

106. What is the original plot level? What is the proposed plot level? How this will affect the land terrain? Has the proponent conducted any analysis on its impact on the environment? Please furnish details.

107. Please furnish the status of NABET accreditation for all EIA consultants hired with their experience in details as of the period the Draft EIA studies were conducted and published.

108. Have all the ToRs been followed for the preparation of the documents?

109. Has authenticated English translation of all material in Regional languages been provided, as stated in the EAC minutes dated 3th – 4th May 2016?

110. It has been reported that the coastal areas of Mundra harbour mangroves and have mudflats, sand dunes, creek network etc. ecologically important areas. Despite this, projects are being allowed to set-up in this area. Why does Adani group always have to either reclaim the mangroves and mudflats or use a site which they have already reclaimed without proper clearances? Please explain.

Thanking you,

Yours faithfully,

Debi Goenka

Executive Trustee

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C-Q-8

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ધર્મેશ મિસ્ત્રી
બ્લોક નં. ૧૪, ઘર નં.૧૩૪૦, નર્મદા એપાર્ટમેન્ટ,
મામલતદાર કચેરી સામે, ભરૂચ.
મો : ૯૯૯૮૬૦૯૧૧૫
તા. ૨૮-૦૪-૨૦૧૭

પ્રતિ શ્રી,
૧. મેમ્બર સેક્રેટરી
ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, સેક્ટર-૧૦ એ, ગાંધીનગર.

વિષય : અદાણી એન્ટરપ્રાઈઝીસ લી. (જિ.કચ્છ)ની પર્યાવરણીય લોકસુનાવણીના વાંધા સુચનો.

૧. કંપની કન્સલ્ટન્ટના QCI-NABET તરફથી એપ્રુવ્ડ કરેલા ફંક્શનલ એરિયા એક્સપર્ટના નામો તથા તેઓએ કયા કયા એરિયા માટે કામ કરેલ છે તેની વિગત, તેની સમયમર્યાદા તથા તેમના પોતાના સહી સિક્કા સાથે કોપી એમ.ઓ.એમ. મા લેવા વિનંતી.

૨. કંપની કન્સલ્ટન્ટના QCI-NABET તરફથી એપ્રુવ્ડ કરેલા ફંક્શનલ એરિયા એક્સપર્ટ કાયમી પગારદાર અધિકારી છે કે નહિં તેની વિગત.

૩. કંપની કન્સલ્ટન્ટના QCI-NABET તરફથી એપ્રુવ્ડ કરેલા ફંક્શનલ એરિયા એક્સપર્ટ જો બહારથી લીધા હોય તો તેઓ અને કન્સલ્ટન્ટ વચ્ચે થયેલા કરારની નકલ એમ.ઓ.એમ. માં લેવા વિનંતી.

૪. કંપની કન્સલ્ટન્ટના QCI-NABET તરફથી એપ્રુવ્ડ કરેલા ફંક્શનલ એરિયા એક્સપર્ટ જો બહારથી લીધા હોય તો તેઓએ પર્યાવરણીય લોકસુનાવણીના ઈ.આઈ.એ. રીપોર્ટ માટે કઈ કઈ કંપની માટે સહીઓ આપી છે અને કામ કર્યા છે તેની વિગત.

૫. કંપની કન્સલ્ટન્ટના QCI-NABET તરફથી એપ્રુવ્ડ કરેલા ફંક્શનલ એરિયા એક્સપર્ટ જો બહારથી લીધા હોય તો તેઓને કેટલી ફી ચુકવવામાં આવેલ છે તે જણાવશો.

૬. કન્સલ્ટન્ટની પર્યાવરણીય લોક સુનાવણી અને આ પ્રોજેક્ટ બાબતે શું જવાબદારી નક્કી કરવામાં આવેલ છે તેની વિગત.

૭. કંપનીએ કન્સલ્ટન્ટને આ પ્રોજેક્ટ માટે કેટલી ફી ચુકવેલ છે તેની વિગત તથા કંપની અને કન્સલ્ટન્ટ વચ્ચે થયેલ કરારની નકલો એમ.ઓ.એમ.માં મુકવી.

૮. કંપનીના કન્સલ્ટન્ટે ઈ.આઈ.એ. રીપોર્ટની અંદર જે ડોક્યુમેન્ટ એક્રેડીટેશન સર્ટીફીકેટ તરીકે આપવામાં આવેલ છે. તે આજની તારીખમાં વેલીડ હોય તો તેની ખરાઈ કરીને હાર્ડ કોપી પર જવાબદાર અધિકારી દ્વારા સહી સિક્કા કરી એમ.ઓ.એમ.માં લેવા વિનંતી.

૯. NABET - QCI નું વેલીડીટી ધરાવતું એક્રીડીટેશન સર્ટીફીકેટ એમ.ઓ.એમ. મા લેશો.

૧૦. ઈ.આઈ.એ. રીપોર્ટનું પ્રેઝન્ટેશન કરનાર વ્યક્તિનું નામ, હોદ્દો તથા સંસ્થાનું નામ, સરનામું જણાવવું તથા તેનું ઓળખપત્રની ઝેરોક્ષ નકલ એમ.ઓ.એમ.મા લેશો.

૧૧. કન્સલ્ટન્ટે કઈ કઈ કંપની માટે ડ્રાફ્ટ ઈ.આઈ.એ. રીપોર્ટ બનાવેલ છે તે કંપનીના નામની યાદી. (તા.૦૧-૦૧-૨૦૧૫ થી તા.૧૦-૦૫-૨૦૧૭ સુધી)

૧૨. કંપનીના અન્ય એકમમાં ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ તરફથી આપવામાં આવેલ સોકોઝ નોટિસ તથા ક્લોઝર નોટિસ એમ.ઓ.એમ.માં મુકવી.

૧૩. કંપનીના ગુજરાત રાજ્ય બહાર એકમ આવેલ હોય અને તે એકમમાં પ્રદૂષણ નિયંત્રણ બોર્ડ સોકોઝ નોટિસ તથા ક્લોઝર નોટિસ આપેલ હોય તો તેની નકલ એમ.ઓ.એમ.માં મુકવી.

૧૪. સુચિત એકમમાં પર્યાવરણ તથા મનુષ્યને નુકસાન કરનારા કયા કયા જોખમી કેમિકલ વાપરવામાં આવનાર છે તેના નામ જણાવશો તથા તે જોખમી કેમિકલથી પર્યાવરણને કયા પ્રકારનું નુકસાન થઈ શકે છે તે જણાવશો તથા મનુષ્યને કયા કયા પ્રકારના રોગ થઈ શકે છે તે જણાવશો.

૧૫. QCI-NABET નું પેમેન્ટ ચુકવાયેલ હોય તો તેની જમા રસીદની કોપી ઉપર સહી-સિક્કા કરી એમ.ઓ.એમ.માં લેશો.

૧૬. QCI-NABET ના નિયમ મુજબ કન્સલ્ટન્ટે લીધેલા બહારના હંગામી ફંકશનલ એરિયા એક્ષપર્ટ ૧ વર્ષ દરમ્યાન કેટલા EIA રીપોર્ટમાં નામ લખાવી સહી કરી શકે છે તેની વિગત જણાવશો.

૧૭. GIDC ની માંગણી મુજબ આજદિન સુધી કેટલા વૃક્ષો વાવ્યા છે જેની વિગત જણાવશો. વૃક્ષો વાવવા માટે પાણી ક્યાંથી મેળવેલ છે તે જણાવશો. પાણી વેચાતુ લીધું હોય તો તેના બીલ એમ.ઓ.એમ.માં લેશો. વાવવામાં આવેલ વૃક્ષોનો આજની તારીખ સાથેનો ડીઝીટલ ફોટોગ્રાફસ એમ.ઓ.એમ.માં લેશો.

૧૮. SLEAC તરફથી કંપનીને આપવામાં આવેલ TOR નું Compliance નો અમલ સત્ય હકીકત સાથે ૧૦૦ ટકા પૂર્ણ થયેલ છે કે નહીં તે જણાવશો.

૧૯. SLEAC તરફથી કંપનીને આપવામાં આવેલ TOR નું Compliance નો અમલ સત્ય હકીકત સાથે ૧૦૦ ટકા પૂર્ણ થયેલ હોય તો તેની ખાતરી કંપની લેખિતમાં આપે.

૨૦. લેન્ડલુઝર્સના નામ સરનામા એમ.ઓ.એમ. માં લેવા તથા જી.આઈ.ડી.સી.એ આપેલ લેન્ડલુઝર્સનું સર્ટીફીકેટ એમ.ઓ.એમ.માં મુકશો.

૨૧. કંપની શરૂ થયે તમામ કર્મચારીઓના નામ ગેટ બહાર નોટીસ બોર્ડ ઉપર પ્રસિદ્ધ કરવામાં આવે તેવું સૂચન છે. તથા ૮૫ ટકા સ્થાનિક લોકોને રોજગારી આપવામાં આવે.

૨૨. કંપની શરૂ થયાથી કંપનીના અન્ય વિસ્તારના એકમમાં બનેલ આગ અકસ્માત, ગેસ ગળતર તથા કંપની અકસ્માતમાં જો કોઈ કામદાર અથવા તો અન્ય વ્યક્તિનું મૃત્યુ થયું હોય તો તેના નામ, બનાવની વિગત, આપવામાં આવેલ વળતરના પુરાવા એમ.ઓ.એમ.માં મુકશો. ઔદ્યોગિક સલામતી અને સ્વાસ્થ્યની કચેરી તરફથી કંપનીને આપવામાં આવેલ ક્લોઝર નોટીસની નકલ, ૪૦ (૨) મુજબ આપવામાં આવેલ નોટિસ એમ.ઓ.એમ. માં મુકવા વિનંતી. તથા તે અંગે થયેલી કાર્યવાહીની તમામ નકલો એમ.ઓ.એમ.માં મુકશો. તેમજ કંપનીને થયેલ દંડની વિગત એમ.ઓ.એમ.માં લેશો.

૨૩. કંપની શરૂ થયાથી કંપનીના અંકલેશ્વર તથા અન્ય વિસ્તારના એકમને જી.પી.સી.બી. તરફથી ક્લોઝર નોટીસ આપવામાં આવેલ હોય તો કંપનીએ રીવોક કેવીરીતે મેળવ્યું તે જણાવશો. તથા રીવોક મેળવવા માટે કરેલ કાર્યવાહીના તમામ કાગળો એમ.ઓ.એમ.માં મુકશો. તથા સરકારી કચેરીમાં ભરેલ ડીપોઝીટ અથવા દંડની રકમની રસીદની નકલ એમ.ઓ.એમ.માં મુકશો.

૨૪. કન્સલ્ટન્ટે QCI-NABET નું એક્રેડીટેશન સર્ટીફીકેટ મેળવવા માટે કરેલી અરજી અને અરજી સાથે રજૂ કરેલ પુરાવાની નકલો એમ.ઓ.એમ.માં મુકશો.

૨૫. ઈ.આઈ.એ. રીપોર્ટનું પ્રેઝન્ટેશન કરનાર વ્યક્તિએ કઈ તારીખ, માસ તથા વર્ષથી સંસ્થા સાથે જોડાયેલ છે તે જણાવશો.

૨૬. પર્યાવરણીય લોકસુનાવણીમાં તથા આ પ્રોજેક્ટમાં ઈ.આઈ.એ. રીપોર્ટનું પ્રેઝન્ટેશન કરનાર વ્યક્તિની જવાબદારી વિશે જણાવશો.

૨૭. અસરગ્રસ્ત વિસ્તારના કુલ કેટલા લોકો અંગ્રેજી ભાષાના જાણકાર છે તે જણાવશો.

૨૮. અસરગ્રસ્ત વિસ્તારના લોકોની ગામડા દીઠ આંકડાકીય માહિતી જણાવશો.

૨૯. અસરગ્રસ્ત વિસ્તારના લોકોની શૈક્ષણિક લાયકાતની ગામડા દીઠ આંકડાકીય માહિતી જણાવશો.

૩૦. આ પ્રોજેક્ટ થકી અસરગ્રસ્ત વિસ્તારના લોકોને તથા કંપનીના કર્મચારીને પ્રદૂષણ થકી, આગ અકસ્માત થકી તથા ઝેરી ગેસ ગળતર થકી કોઈપણ પ્રકારનું નુકસાન નહીં થાય તેવી બાંહેધરી આપતું નોટરી રૂબરૂ સોગંદનામુ કરી કંપની અથવા જવાબદાર કંપની અધિકારીનું સોગંદનામુ એમ.ઓ.એમ. મા લેશો.

૩૧. આ પ્રોજેક્ટ થકી અસરગ્રસ્ત વિસ્તાર સિવાયના બહારના લોકોને તથા કંપનીના કર્મચારીને પ્રદૂષણ થકી, આગ અકસ્માત થકી તથા ઝેરી ગેસ ગળતર થકી કોઈપણ પ્રકારનું નુકસાન નહીં થાય તેવી બાંહેધરી આપતું નોટરી રૂબરૂ સોગંદનામુ કરી કંપની અથવા જવાબદાર કંપની અધિકારીનું સોગંદનામુ એમ.ઓ.એમ. મા લેશો.

૩૨. આ પ્રોજેક્ટ થકી અસરગ્રસ્ત વિસ્તારના લોકોને તથા કંપનીના કર્મચારીને પ્રદૂષણ થકી, આગ અકસ્માત થકી તથા ઝેરી ગેસ ગળતર થકી કોઈપણ પ્રકારનું નુકસાન થાય તો કન્સલ્ટન્ટની જવાબદારી નક્કી થાય છે કે નહી તે જણાવશો.

ધર્મેશ મિસ્ત્રી

સહી

(TRANSLATED)

1625

DHARMESH MISTRI
Block no. 14, house no. 1340, Narmada Apartment, Opp. Mamlatdar office,
Bharuch
Mobile: 9998609115
Date: 28.04.2017

To,
1. Member secretary
Gujarat Pollution Control Board, Sector-10 A, Gandhinagar.

Subject: Objection points for the environmental public hearing of Adani Enterprises limited (District Kutch).

1. It is requested to take copy of QCI-NABET approved company consultant's functional area experts' names, the details of their area of functioning, their time limits along with their signature and stamp, within the MOM.

2. The details showing whether QCI-NABET approved company consultant's functional area expert is an officer on regular pay or not?

3. It is requested to take along with the MOM, the copy of agreement that is held between the federation area expert and consultant, in case if the QCI-NABET approved functional area for the company consultant is enrolled from external source.

4. It is requested to take details of work undertaken by them with the names of the companies for which they have signed for the EIA report during environmental public hearing, in case if the QCI-NABET approved functional area for the company consultant is enrolled from external source.

5. Provide the information of the fees paid, in case if the QCI-NABET approved functional area for the company consultant is enrolled from external source.

6. The details of the responsibilities decided for the consultant for environmental public hearing and as for this project.

7. The details of the fees paid by the company to the consultant and the agreement between the consultant and company to be kept in the MOM.

8. It is requested to place under the MOM, the copy of the document provided under the EIA report as accreditation certificate by the company consultant along with the signature and stamp of the competent office in the hard copy.

9. The accreditation certificate considered valid by NABET-QCI shall be taken in MOM.

10. The name, designation, organization's name and address of the individual providing presentation of the EIA report shall have to be provided along with photocopy copy of identification proof to be kept along with the MOM.

11. The list of the names of companies for which the consultant has prepared draft EIA report. (From 01.01.2015 to 10.05.2017)

12. The show cause notices and closer notice issued by the Gujarat Pollution control board to the company, to be placed in the MOM.

13. In case if the company has a unit outside the state of Gujarat and the show cause notice is issued by the Pollution control board, the copy of the same to be kept in the MOM.

14. Provide the names of the Hazardous chemicals that are harmful for environment and humans and are to be used, provide the type of damage that such Hazardous chemicals shall do to the environment and inform what kind of diseases are possible to the humans.

15. If the QCI-NABET payment is made, place the copy of the payment receipt in MOM, along with signature and stamp upon it.

16. As per the rules of QCI-NABET, how many EIA reports can be signed within one year by the ad-hoc functional area expert appointed by the consultant?

17. Provide the details of the trees plated as per the demand of the GIDC. Provide the details of source of water used for the purpose of plantation of trees. If the water is purchased, provide the bills in MOM. Take into MOM the digital photographs of the trees planted till date.

18. Specify if 100% truthful compliance is undertaken of the TOR provided by SLEAC to the company?

19. The company should provide a written assurance that 100% truthful compliance is undertaken of the TOR provided by SLEAC to the company.

20. The names and addresses of the Land Losers to be taken under MOM and the certificate for Land Losers provided by the GIDC to be placed in MOM.

21. It is instructed that from the initiation of the company, the names of the employees to be published in the notice board outside the gate and 85% of local public to be provided employment.

22. From the initiation of the company, if any fire accident, gas accident or other kind of accident has taken place at company units in other areas, the names & details of the workmen or other persons as well as compensation provided to be placed in the MOM. It is requested to place the closer notice under point

proceedings carried out as for the same to be placed in the MOM. Moreover the details of the penalty inflicted on the company to be placed under MOM. 1627

23. After the indication of the company, if the GPCB has issued closed notice to the Ankleshwar and other units of the company, provide the information that how did the company obtain revoke of the notice. Moreover place all documents in the MOM for the proceedings held for obtaining revoke. Moreover place in the MOM, the amount deposited at government office or receipt of penalty.

24. Place in the MOM the application filed by the consultant for obtaining accreditation certification from the QCI-NABET and the proofs placed along with the same.

25. Provide details as to the date, month and year of joining the organization by the individual that undertakes the presentation of the EIA report.

26. Provide information as to the responsibility of the individual that is to undertake the projection of the EIA report during the environmental public hearing and project.

27. Provide the information that how may people are affected area have knowledge of English language.

28. Provide village wise figurative information of the individuals residing within affected area.

29. Provide village wise figurative information of the educational qualifications of individuals residing within affected area.

30. Take into the MOM the affidavit for assurance signed by company or competent officer of the company, while remaining present before a notary, signifying that the individuals of affect area and company employees shall not suffer any kind of damage due to the pollution, fire accident or toxic gas generated due to the project.

31. Take into the MOM the affidavit for assurance signed by company or competent officer of the company, while remaining present before a notary, signifying that the individuals other than that of affect area and company employees shall not suffer any kind of damage due to the pollution, fire accident or toxic gas generated due to the project.

32. Is the consultant responsible or not, in case if individuals and company employees suffer any kind of damage due to the pollution, fire accident or toxic gas generated due to the project.

Dharmesh Mistri
Sd/- illegible
Signature

1628

C-Q-9

શ્રી મોટા ભાડીયા ગામ પંચાયત

મુ.પો. મોટા ભાડીયા, તા.માંડવી-કચ્છ.

ન. નં. તા.૨૩/૪/૨૦૧૩

વિષયઃ કંપની દ્વારા અરજ્યા લોકલ લોકોના પ્રશ્નોનું નિરાકરણ બાબત

ગ્રામજનો સાથે જણાવવાનું કે અરજ્યા ને પ્રોજેક્ટ આપ્યું છે એ પ્રોજેક્ટ આજ દિવસ સુધી અરજ્યાએ કંપની તરફથી કોઈ પણ જાતનો લાભ આપ્યો નથી એમાં બેરોજગારી, કામ-ધંધા, નોકરી, ગામોનો ગામવાસો, પાકની નુકસાની, ખેતીવાડી ને લગતા પ્રશ્નો, રસ્તાઓ અને આરોગ્યને લગતી સુવિધાઓ આજ દિવસ સુધી પુરી કરવામાં નથી આવી અને આજે પાછો અરજ્યા એ જ પ્રોજેક્ટ આપ્યો એમાં પણ અરજ્યાએ કોઈ લાભ આપ્યો નથી અરજ્યા જરૂરી છે એની અમે વિરોધ કરીએ છીએ આપ્યા પ્રોજેક્ટ સ્વાસ્થ્ય અને ખેતીવાડી ને લગતા મુદ્દાઓ પરિપૂર્ણ કરે એ પ્રોજેક્ટની અમે વિરોધ કરીએ છીએ

ગોવિંદભાઈ વેલજી વરસાણી
ગામ મોટા ભાડીયા
મો:- ૯૭૨૭૩૨૬૬૭૧

અને ગ્રામજનો તરફથી

સરપંચ
શ્રી મોટા ભાડીયા ગામ પંચાયત
મોટા ભાડીયા, તા. માંડવી-કચ્છ.

C-Q-9
(TRANSLATED)

MOTA BHADIYA GRAM PANCHAYAT

At & post MOTA BHADIYA, Ta. Mandvi- Kutch

Outward No. Date 27.4.2017

Subject: No solution of local problems by the Company

Sir,

This is to inform that in all surrounding villages falling within 15 km radius from the existing project of the company, till date no support if provided for the employment, jobs, fodder for cattle, drinking water, problems relating to agriculture, roads, and public health facilities etc. Further, one more hazardous project which can seriously harm the public health and agricultural corps etc is proposed here which we strongly object.

Sd/- Nagshi Gadhvi

9727326671

(On behalf of Sonbaiben Punshi Gadhvi)

Sarpanch

Mota Bhadiya Gram Panchayat

Mota bhadiya Ta. -Mandvi- Kutch

દાખલો

28/4/2017

1630

પ્રતિ શ્રી
મેનેજર સાહેબ
એસઇ ઝેડ
મુદ્રા કચ્છ

વિષય : SEZ મુન્દ્રા ખાતે ગ્રીન ફિલ્ડ કોપર રિફાઇનરી પ્રોજેક્ટ બાબતે
અભિપ્રાય

ઉપરોક્ત વિષયના અનુસંધાને જણાવવાનું કે અદાણી ગ્રુપ દ્વારા મુંદ્રા માં સામાજીક ઉત્તર દાયીત્વ નો ભાગ રૂપે ગ્રામ્ય આરોગ્ય માળખાકીય સુવિધાઓ પશુ પાલન જેવી કલ્યાણ લક્ષી કામો કરેલ છે. અને કંપની આપણી. અમારા વિસ્તારમાં વિકાસ અને રોજગારી. થી વધુ ઉત્તમ વાતાવરણ છે. એ SEZ માં ગ્રીન ફિલ્ડ કોપર રિફાઇનરી પ્રોજેક્ટ આપણી રોજગારી અને વિકાસ ની વધુ ઉંચા લાવશે આમ પર્યાવરણ ના નિયમો નું પાલન કરીને લાવા સાથે સામાજીક ઉત્તર દાયિત્વ ના વિકાસનાં કામો કરે તો આપણે કોઈ વાંધો નથી એ. અમારા વિસ્તાર માં વિકાસ આવે તેમાં અમો સહમત છીએ.

આપનો વિશ્વાસુ

એ. જે. પુંજ
સરપંચ
ઉમા તા. મુન્દ્રા - કચ્છ

અસલ આપવું

1631

C-Q-10
(TRANSLATED)

DHRAB GRAM PANCHAYAT

VILLAGE: DHRAB TAL. MUNDRA DIST. BHUJ – KACHCHH (GUJARAT STATE)
SARPANCH: TURK ABREMAN JUSAB Mob No. 99094 76009

CERTIFICATE

DT.28/04/2017

To,
The Manager,
SEZ,
MUNDRA - KACHCHH.

Subject: Opinion about Greenfield Copper Refinery Project at Mundra.

With respect to the subject mentioned above we would like to state that as part of corporate social responsibility in Mundra, the Adani Group has carried out many activities in the field of education, healthcare, infrastructure development, agriculture, animal husbandry and after existence of this company many business and employment opportunities have been generated and due to establishment of proposed Greenfield copper Refinery Project many job and business opportunities will be created. We have no objection if you observe the environment preservation rules and corporate responsibility are observed for the development of our area, we are always with you on this ground.

Sd/- Abdbdreman Jusab Turk
(A.J.TURK)
SARPANCH
DHRAB GRAM PANCHAYAT
VILL. DHRAB TAL. MUNDRA-KACHCHH.

ASLAM MAMAD

વિના સહકાર નહા ઉધાર પરમેશ્વર સત 1632

સીરાયા ગ્રામ પંચાયત

[redacted] ગામ :સીરાયા (તા. મુંદરા-કચ્છ) [redacted] C-Q-11

રેફ. નં. તારીખઃ 28/04/17

પ્રતિ
મુખ્ય અધિકારીસાહેબ
અદાણીપોર્ટ એન્ડ એસ.ઈ.ઝેડ-મુંદરા.

વિષય:- અદાણી કોપર રીફાઈનરી પ્રોજેક્ટ
બાબત.

સાહેબશ્રી,

જયલાભ સાથે જણાવવાનું અદાણી ગ્રુપ દ્વારા કોપર રીફાઈનરી પ્રોજેક્ટ જનવીકાસ અને સિરાયા ગામની વચ્ચે આવી રહ્યો છે આ પ્રોજેક્ટ થકી જે વાયુપ્રદુષણ અને સિરાયા ગામના નાના મોટા માણસનો વિશ્વાસ થાય, બેરોજગારને રોજગાર મળે, ખેતી અને પશુપાલનનું મુલ્યાંકન વધુ પડતા વિશ્વાસ થાય અને પર્યાવરણનું પણ ધ્યાનમાં લેવાય, જે ગામમાં દ્રઢ વિશ્વાસ ગ્રામજનોને આપીને તે પુરતા પ્રમાણમાં આપવા અને કંપની મિત્રતાનો આપવો તેમજ ગામ મુજબનો સારો મજારહે જેમકે, સાલો તેમજ સારો આપવા.કંપની દ્વારા કોમો વાપરવા અને કંપની ની કોઈ પોંધો નથી અને કંપની ને જરૂર આપવારીશું.

જોઈએ સરપંચશ્રી
સીરાયા ગ્રામ પંચાયત
તા. મુંદરા - કચ્છ

1693

C-Q-11
(TRANSLATED)

SIRACHA GRAM PANCHAYAT

VILLAGE : SIRACHA TAL. MUNDRA-KACHCHH.

DT. 28/04/2017

To,
Chief Officer Saheb,
Adani Port and SEZ,
MUNDRA.

Subject: Regarding Adani Copper Refinery Project.

Dear Sir,

With respect to the subject mentioned above we would like to state that there is new Copper refinery Project is going to be established between the village Siracha and Navinal we have no objection if the poor and untrodden people of Siracha and Navinal will be uplifted , if unemployed get employment, agriculture and animal husbandry industry are not damaged but developed, and if the environment is taken care of, and the fodder in adequate quantity supplied to cows and supplied regularly and supplied accordingly to season such as dry or wet fodder if such types of activities are undertaken by the company then we welcome such project.

Sd/-
Sarpanchshri,
Siracha Gram Panchayat
Tal. Mundra-Kachchh.

રેફ. નં.

તારીખ : 29/04/2

1634

પ્રતિશ્રી,
જિલ્લા કલેક્ટર સાહેબશ્રી,
કલેક્ટર કચેરી કચ્છ-ભુજ

વિષયઃ કોપર રીફાઈનરી પ્રોજેક્ટની લોકે સુનાવણી સભા

જય ભારત સાથે ઉપરોક્ત વિષયે જણાવવાનું
સરકારશ્રી દ્વારા અમારા વિસ્તારમાં જે વિકાસના કાર્યો થયા
જેમાં આ વિસ્તારમાં આવેલ અદાણી ફાઉન્ડેશન જેવી કંપનીઓ
ખુબજ સારો સહકાર મળેલ છે અને હજુ પણ અમારા વિસ્તારન
યુવાનોને રોજગારી મળે, લોકોની આરોગ્ય સુવિધા, પ્રજાના માળ
પ્રાથમિક સુવિધાઓ જેવી કે વહેળાણ, શિક્ષણ, રસ્તા-રોડ પશુઓ
માટે ઘાસ-ચારો જેવી અનેક બાબતોમાં તેમજ આ વિસ્તારના
સર્વાંગી વિકાસમાં આપનો સિંહ ફાળો રહ્યો છે તો અમે આપન
પ્રોજેક્ટને સહર્ષ હૃદય પુર્વક આવકારીએ છીએ આપશ્રી દ્વારા
અગાઉ પણ અમારા વિસ્તારના સર્વાંગી વિકાસ કાર્યોનો જે ધ
વહી રહ્યોછે તે સતત વહેતો રહે એવી અમારી લાગણી
આપ સ્વીકારશો.....

ગઢવી પુનમપ

1635

C-Q-12

(TRANSLATED)

PUNSHI KHETSHI TURIYA (GADHAVI)

SYMBOL **MEMBERSHRI, TALUKA PANCHAYAT (MANDVI - KACHCHH)**

AT & POST BHADIYA, TAL. MANDVI –KACHCHH.

VANDE MATRAM **MOB: 9979328891**

Ref. No. **Date: 29/04/2017**

To,
The District Collector Sahebshri,
Collector Office,
Kachchh - Bhuj

Subject: Regarding Public Hearing of COPPER REFINERY PROJECT.

It may be noted that the various development projects has been implemented in our area with the good cooperation of companies like Adani Foundation situated in our area and still for the employment of youth, health facilities for the people, structural primary facilities for public like housing, education, roads and fodder for animals and many matters and you have a lion share for the overall development of this area, we whole heartedly welcome your new project, we hope you will accept our feelings by continuously carrying out developmental activities as you have been doing in the past.

GADHAVI PUNSHI KHETSHI

રેફ. નં.

તારીખ : ૨૭/૦૫/૨૦૧૮

પ્રતિ શ્રી

1636

એકઝીકયુરીવ ડાયરેક્ટર
સાહેબશ્રી તથા સી.ઓ.ઓ.સેઝ
સાહેબશ્રી અદાણી પોર્ટસ&સેઝ લી.

વિષય:- કોપર રીફાઇનરી પ્રોજેક્ટની લોક સુનાવણી સબ

જય ભારત સાથે ઉપરોક્ત વિષયે જણાવાનું

સરકારશ્રી દ્વારા અમારા વિસ્તારમાં જે વિકાસના કાર્યો થયા
જેમા આ વિસ્તારમાં આવેલ અદાણી પોર્ટ અને સેઝ લી. જેવી કં
દ્વારા ખુબજ સારો સહકાર મળેલ છે અને હજુ પણ અમારા વિસ્
યુવાનોને રોજગારી મળે. લોકોની સારવાર સુવિધા, પ્રજાના આરોગ્ય
પ્રાથમીક સુવિધાઓ જેવીકે રહેઠાણ, શિક્ષણ, રોડ-રસ્તા પશુઓ
ઘાસ-ચારો જેવી અનેક બાબતોમા તેમજ આ વિસ્તારના
સર્વાંગી વિકાસમાં આપનો સિંહ ફાળો રહ્યો છે તો અમે
કોપર રીફાઇનરી પ્રોજેક્ટને સહર્ષ હૃદય પુર્વક આવકારીએ છીએ
આપશ્રી દ્વારા અગાઉ પણ અમારા વિસ્તારના સર્વાંગી વિકાસ
કાર્યોનો જે ઘોધ વહી રહ્યો છે તે સતત વહેતો રહે એવી અ
લાગણીને આપ સ્વીકારશો.....

ગઢડા પુનમ

1637

C-Q-13

(TRANSLATED)

PUNSHI KHETSHI TURIYA (GADHAVI)

MEMBERSHRI, TALUKA PANCHAYAT (MANDVI - KACHCHH)

AT & POST BHADIYA, TAL. MANDVI –KACHCHH.

VANDE MATRAM **MOB: 9979328891**

Ref. No. **Date: 29/04/2017**

To,
Executive Director Sahebshri,
and CEO SEZ Sahebshri,
Adani Port and SEZ Ltd.

Subject: Regarding Public Hearing of COPPER REFINERY PROJECT.

It may be noted that the various development projects has been implemented in our area with the good cooperation of companies like Adani Ports & SEZ ltd. situated in our area and still for the employment of youth, health facilities for the people, structural primary facilities for public like housing, education, roads and fodder for animals and many matters and you have a lion share for the overall development of this area, we whole heartedly welcome your new project, we hope you will accept our feelings by continuously carrying out developmental activities as you have been doing in the past.

GADHAVI PUNSHI KHETSHI

C-1428

1638

પ્રતિ
શ્રી અધિકારી સાહેબશ્રી
અદાણીપોર્ટ એન્ડ એસ.ઈ.ઝેડ
મુંદરા કચ્છ

વિષય: અદાણી ફોર્ટ્રેસ સિક્યોરિટી સર્વિસ.

આદરણીય,
સાદર નમસ્કાર !

જણાવવાનું કે અમારા ગામની સીમમાં અને નજીકમાં આવેલ અદાણી ફોર્ટ્રેસ સિક્યોરિટી સર્વિસ દ્વારા અવારનવાર ઢોરોનો ત્રાસ થાય છે. તેના

1639

C-Q-14

(TRANSLATED)

II PANCH TYAN PARMESHWAR II

SHRI NANA KAPAYA JUTH GRAM PANCHYAT

CLUSTER VILLAGES: NANA KAPAYA, BORANA

Village: Nana Kapaya, Tal. Mundra - Kachchh.

Outward No. Date- 29/04/2017

To,

Shri Officer shri,
Adani Port and SEZ,
Mundra - Kachchh.

Sub: Adani Copper Refinery Project.

Sadar Namaskar

It may be noted that the Copper Refinery Project which is going to take place between Siracha and Navinal is beneficial for the local people as far as generation of employment and their development likewise we hope that it will help in development of village and nation and we welcome the Adani Copper Refinery Project.

Sd/- VALBAI SHAMJI
SARPANCH
Nana Kapaya Borana Juth Gram Panchayat
Tal. MUNDRA – KACHCHH.

1640

1430

અદાણી પોર્ટ સ્પેશિયલ ઇકોનોમિક ઝોન લિમીટેડ

મુંદરા - કચ્છ

વિષય :- ગ્રીનફિલ્ડ કોપર રિફાઇનરી પ્રોજેક્ટ અંગ
બાબત

જય ભારત સાથે જણાવવું છું કે ગ્રીનફિલ્ડ કોપર
રિફાઇનરી પ્રોજેક્ટ આ એરીયા માં આવવા નો છે
તેને અમો શ્રી મગદલી ગ્રામ પંચાયત વતી આવકારીએ
છીએ અને આ પ્રોજેક્ટ થી ભવિષ્ય માં વિજગારીએ
તકો વધશે અને આજુબાજુ ના એરિયા નો વિકા
થશે. તેવી આશા રાખીએ છીએ. અને આ પ્રો
વેલી તકે આવે તેવી આશા રાખીએ છીએ.

(સુ)
આપનો વિશ્વાસુ
ભાઇશ્રીઓ નમુના અંગે
[redacted]
[redacted] પંચાયત
[redacted]

1641

C-Q-15

(TRANSLATED)

SERVICE ORGANIZATION COOPERATION

SHRI TRAGADI GRAM PANCHAYAT

AT AND POST TRAGADI TAL. MANDVI - KACHCHH.

Outward No. **Dt. 21/04/2017**

To,

Adani Port Special Economic Zone Limited,

Mundra - Kachchh.

Sub: Regarding welcoming Greenfield Copper Refinery Project.

It may be noted that the Greenfield Copper Refinery Project has been scheduled to come in this area. We welcome the said project on behalf of Tragadi Gram Panchayat and by this project the employment opportunities in this area will be increased and we hope that surrounding area will be developed and we hope that this project will come on priority.

Yours faithfully,

Sd/- BAIRAJBHA LAKHUBHA JADEJA

SARPANCH

TRAGADI GRAM PANCHAYAT

TAL. MANDVI - KACHCHH.

SERVING HUMANITY

Mob. : 98796 00255
Email : atulpandya1967@gmail.com

Dinesh Thacker
(Gandhidham)

Mob. : 96
Email : rajendra@bkin

1642

1432

IPP
Rtn. Nilimaben Mehta

Treasurer
Rtn. Samir Mehta

Jt. Secretary
Rtn. Dilip Gor

Sergeant at Arms
Rtn. Narendrabhai Dave

DIRECTORS

Teach Chairman
Rtn. Chhayaben Gadhvi

Foundation
Rtn. B N Chothani

Club Administration
Rtn. P V Ganatra

Public Relation
Rtn. V R Gadhvi

Service Project
Rtn. Bhupendra Mehta

New Generation
Sachin Ganatra

Club Trainer
Rtn. D V Bhandarkar

Membership
Rtn. B M Gohil

Editor
Rtn. Sunil Mehta

Pulse Polio
Rtn. Valjibhai Taparia

Greeting Chairman
Rtn. Paresh Palan

ICC
Rtn. Avinash Bhatt

તા: ૨૫-૪-૨૦

પ્રતિશ્રી,

વિષયઃ અદાણી ગ્રુપ દ્વારા કોપર રીફાઇનરી પ્રોજેકટની લોકસુનાવણી બા

માનનીયશ્રી,

સવિનય સહ જણાવવાનું કે, મુંદરા તાલુકામાં અદાણી ગ્રુપ દ્વારા કોપર રીફાઇનરી પ્રોજેકટની સ્થાપના થવા જઇ રહી છે. તેનાંથી મુંદરા તાલુક તમામ લોકોને બેરોજગારોને રોજગારી, કોન્ટ્રાકટરોને, મજુરોને કામ કરવાની વધી જશે અને લોકોનું જીવન ધોરણ ઉચું આવશે અને અમોએ જે પ્રેઝન્ટે તથા વીડીયો જોયો છે તેનાથી ઉપરથી ખેતી અને લોકોના આરોગ્યને પર્યાવરણથી નુકશાન થશે નહી આ પ્રોજેકટ સ્થાપાશે તો તેના કારણે અ ઉધોગો સ્થાપાશે જેથી મુંદરા તાલુકાના લોકોને વધુને વધુ રોજગારીની તકો વ્યાવસાયિક તકો વધી જશે.

આ ઉધોગની સ્થાપના થવાથી લોકોને ધંધાકીય રીતે અને વ્યાવસા રીતે વધુને વધુ તકો મળશે અને અમો ઇચ્છીએ છીએ કે આ કોપર રીફાઇ પ્લાન્ટ જેમ બને તેમ જલ્દી સ્થાપાય અને લોકોને તેનો લાભ મળે.આ કો રીફાઇનરી પ્લાન્ટ સ્થાપાય તેમા અમો સહમત છીએ.

યોગ્ય સાથ અને સહકારની અપેક્ષા સહ,

આપનો વિશ્વા

(અતુલ પંડ્ય
President
ROTARY CLUB OF M

1643

C-Q-16

(TRANSLATED)

ROTARY CLUB OF MUNDRA - KUTCH

RI Dist. 3051 **Ch. No. 28407** **Ch. Dt. 12/12/1991**

Dt. 25/04/2017

To,

Sub: Regarding Public Hearing of Copper Refinery Project of Adani Group.

Respected Sir,

It is utmost respectfully said that due to the Copper Refinery Project going to be established by Adani Group in Mundra Taluka, the unemployed youth will get employment and contractors and laborers will get more opportunities to get work and standard of living of the people of the area will rise and from the presentation and video watched by us we can say that it is not harmful to agriculture and health of the people and environment. If this project will be established than other projects will also come, by which the people of Mundra will get more opportunities for employment and professional opportunities.

On establishment of this industry the people will get more opportunities in their profession and business. And we expecting this plant to be established as soon as possible and people get benefited. We welcome this copper refinery plant.

Hoping for your co-operation.

Yours faithfully,
Sd/- Atul Pandya,
President,
Rotary Club of Mundra.

Ref No: [illegible]

Date: ૨૨/૦૩/૨૦

1644

1434

પ્રતિ,

શ્રી, અદાણી ગ્રુપ

વિષયઃ જણાવવાનું કે અદાણી ગ્રુપ દ્વારા જે સામાજીક વીકાસની કામગીરી કરવામાં આવી રહી છે પ્રશંસા ને પાત્ર છે. અદાણી દ્વારા અહીં શૈક્ષણિક આરોગ્ય અને આજીવીકા ઉપાર્જન ની સેવા ઉપયોગી કાર્ય કરવામાં આવી રહ્યા છે. જે પણ કોપરેટર છે. ત્યા એમના દ્વારા જે ઉદ્યોગ ગૃહો સ્થાપેલ છે તેનાથી મોટા પાયા પર રોજગારી માં વધારો થયેલ છે. અને આવનાર સમયમાં જે નવા પ્રોજેક્ટ કોપર રીફાઇનરી નો આવવાનો છે તેનાથી ઘણા રોજગારી માં વધારો થશે જે વીકાસ ની બાજુ નો અમો આભારી આપકારીએ છીએ.

આભાર સહ

1645

C-Q-17

(TRANSLATED)

Wakf Reg.No. 005-99 - Kachchh.

KARVAN-E- MUSTAFA

MEDICAL AND EDUCATIONAL TRUST

Near Jama Masjid, MUNDRA - KACHCHH 370421 PHONE (02838) 223708

Ref. No. 119/17-18 Dt. 28/04/2017

To,

ADANI GROUP,

It may be noted that the social development activities carried out by Adani Group is really praise worthy. By Adani group, education, health and income generation related activities are being undertaken which is very much beneficial and industry houses established by them has increased the business and employment in Mundra Taluka and in the near future the new copper refinery project will increase the business and employment, we welcome such developmental activities.

Sd/-

Ref. No. 1646 Date : 1436

પ્રતિશ્રી
મેનેજર
અદાણી ગ્રુપ.
મુંદરા (કચ્છ)

વિષય:- અદાણી ગ્રુપ દ્વારા કોપર રીફાઈનરી પ્રોજેક્ટ ન
લીકે સુનાવણી બાબતે.

માનનીયશ્રી,

સવિનય સહ જણાવવાનું કે, મુંદરા તાલુકા માં અ
ગ્રુપ દ્વારા જે કોપર રીફાઈનરી પ્રોજેક્ટની સ્થાપના થવાન
તેનાથી અમારા તાલુકાના લોકોને રોજગારી, મજૂરોને મજૂ
મળી રહે છે. અને લોકોની રહેણી-કરણી માં સુધારો આ
આ કોપર રિફાઈનરી પ્લાન્ટ આવવાથી પર્યાવરણને કોઈ
નુકશાન થવાની સંભાવના નથી, તથા. આ પ્રોજેક્ટના
થી બીજા ઘણા પ્રોજેક્ટ આવશે. જેથી અમારા તાલુ
ગામો માં વધુનેવધુ રોજગારી ની તકો ઊભી થશે.

કોપર રિફાઈનરી પ્લાન્ટ આવવાથી લોકોને ધંધાકી
વધુ વકો મળશે. અને અમો ઈચ્છીએ. છીએ કે આ પ્રો
જેમ બને તેમ જલ્દી સ્થપાય અને લોકો ને તેનો લાભ
આ કોપર રિફાયનરી પ્લાન્ટ સ્થપાય તેમાં અમો સહમત

PRESIDENT

Lions Club of Mundra City
Mundra - Kutch

1647

C-Q-18

(TRANSLATED)

LIONS CLUB OF MUNDRA CITY

Ref. No. **Date:**

To,

The Manager
Adani Group,
Mundra - Kachchh

Subject: Regarding Public Hearing of Copper Refinery Project of Adani Group.

Respected sir,

It may be noted that the Adani Group is going to establish copper refinery project by which the people of this Taluka will get employment and laborers will get their labor work which will uplift the standard of living of local people. There is no threat for damage to environment by this project, and many ancillary industrial units will also come with this project which will increase the employment opportunities in villages of our Taluka.

Due to the copper refinery project the people will get more business opportunities and we wish that this project will be established as soon as possible and people will get benefited out of this project. We welcome this copper refinery project.

Sd/-
PRESIDENT
LIONS CLUB OF MUNDRA CITY
MUNDRA - KACHCHH.

E-mail: mystical9090@gmail.com | PAN No. DFPPS7424F

Ref :

Date :

પ્રતિશ્રી
અધિક્ષક અધિકારી,
અદલતી કાર્યવાહીના, મુંબઈ.

તારીખ: 28/8/.

વિષય : અદલતી કાર્યવાહીના હોય તેવામાં આવા
કામગીરી બાબતે.

જય ભારત સાથે જણાવવાનું કે અદલતી ક
હોય મુંબઈ તાલુકામાં સામાજીક વિકાસના કાર્યો
એની રીતે થાય છે. જેમાં શિક્ષણ, આરોગ્ય અને આ
રોકાણની નહી કાર્યો મુજબ એની રીતે કરવામાં આ
એવી જ રીતે ભવિષ્યમાં પણ કાર્ય કરે એવી
એ આભાર.

Mystical Corporation
R. M. Samy
Proprietor

1649

C-Q-19

(TRANSLATED)

Hiran Ayadi - 9979489090 **Ranubha - 9687960327**

Mystical Corporation

All type of Civil Works and Material Supply
Add: Office no. 5, Rajiviia Complex, Baroi Road, Mundra Dist. Kachchh (Gujarat) Pin - 370421
E-mail: mystical9090@gmail.com I PAN No. DFFPS7424F

Ref. No. Date- 21/04/2017

To,
Authorized Officer,
Adani Foundation,
Mundra.

Sub: Regarding Social Activities being carried out conducted by Adani Foundation.

It may be noted that the Adani Foundation is doing social development activities in Mundra Taluka very efficiently including educational, health and income generation activities. We hope the same will be continued in future as well. Thanks.

For Mystical Corporation,
Sd/- R.M.SAMA
Proprietor

ABHUBHAKHAR F. NODE
1650
Mo. 9913431[illegible]
Mo. 76983 87775

1440

K.G.N. CONSTRUCTION C-Q-20

R.C.C. CONTRUCTION - R.C.C. ALIVATION - LOAD BEARING

Vill. Tragadi, ❋ Ta. Mandvi-KUTCH.

Ref No. : Date :

પ્રતિશ્રી,
મેનેજર શ્રી, અદાણી ફિક્સિંગ
મુંદરા, કચ્છ.

તારીખ 23/8/2019

જય માતા મહાં જણાવવાનું કે અદાણી પોર્ટ મારફતે કરવામાં આવતા વિવિધ કામો પુરા જ મોટે ઉપયોગી છે. તેમજ અદાણી ફિક્સિંગ ઇન્ક કરવામાં આવતા કામો પુરજોશમાં ચાલુ છે. જેના કે. માણીમાતાનો પગલા માં વીજળીની સુવિધા, પાકીંગ સુવિધા તેમજ રોડ રસ્તા લોગ સુવિધા તેમજ - શિફાકા અને ગારેપગા સુવિધાઓ, પણ પુરી - પાડવામાં આપે છે જે આ સુવિધા માટે અને અમારી આવકારી પેઢી માટે પુરા જ ઉપયોગી છે. અદાણી ફિક્સિંગ અને અદાણી પોર્ટ - આવા આગામી કામો કિરણ આવુ વાળી પેઢી અમોને મળે એજ આશા ~~

K.G.N. CONSTRUCTION

Village : Zarapara, Tal. Mundra - Kutch. E-mail : dayagadhvi@hotmail.com

Ref. No. 152 Date :

પ્રતિ,
શ્રી મેનેજરશ્રી ગદાણી ગ્રુપ
મુન્દરા, કચ્છ

તારીખ : ૨૮/૪/૨૦૧૦

વિષય : ગદાણી ગ્રુપ તરફનો કરવામા આવતા રોજગારી કામગીરી બાબતે

જય ભારત સાથ ઉપરોક્ત વિષય અન્વયે જણાવ કે ગદાણી ગ્રુપ કાં રસ્તારમાં આવવાથી અમારા રસ્તા અમારૂં સદ્યતરતાનું તેરમા ખુલ્લા ઉપર આવ્યું છે તે ઉપરાંત જરૂરિયાત મંદ લોકોને રોજગારી મળી છે અને અમારા બાળક ને ઇચ્છે ગદાણી ગ્રુપ દ્વારા આવતા અમાવસ્યાં કોન્ટ્રાક્ટરો મોટા ભાગે સ્થાનિક લોકોની આપવામા આવે છે ભવિષ્યમાં આવી કામગીરીનો લાભ રાખે એવી આશાસનો આભાર વ્યક્ત કરીને લખીએ.

DAYA RANSHI GADHVI

+ પ્રિયાગઢવા

C-Q-20

ABHUBHAKHAR F. NODE 786 (TRANSLATED)
Mob. 76983 87775

K.G.N. CONSTRUCTION

R.C.C. CONSTRUCTION – R.C.C. ALIVATION - LOAD BEARING

Village – Tragadi Tal. MANDVI- Kutch

Ref. No. Dt. 13/04/2017

To,
The Manager,
Adani Foundation,
Mundra - Kachchh.

We would like to state that the various activities done by Adani Group are useful to the people and the activities undertaken by Adani Foundation are praiseworthy like electricity, water and access road facilities in fishermen settlements as well as education and health facilities are also provided which is going to be very useful to the community and its future generation. We hope that Adani Foundation and Adani Group will do such type of social works continuously. Thank you.

For K.G.N. CONSTRUCTION,
Sd/-

1653

C-Q-21
(TRANSLATED)

DAYA RANSHI GADHVI

CIVIL CONTRACTOR AND SUPPLIER
Village- Zarpara, Ta. Mundra (Kutch) E-mail: dayagadhvi@hotmail.com

Ref. No. **Date: 18/04/2017**

To,
The Managershri,
Adani Group,
Mundra - Kachchh.

Subject: Employment related activities conducted by Adani Group.

On the subject mentioned above we would like to state that after Arrival of Adani Group in this area the level of economic stability has been increased in this area. Opportunity and employment has been provided to the needy people and most of the contracts have been given by Adani Group to the local contractors and we are thankful for this and express our gratitude that in future they will keep up this good work.

SEAL SD/- Viram Gelva.

1654

1444

વિષય:- ક્રીપર પ્લાન્ટ ના આવકાર્યા બાબતે.

ઉપરોક્ત વિષય અનુસંધાને જણાવવાનું કે સદ્ગુરુ ટ્રસ્ટ દ્વારા ઈકોનોમી મોડલ ની અંતર્ગત જે ક્રીપર પ્લાન્ટ આપવામાં આવ્યા છે જેને અમે આવકારીએ છીએ. જેના લીધે આજુ-બાજુના ગામો માં રોજગારી વધશે, ધંધા રોજગાર ને ડેવલોપમેન્ટ થાસે. આજુ-બાજુ ના વિસ્તારોનો વિકાસ પણ થશે. તથા કંપની ખોલે ડેવલપ થાશે જેના લીધે કંપની દ્વારા શિક્ષણ તથા આરોગ્યલક્ષી ને વધારે પડતી સગવડ મળશે.

કંપની દ્વારા સ્થાનિક લોકોને કોન્ટ્રાક્ટ, ખેતી વિકાસના કામો, પશુપાલન ડેવલોપમેન્ટ, આરોગ્ય તથા શિક્ષણ ક્ષેત્રે વધુમાં વધુ કાર્યો કરે તેવી અપેક્ષા છે, કંપની દ્વારા ખેતીના વિકાસ માટે વધારે પડતી રોજગારી કરવા આવે તેવી અપેક્ષા રાખીએ છીએ, આજુ-બાજુની ગૌ તથા પશુપાલનનું આપણી કંપની દ્વારા વધારે પડતો વિકાસ કરવામાં આવે તેવી અપેક્ષા છે. આપણો ત્યાર સ્થાનિક પશુપાલનો, ખેડુતો, મજુરવર્ગને વધુ ઉપયોગી બને તેવી સાથે ઈશ્વરના વિકાસમાં આપણો સૌ સાથે મળી સહયોગ કરીએ આભાર સહ.

(ગોવિંદભાઈ ડાંગર)
પ્રમુખ / મંત્રી
શ્રી ભુટભવાની ભેડૂત મંડળ
મોટા ભાડીયા, તા. માંડવી-કચ્છ.

1655

C-Q-22
(TRANSLATED)
SHRI BUT BHAVANI KHEDUT MANDAL
MOTA BHADIYA Tal. MANDVI -
KACHCHH

To,
Adani Port and Special Economic Zone Ltd.
Mundra - Kachchh.

Subject: Welcoming Copper plant.

With respect to the subject mentioned above we welcome the copper plant proposed by Adani Port and Special Economic Zone Ltd. by which the employment in surrounding villages will be increased and Business/professional activities will also increase. The surrounding areas will also develop and since the company will develop,the facilities provided by company like education and health will also increase.

We hope that company will provide contracts, labor work, development of agriculture, development of animal husbandry, health and education related facilities to surrounding villages. We hope that company will give more attention to agricultural development. We hope that your company will provide much assistance to surrounding agriculture and animal husbandry. We hope that your plant will become more useful to local people, animal rearing people, farmers and labor class and also in the development of nation with our collective support.

Thanking You,

Sd/- Gadhvi Kalyan N.
President/ Secretary
SHRI BUT BHAVANI KHEDUT
MANDAL
MOTA BHADIYA, TAL. MANDVI-
KACHCHH

પ્રતિ શ્રી
COO અદાણી ગ્રુપ
મુંદરા- કચ્છ.

તારીખ:- 23/8/2019

વિષય: અદાણી ગ્રુપ દ્વારા કચ્છમાં ખાવલી સામાજીક કામગીરી બાબત.

આથી આપ સાહેબને વિનંતી કરવામાં આવે છે કે અદાણી ગ્રુપ ના અદાણી ફાઉન્ડેશન દ્વારા કચ્છમાં ખાવલી સામાજીક ઉત્થાન લક્ષિત ચુકવણી રૂપે ફિલ્ડવર્કમાં ખાવે અદાણી ફાઉન્ડેશન શિક્ષણ - આરોગ્ય - સામાજીક ઉત્થાન અનેક ક્ષેત્રો કામો અમારા વિસ્તારમાં કરે છે. આ તમામ શિક્ષણ ની ગુણવત્તા માં પણ ખૂબજ સારો છે. અને આરોગ્ય બાબતો માં પણ ઉત્તમ કામ થયા છે. અમે અદાણી ગ્રુપ ચુકવ ચુકવ આગામ વિકાસ કાર્યો કરીએ છીએ

MITHANI ENTERPRISES

Regd. Office: M-2, Golden Arcade, Near Zero Point, Adani Port Road, Mundra-Kutch, 370 421. E-mail : mithanienterprise92@gmail.com
Phone : (O) (02838) 222411 Fax : (02838) 224411 Mob. : 9879928268

1658

C-Q-23
(TRANSLATED)

Pan No. AMVPT1760F
Service Tax No. AMVPT1760FSD001

Mob. No. +91 98242 15983
+91 99249 87477
+91 99136 92815

MITHANI ENTERPRISE

Civil Contractor and Manpower Supply

Date: 13/04/2017

To,
COO
ADANI GROUP,
MUNDRA - KACHCHH

Subject: Regarding Social Activities done by Adani Group.

With respect to the subject mentioned above we would like to respectfully state that the social responsibility conducted by Adani Foundation of Adani Group has been very efficient. Adani Foundation is doing many activities like education, health and income generation in our area and due to this the level of education has been improved and many activities are undertaken in the field of health. We are very thankful to Adani Group.

Sd/-
SEAL OF MITHANI ENTERPRISE

Vivekanand Rural Devlopment Institute

1659

N. H. No. 8A, Near Jain Ashram, Mandvi-Kutch. (Gujarat) 370465
Phone : (02834) 224024, 230651, Fax : 223838

1448

Ref. No. ***Date :***

૨૦/૪/૨૦૧૭-૧૮ ૨૮/૪/૨૦૧૭

પ્રતિ,
સી.ઈ.ઓ.શ્રી,
અદાણી ફાઉન્ડેશન,
મુન્દ્રા-કચ્છ

વિષય : કચ્છમાં આપના ઉદ્યોગગૃહ દ્વારા તાલીમો આપી આજીવિકામાં અભિવૃદ્ધિ અંગે.

સુજ્ઞશ્રી,
સવિનય ઉપરોકત વિષયના અનુસંધાને જણાવવાનું કે, કચ્છમાં ઉદ્યોગગૃહોની સામાજિક જવાબદારીના ભાગરૂપે તાલીમો દ્વારા ગ્રામીણ મહિલા અને યુવકોને સ્કીલ ડેવલપમેન્ટ તથા ક્ષમતાવર્ધનની તાલીમો દ્વારા તેમનામાં આજીવિકાને મજબુત કરવા માટેની ક્ષમતા નિર્માણ થાય છે. જે અમોએ અનુભવ્યું છે. આ બાબતે આપનું ઉદ્યોગગૃહ ખુબ જ જવાબદારીપૂર્વક કામગીરી કરી રહયું છે.

કચ્છના પર્યાવરણની જાળવણીએ પણ અગત્યની બાબત છે.પર્યાવરણનું હિત ન જોખમાય એ રીતે આપ કચ્છમાં ઉદાહરણરૂપ બની શકો.

આપના નવા એકમને આવકારીએ છીએ. સાથેસાથે આપ ગ્રામ વિકાસના અનેકવિધ જરૂરીયાતવાળા કામો કરતા રહો એવી અપેક્ષા સહ.

આપનો સ્નેહાધિન,

(એમ.એલ.બારૈયા)
નિયામક

1660

C-Q-24
(TRANSLATED)

SOC. R. NO. GUJ-2220-K (2012) TRUST R. NO. F-2398-(2012)

VIVEKANAND RURAL DEVELOPMENT INSTITUTE

N.H.NO.8A, Near Jain Ashram, Mandvi - Kutch (Gujarat) 370465
Phone: (02834) 224024, 230651 FAX :223838

Ref. No. 20/4/2017-18 Dt. 28/04/2017

To,
C.E.O. Saheb,
Adani Foundation,
Mundra - Kachchh.

Sub: Regarding livelihood support provided through trainings given by your organization.

Respected sir,

With respect to the subject mentioned above, we have experienced in Kachchh that the industry houses as a part of their corporate responsibilities are providing training to rural women and skill development to youth for giving stability to their income generation. In this regard, your industry house is working in a very responsible way.

In Kachchh the preservation of environment is also an important thing. You shall be a role model in this field in Kachchh.

We welcome your new project proposal. Furthermore we are expecting you to do more and more work in the field of rural development.

Yours sincerely,

Sd/- M. L. BARAIYA
(M.L.BARAIYA)
DIRECTOR

(66)

પુનિકૃત

અધિકૃત અધિકારી/અનુમિકૃત

અદાણી પોર્ટ - ઇન્ટિગ્રેટેડ ઈક્વિપમેન્ટ્સ પ્રા.લિ.

મુંદરા - કચ્છ

વિષય: ક્રિયર રિફ્યુઈલિંગ રસ્તાના બાંધકામ બાબત

જય ભારત સાથે જણાવવાનું કે અમા.

અદાણી પોર્ટ - ઇન્ટિગ્રેટેડ ઈક્વિપમેન્ટ્સ પ્રા.લિ. - મુંદરા

દ્વારા મુંદરા-માંડવી રિક્લેમેશનમાં ક્રિયર રિફ્યુઈલ

રસ્તાના નિર્માણની કામગીરી અમારી દ્વારા, તે

આશીર્વાદ સાથે વિનંતી - ગાડીવાંદર બાજુ

તથા રસ્તાના મધ્યમાં મધ્યમ બાંધકામ છે.

અમારા આજુબાજુના વિસ્તારોમાં વિવે

ગાડીની અવરજવર રસ્તાના કિનારાના લીધે બા

રહ્યું અમારા વિસ્તારનો વિકાસ સાથે મધુમત દીર

રહશે અકસ્માત આશીર્વાદ સાથે વિનંતી સમ

અમારા તથા મધુમતના બાંધકામ હિતમાં.

આપનો

વિશ્વાસ

પ્રમુખશ્રી,

[redacted]

1662

C-Q-25

GUJ/2468/ KACHCHH REGI.F/2647/KACHCHH (TRANSLATED)

EKTA MACHHIMAR SEVA VIKAS SAMITI

TRAGADI BUNDAR, GUNDIYALI, TAL. MANDVI-KACHCHH

REF. NO. **DT.**

TO,
Authorized Officer Shri,
Adani Port, Mundra Special Economic Zone Ltd.
Mundra - Kachchh.

Subject: Welcoming copper Refinery Plant.

On the subject mentioned above Our Ekta Machhimar Seva Samiti whole heartedly welcome your new venture by Adani Port and Special Economic Zone Ltd. for establishing copper refinery plant near Mundra-Mandvi Area.

The unemployed persons of the surroundings area will get employment in your plant and we are agreeable for the development of area.

We, Ekta Machhimar Seva Vikas Samiti welcome your new venture.

Gulam Mamad

Salim Hasan
President
EKTA MACHHIMAR SEVA VIKAS SAMITI

શ્રી ભગવાનજી ડાયાભાઈ ગઢવી
મો. કાંડાગરા
મો. ૯૬૭૪૦ ૧૫૧૪૬

વિષયઃ- સેરા કેમીકલ યુકત પ્રોજેકટ નો વિરોધ C-Q-26

પ્રતિશ્રી

જય ભારત સાથે જણાવવાનું કે હું ગઢવી ડાયાભાઈ વિરમભા ગઢવી રહી. મોરા-કાંડાગરા વાડા વિસ્તાર-મુન્દ્રા-કચ્છ આપશ્રી પાસે એવી અપેક્ષા રાખુ છું કે અહીયા જે પ્રોજેકટો આવ્યા છે અને હવે જે આવી રહ્યા છે ઈ પ્લાન્ટો લોકોનું સ્વાસ્થ્ય નાશ તે કોઈ જાત નું ધ્યાન નહિ રાખતા. ને આજે જે પ્લાન્ટ ની સુનાવણી કરવા આવશો એનું હું અગાયા ના વિરોધ કરુ છુ અને આ પ્રોજેકટ કોઈપણ હીસાબે અહીયા ન આવવું જોઈએ. આવા પ્રોજેકટ ના સ્વાસ્થ્ય ને અને અગા જે ખેતીવાડ ઘોડાગણી બચી છે એ સંપૂર્ણ નાશ પામશે. અગાઉ માં જે કોયલા આધારીત ઉદ્યોગો આવ્યા એના દ્વારા જે પ્રદુષિત હવા ના ખેતા અને ઢોર-ઉછેર ઉપર ગંભીર અસરો પડી છે. એના લાધે ખેત-ઉત્પાદન અને દુધ ઉત્પાદન ઘણુ ઘટી ગયું છે

૬ આવા ઉદ્યોગ ના હવા પ્રદુષિત થશે - સલ્ફર ડાયોકસાઈડ, હાઈડ્રોજન ફલોરાઈડ જેવા સેરા કેમીકલ હવામા ભળતા હવા ને ભયંકર પ્રદુષિત કરશે

પ્રદુષિત હવાના કારણે આવા કેમીકલો ના આજુબાજુના વિસ્તારમાં રહેતા લોકો કેન્સર, દમ, ટી.બી, અસ્થમા, તેમજ રેકસા, ચામડી, આંખોમા અંધાપો જેવા અસંખ્ય રોગો થવાની પુરેપુરા સંભાવનાઓ છે માટે આ પ્રોજેકટ અહીયા ન આવવો જોઈએ જેના લાધે સ્વાસ્થ્ય ને જીવન ઘોરણ જોખમાય

૬ વોટર પોલ્યુશન થશે - લીડ, કોબાલ્ટ, એસીડ સલ્ફ્યુરીક, પાતાળમા ભળશે અને સાંચાઓના માધ્યમથી બહાર આવશે, પ્રદુષિત પાણીના લાધે, ખેતીવાડી અને ઘરોનો માલઢોર (ઢોર-ઉછેર) લોકોને ગંભીર નુકસાન દાયે આવા પાણીથી ખેત કપ-કુટ, ફુલ-ઝાડ નો ઉછેર શકય નથી. વે આવા કેમીકલ યુકત પાણીથી ખેતી લાયક જમીનો રહેતીનથી કુવાના લાધે ઢોર-ઉછેર શકય ન હોતા દુધ-ઘી- છાશ ના જે ઉત્પાદન પણ પડતા ભાંગશે માટે આ ઉદ્યોગ અહીંયા ન આવવો જોઈએ

આવા પ્રોજેકટ આજુ-બાજુ ૫૦ કી.મી માં જયા વસ્તી રહેણાંક નહોય તેવી જગ્યાઓ માં જ કથપાય છે અહીંયા તો માત્ર ૨ કે ૩ કી.મી ની અંદર જ હજારો લોકોનું રહેણાક વિસ્તાર આવેલા છે

ને પાસા નોંધ પરેલા પણ જે ઉદ્યોગ અહી કાર્યરત છે ઈ લોકલ લોકોનું કોઈ પણ રીતે સ્વાસ્થ્ય અને આર્થિક સકકત ગુસ્તો ને કામ-ધંધા અને નોકરી બાબતે ધ્યાન નહિ રાખ્યુ માત્ર ચુંટાયેલા જન પ્રતિનિધિ જ કમીશન ઉપર ધંધા ગળી રહ્યા છે એટલે આ પ્રોજેકટનો વિરોધ કરીએ છીએ

જીવાપનો આભારી → ડાયાભાઈ ગઢવી મો:- ૯૬૭૪૦૧૫૧૪૬.
કાંડાગરા મોટા.

→ પેજ-૧૨ થી 31

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(TRANSLATED)
C-Q-26
Dt. 29/4/2017
Saturday
Applicant; Dahyabhai Gadhvi
At: Kandagara,
Mo.: 9978014986

Subject: Objection of project having poisonous chemicals.

Dear sir,

It is cordially informed that I, Gadhvi Dahyabhai Virambhai Gadhvi, resi. Mota Kandagara, Wadi Area, Mundra Kutch. I hereby expect your favor that the projects established and yet to be established do not take any care of the people from health as well as economic point of view. I hereby oppose the hearing for the plant held here today and aver that this project should not come here at any cost. The health and agriculture whatsoever left in this area will be ruined totally. The agriculture and cattle rearing are affected seriously by dust and polluted air due to establishment of coal based industries. The agriculture production and milk production are reduced to a great extent due it.

The air will be polluted due to such industries, The poisonous chemicals such as sulphur dioxide, Hydrogen fluoride, will be mixed in the air and will pollute the air heavily.

There is high probability of spreading of disease such as cancer, asthma, T.B., and other disease of lungs and skin, blindness and many other diseases due to air pollution. So, this project endangering health and livelihood should not be established here.

There will be water pollution. Lead, chromium, sulphuric acid will be leached to ground water and will come out through irrigation. The cattle rearing and agriculturist class will be affected heavily due to polluted water. It is not possible to use such water for farming. The cultivable land will be affected due to such chemical rich water and consequently cattle rearing will be reduced resulting into reduction in economic activity based on food products based on milk, buttermilk and ghee. So, this project shall not come here.

Such projects should be established in the area having no population in surrounding of 50 kilometer. This is residential area within 2-3 kilometer only where thousands of people are living.

It is to be specifically noted that the industries established here earlier have not at all taken care of the health and employment of the economic scarce local people. The business opportunities are given to only 4-5 selected persons only based on commission. So, we oppose this project.

Yours faithfully,
Sd/- Dahyabhai Gadhvi,
Kandagara Mota
Mo.: 9978014986

વાઘાણાયા નાથા
કપુરીયા વાડી
ગામ: ઉકરપરા,
મુન્દ્રા /કચ્છ
મો: 9427819580

તા.મુન્દ્રા - કચ્છ
પર્યાવરણ - નોકમુક્તાવણી
અધ્યક્ષશ્રી કલેક્ટર સાહેબ

તા-૨૮/૪/૨૦૧૭

વિષય: ગ્રીનફિલ્ડ કોપર રિફાઇનરી પ્રોજેક્ટ વિરોધપત્ર

૧) જય ભારત સાથે જણાવવાનું કે ગ્રીનફિલ્ડ કોપર રિફાઇનરી પ્રોજેક્ટ એરિયા વચ્ચે પ્રાકૃતિક વાઈલ્ડલાઈફ છે. તે બંદ થઇ જશે. મારે આ પ્રોજેક્ટને મંજુરી ન આપવા વિનંતી.

૨ આ પ્રોજેક્ટની આજુબાજુ પર્યાવરણ વિસ્તાર છે. આ પ્રોજેક્ટના દક્ષિણ બાજુ ભરાળીમાં કુવો છે. જેમાં અનેક જાતની વનસ્પતિ છે. પ્રાકૃતિ અને પક્ષીઓનો વસવાટ છે. પ્રોજેક્ટના પશ્ચિમ બાજુ સિરાયા જંગલ છે. જેમાં પશુ-પક્ષીઓ છે. આ પ્રોજેક્ટથી પર્યાવરણને ખૂબ જ નુકસાન થશે. મારે આ પ્રોજેક્ટની મંજુરી ન આપવા વિનંતી.

૩) આ પ્રોજેક્ટથી આજુ-બાજુની ખેતીવાડીને નુકસાન થશે અનાજ આજુબાજુમાં પાવર-પ્લાન્ટો જેવા ઉદ્યોગો છે જેના કારણે બાગાયત ખેતી પર ખૂબ જ નુકસાન થયેલ બારેક, મોલ, દાડમ, નાળિયેર જેવા ફળવૃક્ષ ખેતી પર નુકસાન થાય છે. આ પ્રોજેક્ટથી નુકસાનમાં વધારો થશે મારે કોપર રિફાનરી પ્રોજેક્ટને મંજુરી ન આપવા વિનંતી.

પા-૧-૨

1666

૫) આ કોપર સિંકાઇનરી પ્રોજેક્ટથી તાપમાનના પ્રમાણમાં વધારો થશે અને આ વિસ્તારની જૈવસૃષ્ટિ અને પર્યાવરણને ભયંકર નુકસાન થશે દર વર્ષે તાપમાનમાં વધારો થાય છે. આ પ્રોજેક્ટથી તાપમાનના પ્રમાણમાં ખૂબ વધારો થશે માટે આ પ્રોજેક્ટને મંજુરી ન આપવા વિનંતી.

(5) આ કોપર પ્રોજેક્ટ ની આજુબાજુ મા ગામ આવેલા બધાજ ફાર્મહાઉસ ઉપર ધૂળ જેવા ગામો છે તો માનવ જાત પર પ્રદુષણ થી ભયંકર અસર પડશે માટે આ પ્રોજેક્ટ ને મંજુરી ન આપવા વિનંતી

વી- આસારીયા તારા ગોલવા

C-Q-27
(TRANSLATED)

Ashariya Lakha
Kapuriya Wadi,
Village: Zarpara.
Mundra Kutch
Mo.: 9427819580
Dt. 29/4/2017

The Collector,
The, President,
Environment Public Hearing,
Tunda Mundra-Kutch

Subject: Objection letter for the Greenfield Copper Refinery Project

1. It is cordially informed that there are flowing streams of water falling within the project area of Greenfield copper refinery project area, which will be closed. So, it is requested not to give permission to this project.

2. There is environment area in surrounding of this project. There is a Bharadima dune on the south of this project. There are various types of vegetation in it. It is a stay for animals and birds. There is Siracha forest on the west of the project site. There are birds and animals in it. It is requested not to give permission to this project as the project will adversely impact the environment heavily.

3. The agriculture in surrounding of the project will be affected. There are already existing industries like power plants. Horticulture is heavily impacted due to that. The fertile agriculture such as dates, chickoo, pomegranate, coconut is

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damaged. The damage will be increased due to this project. So, it is requested not to give permission to this project.

4. There will be increase in temperature due to copper refinery and it will cause damage to the livestock and environment. The temperature increases every year and temperature will increase further due to this project. So, it is requested not to give permission to this project.

5. There are villages such as Shiracha, Navinal, Kandagara, Zarpara, Dhrub etc. in surrounding of this project. So, the mankind in the area will be terribly impacted due to pollution. So, it is requested not to give permission to this project.

Yours,

Sd/- Ashariya Lakha Gelva

1669 કાર્યાલય
પ્રાગપુર રોડ જંકશન,
તા. મુન્દ્રા – ૩૭૦ ૪૧૫, કચ્છ, ગુજરાત
ફોન : (૦૨૮૩૮) ૨૨૨૩૫૨
મો. : ૦૯૯૨૫૧ ૨૫૨૦૨ / ૦૯૯૦૯૪ ૭૫૭૬૪

મુંબઈ ઓફિસ
૫, ગુરુકૃપા એપાર્ટમેન્ટ, કસ્તુરબા કોસ[illegible]
બોરીવલી (ઈસ્ટ), મુંબઈ – ૪૦૦ ૦૬૬.
ફોન : ૨૮૬૨ ૭૭૯૫, ૨૮૬૫ ૮૨૬૬ મોબાઈલ : ૭૦૪૫૪ ૩૫૫
E-mail : ahinshadham_kutch@yahoo.co.in

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ક્રમાંક

તારીખ : 29-5-2[illegible]

To,
APSEZ MANAGER
MUNDRA KUTCH

ભારત ની આર્ય પ્રજા ધર્મ-અર્થ-કામ-મોક્ષ આધારીત જીવન પદ્ધતીથી જીવન વિતાવે છે. સમય પ્રમાણે વિકાસ આવશ્યક છે. કચ્છના મુન્દ્રા તાલુકામાં અદાણી ગ્રુપ ના આવવા સ્થાનીક પ્રજાને અધીક ઉપાર્જનની સોનેરી મળી. રોજગારી, ભથ્થા, આરોગ્ય, વગેરે જરૂરીયાત ની સુવિધાઓમાં અદાણી ગ્રુપ તરફથી સારા ગોઠવણ થયેલ છે એની પ્રજા આભારી છે.

આપણો સ્વીકારીએ જ્યારે વિકાસ ત્યારે આપે વિકાસ કરવા રાજ્યો ને અધિકાર આપી ત્રીન ફીલ્ડ ફોપર રિફાઈનરી નું એક પ્રોજેક્ટ અદાણી ગ્રુપ દ્વારા APSEZ માં શરૂ થવાનું ત્યારે ઊપરોક્ત સંસ્થા બુધ્ધ અને પંચાયત પર પ્રેરકાદાયક કાર્ય કરેછે આ સંસ્થા આવ પ્રોજેક્ટના નિયમો નું પાલન કરી કાર્ય થાય ત્યારે આવા પ્રોજેક્ટ ને આવકાર્ય છે. અમ અહકાર રહેશે.

Bhagawan Mahavir Pashu Raksha

Girish. D. Vegada C.E.O

1670

(TRANSLATED)
C-Q-28

BHAGWAN MAHAVIR PASHU RAKSHA ENDRA

SANCHALIT SHETH SHRI LALJI VELJI SHAH

ANCHORWALA AHINSHADHAM

Anchor: Shir Jadvaji Velji Gangar

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Ref. Dt. 29/04/2017

To,
A.P. S.E.Z. Manager
MUNDRA - KACHCHH.

The Indian ARYA public is spending their lives on the life cycle of DHARMA – ARTHA – KARM - MOKSHA but development is necessary according to time. In Mundra Taluka of Kachchh District the local public has got a golden opportunity for earning income after entry of Adani Group. The people are witness to the improved facilities in the employment, education, health etc. like routine life necessities due to fine arrangements done by Adani Group.

We must accept where there is development; we must support the promoters. One Greenfield copper Refinery Project is proposed in A.P.S.E.Z. by Adani Group, the above mentioned organization does many inspirational work of humanity and environmental preservation. When this organization is doing the project work as per rules it is most welcome and we will support the same.

For BHAGWAN MAHAVIR PASHU RAKSHA KENDRA

Sd/- Girish D. Nagda
C.E.O.

Jay Javan Jay Hind Jay kishan

Kheti Vikas Seva Trust

(R.G No: Gujarat/2030/Kutch)
Vill: Zarpara, Tal: Mundra, Dist-kutch-370405

Narn B. Gadhavi, President, Kheti Vikas Seva Trust

Ref. No: Date: 29/04/2017

TO,

The chairman sir

Public Hearing Adani Copper Refinery

Tunda, Mundra Kuchchh

Subject: Our objection and reject adanis copper refinery project.

Respected sir

Mundra taluka was rich in its unique environment and biodiversity. fishermen, farmers and cattel herders would run their business and occupation here. But the adani company has ruined huge paches of mangroves forest that existed here. The mangroves forest was a kind of blessing for the people of the surrounding area as in times of famine. Cattle and camels would survive on mangroves during advers times. Fishermen and local community used mangroves wood to build their small houses, ships and other implements. Fish breeding would take place in mangrove trunks. Mangroves would save the surrounding area from being flooded, tsunami or earthquake, and acted as a natural protecting wall. Such useful mangroves forest has been destroyed in order to build Mudra Port and SEZ. The surrounding area has been severely affected.

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In case the M/s. Adani Enterprise Limited has the proposed Greenfild Copper Refinery Project if allowed, even the remaining patches of mangroves forest will be dangerously impacted. The company has deliberately not mentioned anything about the mangroves forest and the probable impact on it in its Environmental Impact Assessment Report (EIA Report) prepared for the Greenfild Copper Refinery Project. The EIA Notification 2006 has been violated. The marine and ecology of the area have not been studied.

Filling up of Creeks:

the creeks of mundra were filled by up by MPSEZ in order to reclaim land. Which has been cited in the report of the Sunita Narain Committee of Ministry of Environment forest and clement change (MOEF&CC) Government of India. It has brought harmful impact of the surrounding area. The Adani SEZ has filled uo Koyla vadi creek, Navinal Creek, Dhaja vadi creek, Bhradimata creek, Sonaper vadi creek, the creek near old port, kotadi creek-1 and kotadi creek-2. These were all natural creeks and the fishermen of the surrounding 15 villages used thses creeks as a path to enter into the sea. Va liable fish catches were available in these creeks. The area was full of mangroves. The EIA has not mentioned what would be the impact on these creeks due to Copper Refinery Project?

Demolition of Sand Dunes:

in the coastal area of Mundra there were sand dunes as high as 40 to 60 meters. High quality frss would grow on thes sand dunes. Cattel herders of the area used to graze their cattel in this grass land for six to eight months. The land on which the company wants to build the Copper Refinery contained high grass land and forestry land. These have been demolished by the Adani Company. Such sand dunes would help against natural calamities. The Copper Refinery project may lead to further destruction of sand dunes, accelerating the danger of natural calamity, severely damaging the environment as also human and animal population of the area. Nothing has been mentioned in the EAI report about this.

Impact on fishermen community:

the importance of mundra taluka for fishing community and their village is next only to the jakhau fisheries Port. The sea shore along the taluka was used by fishermen from Mandvi and Gandhidham for fishing. Fishermen would get huge quantity of fish here, but due to the activities of the Adani Port &SEZ and Adani Power, the fisheries business has been severely affected. The fisheries production has decreased considerably. Due to this, major challenges have risen in front of the fishing community regarding their livelihood and economy of the area. With the Adani Copper Refinery Project, the area will be further adversely affected. Fishery activity will come to an end due to chemicals and poisonous, materials released from the Copper Refinery. This will create crisis for human being.

Impact on Agriculture and Horticulture:

the land between Mundra and Mandviis rich in horticultural crops and green farms. The stretch is known as its greenbelt, including rich green farms. Water of this area is sweeter than any other part of kutch. The crop of dry dates is found only here in the entire India. This area has remained a green field due to dry date crop. But after 2005, due to the activities of Adani Port &SEZ and Adani Power, the dry date crop has been affected. The ash form the Adani Power Plant spreads over farms of dry dates which spoil fruits, and the raw fruits fall without becoming ripe. More, the dry dates are not as sweet as they used to be earlier. This has adversely affected the livelihood of those who lived on agriculture.

The saline water of the ocean now invades the land, contamination sweet water, adversely affecting ground water. Agriculture cannot be done in saline water. Thus, the area is already facing problems, and if the Copper Refinery is built here, the entire area will be further impacted. The rich farms and agriculture will be destroyed, and this will trouble the farmer's community.

Impact on Animal Husbandry:

in the whole of India, only kutch is the only district where animal population is more than human population. Mundra taluka has been a leader in animal husbandry and related business. Sweet water, vast gaucher land, forest,etc. which are requirement for animal husbandry, are found here. The business of milk and items made from milk flourished in this area. But as the Adani Group has acquired most of the gauchar land and government waste land, no land is left for cattle breeders and animal husbandry. Milk amd milk production has decreased. Cattle breeders have lost their economy.

Above and above this Adani Port &SEZ and Adani Power has acquired gauchar land of 10 village from the government of Gujarat. The details have been given in the table below:

Sr.No	Name of village	Total Gauchar land all figures in acres	Land allotted to sez
1	Tunda	388	211
2	Siracha	386.25	100.22
3	Navimal	276.05	231
4	Zarpara	2840	1000
5	Mundra	1405.04	1215.04
6	Baroi	140	75
7	Goyarsama	135.01	70
8	Luni	199	198

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Sources of Pollution in Copper Industry:

Copper industries is a mineral based industry. Copper bearing materials in the form of oxides or sulphides occur below the earth surface. The copper mineral is axtracted by various methods of mining. During mining large quantity of waste materials are generated. After the ore is taken out, it is crushed and milled. In crushing and grinding enormous amounts of dusts are generated. The ground ore is subjected to flotation for separation of copper rich mineral known as concentrate is then smelted in smelter to produce blister copper. The copper so produced is impure and is called anode copper. Copper production all of them contribute as sources of pollution in the copper industry. Thus the main sources of pollution in copper industries are (i)mining (2) comminution operation, (3) flotation, (4) roasting and smelting, (5) fire refining and electro refining stages, (6) sulphuric acid plant and (7) water treatment plants etc.

So we are request to you and MoEF&CC New Delhi government of india cancelation of Adanis TOR and not given environment clearance.

Thanking you

29/4/17

Naran Gadhavi.

Zarpara Kutch.

1675

C-Q-30 1464

Ref: PM/MP/2784/2017 **Date: 24/04/2017**

To,
Member Secretary
Gujarat Pollution Control Board
Gandhinagar

Sub: Environmental Public Hearing of M/s. Adani Enterprises Limited Village(s) :Siracha and Navinal, Taluka: Mundra, District: Kutch is scheduled on 27th April 2017

Sir,

We have studied the draft EIA report of the above-mentioned project. Following are our observation/comments/questions regarding project and draft EIA report.

1. What was the previous land use of the land for proposed project? Has Industry obtained NA permission for the land? Please provide the document.
2. How the required land for the project is acquired? Was it a government or private land?
3. When was environmental clearance for this project in Form I applied?
4. What is the status of NOC application to GPCB for this project?
5. What is the status of Forest & CRZ clearance for this project? Please provide a copy of both of these clearances.
6. How many mangrove trees will be uprooted due to this project? What is exact restoration plan for mangrove trees which would be displaced due to this project?
7. What type of precautionary measures are to be taken to avoid negative impact of construction activities on marine environment, water quality, inter tidal and sub tidal habitat and sediment quality ?
8. Please give exact dates of ambient air quality, surface water, ground water, noise monitoring and soil quality monitoring.
9. How will the project proponent plan to get coal – pet coke, met coke as a fuel in regular basis? Please provide any agreement made with the supplier.
10. What is the regular monitoring plan that shall be carried out for odor control by the projectproponent?
11. Please justify domestic water requirement.
12. Please provide complete details of each ETP Units.
13. Is there any cost-benefit analysis carried out for proposed project's benefits vs loss of ecosystem including flora, fauna and vegetation?
14. Please give name of registered recycler to whom nickel sludge, arsenic bearing sludge, used oil and oil sludge will be sent for disposal.
15. How many local people will getemployment through this project?
16. What will be action plan for socioeconomic development of an area by project proponent?

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PROJECT NAME:	M/s. Adani Enterprises Limited
VILLAGE:	Siracha and Navinal
TALUKA:	Mundra
DISTRICT:	Kutch
CONSULTANT:	Vimta Labs Limited
PROPOSED PRODUCT:	The proposed greenfield copper refinery project at Adani Port SEZ land
TOR DATE	21st June 2016
CATEGORY:	Category A – 3 (a)
STUDY PERIOD:	1st October to 31st December 2016
STUDY AREA:	10 km
LAND REQUIREMENT:	256.58 ha (634 acres) 154.18 ha (381 acres) – APSEZ area and 102.38ha (253 acres) – forest area for promoting industrial development
MANPOWER REQUIRED:	2000-3000 persons
POWER REQUIREMENT:	300 MW
TYPE OF FUEL:	HSD / FO / LPG / Coal – pet coke, met coke
WATER REQUIREMENT:	32,800 KLD
WATER SOURCE:	APSEZ Ltd through M/s. Mundra Utility Pvt.limited
EFFLUENT GENERATED:	6468 KLD – recycled water
GREENBELT:	84.59 ha

17. What activities industry will take up as a part of CSR and what will be the budget for it?
18. Please give detail list of people who will be responsible for implementation of EMP?
19. We request you to consider inspection report of the Committee headed by Ms. Sunita Narain that was constituted by MoEF for M/s Adani Port and SEZ Ltd, Mundra which submitted its report in April 2013 before granting environmental clearance.
20. We also request you to consider all the Supreme Court's pending and disposed cases that are filed against Adani Group of companies.

Yours truly,

Mahesh Pandya

CC: 1. Collector, Kutch
2. Regional officer, GPCB Kutch

1678

From: **Ibrahim Abdulkadar Turk.**
Jamadarwadi, At Post Dhrab Ta Mundra Dist
Kutch. 370 421
Phone : 90339 96020.
Date: 28-4-2017.

To,
District Collector,
Kutch.

Sub: About AEL copper refinery project and suggestion in environmental public hearing on 29th April 2017.

Respected sir,

As local journalist I welcome the project of the proposed copper refinery project would produce 10 LTPA of copper cathode; 5 LTPA of copper rod; 30 LTPA of sulphuric acid; 5 LTPA of phosphoric acid (as 100% P2O5); 30,000 TPA of aluminum fluoride, 288 TPA of selenium, 50 TPA of gold; 500 TPA of silver etc with the state of art environment friendly technology in Kutch district. The huge development will be based on sustainable development principal and not with devastation of ecology and environment. The precautionary principle applies to the project and on this principal I would like to prevent possible huge pollution. I humbly request MOEFCC and Project proponent Adani Enterprise Ltd to kindly consider the below discussed queries for the abatement of pollution. There is need to modify some of the points/subject matter shown in draft Environmental Impact Assessment report and respective changes should be there in the EMP to achieve the aims and objective of the sustainable development of the region along with business interest.

Suggestions :

1. The EIA report says .....

*1.2.4 ... **Location of the Project** : " The proposed project site is located in Siracha and Navinal villages at APSEZ Mundra taluka, Kutch district in the state of Gujarat. The total area earmarked for the proposed project is 256.58 ha (634 acres), in which 381 acres (154.18 ha) of land belongs to APSEZ area and 102.38 ha (253 acres) of land belongs to forest area for promoting industrial development.*

The question arises here is that when the proposed forest land which is yet not cleared by the MOEFCC stage I or Stage II and pending for consideration how proponent can ask EC over the land??? Is MOEFCC not obeying the own OM? We demand that, the forest land must not be converted as the SEZ has more land available for this project. Why the Adani Enterprise Ltd is asking the Reserve Forest??? We demand detail investigation of the balance land available in SEZ or private land availability in the vicinity. The RF should not be disturbed at all. We demand from proponent that they must have sustainable solution for land availability than the diversion of Reserve forest of 102.38 hector. The entire coastline is going to be industrialised in next few years and there will be no green cover in the semi arid zone. The present forest has the trees and shrubs so it must not be disturbed when the project is going to increase the Sox and other air pollutants in larger quantity. I suggest the project authorities to shift the project if possible at deep in northern side of coast line where the unfertilized land available in huge quantity.

The image on EIA Page C3-16 is showing the project site is in the Shiracha Reserve Forest and Danderi Reserve Forest. So the project site should be out of this two RF.
The Annexure -III land allotment letter is meaningless if the SEZ president is not clear about the land to be given to this project. The letter is not showing clear piece of land with area and its

possession with the SEZ authority it is talking about planning !!.....This issue should be addressed by the AEL authority before taking EC. If The land belong to the government and SEZ does not own it at present than how it can assure the land transfer to AEL.

2. The diversion of forest land wide file number is 8-04/2016-FC has taken valid consent from gram or not? Under Forest Right Act 2006 settlement of rights of local grazers and people are settled or not? I suggest not to divert the forest land but in any circumstances 5 times more land should be developed as forest in 25 kms of the project site with state forest department. MOEFCC should force the company to develop forest in this 25 kms radius only to balance the forest cover.

3. Provide the date of the issuance of the CRZ map by NIO to AEL.

4. Provide the factual details on the distance of various streams/rivers/coast/creek. The EIA report has shown the point 14 in Form 1 (which shown below). The distances of the natural river/creek/estuary/water body needs to be corrected. As per my knowledge the information is given by mistake and I request to verify the same and introduce the fact in Final EIA report also provide the copy to me.

Streams/Rivers Kotri creek (0.5 km, S)
Khari Nadi (1.9 km, W)
Gulf of Kachchh (3.9 km, S)
Nagavanti Nadi (4.7 km, E)
Phot Nadi (8.7 km, ENE)

5. Please provide the details of TSDF as described in the project for Hazardous waste disposal. There is no design shown in EIA report for TSDF site

1. No technical details regarding the TSDF site shown.
2. No Cell details and its capacity defined and no closer plan shown.
3. No details regarding the waste characterisation shown.
4. No details regarding heavy metal encapsulation shown which is to be disposed off in to TSDF.
5. The compliance of the Hazardous and Other Waste (Management and Trans boundary Movement) rules 2016 for the smelter base waste not shown.
6. This project component must be shown differently in the said area of 12.14 Hectors. SLF cell is shown just adjacent to the public road which is not suitable.
7. The criteria for site selection is not studied and followed as defined by MOEFCC/CPCB.
8. The ground water geology, hydrology and contour maps of the area are not studied.
9. The flow pattern of ground water is not studied.
10. The ground water table is not studied. (only 2-5 meter as shown on page C3-10) How TSDF is possible in such type of ground water area.

So this component is illegally inserted in the Draft EIA report as per my belief. The Form I do not have such details and the TOR also. The site specific TOR should be given for such kind of huge 12 hector secure land fill site for disposal of the highly toxic heavy metal baring waste which needs stabilization first. In absence of the waste characterisation the secured LF/TSDF for the hazardous heavy metal baring waste could not be the part of this copper smelter. This component should be taken EC separately along with the phosphogypsum and copper slag storage yard. This plant is very near to coastal area also. Keeping in mind the coastal hazard this site should be out of the coastal zone.

I demand the MOEFCC EAC to look in to the matter and ask the proponent to obtain fresh EC as separate project with proper EMP and EIA report or dispose the toxic metal baring waste of Cr, Cd, Ni, As, Pb, and some types of active radioactive metals in common TSDF available. The MOEFCC and CPCB always ask for common disposal of Hazardous waste in country. Gujarat

has more than 20 Captive TSDF sites and there are problems started in it. Such kind of captive landfill site will not be sustainable for future.

6. The copper slag and phosphogypsum reuse plan is not shown in the EIA report. There will be mountains of the two type of waste if not disposed or used properly. There are problems of this waste having some hazardous characteristics due to traces of heavy metals. The haphazard disposal of these two waste can be hazardous for the environment if disposed without assessing the toxic nature of metals. As all over India all the copper smelter are facing critical problems of disposal.

   I request the AEL to make a plan for Zero Dump of these two types of waste at site. There should be detailed utilization plan from day 1st and according to plan it should be immediately used. MOEFCC should not permit the proposed dumping in open to avoid the mountains of these two types of waste near the Kutch coast.

7. The premise of this project has the gypsum pond. Please provide the details on gypsum pond and its liner system to avoid leaching in to ground water and coastal sandy soil of the project site. The site is reclaimed with soil where the gypsum pond is proposed and it is located near the CRZ area. This pond can lead ground water pollution. Detailed engineering of the pond should be given to MOEFCC in final EIA report along with its handling mechanism. We demand to shift the gypsum pond to northern portion of the project where the soil is stable and having some more load baring capacity than the sandy part.

8. The project will have the water from Mundra Utility Pvt Ltd (MUPL). The water allocation letter is enclosed as Annexure-IV. What will be balance capacity of MUPL after allocating the 32.8MLD. What will be source of water of MUPL.

9. The ETP will have 1.2 MLD of water but where will be the treated water go? Please provide the justification of the water balance diagram shown on page C2-5.

10. Approximately 3 LTPA copper scrap and electronic scrap is also used as input to proposed copper smelting plant and copper scrap melting facility. Will all the 3 LPTA copper waste imported by AEL ? Is such e-waste import or scrap permitted to refine in India? Provide the details from where such huge copper waste will be procured for this proposed plant.

11. Is the technology selection process based on the environmental friendly technology with special consideration of semi arid atmosphere?

    The EIA has shown the Outotec Mercury Removal Process with selection of chloride scrubber Please provide the technological justification of the selection of technology with considering the temperature and humidity of the Kutch region. Will this project manufacture high purity metallic mercury at the site?

12. What will be level of radioactivity in the copper slag and other metal waste? EIA does not have touched up the issue. Please provide the details with proper justification.

13. What will be the pollution load of water/ electrolyte / hazardous waste from the Kaldo Furnace and PMR Plant? There are no word written on it and no details are given in EMP. Please provide the information. What will be done of the solvent used in it will it be recycled or disposed off.

14. Table 2.6 exhibit the emission of the all vents from the whole smelter and allied plants.
    The SO_2 will be from H_2SO_4 Plant will be 3 Lac NM^3/Hr which will be 1 Kg/Ton H_2SO_4 produced. Is it not the huge quantity of SO_2 ? Is the coastal region have that much capacity to take the load of SO_2 in 25-30 kms area in ambient environmental situation? Can the AEL reduce

the emission of SO_2 below 0.75 kg or more less /ton of H_2SO_4 ? I sincerely request the AEL management to reduce SO_2 emission from the H_2SO_4 plant. This is the critical gas which can deteriorate the health of people and animals and affect the environment seriously. I suggest MOEFCC to give the condition of 0.75 kg emission/ton of H_2SO_4 produced.

The SO_2 Level in ambient air is ranging between 20-35 micro-gram/M^3. After the proposed smelter it may cross the ambient air quality limit. So I am suggesting for decrease of SO_2 emission at the time of planning.

15. I suggest assessing the cumulative emission from all stakes shown in the EIA report for SO_2. The dispersion modelling should be carried out on the cumulative emission study. I believe that the cumulative study will show shocking result and the stake height can go above 150 -180 meters. The MOEFCC should increase the height of stake of Main Stack Secondary Gas Scrubber- I & II (Bi flue) Sr no 10. and of H_2SO_4 no 12.

The southern portion of the project site shows the presence of mangrove and it is inter tidal zone falling under CRZ 1A as per the CRZ map attached in EIA report. The southern portion is reclaimed land with sand. so I suggest that AEL should restore the mangrove in 1000 hector in Gujarat coastline to protect the coastal environment and balance the nature.

16. The air quality sampling point is carried out at 5 points between 0-5 kms of project site. There are only 3 location selected between 5 to 10 kms why? To complete the air quality monitoring as per procedure I suggest to carryout air quality analysis at new 5 points between 5 to 10 kms radius of study area and the data should be submitted in final EIA. Necessary changes in air modelling should also be done to minimise the impact of air pollution.

17. Please provide the air pollutants dispersion modelling based on sensitive receptors like habitat, village etc which is not done in draft EIA report and is asked under TOR 10 (i) point

18. I suggest online stake monitoring system for all major stakes emitting SO_2 with showing cumulative emission data online at main gate. There should be display board showing the parameters with permissible limits.

19. Figure 9.1 page C9-6 EIA report has shown the organisational structure of Environment Management Cell. Excluding 5 safety engineer there are only 8 person staff shown which i feel highly inadequate to handle the most important pollution control system and manage the environment. I suggest there should be more Environmental Scientist, Chemist and Engineer needed for the pollution control components of such kind of big smelter. The environmental cell should have employee strength of 25 or more.

20. Adani group is working in the region having ports, power plants and SEZ from 2008. The female literacy rate in the study area of 10 KMS is only 23.58% which is highly unacceptable. I suggest the company should share and increase its CSR budget towards female literacy in the area.

21. I also suggest the utilization of 3% of the project cost not the profit share for the benefits of the local people and their health from the date of the start of project. MOEFCC has in past given these conditions to various high pollution potential projects.

22. As per TOR point IV no plan regarding Arsenic baring sludge is submitted in draft EIA report. Please provide the report for arsenic and mercury baring sludge. I suggest to provide a detailed plan of haz waste disposal in proper way with detailed information.

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23. As per Model TOR the point no x is not complied with. There are no data shown for the flood and river discharge near by the Greenfield project. I request to provide the same from governmental department in final EIA report along with mitigation measures if any.

24. How the zero discharge status will be achieved by this plant is not shown in water table diagram and in draft EIA report. Please furnish details of all the components of ETP and stage wise pollution reduction to achieve the zero discharge status in final EIA.

25. I suggest during construction phase a 2 Nos of high capacity truck mounted dust collector should be used round o clock for controlling dusting in the construction area and introduction of coal tar temporary roads in the whole construction area.

26. As per the map submitted in draft EIA there is no 33% area left for the plantation. So from where the land will be taken for this 33 % plantation area? Please provide the breakup of the land.

27. On Model Tor point 9- CEP...Point No – ii- iii- iv no answer is given in EIA report. I suggest that any violation or any environmental issue the highest authorities should be informed and they should address the problem/grievance/violation with spirit. These grievance redressal mechanism and details must be shared with public also in any such issue and publish on web site.

28. If share holders and board of directors are not aware about the issues/problems of pollution then the management will not work effectively. I suggest that the environmental issues/problems should be addressed in the grievance redressal mechanism and it should be online in local language on web site of proponent.

29. I suggest online complaint redressal mechanism for greater transparency and accountability of pollution control facilities in such huge industry like this. I demand that company should initiate the online complaint redressal mechanism and display all the respective answers of company to avoid misunderstanding and confusion among the citizens/environmental groups/media. The ***MOEFCC should give the condition in Environmental Clearance for this demand.*** This move will lead smooth industrial development of the area avoiding litigations in court and public protest.

I hope the AEL management and MOEFCC will consider my above said suggestions for sustainable development of the Mundra region of Kutch.

Thanking you and hoping for action to protect the people ecology and enviornment.

Sincerely Yours

(Ibrahim Turk)

CC:

1. Member Secretary EAC. MOEFCC.

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C-Q-32
1472

CONSERVATION ACTION TRUST

5, Sahakar Bhavan, 1st Floor, LBS Road, Narayan Nagar, Ghatkopar (W),
Mumbai – 400086
Work: 022 – 25122422/23

Comments, questions and suggestions for the Public Hearing on the 29th April 2017 for "the proposed greenfield copper refinery project at Adani port special economic zone land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat"

1. Please furnish full details of the existing land use of the site proposed for the project.

2. Please furnish the detailed land use of the proposed site as per the approved CZMP.

3. Please furnish a copy of the CZMP of this area approved by MoEF.

4. Has the project proponent carried out mapping of the CRZ area and the HTL – LTL line, buffer area, as well as mud flats, sand dunes, and corals on 1:4000 scale on the CZMP approved by MoEF? If yes, kindly furnish a colour copy.

5. Please furnish a satellite imagery of 1991 of the proposed project area.

6. Please give full land use details and categories of the proposed project area. Please mention how much area is under CRZ I - A, CRZ I, CRZ II, CRZ III and CRZ IV.

7. Does the proposed project area falls under ecologically sensitive and or geomorphologically important area, as per the CRZ Notification 2011?

8. Please specify what are the ecologically sensitive areas and or geomorphologically important areas observed at the proposed site and in the study area, along with the area details (in hectares).

9. Please furnish information on whether mangroves and mud flats are present at the site and the area (in hectares) covered by mangroves and mud flats.

10. Please furnish information at the distance which mangroves and mud flats are observed from the proposed project site.

11. Please furnish details of salt pans and aquaculture ponds within the study area, and their distances from the project site.

12. Please furnish details regarding the fishermen residing and/or fishing in the study area.

13. As per the study area map, the project area not only covers mudflats, it is also falls within the Mundra mangrove reserve forests. It is also in proximity of the Danderi reserve forests, Navinal reserve forest and the Mundra Dhoa reserve forest. Please explain why such an ecologically important area has been selected for this project.

14. As per the information submitted for "Site Alternatives" in the Form I, Site I has no forest area, whereas the proposed Site 2 has 253 acres of forest land that the project proponent has proposed for diversion. Please explain the rationale behind selecting the site which has forest area and explain why the site that does not have forests has not been selected.

15. It is also stated in Form I that mangroves are not present on the site. However, a bare perusal of the google earth images shows that the mangroves exist along the southern boundary of the proposed project. Also, the proposed conveyor belt from the port to the proposed site passes through the mangroves. This can also be observed from the "FIGURE 3.3.2 Landuse/Land Cover Map Based on Satellite Data" of the draft EIA report. Why has this been not mentioned in the Form I? Please explain.

16. The proposed area has been illegally reclaimed by the APSEZ. Entire land use and land cover has been changed due to this. Please give information on the land use and cover as was during 1991 and also before the SEZ clearances were granted. Please also furnish a copy of the permissions issued by the State and Central Government agencies permitting the reclamation and destruction of mangroves.

17. Is the project proponent going to destroy the remaining mangroves of this area as well?

18. Please explain on what basis is the alternative site 1 rejected.

19. The Table-3.3.2 – "Land use breakup details in 10 km radius" clearly mentions presence of mudflats, mangroves and the reclaimed area in the study area. As per this table only 5.27% of the land in the study area is built-up, whereas 11% of the study area is wetland. Why is the site being selected for this proposal?

20. Please explain why the land with scrub vegetation has been categorised as wasteland.

21. Item 21 of Form I under Basic Information states that the proposal involves approval/clearance under the Forest (Conservation) Act, 1980. However, under point 23 "Whether any Forest Land Involved? Area of Forest land Involved (hectares)" it is stated as "N/A". The Draft EIA report has mentioned at many instances the presence of 3 reserved forests and the Mundra mangrove forests. Please explain why such misleading information has been provided in Form 1.

22. In form 1, the query under point 24 is "Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?" The project proponent has replied has "No". It is important to point out here that at-least two court cases are going on the APSEZ land – SLP 28788 of 2016 in the Supreme Court and WP (PIL) 12 of 2011 in the High Court of Gujarat. Please explain why this was not disclosed in the Form 1.

23. What action has been taken by the APSEZ as per the recommendations of the Claude Alvares led "Committee on Mangroves" in the Civil Application 9124 of 2011 under the PIL 12 of 2011? Please furnish the details of the actions taken by the project proponent.

24. The Form 1, under "II Activity" states that no reclamation is envisaged. It is a well-known fact that the entire area has been reclaimed by the Adani group. This has been also stated in the Sunita Narain report. What measures have been taken to restore the area to its original state? How much mangrove plantation has been undertaken? Please furnish with the location details, along with coordinates and site photographs.

25. The Form 1 also mentions "construction of new approach road". However, the document on Alternative sites state that "Widening of existing Road" would be required for this site. Why is there such discrepancy in the information being provided?

26. Where would this proposed new approach road and / or the widening of the existing road come? Please furnish details along with the map showing the proposed new approach road and or widening of the road.

27. Please furnish details on the impacts and mitigation measures of proposed new approach road and/or widening of the road.

28. The Form 1 also mentions construction of new transmission lines. Please show location of the new transmission lines on colored map. Has the area required for this mentioned in the Draft EIA report? Please mention the impact of the transmission lines and the mitigation measures for same. How much forest land is involved? Are these transmission lines passing through CRZ areas? Why can't the existing transmission lines be upgraded?

29. For stream crossings, the Form 1 mentions that "Natural drainage passing through the site will be suitably trained and maintained. There will not be any diversion. Further, conveyer for Copper Concentrate and Rock Phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required." The Adani group has already reclaimed large swathes of mudflats, mangroves and creeks in this area. Now the APSEZ wants to further "suitably train and maintain" the natural drainage. Please furnish details on the impacts of this and mitigation measures of same. Please also explain how this can be permitted in view of the fact that the reclamation has been carried out illegally without valid Environmental, CRZ and Forest Clearances. Please furnish copies of these clearances, if any.

30. Further, there is already pollution in the area due to the coal dust and fly-ash and emissions of the power plant. There have been numerous complaints regarding this from the villagers of this area. Additional conveyor for Copper Concentrate and Rock Phosphate will further deteriorate the environment. Please give details on the impact of and mitigation measures of the conveyor for Copper Concentrate and Rock Phosphate, along with the impacts of the existing power plants.

31. It is mentioned in Form 1 that "Approximately 3000 persons will be employed during construction phase and about 2000 people will be employed during operation phase". Also, please mention if the employment will be given to the locals or to outsiders.

32. What kind of residential and cooking facilities will be provided for the construction workers?

33. What sanitation facilities will be provided for them during the construction phase?

34. How many locals have been employed so far by the APSEZ? Please furnish details. Please furnish how many are temporary and how many with permanent jobs.

35. Under the "Environment Sensitivity", the Form 1 states that "Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value" are not present within 15 kms. However, mangroves are about 167 meters away from the boundary of the proposed project. Moreover, there are 3 reserved forest and the Mundra mangrove forest in the

proposed project area. Mangroves are protected as per the Indian legislation. Please explain why this was not mentioned in the Form 1.

36. Moreover, the 15 kms area covers the villages Tragadi. As per some of the reports Tragadi is turtle nesting sites. Why this has not been mentioned in the Form 1? Please explain. Have the impacts of the proposed project and related activities been studied for the turtle nesting? What are the mitigation measures for same? Please furnish full details of same.

37. Please give details on the pagadiya fishing along the APSEZ area. How many fishermen are engaged in this? How many have been impacted due to the APSEZ? Please furnish full details.

38. What compensation has been provided to fishermen who earlier used to fish by this technique, but had to stop due to the APSEZ? Please furnish full details.

39. How many fishing boats are present in the area? Please furnish full details.

40. From where would the sand be obtained for the proposed construction?

41. The proposed TOR document mentions under Land Use that - "The existing land use pattern in the study area of 10 km radius around the project will be established through the literature review of published Census records and latest available satellite imagery. Based on this review, the land use pattern is categorized into the following five categories:

1. Forest;
2. Irrigated and agricultural Land;
3. Un-irrigated agricultural land;
4. Culturable wasteland; and
5. Land not available for cultivation, which includes built-up areas."

Why are the mudflat areas and the mangroves not mentioned? Also, please demarcate the culturable wasteland and share a coloured map of the same.

42. The brief summary as well as the pre-feasibility report mentions that "There is no significant vegetation or habitation in the project site. The nearest significant features from the project site are 4620 MW Adani Power Plant and Tata Power (Western side of project area), and West Port of APSEZL (South – west direction from project)." Kindly explain why the mangrove vegetation or the three reserve forest areas and mangrove forest areas not significant.

43. The pre-feasibility report also mentions that "Land for different corridors (Power/ Road/ Raw Material Conveyor) would be additional." Please furnish full details of the land required and the existing land use for these corridors. Please furnish the existing land use, whether any eco-sensitive areas, forest lands, mangroves, beaches, etc. exist in these corridors. Please also furnish a coloured map of the proposed corridor area.

44. Why has information on the above-mentioned corridors not provided in the Draft EIA? Please explain.

45. The pre-feasibility report mentions that "From South West to North East majority of area is of APSEZL where west port is also located.. The land is having undulations and minor grading will be required." Kindly provide details on how the grading would be carried. What material would be used for this? From where would it be sourced? Please furnish full details.

46. How many creeks are present in the study area? Please furnish a coloured map and a satellite image showing the creeks.

47. The pre-feasibility report states that "Since the entire land is vacant, hence no displacement and rehabilitation of local population is envisaged". What about the fishermen? How many of fishermen are engaged in fishing in this area? Please furnish full details.

48. How many fisher-folk/local people will be given permanent jobs in the proposed project?

49. What kind of jobs will be given?

50. Will they be imparted appropriate training?

51. Would the job be permanent or temporary?

52. How many salt pans exist in the study area. Please furnish full details.

53. From where will be the coal sourced for "addition in the concentrate for effective smelting"? What will be the ash content, Sulphur content mercury content and radioactivity of the coal proposed to be used? How will it be transported? What is the quantity of the coal envisaged to be stored? What are the ash utilization plan? Please furnish a detailed report on same. What are the mitigation measures for the SOx, particulate matter, arsenic, heavy metals, mercury, radionuclides emissions?

54. Are there any studies conducted on the long-term radioactivity of the ash? Kindly furnish the same if any. What are the mitigation measures proposed for the same?

55. Please share details of the water circulation system proposed as mentioned in the Pre-feasibility report. Please show the layout on map of this proposed water circulation system. Please also share details of the land cover of this proposed area. Why has this not been mentioned in the Draft EIA?

56. The very first criterion for site selection is "Away from environmentally sensitive areas". However, this project falls under the reserve forest and mangrove areas. Please explain.

57. Under section 6.4.2 "Merits & demerits" of the pre-feasibility report why the presence of reserve forests and mangrove forest not mentioned under "Site-II (East of APL)"

58. How much green belt plantation has been undertaken by APSEZ so far? Please provide with the total area, the co-ordinates and the photographs of same.

59. What plant species have been planted in the green-belt in the APSEZ?

60. Are all the species proposed to be planted for the current proposal indigenous?

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61. Where is the sewage treatment plant proposed? Please show the location on the map.

62. Where would the sludge from the sewage treatment plant be disposed of?

63. Is there any facility proposed for the recycling and reuse of the sludge on site? Kindly provide the details along with the location on the map for the same if any.

64. The pre-feasibility report states that the "rejects from the secondary RO plant will be discharged into sea through the outfall channel of APSEZ's desalination plant." Please explain the impacts and mitigation measures of same.

65. What will be the composition of the rejects from the secondary RO plant? Kindly provide the detailed analysis report for the same with the concentration of each constituent.

66. What are the "latest environment technologies" that would be used to treat the gaseous emissions before they are discharged in to the atmosphere?

67. Please furnish a copy of the guidelines on "utilization of Copper Slag".

68. Please furnish a copy of the guidelines on "utilization of Phosphogypsum".

69. Please give full details of the location of the land fill sites for storage of Hazardous Cake and Scrubber Cake as well as a Map showing their locations.

70. Please furnish area details and location map of ETP cake land fill.

71. As per the draft EIA report almost 40% of the forest area is proposed to be converted to industrial use. Why is forest land required for this project?

72. As per the Draft EIA section 3.9.6 - "Endemic Flora Species and Threatened Flora of Navinal Area - Important threatened plant species reported from the region are Dipcadierythraeum, Helichrysumcutchicum, Heliotropiumrariflorum, Pavoniaceratocarpa, Convolvulus stocksii, Commiphorawightii.

Gujarat State Biodiversity Board proposes to declare the area as Biodiversity heritage site and as the site is close to Mundra SEZ, it deserves more protection." Despite this, please explain why this site is being selected for this project?

73. Isn't it ironical that the project proponent proposes to build the proposed copper refinery with environment friendly technology while destroying 102.38 hectares of forests only for this particular project? The project proponent may please explain the logic behind doing this.

74. The area identified for securing the hazardous cake and scrubber cake has not been specified. Neither has the area identified for intermediate/emergency storage of copper slag and phosphogypsum. As mentioned in the Draft EIA, area of 30 acres and 105 acres respectively has been mentioned for the said activities. Please give the location for these. Please also give the land use category of this areas. Have the clearances for this land been obtained? Please share the Forest, CRZ and environment clearances of same.

75. What will be the composition of the hazardous cake? Kindly provide the detailed analysis report for the same with the concentration of each constituent.

76. As per the table 2.9, ETP Cake contains heavy metals. What will be the impact of its disposal on the ground water table? What are the mitigation measures for the same?

77. Also, the project proponent is proposing to do away with 253 acres of forest area and then develop 209 acres of greenbelt/green cover. Kindly explain this.

78. The draft EIA report states that "The proposed copper refinery project of AEL is a one of the important projects. AEL believes that the copper refinery project would add significant value to Indian economy. The project will not only help ensuring by becoming self-sufficient in terms of copper, phosphoric acid and sulphuric acid for India but will also drive macroeconomic growth." This growth driven approach of Adani has been detrimental to the environment of Mundra. Moreover, the project would be detrimental as it will lead to air pollution and will impact the health of people residing in the vicinity.

79. The draft EIA report mentions that "The proposed project would have few adverse impacts on the environment. However, with proper and judicious implementation of the mitigation and environment management measures, the impacts can be minimized and can be maintained well within the permissible limits specified by the regulatory authorities." The approach of Adani group and the indifference towards protection and conservation of environment has been reported time and again. The proposed project will not only lead to further reclamation of mangroves and mudflats, it will also be detrimental to the mangroves and the reserve forests in this area.

80. The draft EIA report mentions that the "Mangroves are situated about 4.5 km near Kotri creek area/ SSW direction, distributed along the networks of creek system." The Google earth imagery dated 19.11.2015 clearly shows that mangroves exist at mere 167 metres from the proposed project. Why has this not been mentioned in the Draft EIA report? Please explain. Moreover, the project also falls under the Mundra mangrove forests. This too has been not mentioned here. Please explain.

81. Please furnish with the details of the APSEZ. How much area has been acquired under the APSEZ at Mundra and how much was permitted under the clearances?

82. Please furnish with all the CRZ, EC, Forest and wildlife clearances of the APSEZ, Mundra.

83. Has the APSEZ undertaken any mangrove plantation? Kindly furnish details of each location wherein the mangrove plantation has been undertaken, along with the area under plantation so far, locations' latitude-longitude, site photographs prior to plantation and post plantation, agency implementing the plantation and the compliance so far. Also furnish with the pre and post plantation satellite images of all the locations.

84. Please mention the area details for mangroves that have been destroyed so far for the APSEZ. Please furnish a 1991 and current satellite data.

85. Please furnish with the details of much of mudflats, sand dunes, creek, salt pans have been reclaimed so far.

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86. Please furnish with the complaints received for the existing projects, specifically regarding to the destruction of mangroves and violation of the CRZ Notification in the APSEZ area.

87. What action has been taken and what is the status and / or compliance of the show cause notices issued by the MoEF and the GPCB regarding the violation of the environmental clearances and the pollution in the APSEZ? Kindly furnish with the details and relevant documents.

88. Has Cumulative impact analysis been conducted for the proposal on local livelihood? What are the findings of this study? Which all companies/projects have been undertaken under this study?

89. What is the carrying capacity of this area to undertake the proposed project with respect to already existing projects? Has any carrying capacity study been conducted? Details thereof may please be furnished.

90. Have there been any complaints/grievances from the fishing community? Kindly furnish with same.

91. Please furnish full details of the environmental clearance and the CRZ clearance, Environmental clearances, Forest clearances and the Wildlife clearances received for the existing APSEZ, Mundra

92. Please furnish details of the CRZ clearance, Environmental clearances, Forest clearances and the Wildlife clearances received for all the facilities existing in the APSEZ.

93. How much land was reclaimed for the existing APSEZ after 20th February 1991?

94. How has the APSEZ impacted the livelihoods of local fisher folk communities?

95. What will be the impact of the additional transport of raw materials and the finished products on the road, rail and the SEZ infrastructure? Please furnish with details of same.

96. Please furnish details of the transportation – road, railway limes, as well sea borne, impacts and mitigations studies conducted for the proposal.

97. The proposed area falls under Seismic Zone V. What are the mitigations measures to handle the situation due to earthquake?

98. Please furnish full details of the field visits conducted to undertake the ecological study including copies of the field notes. Please mention full details of the team members, their qualifications, and the number of man days spent on the ecological data collection.

99. Has the project proponent carried out Social impact assessment report? If yes please furnish if any.

100. Please furnish the latitude-longitude coordinates of the corners/boundaries of the entire APSEZ, Mundra.

101. What are the existing facilities for the parking, washing, repairs and maintenance of trucks and other heavy equipment?

102. What facilities are provided for the drivers and cleaners?

103. What will be the impact of the water/sewage discharged into the creeks and gulf of Kachchh on the overall salinity of the water? Has any such report been conducted?

104. Please furnish No Objection Certificates, Consents, from the State Pollution Control Board for the projects involving discharge of effluents, solid wastes, and sewage waste under Environmental Protection Act 1986.

105. Has the project proponent carried out mangrove conservation plan? If yes then furnish full details with photographs and maps showing the mangrove conservation areas, along with details of the cost of mangrove conservation.

106. What is the original plot level? What is the proposed plot level? How this will affect the land terrain? Has the proponent conducted any analysis on its impact on the environment? Please furnish details.

107. Please furnish the status of NABET accreditation for all EIA consultants hired with their experience in details as of the period the Draft EIA studies were conducted and published.

108. Have all the ToRs been followed for the preparation of the documents?

109. Has authenticated English translation of all material in Regional languages been provided, as stated in the EAC minutes dated 3th – 4th May 2016?

110. It has been reported that the coastal areas of Mundra harbour mangroves and have mudflats, sand dunes, creek network etc. ecologically important areas. Despite this, projects are being allowed to set-up in this area. Why does Adani group always have to either reclaim the mangroves and mudflats or use a site which they have already reclaimed without proper clearances? Please explain.

Thanking you,
Yours faithfully,

Debi Goenka
Executive Trustee
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5 Sahakar Bhavan, 1st Floor
LBS Marg, Narayan Nagar
Ghatkopar (West) Mumbai 400086
Tel: (91-22) 25122422/20 Telefax: 25122423

C-Q-55

1692

QUESTIONS FOR COPPER REFINERY PUBLIC HEARING

1. What kind of forest area is 102.38 hectares?
2. The site is located in the Seismic zone – V, what is the vulnerability of the site due to its seismic sensitivity
3. Figure 1.2 is illegible. Please provide a better of the same map
4. Please provide list of all the raw materials that are required for the purpose of proposed project
5. Please provide name of the sources, along with distance from the plant, from which raw material would be brought to the project site?
6. What are all the different air pollutants which will be added to the Ambient Air Quality (AAQ) because of the transportation of raw material to the project site?
7. What is the incremental concentration (in ug/m3) of each of air pollutants which will be added to the AAQ because of the transportation of the raw material to the project site?
8. Give us a fully list of all the industries within APSEZ area, along with their production capacities.
9. Give us a full list of the all the industries within 15 kilometers radius of APSEZ area, along with their production capacities.
10. Give us a full list of all Air Pollutants which are discharged by each and every industry within APSEZ area, along with the quantum of discharge per hour.
11. Give us a full list of all Air Pollutants which are discharged by each and every industry within 15 kilometers of the APSEZ area, along with the quantum of discharge per hour.
12. What is the maximum baseline concentration of PM2.5 within 15 kilometers radius of the project site?
13. What is the incremental PM2.5 pollution which will be added by the project?

ભીમાભાઈ મોવીયા (ભીંડોરણા)

પ્રમુખ મંત્રી
વન અધિકાર સમિતિ
મું. સીરાચા તા. મુંદરા - ૪૨૭

Mob:- 9426902862

14. What is the impact of water withdrawal from the Sea on marine ecology?

15. The EIA Report is completely silent on feasibility of Zero Liquid Discharge (ZLD). The typical style of Vimta Labs, which is the consultant for the EIA Report, is that they provide Water balance diagram in the EIA Reports and say that it is there is no waste water discharge from the plant. Is water balance diagram sufficient to evaluate the feasibility of ZLD? Therefore, give us scientific explanation about the feasibility of ZLD for the proposed project.

16. Have you obtained prior Forest Clearance for the project?

17. What is the total amount of Forest which has been diverted/cleared so far for the purposes of different project within APSEZ area?

18. What has been the environmental damage which has happened as result of the Forest diversion so far?

19. How much money does the company owe to different banks?

20. How much money does the company owed to public sector banks?

21. What is the source of money for this project?

22. Why should we have a project promoted by a company which is deeply into debt?

23. Have you paid the 2000 crores money imposed as fine/penalty for damaging the Environment?

24. If not, when will the company pay penalty imposted?

25. The environmental damage which has already been caused by your company is punishable under Section 15 of the Environmental (Protection) Act, 1986 and you are liable to be imprisoned for the same. Why has the criminal action not been taken against you?

આંબાભાઈ પુંજાભાઈ વિરાણી

પ્રમુખ મંત્રી
વન અધિકાર સમિતિ
મું. સીરાચા તા. મુંદરા - કચ્છ

Mob:- 9426902562

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C-Q-34

ચૌહાણ પ્રવિણસિંહ ભુરૂભા.
ગામઃ શીરાચા,
તા:મુંદરા-કચ્છ.

પ્રતિ શ્રી,
મેમ્બર સેક્રેટરી,
ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ,
ગાંધીનગર-ગુજરાત.

વિષયઃ મેસર્સ અદાણી એન્ટરપ્રાઇઝીઝ લિમિટેડ, અદાણી સ્પેશીયલ ઇકોનોમીક ઝોનની ગામઃ નવીનાળ અને શીરાચામાં આવી રહેલ ગ્રીનફીલ્ડ કોપર રીફાઇનરી પ્રોજેકટના વાંધા બાબતઃ

1) <u>ટર્મસ ઓફ રેફરન્સ નું નોન કમ્પલાયંસ અને તાઃ ૩૧-૦૩-૨૦૧૧ વાળા ભારત સરકાર નાં સર્કયુલર નું ભંગ.(બિડાણ-૧)</u>

a) આ પ્રોજેકટ માટે તા:૨૧ જુન ૨૦૧૬ ના રોજ ટી.ઓ.આર.(ટર્મસ ઓફ રેફરંસ) ઇસ્યુ કરવામા આવ્યો, જેમા સેકસન ૫(આઇ) માં સ્પષ્ટ જણાવવામાં આવ્યું છે કે જે ૧૦૨ હેકટર ફોરેસ્ટ ની જમીનનો ઉપયોગ થવાનો છે તેના કલીયરંસની નકલ રજુ કરવી.
   i) અદાણી એન્ટરપ્રાઇઝ દ્વારા એન્વાયર્મેન્ટ કલીયરંસ લેવા માટે જે ફાર્મ ૧(MoEFCC એ પોતાની વેબસાઇટ ઉપર અપલોડ કર્યું છે.) સબમીટ કરવામા આવ્યો છે તેમા ફોરેસ્ટ કલીયરંસ અન્ડર ધી પ્રોસેસ છે એવું જણાવવામા આવ્યું છે.
   ii) ડ્રાફટ ઈ.આઇ.એ. રીપોર્ટ ના પાના નં. AI 14 પર (ટી.ઓ.આર. નું કમ્પલાયંસ નથી કરવામા આવ્યું) પણ ફોરસ્ટ કલીયરંસ પેન્ડીગ છે એવું જણાવવામા આવ્યું છે.

   આમ, ઉપરોકત મુદ્દાઓને લઇને સ્પષ્ટ થાય છે કે અદાણી એન્ટરપ્રાઇઝ દ્વારા ટી.ઓ.આર. નું કમ્પલાયંસ કરવામા નથી આવ્યું માટે જયાં સુધી તી.ઓ.આર. નું કંપલાયંસ ન થાય ત્યાં સુધી પર્યાવરણીય લોક સુનાવણી માન્ય ગણાય નહી.

b) MoEFCC ના તા:૩૧-૦૩-૨૦૧૧ ના સરકયુલર (બિડાણ-૪) માં જણાવ્યા પ્રમાણે કોઇપણ નવો પ્રોજેકટ, જેમાં વન વિભાગની જમીનનો ઉપયોગ થવાનો હોય તો પહેલા ફોરેસ્ટ કલીયરંસ લેવું ત્યાર બાદ એન્વાયર્મેન્ટલ કલીયરંસ ની પ્રોસેસ કરવી. અદાણી એન્ટરપ્રાઇઝના આ પ્રોજેકટ માટે ૧૦૨ હેકટર જમીન ફોરેસ્ટ ની છે અને ફોરેસ્ટ કલીયરંસ પેન્ડીગ છે. જે બિડાણ-૨ અને બિડાણ-૩ માં સાબિત થાય છે. આમ, ફોરેસ્ટ કલીયરંસ પહેલા એન્વાયર્મેન્ટ કલીયરંસ ની કોઇપણ પ્રોસેસ કરવી ગેરકાદેસર છે, અને પબ્લીક હેયરીંગ પણ ગેરકાયદેસર ગણાવી.

c) ઇ.આઇ.એ. નોટીફીકેશન, ૨૦૦૬ ની સેકશન 8(vi) મા જણાવ્યા મુજબ કોઇપણ માહિતી જાણી જોઇને ગેરમાર્ગે દોરવા માટે છુપાવવામા આવી હોય તો અરજી રદ કરવી. આમ, અદાણી એન્ટરપ્રાઇઝ દ્વારા ગેરમાર્ગે દોરવા જાણી જોઇને ફોરેસ્ટ કલીયરંસ ને લગતી ઉપરોકત માહિતી છુપાવવામા આવી છે. આથી તેની પર્યવરણ કલીયરંસ માટેની અરજી રદ થવી જ જોઇએ.

d) ઉપરોકત મુદા નં. ૧. બાબતે મારા દ્વારા તાઃ ૧૧/૦૪/૨૦૧૭ ના રોજ, (૧) કે. સી. મિસ્ત્રી, મેમ્બર સેક્રેટરી, ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, ગાંધીનગર. અને (૨). અરવીદ અગ્રવાલ, ચેરમેન, ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, ગાંધીનગર. (૩). રીજનલ ઓફીસર, ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, ગાંધીધામ. (૪). એમ.એ. ગાંધી, કલેકટર, કચ્છ. (૫). એમ.કે.સીંગ, જોઇટ સેક્રેટરી, એમ.ઓ.ઇ.એફ.સી.સી. નવી દીલ્લી. વાળાઓને ઇમેઇલ દ્વારા ફરીયાદ(બિડાણ-૫) કરેલ હોવા છતાં એકશન લેવામા કેમ નથી આવ્યા? એન્વાયર્મેન્ટ કલીયરંસ ને લગતી પ્રોસેસ કેમ રોકવામા નથી આવી? પબ્લીક હીયરીંગ કયા આધારે કરવામા આવી રહી છે?

2) ફોર્મ-૧ ની અંદર છુપાવવામા આવેલ માહિતીઃ

a) બેઝીક ઇન્ફર્મેશનના મુદા નં. ૧૬ અને ૨૬ માં સૂચિત પ્રોજેકટની જમીન પર નવીનાળ ગૌચર જમીનની પી.આઇ.એલ. નં ૧૭ ઓફ ૨૦૧૧ ના જજમેન્ટ પર રીવ્યુ પીટીશન કરવામા આવી, જે હાલમા ચાલુ છે. આ માહિતી છુપાવવામા આવી છે.

b) ફાર્મ-૧ ના એન્વાયર્મન્ટલ સેન્સીટીવીટી ના મુદ્દા નં-૨ અને ૧૦ માં અદાણી દ્વારા દાણેશ્વરી નદી ની માહિતી છુપાવવામા આવી છે, જયારે આ નદી સૂચિત પ્રોજેકટ વિસ્તારની અંદરથી પસાર થઇ રહી છે. આમ, આ માહિતી છુપાવવામા આવી છે.

આમ, ઇ.આઇ.એ. નોટીફીકેશન, ૨૦૦૬ ની સેકશન 8(vi) મા જણાવ્યા મુજબ કોઇપણ માહિતી જાણી જોઇને ગેરમાર્ગે દોરવા માટે છુપાવવામા આવી હોય તો અરજી રદ કરવી. અદાણી ગ્રીનફીલ્ડ કોપર રીફાઇનરી દ્વારા જાણી જોઇને ફાર્મ-૧ માં ઉપરોકત માહિતી છુપાવવામા આવી છે, જેથી તેની અરજી રદ થવી જોઇએ.

3) ઇ.આઇ.એ. રીપોર્ટ ની ક્ષતિઓ:

a) ઇ.આઇ.એ. રીપોર્ટના પેજ નં. ૮૧-૪ પર મુદા નં. ૧૦ માં અદાણી દ્વારા જણાવવામા આન્યું છે કે ૧૦ કી.મી.રેડીયસની અંદર આરકયોલોજીકલી ઇમ્પોર્ટન્ટ સ્થળો નથી. જયારે સૂચિત પ્રોજેકટ વિસ્તાર થી ૧ કી.મી. ના અંતરે નવીનાળ રીઝર્વ ફોરેસ્ટની અંદર આરકયોલોજીકલ સ્થળ આવેલો છે. જેને લઇને એમ.એસ. યુનિવર્સિટીના આરકયોલોજીકલ ડીપાર્ટમેન્ટ દ્વારા આ વિસ્તારનો સર્વે કરેલ છે જેનો પ્રાથમિક રીપોર્ટ આ સાથે જોડેલ છે. આમ, આ માહિતી છુપાવવામા આવી છે.

4) સુનિતા નારાયણ કમીટીના રીપોર્ટનું વાયોલેશન.

a) સુનીતા નારાયણ કમીટી રીપોર્ટના પાના નં. ૬૯ પર જણાવવામાં આવ્યું છે કે ભદ્રેશ્વર ખાતે ફીશીંગ બંદર બનાવવું જેથી કરીને આસપાસના ગામોના લોકો ત્યાં માછીમારી કરી શકે. પરંતુ અત્યાર સુધી આવું કંઇપણ કરવામા નથી આવ્યું.

b) સુનીતા નારાયણ કમીટી રીપોર્ટના પાના નં. ૬૯ પર જણાવવામાં આવ્યું છે ક માછીમારો કીનારા પર આવી જઇ શકે તે માટે આવવા જવાની વ્યવસ્થા ઊભી કરવી. જયારે અદાણી દ્વારા આવું કંઇપણ કરવામા આવ્યું નથી.

c) સુનીતા નારાયણ કમીટી રીપોર્ટના પાના નં. ૭૫ પર જણાવવામાં આવ્યું છે કે સામુદાયીક ગૌચર જમીનો સ્વેચ્છાએ પરત આપવી જોઇએ જેથી લોકો પોતાના પશુઓ ચરાવી શકે. પરંતુ આવું કંઇપણ કરવામા આવ્યું નથી.

d) પાના નં. ૭૫ પર જણાવવામા આવ્યું છે કે અત્યારના જેટલા પણ પ્રોજેકટો છે તેનું કયુમ્યુલીટીવ ઇમ્પેકટ અસેસમેંટ(સંકલીત અસરોનો અભ્યાસ) થવું જોઇએ અને તેની પરથી પર્યાવરણીય અસરોના નિરાકરણ માટેના પગલા ભરવા જોઇએ. આમ, અત્યાર સૂધી અભ્યાસ કરવામા આવ્યો નથી જેથી નવા પ્રોજેકટો ને મંજુરી મળવી જોઇએ નહી.

e) કમીટીએ રેકોમેન્ડેશન નં. ૭.૨.૨ માં જણાવ્યું છે કે નોર્થ પોર્ટ ની પર્યાવરણીય મંજુરી રદ થવી જોઇએ, કારણ કે તે વિસ્તારમાં બોચા આઇલેન્ડ આવેલો છે અને ત્યાં મોટા પ્રમાણમાં ચેરીયાઓને નુકશાન પહોંચાડાયો છે. તે છતાં મંજુરી રદ કરવામા આવી નથી.

f) સુનીતા નારાયણ કકમીટીની ભલામણ મુજબ HTL અને LTL નું મેપીંગ કરી પબ્લીક ડોમેન માં મૂકવું, જે આજ દીવસ સુધી મૂકવામા નથી આવ્યું.

5) વન વિભાગની જમીનનો પ્રશ્ન/

a) અદાણી દ્વારા તા: ૧૯ જૂલાઇ ૨૦૦૪ માં મુંદરા તાલુકાના આઠ ગામોની કુલ્લ ૧૫૭૬.૮૧ હેકટર રીઝર્વ ફોરેસ્ટ ની જમીનની માંગણી કરવામા આવેલ છે, જેનું ફોરેસ્ટ કલીયરંસ અન્ડર પ્રોસેસ છે. આ પ્રોજેકટ માટે જે જમીન નો ઉપયોગ થવાનો છે તે જમીન ૧૫૭૬.૮૧ વાળી માંગણી માની ૧૦૨.૩૮ હેકટર શીરાચા દાણદેરી રખાલ (રીઝર્વ ફોરેસ્ટ) ની છે.

b) વન અધિકાર અધિનિયમ ૨૦૦૬ પ્રમાણે કોઇપણ વન ની જમીન પર પહેલો અધિકાર તેનો ઉપયોગ કરતા ગ્રામજનોનો છે. અને ગ્રામસભાની મંજુરી વગર ઔધોગીક હેતુ કે અન્ય કોઇપણ હેતુ માટે ફાળવી શકાય નહી.

c) વન અધિકાર અધિનિયમ અંતર્ગત કોઇપણ કોમ્યુનિટી વન ની જમીનનો ત્રણ પેઢીથી ઉપયોગ કરતા હોય અથવા આજીવિકા મેળવતા હોય તો તેને હક મળી શકે છે.

d) આ ૧૫૭૬.૮૧ હેકટર ફોરેસ્ટની જમીન નો ઉપયોગ તેની આજુ-બાજુના ગામલોકો પોતાની આજીવિકા ચલાવવા કરે છે તો આ જમીન વન અધિકાર અધિનિયમ અંતર્ગત ઔદ્યોગિક હેતુ માટે ફાળવી શકાય નહી.

e) શીરાચા ગ્રામ પંચાયતે સૂચિત પ્રોજેકટ માટે ઉપયોગ થનાર જંગલની જમીન પર તા:૨૪/૦૪/૨૦૧૭ ના રોજ વન અધિકાર અધિનિયમ હેઠળ કોમ્યુનિટી રાઇટસ સેટલ કરવા પ્રાંત સ્તરીય વન અધિકાર સમિતી પાસે પોતાનો દાવો રજુ કર્યો છે.

f) ૧૫૭૬.૮૧ હેકટર જમીનની માંગણી માં નવીનાળ ગામની પણ ૮૯ હેકટર જમીન આવે છે અને તેના પર નવીનાળ ગ્રામસભા દ્વારા સામુહિક દાવો કરવામા આવ્યો છે.

g) વન અધિકાર અધિનિયમ પ્રમાણે આ જંગલ ની જમીન પર પ્રથમ અધિકાર ગ્રામજનો નો છે, જેથી તેનું ફોરેસ્ટ કલીયરંસ ન મળી શકે અને પ્રોજેકટ માટે ઉપયોગ ન થઇ શકે.

h) આ વિસ્તારમાં આ છેલ્લું રીઝર્વ ફોરેસ્ટ છે. જો તેને ઔધોગિક હેતુ માટે ફાળવી દેવામાં આવશે તો જંગલ વગરનો વિસ્તાર બની જશે અને ઔધોગિક વિસ્તારમાં જંગલો વધારે હોવા જરૂરી છે.

6) અદાણી પોર્ટ એન્ડ સ્પેશીયલ ઇકોનોમીક ઝોન ના એન્વાયર્મેંટ કલીયરંસ નું નોન કંપ્લાયંસ:

a) સ્પેશીફીક કંડીશન (૨) પ્રમાણે વિસ્તારમાં આવતી ક્રીકો, નદીઓ અને ચેરીયાના વિસ્તારનું સંરક્ષણ કરવું. જયારે, અદાણી દ્વારા આ વિસ્તારની ક્રીકો, નદીઓ અને ચેરીયાના વિસ્તારનું નિકંદન કાઢેલ છે. જે માં જોડેલ અલગ અલગ વર્ષનાં સેટેલાઇટ ફોટોગ્રાફસમાં જોઇ શકાય છે. આમ, આ કંડીશનનું વાયોલેશન કરવામા આવેલ છે.

b) સ્પેશીફીક કંડીશન (૪) માં જણાવ્યા પ્રમાણે દરેક ક્રીકની સ્થિતિ સેટેલાઇટ ઇમેજ-૨૦૦૫ ની સરખામણીએ લાવવી. પરંતુ અદાણી પોર્ટ એન્ડ એસ.ઇ.ઝેડ. દ્વારા આ કંડીશનનું પાલન કરવામાં આવેલ નથી.

c) સ્પેશીફીક કંડીશન નં. (૫) માં જણાવવામા આવ્યું છે કે વર્ષમાં એક વખત તાજેતરનો સેટેલાઇટ નકશો રજુ કરવો જેથી તેની સરખામણી વર્ષ-૨૦૦૫ ના સેટેલાઇટ નકશા સાથે થઇ અને ખાત્રી કરી શકાય કે ક્રીકો, નદીઓ, ચેરીયાઓ અને ક્રીકોના મુખમાં કોઇ ફેરફાર થયો છે કે નહી. એ.પી.એસ.ઇ.ઝેડ. દ્વારા અત્યાર સુધી આવો કોઇ નકશો રજુ કરવામા આવ્યો નથી. આમ, આ કંડીશનનું કંપલાયંસ કરવામા નથી આવ્યું.

d) સ્પેશીફીક કંડીશન (૬) માં જણાવ્યા મુજબ સુનિતા નારાયણ કમીટી દ્વારા રજુ કરવામા આવેલ રીપોર્ટને ધ્યાનમાં રાખીને પર્યાવરણ અને વન મંત્રાલય દ્વારા લાગુ કરવામા આવેલ આદેશનું એપી.એસ.ઇ.ઝેડ. એ પાલન કરવું. જયારે એ.પી.એસ.ઇ.ઝેડ. દ્વારા તેનું પાલન કરવામા નથી આવી રહ્યું.

e) સ્પેશીફીક કંડીશન (૧૨) અને (૧૩) માં જણાવ્યા પ્રમાણે NCSCM/NIOT એ પર્યાવરણ અને વન મંત્રાલય દ્વારા મંજુર કરાયેલ એકશન પ્લાનના અમલીકરણ માટેનું નિયંત્રણ અથવા ચકાસણી કરશે. છ માસિક મોનીટરીંગ રીપોર્ટ સાથે એકસન પ્લાનના પાલનનો રીપોર્ટ રજુ કરવાનો રહેશે. આ કંડીશનનું કંપલાયંસ અત્યાર સુધી કરવામા આવ્યું નથી.

f) સ્પેશીફીક કંડીશન (૧૫) માં જણાવ્યા પ્રમાણે નદીના માર્ગમાં કોઇપણ પ્રકારનો ફેરફાર કરવો નહી. જયારે, એ.પી.એસ.ઇ.ઝેડ દ્વારા.....

i) કાંડાગરા વાળી નદી જે અદાણી પાવર વચ્ચેથી નીકળે છે તેનો રૂટ બદલી નાખવામા આવેલ છે.

ii) નવીનાળ અને શીરાચા વચ્ચે આવેલ કમંડવાળા છેલાનો રૂટ બદલવામાં આવેલ છે.

iii) નાગમતી નદીનો એક મૂખ બંધ કરી નાખેલ છે.

iv) ધ્રબ વાળી નદી પર ઓ.સી.સી.એલ. કંપની ઊભી કરી દેવામા આવેલ છે.

v) કેવડી નદી ઉપર અદાણી હોસ્પીટલનનું બાંધકામ કરી નાાખવામા આવેલ છે. આમ, આ શરતનું ભંગ કરવામા આવેલ છે.

g) સ્પેશીફીક કંડીશન (૧૮) માં જણાવ્યા પ્રમાણે ચેરીયા વિસ્તારથી ૫૦ મીટર સુધી કોઇપણ ડેવલપમેન્ટ કરવું નહી. જયારે પ્રોજેકટ પ્રપોનન્ટ દ્વારા ઘણી જગ્યાએ બાંધકામ કરી દેવામા આવ્યું છે. જેમ કે, અદાણી હાઉસની બિલ્ડીગ ઊભી કરી દેવામા આવી છે. આમ, આ કન્ડીશનનું ભંગ કરવામાં આવ્યું છે.

7) ગુજરાત ઇકોલોજી કમીશન નો રીપોર્ટ:

a) કોલ હેન્ડલીગના કારણે ચેરીયા અને તેની ઇકોસીસ્ટમ પર થઇ રહેલ અસર ની ગુજરાત ઇકોલોજી કમીશન દ્વારા સ્ટડી કરી એક રીપોર્ટ બનાવવામાં આવ્યો છે. તેમાંથી મુંદરા પોર્ટ પણ આ સ્ટડી નો ભાગ હતો.

b) આ રીપોર્ટ મુજબ કોલસાની ડસ્ટના કારણે ચેરીયાની વૃધ્ધી પર અસર થઇ છે.

c) આ રીપોર્ટ એમ કહે છે કે ૨૦૧૦/૧૧ માં BOD(બાયોલોજીકલ ઓક્સિજન ડીમાંડ) ૯.૫૨ હતા જે ૨૦૧૨/૧૩ માં વધીને ૨૭ સુધી પહોંચ્યા છે, જે અભ્યાસ વિસ્તારના પાર્ટસ થી સૌથી વધારે અહીયા વધ્યા છે.

d) COD (કેમીકલ ઓકસીજન ડીમાન્ડ) પણ ૨૦૧૦/૧૧ માં ૩૮ હતો જે ૨૦૧૨/૧૩ માં વધીને ૯૨.૬૫પહોંચ્યું છે.

e) DO (ડીસોલ્વેડ ઓકસીજન) ૪.૮ થી વધીને ૪.૯૨ પહોંચ્યું છે, જે CPCB ની પરમીશેબલ લાઇન થી ઉંચું છે.

f) SO (સસ્પેન્ડેડ સોલીડ, પાણીમાં વધતું ધુંધળાપણું) ૫૬ થી વધીને ૧૬૨ પર પહોંચ્યું છે, જે CPCB ની પરમીશેબલ લાઇન થી ઉંચું ગયું છે.

g) નાઇટ્રેટ ૨૦૧૦/૧૧ માં ૦.૩૧૩ હતું જે ૨૦૧૨/૧૩ માં વધીને ૧.૧૫૪ પર પહોંચ્યું છે.

8) અદાણી એન્ટરપ્રાઇઝ લી.ના કોપર રીફાઇનરી પ્રોજેકટ માટે નવીનાળ ગામની ગૌચર જમીન હતી તેનો ઉપયોગ થવાનો છે. આ જમીનની મેટર કોર્ટમાં ચાલી રહી છે. તેનો હજી કોઇ પણ પાર્ટીની ફેવરમાં નિકાલ કરવામા નથી આવ્યો.

9) લોકલ લોકોની રોજગારી માટે આટલા બધા ઉદ્યોગો હોવા છતાં પણ કંઇ કરવામા નથી આવ્યું. જેમ કે અદાણી પાવર પ્લાન્ટ માટે આજુબાજુના વિસ્તારની ૪૦૦ હેકટર જેટલી જમીન આપવામા આવી અને માછીમારો, ખેડુતો અને પશુપાલકોને બેરોજગાર બનનાવી તેના બદલામા ૭૦૦૦ લેબર માંથી માત્ર ૫૦૦ લોકલ અને ૧૫૦૦ એમ્પ્લોયર માંથી માત્ર ૧૫ લોકલ છે. તો આ પ્રોજેકટ થી બેરોજગારી અને પ્રદુષણ સિવાય કંઇ નહી મળે.

10) આ વિસ્તાર દરીયાકીનારાનો છે. માટે સી.આર.ઝેડ. કલીયરંસ લેવું જરૂરી છે. કારણ કે વાવાઝોડું તેમજ ભુકંપ કે સુનામી વખતે બચાવ માટેનો એકશન પ્લાન બનાવી શકાય.

11) કંપની દ્વારા ૩૨૮૦૦ કે.એલ.ડી. પાણીનો ઉપયોગ કરવામાં આવશે. અને તેના માટે ડીસેલીનેશન પ્લાનનો ઉપયોગ કરવામા આવશે. તેના ડીસ્ચાર્જના કારણે દરીયાઇ જીવ સૃષ્ટી ઉપર ખરાબ અસર થશે. આ ડીસેલીનેશન પ્લાન કંપની સાથે સંકળાયેલ છે પરંતુ તેની અસરોનો અભ્યાસ કરવામા આવેલ નથી.

12) આ વિસ્તારમાં બે પાવર પ્રોજેકટ અને એશિયાનું મોટું કોલ હેન્ડલીગ પોર્ટ આવેલું છે પરંતુ ઇ.આઇ.એ. રીપોર્ટમાં બતાવવામાં નથી આવી.

13) અદાણીના બીજા પ્રોજેકટોના એન્વાર્યમેન્ટ કલીયરંસના કંપલાયંસ કરવામાં આવેલ નથી, તો નવા પ્રોજેકટ ને મંજુરી આપી અને આજુ-બાજુના વિસ્તારના લોકોને નુકશાન પહોચાડી ન શકાય.

14) સૂચિત પ્રોજેકટની ગૌચર જમીન પર અમારા ગામના પશુઓ ચરીયાણ કરતા હતા તે છીનવી આજીવિકા ખતમ કરી નાખવામા આવેલ છે. હવે વધેલી આ ફોરેસ્ટની જમીન પણ આપીને પ્રોજેકટ લગાવવામાં આવશે તો ચરીયાણ રહેશે જ નહી.

15) કોપર રીફાઇનરીના કારણે સલ્ફયુરીક એસીડ જેવા હઇઝારદીઅસ કેમીકલ નીકળવાના છે જેના કારણે આ વિસ્તારમાં પ્રદુષણ વધી જશે અને એસીડ વરસાદ થવાની સંભાવના વધી જશે. જેથી આ પ્રોજેકટ રદ થવો જોઇએ.

16) નદી બંધ કરવાના કારણે આસપાસના વિસ્તારની જમીનનું ધોવાણ થશે અને પૂર જેવી સ્થીતીમાં આજુબાજુના ગામડાઓ ને જોખમ સર્જાસે.

17) જુનારસ્તાઓ બંધ થશે જેમાનો એક નવીનાળ થી કોટડી ક્રીકનો માછીમારોનો રસ્તો બંધ થશે.

18) આ જંગલની અંદર વન્ય પ્રાણીઓ રહે છે તો તેઓના રહેઠાણ નાશ પામશે જેના રેસ્ટોરેશન ને લઇ શુ?

ગોપાલ ગોવિંદભાઈ મોરજરિયા

આપનો વિશ્વાસુ

1698

C-Q-34

(TRANSLATED)

Chaunan Pravinsinh Bhurubha,

Village:Siraya,

Tal: Mundra Kutch

To,

The Member Secretary,

Gujarat Pollution Control Board,

Gandhinagar - Gujarat

Subject: Protest Objection for Greenfield Copper Refinery Project coming in M/s. Adani Enterprises Limited, Adani Special Economic Zone in village: Shiracha and Navinal.

1. **Non compliance of Terms of Reference and Breach of Circular dt. 31-03-2011 of the Government of India (Encl.: 1)**

   a) A T.O.R. (Terms of Reference) was issued for this project of dt. 21st June, 2016, in which it was clearly stated in Section 5(I) that clearance for forest land of 102 hectare should be submitted.

      i) It is declared in Form No.1 (MoEFCC uploaded by them on their website) to obtain Environment Clearance by Adani Enterprise that forest clearance is under the process.

      ii) It is declared on draft E.I.A. report on page no. AI 14 that (T.O.R. is not compliance by Adani) but forest clearance is pending.

      Thus, considering the abovementioned issued it is clear that T.O.R. is not compliance by Adani Enterprise. So, Environmental Public Hearing is not valid until the T.O.R. compliance is not made.

   b) According to Circular dt. 31-03-2011 of MoEFCC (Encl: 4) that forest clearance should be obtained first for any new project, in which the land of forest department is to be utilized and the environmental clearance process should be made thereafter. The land of 102 Hectare is of Forest in this project of Adani Enterprise and Forest Clearance is pending. It is proved by Encl: 2 and Encl:3. Thus, any environment clearance process made before forest clearance is illegal and Public Hearing may also be treated illegal.

   c) As per Section 8(iv) of E.I.A. Notification, 2006 if any information is concealed deliberately, the application should be cancelled. Thus, the abovementioned

information pertaining to forest clearance is concealed by Adani Enterprise deliberately to misguide. Hence, their application for environment clearance must be cancelled.

d) Why any action is not taken in spite of the complaint (encl.:5) regarding abovementioned point no. 1 is made by me by e-mail on 11/04/2017 to (1) K. C. Mistry, Member Secretary, Gujarat Pollution Control Board, Gandhinagar and (2) Arvind Agrawal, Chairman, Gujarat Pollution Control Board, Gandhinagar, (3) Regional Officer, Gujarat Pollution Control Board, Gandhidham, (4) M. A. Gandhi, Collector, Kutch, (5) M. K. Sing, Joint Secretary, MOEFCC., New Delhi?. Why the process pertaining to Environment Clearance is not stopped? On what basis Public Hearing is arranged?

2. **Information concealed in Form-1**

a) Review Petition is filed on judgment of P.I.L. No.17 of 2011 of the grazing land of Navinal on the land proposed in point no. 16 and 26 of basic information. It is concealed that it is under proceeding.

b) The information of Daneshwari River is concealed by Adani in point nos. 2 and 10. But, this river passes through the proposed project. Thus, the information is concealed.

Thus, as per Section 8(iv) of E.I.A. Notification, 2006 if any information is concealed deliberately, the application should be cancelled. The abovementioned information is deliberately concealed in Form No.1 by Adani Greenfield Copper refinery. Hence, their application deserves to be cancelled.

3. **Deficiencies in E.I.A. report**

a) It is declared by Adani in point no. 10 on page Nos. 1-4 of E.I.A. report that there is no archeologically important place within the radius of 10 km. But, an archeological place is situated in Navinal Reserve Forest, about 1 km. from the proposed project area. Accordingly, survey of this area is made by archeological department of M. S. University. The primary report is attached herewith. Thus, this information is concealed.

4. **Violation of Sunita Narayan Committee**

a) It is mentioned on page no. 69 of Sunita Narayan Committee Report that fishing port should be made at Bhadreshwar so that people of surrounding villages may make fishing activity there. But nothing such is made there.

b) It is mentioned on page no. 69 of Sunita Narayan Committee Report that arrangement of coming and going should be made so that fishermen may move on coast. But nothing such is made there by Adani .

c) It is mentioned on page no. 75 of Sunita Narayan Committee Report that collective grazing land should be given back voluntarily so that people may graze their animals. But nothing such is made there.

d) It is mentioned on page no. 75 of Sunita Narayan Committee Report that studied till now. So permission for new project should not be granted.

e) The committee has mentioned in recommendation no. 7.2.2 that environment permission for north port should be cancelled, because Bocha Island is situated there and mangrove is caused heavy damage there. In spite of that permission is not withdrawn.

f) As per the Sunita Narayan Committee report maping of HTL AND LTL should be made and kept in public domain, which is not placed till date.

5. **Issue of land of forest department**

a) A demand of land of reserve forest of 8 villages aggregating to 1576.81 hectare is made by Adani on dt. 19th July, 2004. Its forest clearance is under process. Out of 1576.81 hectare of demanded land to be used for project, 102.38 Hectare of land is of Shiracha Danderi Rakhal (reserve forest).

b) According to Forest Privilege Act, 2006 the villagers making use of the land have prior right on it and it cannot be allotted for industrial or other use without permission of the village meeting.

c) According to Forest Privilege Act, any community in use of the land for last three generations or earning livelihood from it may have right on it.

d) The villagers of surrounding are making use of this forest land of 1576.81 Hectare. So this land cannot be allotted for industrial purpose according to Forest Privilege Act

e) Shiracha Gram Panchayat has put it claim before Prant Stariya Van Adhikar Samiti to settle its community rights on the forest land to be used for proposed project.

f) Out of the 1576.81 hectare of land under demand, 89 hectare of land is of Navinal village and Navinal Village Committee has put collective claim on it.

g) According to Forest Privilege Act, the villagers have prior right on it. So, its forest clearance cannot be availed and it cannot be used for the project.

h) It is the last reserve forest in the area. If it is allotted for industrial purpose, the area will remain without forest and more forest are essential for industrial area.

6. **Noncompliance of Environment Clearance of Adani Port and Special Economic Zone**

a) As per condition (2) conservation of creeks, rivers mangroves coming within the area is to be made. It can be seen from the photographs of different years taken from satellite annexed herewith that the creeks, rivers mangroves coming within the area are exterminated by Adani. Thus, the condition is violated.

b) As per condition () condition of every creek should be kept in comparison with the satellite image, 2005.But, the condition is not followed by the Adani Port and S.E.Z.

c) It is directed in Specific Condition (5) that a recent satellite map should be submitted once a year so that it can be compared with the Satellite map of year 2005 and confirmed whether there is any change in creeks, rivers, mangrove and mouth of creek. No such map is submitted by A.P.S.E.Z. till date. Thus, condition compliance is not followed.

d) As per condition (6) A.P.S.E.Z. must observe order passed by the Ministry of Environment and Forest considering the report submitted by Sunita Narayan Committee. But, it is not followed by A.P.S.E.Z.

e) As directed in condition (12) and (13) NCSCM/NIOT will control and verify the implementation as per action plan approved by Ministry of Environment and Forest. Execution Report of Action Plan will be required to be submitted with six monthly monitoring reports. This condition is not complied till date.

f) As per condition (15) no change should be made in flow of river. But,

   a) The route of river of Kandagara passing through Adani Power is changed.

   b) The Kamandwala flow between Navinal and Shiracha is changed.

   c) The mouth of Nagmati River is closed.

   d) O.C.C.L. Company is established on river of Dhrab.

   e) Construction of Adani Hospital is made on Kevdi River. Thus, breach of this condition is made.

g) As per condition (18) no development should be made up to 50 meter from mangrove area. But, many constructions are erected by project proponent such as construction of Adani House building. Thus, breach of this condition is made.

7. Report of Gujarat Ecology Commission.

   a) A report is prepared by Gujarat Ecology Commission upon study of effect on mangrove and its ecology due to coal handling. Mundra Port is a part of it.
   b) According to the report growth of mangrove is affected by coal dust.
   c) As per the report BOD (Biological Oxygen Demand) was 9.52 in 2010/11 which has reached to 27 in 2012/13 which is the highest in the areas under survey.

d) COD (Chemical Oxygen Demand) was also 38 in 2010/11 which reached to 92.65 in 012-13.
e) DO (Dissolved Oxygen) has reached to 4.92 from 4.8. which is CPCB is higher than permissible line.
f) SO (Suspended Solid, blirness in water) has reached to 162 from 56 which is CPCB is higher than permissible line.
g) Nitrate 0.313 in 2010-11 has reached to 1.154 in 2012-13.

8. The grazing land of Navinal village will be used for Copper Refinery Project of Adani Enterprise Ltd. The matter of land is sub-juiced. No judgment is passed in favor of any party.
9. In spite of having so many industries, nothing is made for the employment to local people. I.e. 400 Hectare of land of surrounding villages is given to Adani Power and fishermen, farmers, cattle breeders are left unemployed. In reward thereof only 500 out of 7000 laborers and 15 out of 1500 employees are local. Consequently, nothing but unemployment and pollution will be available from this project.
10. This is a coastal area. So, C.R.Z. clearance is required so as to make action plan for salvage against earthquake or tsunami.
11. 32800 K.L.D. will be utilized by the company and desalination plant will be used for it, which will affect the sea-life adversely. This desalination is connected with the company. But no study of its effect is made.
12. There are two power projects and biggest coal handling port in Asia is situated here but it is not mentioned in E.I.A. report.
13. Environment Clearance Compliance of other projects of Adani is not made. So, people in surrounding should not be caused damage by giving permission to new project.
14. The livestock of our villages were grazing on the grazing land of the proposed project. The livelihood is ruined by snatching it. Now there will be no grazing land by giving remaining forest land to new project.
15. The hazardous chemical such as sulphuric acid will come out due to copper refinery. The possibility of pollution and acid rain will increase. So, this project should be cancelled.
16. The land in surrounding will be washed out due to closure of the river and danger of flood will increase in surrounding villages.
17. Old roads will be closed. One of which from Navinal to Kotdi creek will be closed.
18. Wild animals are living in this area, what about their restoration?

Yours faithfully,
Chaunan Pravinsinh Bhurubha.

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પ્રતિ શ્રી
જિલ્લા કલેક્ટર સાહેબ,
કચ્છ.

૧૧.૨૯/૪/૧૯

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટથી સ્થાનિક લોકોને થનાર નુકશાન બાબતે લેખિત વાંધા/વિરોધ મૂકવા બાબત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે કચ્છ જિલ્લામાં નવીનાળ અને શિરાચા ગામમાં આવનાર અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના પ્રોજેકટને લીધે સ્થાનિક લોકો, વન પર નિર્ભર સમુદાય, માછીમારો અને દરિયાઈ પટ્ટીના પર્યાવરણ અને જીવસૃષ્ટિ સામે ગંભીર ખતરો છે. જે બાબતને ડ્રાફ્ટ ઇઆઇએ રિપોર્ટમાં ઘણી ખામીઓ અને ભૂલો તેમજ ખોટી માહિતીઓ છે. આ અભ્યાસ રિપોર્ટમાં દેખાય છે કે આ દરિયાકિનારે આવો મોટો ઉધોગ સ્થાપવાથી માનવ સ્વાસ્થ્ય, પશુ-પંખીઓ અને સમગ્ર જીવસૃષ્ટિને ગંભીર અને કાયમી નુકશાન થાય એમ છે. તેની ભરપાઈ થઈ શકે એમ નથી. સ્થાનિક ગામોમાં રહેતા લોકોની આવનારી પેઢી લુલી, લંગડી અને નપુંસક પેદા થાય એવો ભયજનક પ્રદૂષણ ફેલાવતો આ પ્રોજેકટ છે. તેથી આ સ્થળે અમે આ પ્રોજેકટનો વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજકેટનું સ્થળ યોગ્ય ન હોવાથી તેને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) દ્વારા પ્રોજેકટની જગ્યા માટે પસંદગી માટે આરક્ષિત વનની જગ્યા પસંદ કરવા સામે મારો વિરોધ છે. જમીન માટેના વિકલ્પોજ ખોટા પસંદ કરવામાં આવેલ છે. આ પ્રોજેકટ દરિયાકિનારાને મૂકી ને સ્થાપવો જોઇયે. કાચામાલને પરિવહન માટે ક્લોઝ પાઇપલાઇન કન્વેયર સિસ્ટમ હયાત હોય આ પ્રોજેકટને દરિયા કિનારાથી દૂર વધુ અંદર સ્થાપી શકાય એમ હોવા છતાં આ પ્રોજેકટને દરિયાનજીક નાખવાનું કંપનીના સંચાલકો એ નક્કી કરેલ છે જે અયોગ્ય છે. ઉધોગ માટે પાણી અને વીજળી પણ સરળતાથી ત્યાં આપી શકાય અને પાણીનો નિકાલ શૂન્ય હોય કોઈ પાણી બહાર ફેકવાની સમસ્યાનો પણ સવાલ નથી. દરિયાકાંઠે આવો ઉધ્યોગ સ્થાપવોજ જોખમી છે અને દરિયાઈ પર્યાવરણને નુકશાન કરી દરિયાઈ જમીનને રેતી પૂરી સમથળ કરી તેના પર આવો પ્રોજેકટ સ્થાપવો નુકશાનકારક છે. આથી અમે વન અધિકાર કાયદા 2006 હેઠળ ગામના સ્થાનિક લોકો કે જે વન પર નિર્ભર છે તેમની આજીવિકા જોખમમાં છે તેઓ આ પ્રોજકેટનો વિરોધ કરીએ છીએ. વનની જમીનો ઓછી થતી જાય છે તેથી અમારા ગામનું દંડેરી અને શિરાચાનું જંગલ કંપનીએ ને અન્ય ઓધોગિક હેતુઓ માટે મળવું જોઇયે નહી. ગામના

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ઢોર અને ગાયો આ જંગલમાં ચરે છે. તેથી અમો આ વનનો કંપનીના હેતૂ માટે ઉપયોગ સામે વિરોધ બતાવીએ છીએ.

2. <u>મેંગરૂવના ઝાડો કાપી નાખી, ખાડીઓ પૂરી તેમને કાયમી નુકશાન પહોંચાડવાનું કામ અદાણી કંપનીએ કરેલ છે. નવીનાળના દરિયા કિનારે જંગલમાં મોજૂદ રેતીના ઢુવાઓ તોડી નાખી તે રેતીનો ઉપયોગ પોર્ટ બનાવવા કરેલ છે જને લીધે સમગ્ર દરિયાઈ વિસ્તારની ભૌગોલિક પરિસ્થિતી બદલાઈ ગયેલ છે અને તે માટે અમારો કેસ માનનીય સુપ્રીમ કોર્ટમાં આજે ચાલે છે.</u> આ એપીએસઇઝેડ બનાવતી વખતે થયેલ આ વિસ્તારના પર્યાવરણ, દરિયાકિનારાને થયેલ ભારે નુકશાન, લોકોની આજીવિકાને અદાણી કંપનીએ પહોંચાડેલ હાનિ બદલ અમને આ કંપની અને તેના આવનાર પ્રોજેકટ સામે વિરોધ છે. આ કંપની પર્યાવરણને નુકશાન પહોંચાડીને અને જીવસૃષ્ટિને નુકશાન પહોંચાડી ઉધોગો સ્થાપે છે એ વાત કોર્ટ અને સરકારમાં પણ સાબિત છે. તેથી આ વિવાદિત કંપની અને તેના ખરડાયેલા ભૂતકાળને ધ્યાને રાખી આ પ્રોજેકટ નામંજૂર કરવામાં આવે.
3. આ પ્રોજેકટ કયા કયા સર્વે નંબરમાં કરવામાં આવનાર છે તમામ સર્વે નંબરની વિગતો રિપોર્ટ માં બતાવેલ નથી. કેમ? જેતે ગામ સહિતની વિસ્તાર દર્શાવતી તમામ વિગતો અમને આપશો.
4. પ્રોજેકટ માટે APSEZની કેટલી જમીન AEL ને આપવામાં આવેલ છે. તે તમામ પ્લોટના નંબર અને તેનું ક્ષેત્રફળ જણાવો અને તેનો પ્રત્યક્ષ કબ્જો કોની પાસે છે તે પ્લોટ દીઠ કાગળ પર લેખિતમાં બતાવશો.
5. હાલમાં APSEZ માં જેટલા પ્લોટ હોય તે તમામ પ્લોટનો વિસ્તાર બતાવતી માહિતી આપશો. કેટલા પ્લોટ વેચાઈ ગયા અને કેટલા પ્લોટ વેચાણ વગરના છે તેની પણ માહિતી આપશો.
6. આ પ્રોજેકટ જગ્યા કે જે APSEZની માલિકીની છે તેના પર પર આજની તારીખે SEZ નોટિફાઇ છે કે નહીં? તે નોટિફિકેશનની નકલ આપશો.
7. આ પ્રોજેકટ જગ્યા કે જે APSEZ AELને આપશે તે એસઇઝેડમાં ગણાશે કે નહીં ? જરૂરી માહિતી સરકારી રેકર્ડ અને સ્થિતિ પ્રમાણે આપશો.
8. આ જગ્યા કે જ્યાં પ્રોજેકટ કરવામાં આવશે તે જગ્યાની APSEZની માલિકી દર્શાવતા સરકારી દસ્તાવેજ આપશો.
9. MPSEZ દ્વારા જે તે સમયે શિરાયા, દંદેરી ફોરેસ્ટની ગેર કાયદેસર રીતે પચાવી પાડેલી જમીનની વિગતો આપશો. જે જમીન ભારત સરકારે ડીનોટિફાય કરેલ ન હોય પણ કંપનીએ કબ્જો કરેલ હોય તેવી જમીનની વિગતો આપશો.
10. APSEZ દ્વારા SEZ ડીનોટિફાય કરવામાટે (AEL ના પ્રોજેકટ વિસ્તાર માટે) ભારત સરકારની કોઇ મંજૂરી માંગવામાં આવેલ હોયતો દરખાસ્તની તારીખ આપશો.
11. AEL નો કોપર પ્લાન્ટ માટે શિરાયા, દંદેરી જંગલની જમીન લઈ તેના પર પ્રોજેકટ કરવાનું પ્રયોજન અને તર્ક આપશો.
12. MPSEZ ને જેતે સમયે ભારત સરકારે જંગલની જમીન તેમજ અન્ય જમીન પર રિક્લેમેશનની પરવાનગી આપી હોય તો તેની નકલ આપશો.

13. ફોર્મ 1 માં બતાવેલ પ્રોજેકટની જગ્યામાં અનામત જંગલ બતાવેલ નથી જ્યારે નકશા અને ઇઆઇએ રિપોર્ટમાં બતાવેલ છે. આમ વિરોધાભાષી માહિતી કેમ આપવામાં આવેલ છે?
14. કંપનીએ ફરજિયાત 30% ગ્રીનબેલ્ટ બનાવવાનું છે. તો 526 હેક્ટરના 30% એટલે 157 હેક્ટર ગ્રીનબેલ્ટ બનાવવાનું થાય. કુલ 526 હેક્ટર પૈકી 102 હેક્ટર તૈયાર અનામત જંગલ લઈ કંપની ગ્રીન બેલ્ટ તરીકે બતાવવા માંગે છે?? જો હા તો બીજા 55 હેક્ટર અનામત જંગલ ક્યાથી લાવશે? આમ આ કંપની ખોટી રીતે ફોરેસ્ટ પચાવી પાડવા માંગે છે.
15. ઇઆઇએ રિપોર્ટના પાનાં સી-3 16માં બતાવ્યા મુજબ આ પ્રોજેકટનો મોટાભાગનો વિસ્તાર શિરાચા, દંદેરી જંગલની જમીન પર આવે છે. શું આ નક્શો ખોટો છે? તો સાચો નક્શો આપશો.
16. ઉપરોક્ત મુદ્દા માટે APSEZને મળેલ ફોરેસ્ટ કલિયરન્સની નકલ આપશો.
17. જંગલની જમીન બીજા ઔધોગિક ઉપયોગ માટે ડી નોટિફાય કરવા માટે મુકેલ છે તો તે બાબતે સ્થાનિક પંચાયતો એ આપેલ નો ઓબ્જેક્ષન સર્ટિફિકેટ ની નકલ આપશો.
18. <u>વન અધિકાર અધિનિયમ 2006 હેઠળ જરૂરી જિલ્લા કલેકટરે જંગલ સિવાય બીજી ખાનગી કે સરકારી જમીન આ વિસ્તારમાં ઉપલબ્ધ નથી તે બાબતે આપેલ પ્રમાણપત્રની નકલ આપશો.</u>
19. MPSEZ સામે SLP 28788 /2016 થી સુપ્રીમ કોર્ટ અને WP (PIL) 12/ 2011 થી ગુજરાત હાઇકોર્ટમાં ચાલતા કેસની વિગતો અને વિવાદ શેનો છે તેની માહિતી આપશો.
20. સુનિતા નારાયણ કમિટી દ્વારા વન અને પર્યાવરણ મંત્રાલયને થયેલ ભલામણ મુજબ કંપનીએ કેટલો દંડ સરકારમાં ભરેલ છે? આ દંડની હાલની સ્થિતિ દર્શાવશો અને આ બાબતે કાયદાકીય રીતે માહીતી આપશો.
21. પ્રોજેકટ સાઇટ માટે પસંદ કરવામાં આવેલ જમીન અને જંગલની જમીનમાં કેટલા કુદરતી નદી નાળા છે તેની વિગતો ઇઆઇએ રિપોર્ટ સિવાય વધારામાં જણાવશો જેથી કોઈ પણ નદી નાળા જાણ બહાર ફાઇનલ ઇઆઇએ રિપોર્ટમાં રહી ના જાય. વધુ ચોકસાઇથી પુનઃ અભ્યાસ કરવાની અમારી માંગ છે અને ગામ અને ગામ લોકો પર થનાર અસરો બાબતે ચકાસણી ફરી કરવામાં આવે એવી અમારી માંગ છે. નદી નાળા અને કોતરો વરસાદી પાણી ના નિકાલ ની વ્યવસ્થાઓ APSEZ માં બંધ કરવામાં આવેલ હતા પૂરી દેવાયેલ હતા. જે ફરીથી ખોલવા મારી અરજ છે. નવા કોઈ પણ વહેણ બંધ કરવાથી અમો કંપની સામે કાયદાકીય પગલાં ભરીશું.
22. AELના પ્રોજેકટની નજીક દરિયા વિસ્તારના GCZMA માન્ય CZMPની નકલ આપશો.
23. NIO દ્વારા બનાવાયેલ CRZ મેપની વિસ્તૃત વાંચી સમજી શકાય એવી કલર નકલ હાર્ડ કોપીમાં આપશો.
24. મેંગરુવના ઝાડો કે જે સીઆરઝેડ 1એ માં આવે છે તેનાથી આ પ્રોજકેટનું નજીકમાં નજીક અંતર બતાવશો. અને તે માટે જરૂરી રેકર્ડની નકલ આપશો.
25. આ દરિયાઈ વિસ્તારમાં વસતા માછીમારોની સંખ્યા અને તેમના હયાત ધંધા રોજગાર વિષે માહિતી આપશો.
26. MPSEZ ના પ્રોજકેટને લીધે આ વિસ્તારમાં બેકાર થયેલ માછીમારોની સંખ્યા બતાવશો.
27. પ્રોજેકટની નજીક આ વિસ્તારમાં કેટલા માછીમારો પગડિયા માછીમારી કરે છે તેની સંખ્યા જણાવશો.

28. આ પ્રોજેકટથી માછીમારી માટે આવવા જવાના કેટલા રસ્તા બંધ થાય છે? કે ભૂતકાળમાં બંધ કરવામાં આવેલ છે?
29. આ પ્રોજેકટથી જંગલ પર નભનારા પશુઓ અને જંગલનો સામુદાયિક ઉપયોગ કરતાં લોકો પર કેવી અસર થશે અને આવા કેટલા લોકો છે તેની માહિતી આપશો. FRA 2006 હેઠળ થયેલ કાર્યવાહીની નકલ આપશો.
30. કોપર સ્લેગ અને ફોસફોજીપ્સમનો વપરાશ પ્લાન બતાવશો.
31. ગુજરાત રાજ્ય જૈવ વિવિધતા બોર્ડ દ્વારા નવીનાળ જંગલને જૈવવિવિધતા વારસા જગ્યા જાહેર કરવામાં આવેલ છે કે કેમ કે તેની દરખાસ્ત ચાલે છે કે કેમ તેની વિગત આપશો.
32. નવીનાળ-શિરાચા દરિયાઈ વિસ્તારની કેરિંગ કેપેસિટી વિષે કોઈ અભ્યાસ હાથ ધરવામાં આવેલ છે કે નહીં? જો અભ્યાસ થયેલ હોય તો તેની માહિતી આપશો. AEL ના પ્રોજેકટ પછી કેટલી કેપીસીટી બચશે તેની માહિતી આપશો.
33. અદાણી અને ટાટાના પાવર પ્લાન્ટના કારણે હવા, પાણીના પ્રદૂષણ અને AEL ના કોપર પ્લાન્ટ પછી પેદા થતાં હવા પાણીના પ્રદૂષણની સંયુક્ત અસરો વિષે બંને પ્રોજેકટના ઇઆઇએ રિપોર્ટની તુલના કરવામાં આવેલ છે કે કેમ તેની માહિતી આપશો.
34. આ પ્રોજેકટ વિષે અંગ્રેજીમાંથી ગુજરાતી ભાષાંતર કરવામાં આવેલ પર્યાવરણને લગતા સાહિત્યની નકલો ક્યાં મૂકવામાં આવેલ હતી તેની માહિતી આપશો. ઇએસીની મિટિંગ મિનિટ્સમાં જણાવ્યા મુજબ.
35. અત્યાર સુધી અદાણિ ગ્રૂપ દ્વારા મેંગરુવ પુનઃ સ્થાપન કાર્યક્રમ હેઠળ ટોટલ કેટલા હેક્ટર મેંગરુવ રોપેલા છે અને ક્યાં ક્યાં રોપેલા છે ? તેની વિગતવાર માહિતી આપશો.
36. શું એપીએસઇઝેડમાં આવતી પાવર ટ્રાન્સમિશન લાઇનો AELના પ્રોજેકટને લીધે ખસેડવામાં આવશે? વધુ વિગતો આપશો.
37. અત્યંત પ્રદુષિત એવા કોપર રિફાઇનરીના પ્લાન્ટના પર્યાવરણ વ્યવસ્થાપન પ્લાન માટે જરૂરી સ્ટાફ (8 માણસો) ઇઆઇએ રિપોર્ટમાં બતાવ્યા મુજબ યોગ્ય છે? પ્રદૂષણની બાબતોને અદાણી સમૂહ કેટલી ગંભીરતાથી લે છે તેનો આ એક ઉત્તમ નમૂનો છે.
38. શું અદાણી પોર્ટનો સ્ટાફ પણ આ AEL પ્રોજેકટમાં પર્યાવરણ અને પ્રદૂષણની બાબતો જોશે? હાલમાં એવો કેટલો સ્ટાફ છે જે અદાણી સમૂહમાં નોકરી કરે છે અને સમૂહના તમામ પ્રોજેકટોમાં (પોર્ટ, એસઇઝેડ, પાવર પ્લાન્ટ વિગેરે) તેમની નોકરી અને પ્રદાન હોય છે? શું કાયદાકીય રીતે આ શક્ય છે ?
39. કેમિકલના 30 એકરના ઝેરી ઉકરડાના SLF પ્લાન વિષે TOR માં કે અન્ય કોઈ જગ્યા એ કેમ કોઈ માહિતી આપવામાં એવલ નથી ? વગર TOR આ પ્લાન શક્ય છે?
40. ૪૬થી વધુ ચીમનીઓમાંથી સલ્ફ્યુરિક એસિડ અને અન્ય ઝેરી ધુમાડા અને ટનોબંધી રોજનો સલ્ફર ડાયોક્સાઇડ વાયુ હવાની દિશામાં આજુબાજુના વિસ્તારમાં ફેલાઇ ગામોને બરબાદ કરી નાખશે તે માટે કોણ જવાબદાર રહેશે?

41. <u>લોકોના ફેફસા પર આ ઝેરીલા ગેસોની શું અસરો પડશે એ વિષે અભ્યાસ કરેલ હોય તો તેની નકલ આપશો અને ન કરેલ હોય તો તે અભ્યાસ કરાવી પછીજ તે આધારે આ પ્રોજેકટને મંજૂરી નકારી કાઢવાની અમારી માંગ છે.</u>
42. ઝેરી ધાતુઓના હવામાં માપવાના સાધનો GPCB પાસે છે ? જો GPCB આ ધાતુઓનું પ્રમાણ માપી જ શકવામાં અસમર્થ હોય તો આ પ્રદૂષણ કોણ માપશે ? એની વિગતો આપશો.
43. શું આ સ્મેલ્ટર પ્રોજેકટનું ગંદુ પાણી સીધી કે આડકતરી રીતે દરિયામાં નાખવામાં આવશે?
44. આખા પ્રોજેકટમાંથી નીકળતું ઔધોગિક ગંદુ પાણી શુધ્ધ થવાનું છે તે સીઇટીપીની ડિઝાઇન આ ઇઆઇએમાં બતાવેલ નથી. તો તે ડિઝાઇનની નકલ આપશો.
45. પાણીના રિસાઇક્લિંગ પ્લાન્ટની માહિતી કે ડિઝાઇન પણ આપવામાં આવેલ નથી. તેની માહિતી આપશો.
46. સ્થાનિક ગામ લોકોના હાલના આરોગ્યનો અભ્યાસ કંપનીએ કરેલ હોય તો તેની નકલ આપશો. સ્થાનિક ગામલોકોને આ પ્રોજેકટ વિષેની માહિતી સરળ ભાષામાં આપવામાં આવેલ છે કે સમજાવવામાં આવેલ છે કેમ તેની વિગતો જણાવશો?
47. સ્થાનિક લોકોને APSEZ માં આજદિન સુધી કેટલી નોકરીઓ મળી છે તેની સંખ્યા બતાવશો.
48. સ્થાનિક લોકોને APSEZ માં કેટલા કોન્ટ્રાક્ટ મળેલ છે તેની સંખ્યા અને ગામ લોકોનો જે વિકાસ થયેલો હોય તેવા ઉદાહરણો નામ અને ગામ સહિત આપશો.
49. સ્થાનિક લોકોને અને પર્યાવરણને થયેલ નુકશાન બાબત સ્થાનિક ગ્રામ પંચાયતોના વાંધા વિરોધ બાબતે ઇઆઇએ રિપોર્ટમાં કેમ કશુજ લખેલ નથી. તેની સંપૂર્ણ માહિતી આપશો.

ઉપરોક્ત પ્રોજેકટથી થતાં ફાયદા કરતાં સ્થાનિક લોકો, પશુપાલન, આરોગ્ય, પર્યાવરણ અને દેશને નુકશાન મોટું હોય કાયદાકીય ગૂંચવાળો આ પ્રોજેકટ પડતો મૂકવા મારી અરજ છે. અમો ભવિષ્યમાં થનાર પ્રદૂષણને લીધે ભોગ બનવા માંગતા ન હોય અમારે આ પ્રોજેકટ અને તેનો વિકાસ જોઈતો નથી.

આભાર સહ અને આ પર્યાવરણ લોક સુનાવણીમાં મારો વાંધો રજૂ કરી આગળની કાર્યવાહી કરવાની અપેક્ષા સહ.

આપનો વિશ્વાસુ

[illegible]

~~પ્રવીણસિંહ ચૌહાણ.~~

~~ગામ- સિસચા. તા. મુંદ્રા જી. કચ્છ.~~

[illegible]

[illegible]

[illegible]

1708

C-Q-35
(TRANSLATED)

VIJAY U. GADHVI
Shri Harinagar 1
Mandvi Naliya Road
Mandvi –Kutch
Dt. 29-4-17

To,
District Collector
KUTCH.

Sub: Objections in writing towards the damage likely to occur to the local public due to proposed Copper Refinery Project of Adani Enterprise Limited (AEL)

Honourable Sir,
It is humbly submitted that, due to Copper Refinery Project of Adani Enterprise Limited (AEL) proposed to be established in the district of Kutch in the villages of Navinal and Siracha is a serious danger to the local public, local community depending on the forest, fishermen, and environment and coastal ecology. There are many discrepancies, mistakes and wrong information in the draft EIA report. It transpires from the study report that if such a big project is established on the sea shore human health, animal – birds, and coastal life as a whole will be jeopardized seriously and permanently that cannot be compensated. This is such a dangerous pollution emanating project that the future generations of locals residing in the surrounding villages may be crippled , lame and impotent. Therefore we are objecting establishment of the project at this location. We are submitting our written objection on the basis of the points mentioned below. And we demand to prevent establishment of this project at this location as it is not suitable here.

1. We object selection of land of reserved forest as project site by Adani Enterprise Limited (AEL). The options selected for the project site are wrong. This project shall be established away from the sea shore. As close pipeline conveyor system for transportation of raw material is already in existence it is possible to establish this project away from sea shore in spite

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of that the company management has decided to establish it near sea shore. It is not fair. Water and electricity also can be supplied there easily and water disposal being zero there is no problem of water discharge. It is dangerous to establish such an industry on the sea shore. Damaging the environment of the sea and creating land by reclamation using sand and establishing such project on it is harmful. So we object the project under Forest Rights Act 2006 as livelihood of people of village who are dependent on the forest is under risk. Forest lands are reducing so the land of Danderi and Shiracha forest should not be given to the company for other industrial purpose. Cattle of the village graze in this forest. So we are taking strong objection against the use of the forest for the company.

2. Adani company has done permanent damage by cutting the Mangrove trees and filling up the creeks. Sand dune available in the forest on the sea shore of Navinal has been used for development of port. So the whole geography of the coastal area has changed. And as on date our case is pending with Hon. Supreme Court in the matter. During development of APSEZ the damage has been done to the environment, the sea shore and livelihood of the people, so we object the company and the proposed project. The matter has been proved in the court and the government that the company is establishing industries by damaging environment and coastal life. Therefore considering the company being disputed and its spoiled past this project deserves to be rejected.
3. Why the details of all survey numbers of land in which the said project is proposed to come up is not mentioned in the report. Please provide the entire detail about the area including the respective villages.
4. Please mention plot numbers and its area in respect of APSEZ land given to AEL for the project and also provide plot wise details of land ownership in writing.
5. Furnish area wise details of all the plots which are with APSEZ at present. Also furnish details of plots sold out and unsold.

6. Is the land proposed for the project and owned by the APSEZ, a notified SEZ? Provide the copy of the notification.

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7. Is the area of the project that shall be given by APSEZ to AEL, to be considered under the SEZ? Provide the relevant details as per the Government record and status.

8. Provide the government documents showing the ownership of APSEZ for the land where the project is to be established.

9. Provide the details of the land that is illegally encroached by MPSEZ at Shiracha, Danderi forest. Provide the details of the land that is not denotified by the Government of India but has been taken into possession by the company.

10. Provide the date of the submission in case if the APSEZ would have sought approval of SEZ denotification (for AEL project area) from the Government of India.

11. Provide the planning and logic for undertaking project for AEL copper plant while obtaining the land at Shiracha, Daderi forest.

12. Provide the copy of the permission for reclamation provided by the Government of India, if any, to the MPSEZ for forest land and other land.

13. The reserved forest is not mentioned in Form 1 of the project but it is shown in map and EIA report. Why such contradictory information is provided?

14. The company has to make 30% green belt compulsorily. Therefore 157 hector comes as 30% of green belt of 526 hector. Out of the 526 hector does the company wish to obtain 102 hector of reserve forest and show it as green belt? If yes, from where will the company bring the rest of the 55 hector of reserve forest? Thus, this company wants to encroach the forest illegally.

15.. As shown under the EIA report page no. C-3 16, most part of the project falls in Shiracha, Dedari forest land. Is this map false? If so, provide a correct map.

16. Provide the forest clearance copy that was received by the APSEZ for the above mentioned point.

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17. If the forest land proposed to be denotified for other industrial use, then provide the copy of no objection certificates given by local Panchayats in this regard.

18. Please provide a copy of the certificate given by the district collector under the Forest Rights Act, 2006, stating that private or Government land is not available in this area other than the forest in this area.

19. Provide the information about what is the dispute under the SLP 28788/2016 being heard in the Supreme court and WP (PIL) 12/2011 being heard in the Gujarat High Court against MPSEZ.

20. What is the amount of penalty paid by the company to the Government on the basis of the recommendation provided by Sunita Narayan committee to the Forest and Environment ministry? Provide the current status of the penalty and provide the legal information about the same.

21. Apart from the EIA report, please provide the additional details about how many natural rivers, drains are located in the land selected for Project Site and forest land, so that no river, drains would be left to be mentioned in the final EIA report out of knowledge. Our demand is to re-study with more accuracy and the demand is made to make re investigation about possible effects that may incur to village and villagers. Our demand is to re open all closed canals, bays and creeks again. We will take legal actions against the company on any new closer of water flow.

22. Please provide copy of GCZMA approved CZMP for of the seaside area near the AEL project.

23. Please provide a readable and understandable hard color copy of the CRZ map prepared by NIO.

24. Mention the shortest distance of mangrove area which fall in CRZ 1A from the proposed project. And provide a copy of the records for it.

25. Provide information about the number of fishermen residing in the coastal area and about their existing business.

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26. Provide the number of fishermen who have become unemployed due to MPSEZ project

27. Provide the number of fishermen who do Pagadiya fishing near the project.

28. How many access roads used by fisherfolks for commuting will be closed due to this project? or have been closed in the past?

29. What type of impacts will be there on animals and people collectively relying on forests and how people and animals will be affected due to this project. And provide the copy of procedures followed under FRA 2006.

30. Provide the consumption plan of Copper Slag and Phospho gypsum.

31. Provide the detail as to whether the Navinal forest has been declared as biodiversity heritage place by the Gujarat State Biodiversity Board, or it is being under proposal.

32. Whether a study has been conducted to identify carrying capacity of the Navinal- Shiracha coastal area? Provide information if the study is undertaken. Provide information on how much capacity will be left after AEL's project.

33. Provide the information on whether the comparison is made on EIA reports of both projects for the combined impact of air- water pollution caused due to the power plant of Adani and Tata Power, air, water pollution and after AEL's Copper plant.

34. Provide the information about where the copies of the environmental literature of this project were kept which were translated from English to Gujarati according to the EAC meeting minutes.

35. So far, how many hectare of Mangrove afforestation is carried out by Adani Group and where is plantation done? Provide the detailed information.

36. Will the power transmissions line of APSEZ be moved due to AEL's project? Provide more details.

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37. The staff required (8 persons) for the Environmental Management Plan of highly polluted Copper Refinery Plant is proper as shown in the EIA report? This is a best example of how serious the Adani group is to the pollution issues

38. Will Adani Port staff also look into environmental and pollution issues in this AEL project? Currently, how many staff are there who serves in the Adani Group and also have contributions in all the projects of the group (port, SEZ, power plant etc.)? Is it appropriate to perform such jobs. Is it legally allowed?.

39. Why no information is given in TOR or any other place about the 30 acres of SLF? Is this plan possible Without TOR?.

40. Who will be responsible for destroying surrounding villages located in wind direction by spreading sulfuric acid and other toxic gases and other tons of sulfur dioxide gas from more than 46 chimneys? .

41. If you have studied about the impact of these Toxic Gases on people's lungs, then provide the copy of it and if not, then our demand is that the approval or rejection should be given on the basis of such study.

42. Does the GPCB have the instruments to measure toxic gases concentration in air? If GPCB is unable to measureconcentrations of metals then who will measure the pollution? Provide the detail about it.

43.. Will the effluent of the Smelter project be directly or indirectly discharged in the sea?

44. The CEPT design in which industrial waste water will be treated is not mentioned in EIA. So, provide the copy of that design.

45. The information or design of the water recycling plant is also not provided. Provide its information.

46. Provide the copy if the company has done the study of the existing health conditions of the local village people. Provide the details if the local village people have been explained the information in the simple language about this project.

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47. Provide number of total employment given to locals by APSEZ till date.

48. The number of contracts received by local people in APSEZ and the detail of development activities including examples with name and village.

49. Why nothing has been written in the EIA report about the objections of local village panchayat about the loss of local people and environmental damage? Provide the complete information about it.

As the local people, animal-husbandry, health, environment and country may be adversely affected rather than benefits from above mentioned project, hence it is my submission that the project be abandoned. As we do not want to suffer from the pollution in future, we do not want the project and the development from it.

Thanking you and with the expectation by representing my objection in this environmental public hearing and to take further actions,

Yours faithfully

Sd/-
VIJAY U. GADHVI
The president of Katch Charan Sabha
Mandvi –Kutch

Dt. 29-4-17

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પર્યાવરણીય લોક સુનાવણી માં તા 29-4-2017 ના રોજ રજૂઆત

પ્રતિ શ્રી
જિલ્લા કલેક્ટર સાહેબ અને અધ્યક્ષ જિલ્લા પર્યાવરણ લોક સુનાવણી સમિતિ.
કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટ સામે દરિયાઈ પર્યાવરણ અને માછીમારોને નુકશાન બાબતે લેખિત વાંધા/વિરોધ દર્શાવવા બાબત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે નેશનલ ફીશરફોક ફોરમ દેશના દરિયાકિનારે વસેલા સમુદાયો, માછીમારી અને દરિયાઈ પર્યાવરણ સંરક્ષણનું કામ કરે છે. કચ્છ જિલ્લામાં નવીનાળ અને શિરાચા ગામમાં આવનાર અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના પ્રોજેકટને લીધે માછીમારી, દરિયાઈ પર્યાવરણ અને જીવસૃષ્ટિ સામે ગંભીર ખતરો છે. જે બાબતને લઈ અમોએ ડ્રાફ્ટ ઇઆઇએ રિપોર્ટનો અભ્યાસ કરેલ છે અને આ અભ્યાસ પછી માલૂમ પડે છે કે આ દરિયાકિનારે આવો મોટો ઉધોગ સ્થાપવાથી જીવસૃષ્ટિને ગંભીર અને કાયમી નુકશાન થાય એમ છે. તેથી આ સ્થળે અમે આ પ્રોજેકટનો વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજકેટનું સ્થળ યોગ્ય ન હોવાથી તેને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) દ્વારા પ્રોજેકટની જગ્યા માટે પસંદગી માટેના વિકલ્પોજ ખોટા પસંદ કરવામાં આવેલ છે. આ પ્રોજેકટ દરિયાકિનારે સ્થાપવાની જરૂરિયાત જ નથી. કાચામાલને પરિવહન માટે ક્લોઝ પાઇપલાઇન કન્વેયર સિસ્ટમ હયાત હોય આ પ્રોજેકટને દરિયા કિનારાથી ૧૦ કિમી કરતાં વધુ અંદર સ્થાપી શકાય એમ હોવા છતાં આ પ્રોજેકટને દરિયાનજીક નાખવાનું કોઈ કારણ કે તર્ક નથી. પાણી અને વીજળી પણ સરળતાથી ત્યાં આપી શકાય તેમ છે. પાણીનો નિકાલ શૂન્ય હોય કોઈ પાણી બહાર ફેકવાની સમસ્યાનો પણ સવાલ નથી. દરિયાકાંઠે આવો ઉધ્યોગ સ્થાપવોજ જોખમી છે અને દરિયાઈ પર્યાવરણને નુકશાન કરી દરિયાઈ જમીનને રેતી પૂરી સમથળ કરી તેના પર આવો પ્રોજેકટ સ્થાપવો નુકશાનકારક છે.
2. આ પ્રોજેકટ કયા કયા સર્વે નંબરમાં કરવામાં આવનાર છે તમામ સર્વે નંબરની જેતે ગામ સહિતની વિસ્તાર દર્શાવતી વિગતો આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
3. પ્રોજેકટ માટે APSEZ ની કેટલી જમીન AEL ને આપવામાં આવેલ છે. તે તમામ પ્લોટના નંબર અને તેનું ક્ષેત્રફળ જણાવો અને તેનો પ્રત્યક્ષ કબ્જો કોની પાસે છે તે પ્લોટ દીઠ બતાવશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
4. હાલમાં APSEZ માં જેટલા પ્લોટ હોય તે તમામ પ્લોટનો વિસ્તાર બતાવતી માહિતી આપશો. કેટલા પ્લોટ વેચાઈ ગયા અને કેટલા પ્લોટ વેચાણ વગરના છે તેની પણ માહિતી આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.

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5. આ પ્રોજેકટ જગ્યા કે જે APSEZની માલિકીની છે તેના પર પર SEZ નોટિફાઇ છે કે નહીં ? તે નોટિફિકેશનની નકલ આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
6. આ પ્રોજેકટ જગ્યા કે જે APSEZ AELને આપશે તે એસઇઝેડમાં ગણાશે કે નહીં ? જરૂરી માહિતી સરકારી રેકર્ડ અને સ્થિતિ પ્રમાણે આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
7. આ જગ્યા કે જ્યાં પ્રોજેકટ કરવામાં આવશે તે જગ્યાની APSEZની માલિકી દર્શાવતા દસ્તાવેજ આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
8. MPSEZ દ્વારા જે તે સમયે શિરાચા, દંદેરી ફોરેસ્ટની ગેર કાયદેસર રીતે પચાવી પાડેલી જમીનની વિગતો આપશો. જે જમીન ભારત સરકારે ડીનોટિફાય કરેલ ન હોય પણ કંપનીએ કબ્જો કરેલ હોય તેવી જમીનની માહિતી આપશો, અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
9. APSEZ દ્વારા SEZ ડીનોટિફાય કરવામાટે (AEL ના પ્રોજેકટ વિસ્તાર માટે) ભારત સરકારની કોઈ મંજૂરી માંગવામાં આવેલ હોયતો દરખાસ્તની તારીખ આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
10. AEL નો કોપર પ્લાન્ટ માટે શિરાચા, દંદેરી જંગલની જમીન લઈ તેના પર પ્રોજેકટ કરવાનું પ્રયોજન અને તર્ક આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
11. MPSEZ ને જેતે સમયે ભારત સરકારે જંગલની જમીન તેમજ અન્ય જમીન પર રિક્લેમેશનની પરવાનગી આપી હોય તો તેની નકલ આપશો.
12. ફોર્મ 1 માં બતાવેલ પ્રોજેકટની જગ્યામાં અનામત જંગલ બતાવેલ નથી જ્યારે નકશા અને ઇઆઇએ રિપોર્ટમાં બતાવેલ છે. આમ વિરોધાભાષી માહિતી કેમ આપવામાં આવેલ છે?
13. કંપનીએ ફરજિયાત 30% ગ્રીનબેલ્ટ બનાવવાનું છે. તો 526 હેક્ટરના 30% એટલે 157 હેક્ટર ગ્રીનબેલ્ટ બનાવવાનું થાય. કુલ 526 હેક્ટર પૈકી 102 હેક્ટર તૈયાર અનામત જંગલ લઈ કંપની ગ્રીન બેલ્ટ તરીકે બતાવવા માંગે છે?? જો હા તો બીજા 55 હેક્ટર અનામત જંગલ ક્યાથી લાવશે?
14. તૈયાર જંગલ કાપી નાખી નવું પ્લાંટેશન કરવું યોગ્ય છે ? આ બાબતે વધુ માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
15. ઇઆઇએ રિપોર્ટના પાનાં સી-3 16માં બતાવ્યા મુજબ આ પ્રોજેકટનો મોટાભાગનો વિસ્તાર શિરાચા, દંદેરી જંગલની જમીન પર આવે છે. શું આ નકશો ખોટો છે? તો સાચો નકશો આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
16. ઉપરોક્ત મુદ્દા માટે APSEZને મળેલ ફોરેસ્ટ કલિયરન્સની નકલ આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
17. APSEZ અને AEL ના પ્રોજેકટના તમામ હયાત ડાઇરેક્ટરો/ માલિકોના નામ આપશો અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
18. MPSEZ સામે SLP 28788 /2016 થી સુપ્રીમ કોર્ટ અને WP (PIL) 12/ 2011 થી ગુજરાત હાઇકોર્ટમાં ચાલતા કેસની વિગતો અને વિવાદ શેનો છે તેની માહિતી આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં વિસ્તૃત સ્વરૂપમાં મુકશો.
19. સુનિતા નારાયણ કમિટી દ્વારા વન અને પર્યાવરણ મંત્રાલયને થયેલ ભલામણ મુજબ કંપનીએ કેટલો દંડ સરકારમાં ભરેલ છે? આ દંડની હાલની સ્થિતિ દર્શાવશો અને આ બાબતે કાયદાકીય રીતે માહીતી આપશો. અને આ બાબત પર ટીકા ટિપ્પણી સાથે ફાઇનલ ઇઆઇએ રિપોર્ટમાં લેખિતમાં મુકશો.

20. પ્રોજેકટ સાઇટ માટે પસંદ કરવામાં આવેલ જમીન અને જંગલની જમીનમાં કેટલા કુદરતી નાળા છે તેની વિગતો ઇઆઇએ રિપોર્ટ સિવાય વધારામાં જણાવશો જેથી કોઈ પણ નદી નાળા જાણ બહાર ફાઇનલ ઇઆઇએ રિપોર્ટમાં રહી ના જાય. વધુ ચોકસાઇથી પુનઃ અભ્યાસ કરવાની અમારી માંગ છે. બંધ કરેલ તમામ કાંસ ખાડી અને નાળાઓ ફરીથી ખોલવાની અમારી માંગ છે. આ વિષે માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
21. AELના પ્રોજેકટની નજીક દરિયા વિસ્તારના GCZMA માન્ય CZMPની નકલ આપશો.
22. NIO દ્વારા બનાવાયેલ CRZ મેપ ની વિસ્તૃત વાંચી સમજી શકાય એવી કલર નકલ આપશો.
23. મેંગરુવના ઝાડો કે જે સીઆરઝેડ 1એ માં આવે છે તેનાથી આ પ્રોજકેટનું નજીકમાં નજીક અંતર બતાવશો. અને તે માટે જરૂરી રેકર્ડની નકલ આપશો.
24. આ દરિયાઇ વિસ્તારમાં વસતા માછીમારોની સંખ્યા અને તેમના હયાત ધંધા રોજગાર વિષે માહિતી આપશો.
25. MPSEZ ના પ્રોજકેટને લીધે બેકાર થયેલ માછીમારોની સંખ્યા બતાવશો.
26. પ્રોજેકટની નજીક કેટલા માછીમારો પગડિયા માછીમારી કરે છે તેની સંખ્યા જણાવશો.
27. આ પ્રોજેકટથી માછીમારી માટે આવવા જવાના કેટલા રસ્તા બંધ થાય છે? કે ભૂતકાળમાં બંધ કરવામાં આવેલ છે? અને આ માહિતીને ફાઇનલ ઇઆઇએ રિપોર્ટમાં સુધારી મુકશો.
28. આ પ્રોજેકટથી જંગલ પર નભનારા પશુઓ અને જંગલનો સામુદાયિક ઉપયોગ કરતાં લોકો પર કેવી અસર થશે અને આવા કેટલા લોકો છે તેની માહિતી આપશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
29. તાંબુ બનાવવા માટે કાચામાલમાં સલ્ફર, પારો અને વિકિરણ ઉત્સર્જિત કરતી સક્રિય ધાતુઓની માત્રા જણાવશો. અને તેમની સ્લેગમાં કેટલી માત્રા હશે તે પણ જણાવશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
30. સીઆરઇપી મુજબ કોપર સ્લેગ અને ફોસફોજીપ્સમના વ્યવસ્થાપન વિષે માહિતી આપશો.
31. સીઆરઇપી મુજબ સલ્ફ્યુરિક એસિડ પ્લાન્ટમાંથી નીકળતા ઉત્સર્જનનું પાલન કરવાના પગલાં બતાવશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
32. સીઆરઇપી મુજબ સલ્ફર ડાઈઓકસાઈડના ઉત્સર્જન ઘટાડવાની વ્યવસ્થા જણાવશો.
33. કોપર સ્લેગ અને ફોસફોજીપ્સમનો વપરાશ પ્લાન બતાવશો. અને તેને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
34. સ્મેલ્ટરને લાગુ પડતી તમામ સીપીસીબીની કેપ ગાઈડલાઇન્સ ના પાલન માટે ચોક્કસ પ્લાન આ ડ્રાફ્ટ ઇઆઇએ રિપોર્ટમાં ઉમેરવામાં આવે અને ફાઇનલ ઇઆઇએ રિપોર્ટમાં વન અને પર્યાવરણ મંત્રાલય સામે મંજૂરી વખતે મૂકવામાં એવી મારી માંગ છે. આની એક નકલ અમને પણ આપવામાં આવે. સંપૂર્ણ માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
35. ગુજરાત રાજ્ય જૈવ વિવિધતા બોર્ડ દ્વારા નવીનાળ જંગલને જૈવવિવિધતા વારસા જગ્યા જાહેર કરવામાં આવેલ છે કે કેમ કે તેની દરખાસ્ત ચાલે છે કે કેમ તેની વિગત આપશો. માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
36. નવીનાળ-શિરાચા દરિયાઈ વિસ્તારની કેરિંગ કેપેસિટી વિષે કોઈ અભ્યાસ હાથ ધરવામાં આવેલ છે કે નહીં? જો અભ્યાસ થયેલ હોય તો તેની માહિતી આપશો. AEL ના પ્રોજેકટ પછી કેટલી કેપીસીટી બચશે તેની માહિતી આપશો. માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.

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37. અદાણી અને ટાટાના પાવર પ્લાન્ટના કારણે હવા, પાણીના પ્રદૂષણ અને AEL ના કોપર પ્લાન્ટ પછી પેદા થતાં હવા પાણીના પ્રદૂષણની સંયુક્ત અસરો વિષે બંને પ્રોજેકટના ઇઆઇએ રિપોર્ટની તુલના કરવામાં આવેલ છે કે કેમ તેની માહિતી આપશો. આ માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
38. આ પ્રોજેકટ વિષે અંગ્રેજીમાંથી ગુજરાતી ભાષાંતર કરવામાં આવેલ પર્યાવરણને લગતા સાહિત્યની નકલો ક્યાં મૂકવામાં આવેલ હતી તેની માહિતી આપશો. ઇએસીની મિટિંગ મિનિટ્સમાં જણાવ્યા મુજબ.
39. અત્યાર સુધી અદાણિ ગ્રૂપ દ્વારા મેંગરુવ પુનઃ સ્થાપન કાર્યક્રમ હેઠળ ટોટલ કેટલા હેક્ટર મેંગરુવ રોપેલા છે અને ક્યાં ક્યાં રોપેલા છે ? તેની વિગતવાર માહિતી નકશા સાથે અને કરેલ કુલ ખર્ચ ની રકમ સાથે આપશો.
40. શું એપીએસઇઝેડમાં આવતી પાવર ટ્રાન્સમિશન લાઈનો AELના પ્રોજેકટને લીધે ખસેડવામાં આવશે? વધુ વિગતો આપશો.
41. અત્યંત પ્રદુષિત એવા કોપર રિફાઇનરીના પ્લાન્ટના પર્યાવરણ વ્યવસ્થાપન પ્લાન માટે જરૂરી સ્ટાફ (૪ માણસો) ઇઆઇએ રિપોર્ટમાં બતાવ્યા મુજબ યોગ્ય છે? પ્રદૂષણની બાબતોને અદાણી સમૂહ કેટલી ગંભીરતાથી લે છે તેનો આ એક ઉત્તમ નમૂનો છે.
42. શું અદાણી પોર્ટનો સ્ટાફ પણ આ AEL પ્રોજેકટમાં પર્યાવરણ અને પ્રદૂષણની બાબતો જોશે? હાલમાં એવો કેટલો સ્ટાફ છે જે અદાણી સમૂહમાં પણ નોકરી કરે છે અને સમૂહના તમામ પ્રોજેકટોમાં (પોર્ટ, એસઇઝેડ, પાવર પ્લાન્ટ વિગેરે) તેમની નોકરી અને પ્રદાન હોય છે? શું કાયદાકીય રીતે આ શક્ય છે ? APSEZ ના પર્યાવરણના ઉચ્ચ અધિકારી અને હેડનું નામ અને તેમની યોગ્યતા જણાવશો. માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
43. કેમિકલના 30 એકરના ઝેરી ઉકરડાના પ્લાન વિષે TOR માં કે અન્ય કોઈ જગ્યા એ કેમ કોઇ માહિતી આપવામાં એવલ નથી ? વગર TOR આ પ્લાન શક્ય છે? માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
44. 46 જેટલી ચીમનીઓમાંથી સલ્ફ્યુરિક એસિડ અને અન્ય ઝેરી ધુમાડા અને ટનોબંધી રોજનો સલ્ફર ડાયોક્સાઈડ વાયુ હવાની દિશામાં આજુબાજુના વિસ્તારમાં દરિયાઈ વિસ્તારમાં બેસી દરિયાના પાણીમાં ઓગળવાથી ગલ્ફ ઓફ કચ્છ અને જામનગર મરીન નેશનલ પાર્ક પર અને કોરલ પર શું અસરો પડશે? આ વિષે અભ્યાસ કરેલ હોય તો તેની નકલ આપશો માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો. અભ્યાસ ન કરેલ હોય તો તે અભ્યાસ કરાવી તેની નકલ અમને આપી પછીજ પ્રોજેકટને મંજૂરી આપવાની માંગ છે.
45. આ પ્લાન્ટને લીધે કોરલ બ્લીચિંગ અને દરિયાઈ એસીડીફિકેશનમાં કેટલો વધારો થશે તે જણાવશો. સલ્ફર ડાયોક્સાઈડ ભેજમાં ઓગળી સલ્ફ્યુરિક એસિડ બને છે જે દરિયામાં જવાથી દરિયાની PH કેટલી વધશે ?
46. ગ્લોબલ વોર્મિંગમાં પ્રોજેકટને લીધે શું વધારો થશે ??
47. કેટલા અબજ ટન ગ્રીન હાઉસ ગેસ આ પ્રોજેકટથી પૃથ્વીના વાતાવરણમાં જશે ? માહિતી ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
48. ગ્રીન હાઉસ ગેસ ઓછા કરવાનો પ્લાન ફાઇનલ EIA રિપોર્ટમાં બતાવશો.

49. જીપ્સમ પોંડ અને તેમનાથી ગળતર થઈ નીકળતા ગંદા પાણીથી દરિયાને થનાર નુકશાનની વિગતો ફાઇનલ ઇઆઇએ રિપોર્ટમાં આપશો.
50. RO રિજેક્ટને દરિયામાં નાખવામાં આવનાર હોય તો તેની વિગતો આપશો.
51. ઝેરી ધાતુઓના હવામાં માપવાના સાધનો GPCB પાસે છે ? જો GPCB આ ધાતુઓનું પ્રમાણ માપી જ શકવામાં અસમર્થ હોય તો આ પ્રદૂષણ કોણ માપશે? અન્ય એજન્સીની પ્રમાણિક્તા અને વિશ્વષનિયતા કેટલી ?
52. શું આ આ આખા સ્મેલ્ટર પ્રોજેકટનું ઓધોગિક ટ્રીટ કરેલ પાણી સીધી કે આડકતરી રીતે દરિયામાં નાખવામાં આવશે? સ્પષ્ટ જવાબ હા કે ના માં આપશો.
53. શું આ સ્મેલ્ટર ઝીરો ડિસ્ચાર્જના સિધ્ધાંત પર કામ કરશે તો ફાઇનલ ઇઆઇએ રિપોર્ટમાં આ બાબતે વધુ માહિતી EMP માં આપશો?
54. શું આ સ્મેલ્ટર સંપૂર્ણ પાણી રીસાઇકલ રિયુઝ કરી લેશે? આખો રિયુઝ પ્લાન અને તેના ઘટકો ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.
55. આખા પ્રોજેકટમાંથી નીકળતું ઓધોગિક ગંદુ પાણી શુધ્ધ થવાનું છે તે સીઇટીપીની ડિઝાઇન આ ઇઆઇએમાં બતાવેલ નથી. તો તે ડિઝાઇનની નકલ આપશો.
56. પાણીના રિસાઇક્લિંગ પ્લાન્ટની માહિતી કે ડિઝાઇન પણ આપવામાં આવેલ નથી. તેની માહિતી આપશો.
57. હાલમાં આવેલ માનનીય સુપ્રીમ કોર્ટના ઓધોગિક ગંદા પાણીના પ્રાથમિક ટ્રીટમેન્ટ કરવાના ચુકાદા સામે કંપનીએ કરેલ કાર્યાવહી ની નકલ આપશો. અને ફાઇનલ ઇઆઇએ રિપોર્ટમાં મુકશો.

ઉપરોક્ત બાબતે માહિતી છુપાવવામાં આવેલ છે અને આ પ્રોજેકટ દરિયાકિનારે સ્થાપવાથી સમગ્ર ગલ્ફ ઓફ કચ્છ અને મરીન નેશનલ પાર્ક ઉપરાંત માછીમારીને ગંભીર ખતરો પેદા થશે. આ પ્રોજેકટથી થતાં ફાયદા કરતાં લોકો, પશુપાલન, આરોગ્ય, પર્યાવરણ અને દેશને નુકશાન મોટું હોય કાયદાકીય ગૂંચવાળો આ પ્રોજેકટ પડતો મૂકવા મારી અરજ છે. કંપનીના કરોડોના ફાયદા માટે લોકો અને સરકારને અબજો રૂપિયાનું નુકશાન કરતાં આ પ્રોજેકટને પડતો મૂકવા અમારી અપીલ છે.

આભાર સહ
આપનો વિશ્વાસુ

ઉસ્માનગની એચ. શેરસિયા
સેક્રેટરી
નેશનલ ફીશરફોક ફોરમ.
મુ પોસ્ટ કણકોટ તા વાંકાનેર જી મોરબી.
94274-43976

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C-Q-36
(TRANSLATED)

Representation in Environmental Public hearing on dated 29-4-2017

To,
District Collector and Chairman, District Environmental Public hearing Committee, Kachchh.

Subject: Regarding written objection / protest for the loss of marine environment and fishermen against Adani Enterprise Ltd. (AEL) Copper Refinery Project

Respected sir,

With respectful regards we have to inform that, National Fisher folk Forum is engaged in welfare of communities residing on coastal areas, fishermen and conservation of marine environment. Fisheries, Marine environment and life shall have serious threat because of proposed copper refinery project of Adani Enterprise Ltd. in Navinal and Shiracha villages of Kutch District. In respect of the same, we have studied Draft EIA Report and on the basis of the same it is observed that such project on costal area, marine life shall have serious and irreparable loss. Hence we oppose the project at the site. We submit our written objections on issues mentioned hereunder and since the project site is not proper, we demand stoppage of the project at the site.

1. Options for selection of project site by Adani Enterprise Ltd. are improper. There is no need to establish such project in coastal area. Since close pipeline conveyer system is available for transportation of raw material, this project can be established at a distance of more than 10 kms away from the coastal line, there is no logic behind establishing the project on coastal line. Water and electricity also can be made available there. Since zero water discharge, there is no issue of water wastage to be disposal. It is dangerous to establish such project on coast line and establishing such project by harmful of marine life and environment by leveling the area with sand is harmful.

2. Please provide us details of survey numbers of land in which the said project is proposed to come up with details of villages under which the said land falls and please include the same in final EIA Report.

3. Please mention plot numbers and its area in respect of APSEZ land given to AEL for the project and also mention give plot wise details of persons in whose possession the same and please include the same in final EIA Report.

4. Furnish area wise details of all the plots which are with APSEZ at present. Also furnish details of plots sold out and unsold and please include the same in final EIA Report.

5. Is the site for the project owned by the APSEZ a notified SEZ? Provide the copy of the notification. Please include the same in the final EIA report.

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6. Is the area of the project that shall be given by APSEZ to AEL, to be considered under the SEZ? Provide the relevant details as per the government record and status. Please include the same in the final EIA report.

7. Provide the documents showing the ownership of APSEZ for the site at which the project is to be undertaken. Place the same in the final EIA report.

8. Provide the details of the land that is illegally siphoned off by MPSEZ at Shiracha, Danderi forest. Provide the details of the land that is not denotified by the government of India but has been taken into possession by the company. Place the same in the final EIA report.

9. Provide the date of the submission in case if the APSEZ would have sought approval of SEZ denotification (for AEL project area) from the government of India. Place the same in the final EIA report.

10. Provide the planning and logic for undertaking project for AEL copper plant while obtaining the land at Shiracha, Daderi forest. Place the same in the final EIA report.

11. Provide the copy of the permission for reclamation provided by the government of India, in any, to the MPSEZ for forest land and other land.

12. The reserved forest is not mentioned under project of Form 1 but map and EIA report is shown. Why is this contradictory information provided?

13. The company is to make 30% green belt mandatory. Therefore 157 hector comes as 30% of green belt of 526 Ha. Out of the 526 Ha does the company wish to obtain 102 Ha of reserve forest and show it as green belt? If yes, from where will the company bring the rest of the 55 Ha of reserve forest?

14. Is it proper to cut off the ready forest and initiate new plantation? Provide further information as for this in the report.

15. . As shown under the EIA report page no. C-3 16, most part of the project is situated on the Shiracha, Dedari forest land. Is this map false? Therefore, provide a correct map. And place the same in the final EIA report.

16. Provide the forest clearance copy that was received by the APSEZ for the above mentioned point. Moreover, place the same in the final EIA report.

17. Provide the names of all present directors/owners of APSEZ and AEL project and provide them in the final EIA report.

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18. Provide the information that what is the dispute under the SLP 28788/2016 held before the Supreme court and WP (PIL) 12/2011 held before the Gujarat High Court against MPSEZ. Place the same in an elaborate manner under final EIA report.

19. What is the amount of penalty paid by the company to the government on the basis of the recommendation provided by Sunita Narayan committee to the Forest and Environment ministry? Provide the current status of the penalty and provide the legal information as for the same. Provide the file with remarks as for this issue in writing within the final EIA report.

20. Apart from the EIA report, Please provide the additional details as to how many natural river, drains are located in the land selected for Project Site and forest land, so that no river, drains would be left to mentioned in the final EIA report out of knowledge. Our demand is to re-study with more accuracy. Our demand is to open all closed canals, bays and creeks again. Place information in the final EIA report.

21. Please provide GCZMA approved CZMP copy of the costal area near the AEL project.

22. Please provide a detailed color copy of the CRZ map prepared by NIO which readable and understandable.

23. Keep the difference of mangroves trees that come into the CRZ 1 in close vicinity of the project. And provide a copy of the records required for it.

24. Provide information about the number of fishermen residing in the costal area and about their existing business.

25. Show the number of fishermen who have become unemployed due to MPSEZ project

26. Provide the number of fishermen who do Pagadiya fishing near the project.
27. How many roads for commuting are closed for the fishers due to this project? or has been closed in the past? And update this information in the final EIA report.

28. Provide the information on how many animals rely on forests and how people will be affected who use the forests in community by this project. And put it in the final EIA report.

29. To make copper product, provide the information about Sulphur content, mercury and radiation and amount of active metals in raw material, . And also mention how much amount of them will be there in slag. And place in the final EIA report.

30. Provide the information on the management of Copper Slag and Phospho gypsum according to the CREP.

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31. According to the CREP, show the steps to follow emissions from the sulfuric acid plant and put it in the final EIA report.

32. Provide the information about the management of emissions reduction of sulfur dioxide as per CREP.

33. Make utilization plan for copper slag and Phosphogypsum. And put it in the final EIA report.

34. For the implementation of all CREP Guidelines of CPCB, applicable to the smelter, I demand that the specific plan is to be included in this draft EIA report and in the final EIA report, and to be placed before the Ministry of Environment and Forest at the time of approval. A copy of this is to be given to us too. Put the complete information in the final EIA report.

35. Provide the detail as to whether the Navinal forest has been declared as biodiversity heritage place by the Gujarat State Biodiversity Board, or it is being under proposal. Put information in the final EIA report.

36. Whether a study has been conducted about the Navinal- Shariya costal area carrying capacity? Provide information if the study is undertaken. Provide information on how much capacity will be left after AEL's project. Place information in the final EIA report.

37. Provide the information on whether the comparison is made on EIA reports of both projects for the combined impact of air- water pollution caused due to the power plant of Adani and Tata Power, air, water pollution and after AEL's Copper plan. Put this information in the final EIA report.

38. Provide the information about where the copies of the environmental literature of this project were kept which were translated from English to Gujarati according to the EAC meeting minutes.

39. So far, under the mangrove aforestation Program, in how many total numbers of hectares mangrove are planted by Adani Group and where are planted? Provide the detailed information along with the map and with the total amount of money spent.

40. Will the power transmissions line in APSEZ be moved due to AEL's project? Provide more details.

41. The staff required (8 persons) for the Environmental Management Plan of highly polluted Copper Refinery Plant is proper as shown in the EIA report? This pack is a best example of how serious the Adani group is to the pollution issues

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42. Will Adani Port staff also look into environmental and pollution issues in this AIL project? Currently, how many staff are there who serves in the Adani Group and also have contributions in all the projects of the group (port, SEZ, power plant etc.)? Is it Possible legally? Provide the name and his eligibility of the APSEZ's environmental officer and head. Put information in the final EIA report.

43. Why no information is given about TOR or any other place about the 30 acres of toxic waste in the chemical plant? Is this plan possible without TOR? Put information in the final EIA report.

44. What will be the effect on coral of Gulf of Kutch and Jamnagar Marine National Park by dissolving sulfuric acid and other toxic gas and other tons of sulfur dioxide gas in the sea water in the direction of air surrounding marine area from 46 Chimneys ? Provide a copy of it if the study is undertaken about this. Put the information in the final EIA report. If the study is not done, then it is a demand to allow the project after studying and giving us a copy of it.

45. Provide us information about how much this plant will increase coral bleaching and marine acidification. By dissolving in moisture, Sulfur dioxide gets converted into sulfuric acid, how much pH will increase by going that into the ocean?

46. Due to the project what will be the increase in global warming?

47. How many billion tons of green house gas will go to Earth's atmosphere by this project? Put information in the final EIA report.

48. Show the plan to reduce the greenhouse gas in final EIA report

49. . Provide in the final EIA report, the details of damage to the sea from the gypsum pond and the waste water that would be thrown out of it.

50. Provide the details of RO reject if it is to be discharge in the sea.

51. Does the GPCB have the instrument to measure toxic gases from air? If GPCB is unable to provide the measurement of pollution, who shall measure the pollution? What is the integrity and reliability of other agencies?

52. Will the industrial treated water for the entire Smelter project be directly or indirectly discharge in the sea? Provide specific reply in yes or no.

53. Will this smelter work on the principle of zero discharge? Therefore provide the further details as to this in the final EIA report at the time of EMP.

54. Will this smelter recycle reuse the entire water? Provide the entire reuse plan and the related final EIA report.

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55. The CETP design for treatment of industrial waste water coming out from the entire project is not shown in the EIA. Provide the copy of that particular design.

56. The information or design of the water recycling plant is also not provided. Provide its information.

57. Provide the copy of the details as to proceedings undertaken by company for the recent judgment passed by the Honorable Supreme Court for preliminary treatment of the waste water. Place it under the final EIA report.

The information as for these points has been kept hidden and a serious threat shall be generated for the Gulf of Kutch and Marine National Park along with fisheries. As the loss to people, animal-husbandry, health, environment and country is much more than benefit from the project, it is my submission that the project be abandoned while considering the legal tangles. It is our appeal to abandon this project that gives benefit of crores of rupees to the company against loss of multi crores to the people and government.

Thanking you
Yours faithfully

Sd/- (illegible)
Usmangani H. Sherseeya
Secretary
Natinal Fisheries Forum
At Post Kancoat, taluka Vakaner, district Morbi
94274-43976

પ્રતિ શ્રી
જિલ્લા કલેક્ટર
કચ્છ.

૨૯-૪-૨૦૧૩ 1726
C-Q-37

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેક્ટ સામે વાંધા/વિરોધ દર્શાવવા બાબત રજૂઆત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે અમો અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના ખતરનાક પ્રોજેક્ટ સામે વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજેક્ટને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. AEL કંપનીએ જે જગ્યાએ અદાણી એસઇઝેડની જગ્યા બતાવેલ છે ત્યાં શિરાયા ગામનું આરક્ષિત જંગલ આવેલ છે જેના પર અમારા ગામોનું પશુધન નભે છે અને લોકોની આજીવિકા નિર્ભર છે. આ જંગલ જમીનની માલીકી હજી સુધી ગુજરાત સરકારે કે ભારત સરકારે AEL કે MPSEZને આપેલ નથી. તદ ઉપરાંત શિરાયા ગામનું આરક્ષિત જંગલ અને દદેરી જંગલ પણ સરકારી રેકર્ડ પર ચાલે છે અને સરકારના કબજામાં છે. આમ આ પ્રોજેક્ટમાટે કોઈપણ જમીનની માલિકી AEL નથી. તેમ છતાં MPSEZ ઓથોરીટીએ ખોટી રીતે આ જમીન AELને કોપર રિફાઇનરીના પ્રોજેક્ટ માટે આપી છે તેવી સરકારમાં રજૂઆત કરવામાં આવેલ છે. આમ જમીન માલિકી વગર આ પ્રોજેક્ટ SEZ અને જંગલની જમીન પર આયોજિત છે તેની સામે અમારો વાંધો છે. જો આ જમીન ની માલિકી અદાણી કંપનીની હોય તો તે સરકારી રેકર્ડ ૭-૧૨ વિગેરે અમોને બતાવે. હજી કંપની પાસે જગ્યા નથી અને કંપની પ્લાન્ટ નાખવાની વાત કરે છે જે 'ભેંસ ભાગોળે અને છાસ છાગોળે' કહેવતને અનુરૂપ છે. રિપોર્ટમાં બતાવેલ પ્રોજેક્ટની જગ્યા તો ઘી અને માખણની વાતો કરે છે.
2. અમે આ પ્રોજેક્ટમાં તાંબાની બનાવટ દરમિયાન નિકળનાર ઝેરીલા અને ગંધાતા અનેક પ્રકારના ગેસોને લીધે અમને, અમારા બાળકો પરિવારના આરોગ્યને, અમારા પશુધનને, અમારા વિસ્તારની જીવસૃષ્ટિને અને દરિયાકિનારાને ગંભીર ખતરો હોય અમે આ પ્રોજેક્ટનો સખ્ત વિરોધ કરીએ છીએ. *૪૬ જેટલી 300 ફૂટ ઊંચી મોટી મોટી ચીમનીઓ ૨૪ કલાક ૩૬૫ દિવસ ઝેરીલા વાયુઓ અમારા વિસ્તારમાં ફગાવશે* જે અમારા ગામો પર પથરાઈને અમારા ફેફસા ખરાબ કરી નાખશે. સલ્ફર ડાયોકસાઈડ જેવા વાયુઓ લોખંડ કાટની ઓગાળી નાખે તેવા ઘાતક વાયુઓ છે જે લાખો ટનની માત્રામાં સતત નીકળશે અને ગામો પર ફેલાશે અને અમારા ફેફસા કોરી નાખશે. આવા ભયંકર પ્રોજેક્ટ અમને સોનાનો વિકાસ આપે તો પણ અમારી જાત અને આવનારી પેઢીને પ્યાને રાખી અમને મંજૂર નથી.
3. વિવિધ પ્રકારના અત્યંત ઝેરી અને નુકશાનકારક એસિડો અને સંખ્યાબંધ વાયુઓ નિકળવાથી અમારો સમગ્ર વિસ્તાર કાળો મેષ થઈ જશે. આ પ્રકારના ધાતુઓ બનાવતા પ્લાન્ટને લીધે દેશમાં અનેક જગ્યાએ પર્યાવરણ અને લોકોને પારાવાર નુકશાન થઈ રહ્યાના ઉદાહરણો હાજર હોવાથી અમો આ પ્લાન્ટનો વિરોધ કરીએ છે. આ કંપનીએ બનાવેલ રિપોર્ટમાં અમારા ગામો અને તેમાં રહેતા લોકોની હાજરી બરાબર બતાવેલ નથી. અને ઝેરી વાયુઓથી શું અસર થશે એ પણ લખેલ નથી. તેથી અમે આ વિષે વધુ કહી શકવાની સ્થિતિએ નથી. અમને મળેલ જાણકારી મુજબ આ પ્લાન્ટના ગેસોથી ફેફસા સુકકા પડી જાશે અને ખેતીમાં કૂલો ખરી જાશે. એટલે અમને અમારા આરોગ્ય અને આજીવિકાની ચિંતા છે. જેને ભારત સરકારે યોગ્ય રીતે સમજી વિચારી નિર્ણય લેવો જોઇયે અને લોકોના હિતમાં અમારા ગામો બચાવી લેવા જોઇયે.
4. AEL કંપનીમાંથી તાંબું બનાવવા માટે જે કાચો માલ લાવવામાં આવશે તેમાંથી અડધાથી વધુ કાચામાલનો કચરો નીકળશે દર વર્ષે લગભગ ૮ થી ૧૦ લાખ ટન કચરો (૧ લાખ ખટારા) નીકળશે અને આ કચરો આખા કચ્છ જિલ્લાના વિસ્તારમાં ફેલાશે. અમારા ગામોમાં અમારે ગામ લોકો ભાગવું પડે એવી પરિસ્થિતીનું નિર્માણ થવા જઇ રહ્યું હોય ત્યારે અમોને આ પ્રોજેક્ટ સામે વિરોધ છે.
5. ગામના લોકોને પીવા વાપરવાના પાણીના ફાંફા છે. ત્યારે આટલો મોટો પ્લાન્ટ પાણી ક્યાથી લાવશે અને અબજો લિટર પાણી ક્યાં કેટલે દૂર થી ગામના લોકો માટે રહસ્ય છે. અમોને કંપની જણાવે કે અબજો લિટર પાણી ક્યાથી લાવશે.
6. આ કંપનીમાં 30 એકરનો ઝેરી કચરાને દાટવાનો ઉકરડો પણ બનાવવાનો છે. અમારા ગામો તો આ લાખો ટન કેમિકલ કચરાના ઉકરડાની મરી પરવારશે જેની સરકારે ગંભીર નોંધ લેવી. આ ઉકરડો ક્યારે ખાલી થશે એની કોઇ મર્યાદાજ નથી.
7. અદાણિ અને ટાટાના પાવર પ્લાન્ટને લીધે એમજ અમારા ગામો અને લોકોને હયાત હવાના પ્રદૂષણને આરોગ્યની તકલીફ ત્યારે આ નવુ ભૂત અમારા બાળકો અને અમને ખતમ કરી નાખશે એ નક્કી છે તેથી અમો આ પ્રોજક્તનો વિરોધ કરીએ છીએ. પાવર પ્લાન્ટને લીધે ખારેક અને ખેતીના પાકોમાં ખૂબ મોટું નુકશાન છે હવે આ તાંબાનો નવો ઝેરીલો પ્લાન્ટ અમારા આરોગ્યને વધુ બગાડી શકે એમ હોય અમે વધુ પ્રદૂષણ ફેલાવતા આ પ્લાન્ટનો વિરોધ કરીએ છે.
8. અદાણિ તાંબાની કંપનીમાં સ્થાનિકોને રોજગારી આપવાની વાતો કરી છે. ટાટા અને અદાણીના પાવર પ્લાન્ટ બનાવતી વખતે પણ આવીજ વાતો કરેલ હતી જે આજ સુધી પૂરી નથી થઈ આમ સ્થાનિક લોકોને મરવા સિવાય છૂટકો જ નથી. તેથી અમને આ પ્લાન્ટ ખપે નહીં.
9. આ પ્લાન્ટથી મર્કયુરી એટલે કે ઝેરી ધાતુ પારો નીકળશે અને હવામાં આ ઝેર ફેલાશે નહીં દેખાતી આ ધાતુથી અમોને ધીમું ઝેર આપવાના આ પ્લાન્ટનો અમે અમારા ગામો સિવાય બીજે કયાક જ્યાં માનવ વસ્તી ન હોય ત્યાં નાખવા માટે સરકારને રજૂઆત કરીએ છે.
10. તાંબાની સાથે સોનું ચાંદી પ્લેટિનમ પણ અહિયાં નીકળશે. આ બધી કીમતી ધાતુઓમાંથી અમો ગામ લોકોને કંપની કેટલો હિસ્સો આપશે જેનાથી અમારી દવા દારૂનો ખર્ચ નીકળે. અમારા ભાગની રકમ ટકામાં જણાવવા વિનંતી છે. પેલા ૨૦૦ કરોડના દંડનું શું થયું એ જણાવશો.

આમ અમને આ પ્લાન્ટ અને ઔધોગિક વિકાસની જરૂર નથી. અમો અમારો વિકાસ જાતે કરી લઈશું પણ આવો ઝેરી અને સ્વાસ્થ્યને નુકશાનકારક પ્રોજેક્ટ અમને ખપતો નથી એ અમે સરકાર અને અદાણિ કંપની ને જણાવી છે.

આભાર

નામ :.....ગામ ..... સહી .....

C-Q- 37

(TRANSLATED)

Date 29-4-2017

To,
District Collector
KUTCH.

SUB: PETITION TAKING OBJECTION AGAINST COPPER REFINARY PROJECT OF M/S. ADANI ENTERPRISE LIMITED (AEL)

Respected Sir,

We, the undersigned herewith oppose the coming up dangerous copper refinery project of M/s Adani Enterprise Limited. We submit herewith our objection taking petition to your good office with the points shown here under and request you to take suitable action as to with-held the project at the earliest possible:

1) The site shown by M/s. Adani Enterprise Limited (AEL) under the SEZ shown at Siracha village is a reserved forest and the only sustainability source of our cattle resulting in our only livelihood and income source. This land is still not allotted to the M/s. Adani Enterprise Limited (AEL) or MPSEZ and there still exist a forest land on the Government records which include the village Danderi forest land and is in government possession. Thus as on date no land is in the name of M/s. Adani Enterprise Limited (AEL) but the MPSEZ have proceeded for allotment of this land to the above company for its copper refinery project and have reported to the Government accordingly. So we are taking objection for this proposed project by M/s. Adani Enterprise Limited (AEL) without proper sanction. If the land in question is in the possession of M/s. Adani Enterprise Limited (AEL) they should have shown 7/12 extract to us. Thus the company has not acquired required land from Government and yet they are trying to set the project which is ridiculous.
2) We are totally against this project as the project will spread most dangerous toxic gas and stinking smell which is dangerous for the health of our children, cattle and other living elements as well as the sea **as its 300 ft high 46 chimneys will spread toxic gas all over the area 24 hours 365 days.**The Sulphur dioxide can even rust the iron, is a deadly gas which will come out from the plant process in lacs of tons and spread over nearby villages and will damage the lungs. Therefore, such project is not agreeable at any cost to us looking to the future of our generation, even if it contains golden features.
3) It is feared that the entire area will be affected by residue of the plant and will spread black power over the agricultural crops and affect it with acidic and many other gaseous pollution also. There are many examples in the country that such metal plant has damaged the atmosphere by creating pollution in many ways and hence we oppose the same. We have come to know that the plant organizers have not made demographic survey of connecting area and not shown the negative points involved in their proposed project and also not shown the

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reactions by toxic gas, We cannot say more due to lack of more scientific knowledge. But we come to know that by this plant's gaseous air pollution there will be effect on flowers of crops and it will not develop naturally to yield the anticipated production quality and quantity. This will affect our livelihood and health naturally which the Indian Government should consider sympathetically and save the villages in the interest of public at large.

4) The company will produce about 50% residue of raw material while making the end product from copper and this residue come to approximately 8-10 lac tons (i.e. 1 lac trucks) and this will affect the entire area of Kutch. In such circumstance there will be no alternate except to leave the village and hence we oppose this project.
5) There is problem of drinking water in our area and it is a question that how the company will manage for water requirement and if managed and what about effluent treatment?
6) We have come to know that they are planning to make an hazardous waste plant for this 30 acre plant which will affect the villages.
7) There are also some problems because of existing power plants in our area by Tata and Adani Group, even though we are going to face a new problem by this new project in the form of hazardous pollution which will affect our children and hence we oppose the project. Due to power plant some agricultural activities like date palm crop are affected but by this project it is sure that gas from copper refinery will affect our health also more make the atmosphere polluted, hence we oppose the project.
8) The company, M/s. Adani Enterprise Limited (AEL) is assuring about local employment butthe earlier companies like Tata group has not fulfilled such promises.
9) We have come to know that there will be residue of mercury and this is a toxic chemical element which will spread in the air, so we are representing our appeal to the Government to please set up such plant in any non-populated area.
10) We have come to know that there are other materials like gold, silver and platinum are also a by-product of the company yet it is useless activity looking the health problem etc.

In view of above we request you to kindly recommend the government to take necessary actions as to cancel this project as we do not need industrial development at the cost of public health.

Thanking you,

Yours faithfully,

NAME: VIJAY U. GADHAVI

VILLAGE –MANDVI

Sd/-

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૨૯-૪-૨૦૧૭

પ્રતિ શ્રી

જિલ્લા કલેક્ટર

કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટ સામે વાંધા/વિરોધ દર્શાવવા બાબત રજૂઆત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે અમો અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના ખતરનાક પ્રોજેકટ સામે વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજેકટને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. AEL કંપનીએ જે જગ્યાએ અદાણી એસઇઝેડની જગ્યા બતાવેલ છે ત્યાં શિરાચા ગામનું આરક્ષિત જંગલ આવેલ છે જેના પર અમારા ગામોનું પશુધન નભે છે અને લોકોની આજીવિકા નિર્ભર છે. આ જંગલ જમીનની માલીકી હજી સુધી ગુજરાત સરકારે કે ભારત સરકારે AEL કે MPSEZને આપેલ નથી. તદ ઉપરાંત શિરાચા ગામનું આરક્ષિત જંગલ અને દંદેરી જંગલ પણ સરકારી રેકર્ડ પર ચાલે છે અને સરકારના કબજામાં છે. આમ આ પ્રોજેકટમાટે કોઇપણ જમીનની માલિકી AEL નથી. તેમ છતાં MPSEZ ઓથોરીટીએ ખોટી રીતે આ જમીન AELને કોપર રિફાઇનરીના પ્રોજેકટ માટે આપી છે તેવી સરકારમાં રજૂઆત કરવામાં આવેલ છે. આમ જમીન માલિકી વગર આ પ્રોજેકટ SEZ અને જંગલની જમીન પર આયોજિત છે તેની સામે અમારો વાંધો છે. જો આ જમીન ની માલિકી અદાણી કંપનીની હોય તો તે સરકારી રેકર્ડ ૭-૧૨ વિગેરે અમોને બતાવે. હજી કંપની પાસે જગ્યા નથી અને કંપની પ્લાન્ટ નાખવાની વાત કરે છે જે "ભેંસ ભાગોળે અને છાસ છાગોળે" કહેવતને અનુરૂપ છે. રિપોર્ટમાં બતાવેલ પ્રોજેકટની જગ્યા તો ધી અને માખણની વાતો કરે છે.
2. અમે આ પ્રોજેકટમાં તાંબાની બનાવટ દરમિયાન નિકળનાર ઝેરીલા અને ગંધાતા અનેક પ્રકારના ગેસોને લીધે અમને, અમારા બાળકો પરિવારના આરોગ્યને, અમારા પશુધનને, અમારા વિસ્તારની જીવસૃષ્ટિને અને દરિયાકિનારાને ગંભીર ખતરો હોય અમે આ પ્રોજેકટનો સદંતર વિરોધ કરીએ છીએ. ***૪૬ જેટલી 300 ફૂટ ઊંચી મોટી મોટી ચીમનીઓ ૨૪ કલાક ૩૬૫ દિવસ ઝેરીલા વાયુઓ અમારા વિસ્તારમાં ફગાવશે*** જે અમારા ગામો પર પથરાઈને અમારા ફેફસા ખરાબ કરી નાખશે. સલ્ફર ડાયોકસાઈડ જેવા વાયુઓ લોખંડ ક્ટાવી ઓગાળી નાખે તેવા ઘાતક વાયુઓ છે જે લાખો ટનની માત્રામાં સતત નીકળશે અને ગામો પર ફેલાશે અને અમારા ફેફસા કોરી નાખશે. આવ ભયંકર પ્રોજેકટ અમને સોનાનો વિકાસ આપે તો પણ અમારી જાત અને આવનારી પેઢીને ધ્યાને રાખી અમને મંજૂર નથી.
3. વિવિધ પ્રકારના અત્યંત ઝેરી અને નુકશાનકારક એસિડો અને સંખ્યાબંધ વાયુઓ નિકળવાથી અમારો સમગ્ર વિસ્તાર કાળો મેષ થઈ જશે. આ પ્રકારના ધાતુઓ બનાવતા પ્લાન્ટને લીધે દેશમાં અનેક જગ્યાએ પર્યાવરણ અને લોકોને પારાવાર નુકશાન થઈ રહ્યાના ઉદાહરણો હાજર હોવાથી અમો આ પ્લાન્ટનો વિરોધ કરીએ છે. આ કંપનીએ બનાવેલ રિપોર્ટમાં અમારા ગામો અને તેમાં રહેતા લોકોની હાજરી બરાબર બતાવેલ નથી અને ઝેરી વાયુઓથી શું અસર થશે એ પણ લખેલ નથી. તેથી અમે આ વિષે વધુ કહી શકવાની સ્થિતિએ નથી. અમને મળેલ જાણકારી મુજબ આ પ્લાન્ટના ગેસોથી ફેફસા સુકકા પડી જાશે અને ખેતીમાં ફૂલો ખરી જાશે. એટલે અમને અમારા આરોગ્ય અને આજીવિકાની ચિંતા છે જેને ભારત સરકારે યોગ્ય રીતે સમજી વિચારી નિર્ણય લેવો જોઇએ અને લોકોના હિતમાં અમારા ગામો બચાવી લેવા જોઇએ.
4. AEL કંપનીમાંથી તાંબું બનાવવા માટે જે કાચો માલ લાવવામાં આવશે તેમાંથી અડધાથી વધુ કાચામાલનો કચરો નીકળશે દર વર્ષે લગભગ થી ૧૦ લાખ ટન કચરો (૧ લાખ ખટારા) નીકળશે અને આ કચરો આખા કચ્છ જિલ્લાના વિસ્તારમાં ફેલાશે. અમારા ગામોમાં અમારે ગામ છોડ ભાગવું પડે એવી પરિસ્થિતીનું નિર્માણ થવા જઇ રહ્યું હોય ત્યારે અમોને આ પ્રોજેકટ સામે વિરોધ છે.
5. ગામના લોકોને પીવા વાપરવાના પાણીના ફાંફા છે. ત્યારે આટલો મોટો પ્લાન્ટ પાણી ક્યાથી લાવશે અને અબજો લિટર પાણી ક્યાં ફેકી દેશે ? ગામના લોકો માટે રહસ્ય છે. અમોને કંપની જણાવે કે અબજો લિટર પાણી ક્યાથી લાવશે.
6. આ કંપનીમાં 30 એકરનો ઝેરી કચરાને દાટવાનો ઉકરડો પણ બનાવવાનો છે. અમારા ગામો તો આ લાખો ટન કેમિકલ કચરાના ઉકરડાન મરી પરવારશે જેની સરકારે ગંભીર નોંધ લેવી. આ ઉકરડો ક્યારે ખાલી થશે એની કોઈ મર્યાદાજ નથી.
7. અદાણિ અને ટાટાના પાવર પ્લાન્ટને લીધે એમજ અમારા ગામો અને લોકોને હ્યાત હવાના પ્રદૂષણને આરોગ્યની તકલીફ ત્યારે આ નવું ભૂ અમારા બાળકો અને અમને ખતમ કરી નાખશે એ નક્કી છે તેથી અમો આ પ્રોજક્તનો વિરોધ કરીએ છીએ. પાવર પ્લાન્ટને લીધે ખારેક અ ખેતીના પાકોમાં ખૂબ મોટું નુકશાન છે હવે આ તાંબાનો નવો ઝેરીલો પ્લાન્ટ અમારા આરોગ્યને વધુ બગાડી શકે એમ હોય અમે વધુ પ્રદૂષ ફેલાવતા આ પ્લાન્ટનો વિરોધ કરીએ છે.
8. અદાણિ તાંબાની કંપનીમાં સ્થાનિકોને રોજગારી આપવાની વાતો કરી છે. ટાટા અને અદાણીના પાવર પ્લાન્ટ બનાવતી વખતે પણ આવી વાતો કરેલ હતી જે આજ સુધી પૂરી નથી થઈ આમ સ્થાનિક લોકોને મરવા સિવાય છૂટકો જ નથી. તેથી અમને આ પ્લાન્ટ ખપે નહીં.
9. આ પ્લાન્ટથી મર્કયુરી એટલે કે ઝેરી ધાતુ પારો નીકળશે અને હવામાં આ ઝેર ફેલાશે નહીં દેખાતી આ ધાતુથી અમોને ધીમું ઝેર આપવાના પ્લાન્ટનો અમે અમારા ગામો સિવાય બીજે ક્યાક જ્યાં માનવ વસ્તી ન હોય ત્યાં નાખવા માટે સરકારને રજૂઆત કરીએ છે.
10. તાંબાની સાથે સોનું ચાંદી પ્લેટિનમ પણ અહિયાં નીકળશે. આ બધી કીમતી ધાતુઓમાંથી અમો ગામ લોકોને કંપની કેટલો હિસ્સો આપશે જેનાથી અમારી દવા દારૂનો ખર્ચ નીકળે. અમારા ભાગની રકમ ટકામાં જણાવવા વિનંતી છે. પેલા ૨૦૦ કરોડના દંડનું શું થયું એ જણાવો?

આમ અમને આ પ્લાન્ટ અને ઔધોગિક વિકાસની જરૂર નથી. અમો અમારો વિકાસ જાતે કરી લઈશું પણ આવો ઝેરી અને સ્વાસ્થ્યને નુકશાનકા પ્રોજેકટ અમને ખપતો નથી એ અમે સરકાર અને અદાણિ કંપની ને જણાવી છે.

આભાર

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(TRANSLATED)

Date 29-4-2017

To,
District Collector
KUTCH.

SUB: PETITION TAKING OBJECTION AGAINST COPPER REFINARY PROJECT OF M/S. ADANI ENTERPRISE LIMITED (AEL)

Respected Sir,

We, the undersigned herewith oppose the coming up dangerous copper refinery project of M/s Adani Enterprise Limited. We submit herewith our objection taking petition to your good office with the points shown here under and request you to take suitable action as to with-held the project at the earliest possible:

1) The site shown by M/s. Adani Enterprise Limited (AEL) under the SEZ shown at Siracha village is a reserved forest and the only sustainability source of our cattle resulting in our only livelihood and income source. This land is still not allotted to the M/s. Adani Enterprise Limited (AEL) or MPSEZ and there still exist a forest land on the Government records which include the village Danderi forest land and is in government possession. Thus as on date no land is in the name of M/s. Adani Enterprise Limited (AEL) but the MPSEZ have proceeded for allotment of this land to the above company for its copper refinery project and have reported to the Government accordingly. So we are taking objection for this proposed project by M/s. Adani Enterprise Limited (AEL) without proper sanction. If the land in question is in the possession of M/s. Adani Enterprise Limited (AEL) they should have shown 7/12 extract to us. Thus the company has not acquired required land from Government and yet they are trying to set the project which is ridiculous.
2) We are totally against this project as the project will spread most dangerous toxic gas and stinking smell which is dangerous for the health of our children, cattle and other living elements as well as the sea **as its 300 ft high 46 chimneys will spread toxic gas all over the area 24 hours 365 days.**The Sulphur dioxide can even rust the iron, is a deadly gas which will come out from the plant process in lacs of tons and spread over nearby villages and will damage the lungs. Therefore, such project is not agreeable at any cost to us looking to the future of our generation, even if it contains golden features.
3) It is feared that the entire area will be affected by residue of the plant and will spread black power over the agricultural crops and affect it with acidic and many other gaseous pollution also. There are many examples in the country that such metal plant has damaged the atmosphere by creating pollution in many ways and hence we oppose the same. We have come to know that the plant organizers have not made demographic survey of connecting area and not shown the negative points involved in their proposed project and also not shown the

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reactions by toxic gas, We cannot say more due to lack of more scientific knowledge. But we come to know that by this plant's gaseous air pollution there will be effect on flowers of crops and it will not develop naturally to yield the anticipated production quality and quantity. This will affect our livelihood and health naturally which the Indian Government should consider sympathetically and save the villages in the interest of public at large.

4) The company will produce about 50% residue of raw material while making the end product from copper and this residue come to approximately 8-10 lac tons (i.e. 1 lac trucks) and this will affect the entire area of Kutch. In such circumstance there will be no alternate except to leave the village and hence we oppose this project.
5) There is problem of drinking water in our area and it is a question that how the company will manage for water requirement and if managed and what about effluent treatment?
6) We have come to know that they are planning to make an hazardous waste plant for this 30 acre plant which will affect the villages.
7) There are also some problems because of existing power plants in our area by Tata and Adani Group, even though we are going to face a new problem by this new project in the form of hazardous pollution which will affect our children and hence we oppose the project. Due to power plant some agricultural activities like date palm crop are affected but by this project it is sure that gas from copper refinery will affect our health also more make the atmosphere polluted, hence we oppose the project.
8) The company, M/s. Adani Enterprise Limited (AEL) is assuring about local employment butthe earlier companies like Tata group has not fulfilled such promises.
9) We have come to know that there will be residue of mercury and this is a toxic chemical element which will spread in the air, so we are representing our appeal to the Government to please set up such plant in any non-populated area.
10) We have come to know that there are other materials like gold, silver and platinum are also a by-product of the company yet it is useless activity looking the health problem etc.

In view of above we request you to kindly recommend the government to take necessary actions as to cancel this project as we do not need industrial development at the cost of public health.

Thanking you,

Yours faithfully,

NAME: CHAUJAN PRAVINSINH BHURUBHA

VILLAGE –SIRAYA

Sd/- PRAVINSINH BHURUBHA

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પ્રતિ શ્રી
જિલ્લા કલેક્ટર
કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટ સામે વાંધા/વિરોધ દર્શાવવા બાબત રજૂઆત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે અમો અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના ખતરનાક પ્રોજેકટ સામે વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજેકટને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. AEL કંપનીએ જે જગ્યાએ અદાણી એસઇઝેડની જગ્યા બતાવેલ છે ત્યાં શિરાચા ગામનું આરક્ષિત જંગલ આવેલ છે જેના પર અમારા ગામોનું પશુધન નભે છે અને લોકોની આજીવિકા નિર્ભર છે. આ જંગલ જમીનની માલીકી હજી સુધી ગુજરાત સરકારે કે ભારત સરકારે AEL કે MPSEZને આપેલ નથી. તદ ઉપરાંત શિરાચા ગામનું આરક્ષિત જંગલ અને દંદેરી જંગલ પણ સરકારી રેકર્ડ પર ચાલે છે અને સરકારના કબજામાં છે. આમ આ પ્રોજેકટમાટે કોઇપણ જમીનની માલિકી AEL નથી. તેમ છતાં MPSEZ ઓથોરીટીએ ખોટી રીતે આ જમીન AELને કોપર રિફાઇનરીના પ્રોજેકટ માટે આપી છે તેવી સરકારમાં રજૂઆત કરવામાં આવેલ છે. આમ જમીન માલિકી વગર આ પ્રોજેકટ SEZ અને જંગલની જમીન પર આયોજિત છે તેની સામે અમારો વાંધો છે. જો આ જમીન ની માલિકી અદાણી કંપનીની હોય તો તે સરકારી રેકર્ડ ૭-૧૨ વિગેરે અમોને બતાવે. હજી કંપની પાસે જગ્યા નથી અને કંપની પ્લાન્ટ નાખવાની વાત કરે છે જે "લેસ ભાગોળે અને છાસ છાગોળે" કહેવતને અનુરૂપ છે. રિપોર્ટમાં બતાવેલ પ્રોજેકટની જગ્યા તો ઘી અને માખણની વાતો કરે છે.
2. અમે આ પ્રોજેકટમાં તાંબાની બનાવટ દરમિયાન નિકળનાર ઝેરીલા અને ગંધાતા અનેક પ્રકારના ગેસોને લીધે અમને, અમારા બાળકો પરિવારના આરોગ્યને, અમારા પશુધનને, અમારા વિસ્તારની જીવસૃષ્ટિને અને દરિયાકિનારાને ગંભીર ખતરો હોય અમે આ પ્રોજેકટનો સદંતર વિરોધ કરીએ છીએ. ***૪૬ જેટલી 300 ફૂટ ઊંચી મોટી મોટી ચીમનીઓ ૨૪ કલાક ૩૬૫ દિવસ ઝેરીલા વાયુઓ અમારા વિસ્તારમાં ફગાવશે*** જે અમારા ગામો પર પથરાઇને અમારા ફેફસા ખરાબ કરી નાખશે. સલ્ફર ડાયોકસાઇડ જેવા વાયુઓ લોખંડ ક્લાવી ઓગાળી નાખે તેવા ઘાતક વાયુઓ છે જે લાખો ટનની માત્રામાં સતત નીકળશે અને ગામો પર ફેલાશે અને અમારા ફેફસા કોરી નાખશે. આવ ભયંકર પ્રોજેકટ અમને સોનાનો વિકાસ આપે તો પણ અમારી જાત અને આવનારી પેઢીને ધ્યાને રાખી અમને મંજૂર નથી.
3. વિવિધ પ્રકારના અત્યંત ઝેરી અને નુકશાનકારક એસિડો અને સંખ્યાબંધ વાયુઓ નિકળવાથી અમારો સમગ્ર વિસ્તાર કાળો મેષ થઈ જશે. અ પ્રકારના ધાતુઓ બનાવતા પ્લાન્ટને લીધે દેશમાં અનેક જગ્યાએ પર્યાવરણ અને લોકોને પારાવાર નુકશાન થઈ રહ્યાના ઉદાહરણો હાજ હોવાથી અમો આ પ્લાન્ટનો વિરોધ કરીએ છે. આ કંપનીએ બનાવેલ રિપોર્ટમાં અમારા ગામો અને તેમા રહેતા લોકોની હાજરી બરાબર બતાવેલ નથી. અને ઝેરી વાયુઓથી શું અસર થશે એ પણ લખેલ નથી. તેથી અમે આ વિષે વધુ કહી શકવાની સ્થિતિએ નથી. અમને મળેલ જાણકા મુજબ આ પ્લાન્ટના ગેસોથી ફેફસા સુકકા પડી જાશે અને ખેતીમાં ફૂલો ખરી જશે. એટલે અમને અમારા આરોગ્ય અને આજીવિકાની ચિંતા દે જેને ભારત સરકારે યોગ્ય રીતે સમજી વિચારી નિર્ણય લેવો જોઇએ અને લોકોના હિતમાં અમારા ગામો બચાવી લેવા જોઇએ.
4. AEL કંપનીમાંથી તાંબું બનાવવા માટે જે કાચો માલ લાવવામાં આવશે તેમાંથી અડધાથી વધુ કાચામાલનો કચરો નીકળશે દર વર્ષે લગભગ થી ૧૦ લાખ ટન કચરો (૧ લાખ ખટારા) નીકળશે અને આ કચરો આખા કચ્છ જિલ્લાના વિસ્તારમાં ફેલાશે. અમારા ગામોમાં અમારે ગામ છો ભાગવું પડે એવી પરિસ્થિતીનું નિર્માણ થવા જઇ રહ્યું હોય ત્યારે અમોને આ પ્રોજેકટ સામે વિરોધ છે.
5. ગામના લોકોને પીવા વાપરવાના પાણીના ફાંફા છે. ત્યારે આટલો મોટો પ્લાન્ટ પાણી ક્યાથી લાવશે અને અબજો લિટર પાણી ક્યાં ફેકી દેશ ગામના લોકો માટે રહસ્ય છે. અમોને કંપની જણાવે કે અબજો લિટર પાણી ક્યાથી લાવશે.
6. આ કંપનીમાં 30 એકરનો ઝેરી કચરાને દાટવાનો ઉકરડો પણ બનાવવાનો છે. અમારા ગામો તો આ લાખો ટન કેમિકલ કચરાના ઉકરડા મરી પરવારશે જેની સરકારે ગંભીર નોંધ લેવી. આ ઉકરડો ક્યારે ખાલી થશે એની કોઈ મર્યાદાજ નથી.
7. અદાણિ અને ટાટાના પાવર પ્લાન્ટને લીધે એમજ અમારા ગામો અને લોકોને હયાત હવાના પ્રદૂષણને આરોગ્યની તકલીફ ત્યારે આ નવું પ્ર અમારા બાળકો અને અમને ખતમ કરી નાખશે એ નક્કી છે તેથી અમો આ પ્રોજક્તનો વિરોધ કરીએ છીએ. પાવર પ્લાન્ટને લીધે ખારેક અ ખેતીના પાકોમાં ખૂબ મોટું નુકશાન છે હવે આ તાંબાનો નવો ઝેરીલો પ્લાન્ટ અમારા આરોગ્યને વધુ બગાડી શકે એમ હોય અમે વધુ પ્રદૂષ ફેલાવતા આ પ્લાન્ટનો વિરોધ કરીએ છે.
8. અદાણિ તાંબાની કંપનીમાં સ્થાનિકોને રોજગારી આપવાની વાતો કરી છે. ટાટા અને અદાણીના પાવર પ્લાન્ટ બનાવતી વખતે પણ આવ વાતો કરેલ હતી જે આજ સુધી પૂરી નથી થઈ આમ સ્થાનિક લોકોને મરવા સિવાય છૂટકો જ નથી. તેથી અમને આ પ્લાન્ટ ખપે નહીં.
9. આ પ્લાન્ટથી મર્કયુરી એટલે કે ઝેરી ધાતુ પારો નીકળશે અને હવામાં આ ઝેર ફેલાશે નહીં દેખાતી આ ધાતુથી અમોને ધીમું ઝેર આપવાના પ્લાન્ટનો અમે અમારા ગામો સિવાય બીજે ક્યાક જ્યાં માનવ વસ્તી ન હોય ત્યાં નાખવા માટે સરકારને રજૂઆત કરીએ છે.
10. તાંબાની સાથે સોનું ચાંદી પ્લેટિનમ પણ અહિયાં નીકળશે. આ બધી કીમતી ધાતુઓમાંથી અમો ગામ લોકોને કંપની કેટલો હિસ્સો આપ જેનાથી અમારી દવા દારૂનો ખર્ચ નીકળે. અમારા ભાગની રકમ ટકામાં જણાવવા વિનંતી છે. પેલા ૨૦૦ કરોડના દંડનું શું થયું એ જણાવો?

આમ અમને આ પ્લાન્ટ અને ઓધોગિક વિકાસની જરૂર નથી. અમો અમારો વિકાસ જાતે કરી લઈશું પણ આવો ઝેરી અને સ્વાસ્થ્યને નુકશાનકા પ્રોજેકટ અમને ખપતો નથી એ અમે સરકાર અને અદાણિ કંપની ને જણાવી છે.

આભાર

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C-Q- 39

(TRANSLATED)

Date 29-4-2017

To,
District Collector
KUTCH.

SUB: PETITION TAKING OBJECTION AGAINST COPPER REFINARY PROJECT OF M/S. ADANI ENTERPRISE LIMITED (AEL)

Respected Sir,

We, the undersigned herewith oppose the coming up dangerous copper refinery project of M/s Adani Enterprise Limited. We submit herewith our objection taking petition to your good office with the points shown here under and request you to take suitable action as to with-held the project at the earliest possible:

1) The site shown by M/s. Adani Enterprise Limited (AEL) under the SEZ shown at Siracha village is a reserved forest and the only sustainability source of our cattle resulting in our only livelihood and income source. This land is still not allotted to the M/s. Adani Enterprise Limited (AEL) or MPSEZ and there still exist a forest land on the Government records which include the village Danderi forest land and is in government possession. Thus as on date no land is in the name of M/s. Adani Enterprise Limited (AEL) but the MPSEZ have proceeded for allotment of this land to the above company for its copper refinery project and have reported to the Government accordingly. So we are taking objection for this proposed project by M/s. Adani Enterprise Limited (AEL) without proper sanction. If the land in question is in the possession of M/s. Adani Enterprise Limited (AEL) they should have shown 7/12 extract to us. Thus the company has not acquired required land from Government and yet they are trying to set the project which is ridiculous.
2) We are totally against this project as the project will spread most dangerous toxic gas and stinking smell which is dangerous for the health of our children, cattle and other living elements as well as the sea **as its 300 ft high 46 chimneys will spread toxic gas all over the area 24 hours 365 days.**The Sulphur dioxide can even rust the iron, is a deadly gas which will come out from the plant process in lacs of tons and spread over nearby villages and will damage the lungs. Therefore, such project is not agreeable at any cost to us looking to the future of our generation, even if it contains golden features.
3) It is feared that the entire area will be affected by residue of the plant and will spread black power over the agricultural crops and affect it with acidic and many other gaseous pollution also. There are many examples in the country that such metal plant has damaged the atmosphere by creating pollution in many ways and hence we oppose the same. We have come to know that the plant organizers have not made demographic survey of connecting area and not shown the negative points involved in their proposed project and also not shown the

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reactions by toxic gas, We cannot say more due to lack of more scientific knowledge. But we come to know that by this plant's gaseous air pollution there will be effect on flowers of crops and it will not develop naturally to yield the anticipated production quality and quantity. This will affect our livelihood and health naturally which the Indian Government should consider sympathetically and save the villages in the interest of public at large.

4) The company will produce about 50% residue of raw material while making the end product from copper and this residue come to approximately 8-10 lac tons (i.e. 1 lac trucks) and this will affect the entire area of Kutch. In such circumstance there will be no alternate except to leave the village and hence we oppose this project.
5) There is problem of drinking water in our area and it is a question that how the company will manage for water requirement and if managed and what about effluent treatment?
6) We have come to know that they are planning to make an hazardous waste plant for this 30 acre plant which will affect the villages.
7) There are also some problems because of existing power plants in our area by Tata and Adani Group, even though we are going to face a new problem by this new project in the form of hazardous pollution which will affect our children and hence we oppose the project. Due to power plant some agricultural activities like date palm crop are affected but by this project it is sure that gas from copper refinery will affect our health also more make the atmosphere polluted, hence we oppose the project.
8) The company, M/s. Adani Enterprise Limited (AEL) is assuring about local employment butthe earlier companies like Tata group has not fulfilled such promises.
9) We have come to know that there will be residue of mercury and this is a toxic chemical element which will spread in the air, so we are representing our appeal to the Government to please set up such plant in any non-populated area.
10) We have come to know that there are other materials like gold, silver and platinum are also a by-product of the company yet it is useless activity looking the health problem etc.

In view of above we request you to kindly recommend the government to take necessary actions as to cancel this project as we do not need industrial development at the cost of public health.

Thanking you,

Yours faithfully,

NAME: JADEJA JAYPALSINH M

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પ્રતિ શ્રી

જિલ્લા કલેક્ટર

કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટ સામે વાંધા/વિરોધ દર્શાવવા બાબત રજૂઆત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે અમો અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના ખતરનાક પ્રોજેકટ સામે વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજકેટને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. AEL કંપનીએ જે જગ્યાએ અદાણી એસઇઝેડની જગ્યા બતાવેલ છે ત્યાં શિરાચા ગામનું આરક્ષિત જંગલ આવેલ છે જેના પર અમારા ગામોનું પશુધન નભે છે અને લોકોની આજીવિકા નિર્ભર છે. આ જંગલ જમીનની માલીકી હજી સુધી ગુજરાત સરકારે કે ભારત સરકારે AEL કે MPSEZને આપેલ નથી. તદ ઉપરાંત શિરાચા ગામનું આરક્ષિત જંગલ અને દંદેરી જંગલ પણ સરકારી રેકર્ડ પર ચાલે છે અને સરકારના કબજામાં છે. આમ આ પ્રોજેકટમાટે કોઈપણ જમીનની માલિકી AEL નથી. તેમ છતાં MPSEZ ઓથોરીટીએ ખોટી રીતે આ જમીન AELને કોપર રિફાઇનરીના પ્રોજેકટ માટે આપી છે તેવી સરકારમાં રજૂઆત કરવામાં આવેલ છે. આમ જમીન માલિકી વગર આ પ્રોજેકટ SEZ અને જંગલની જમીન પર આયોજિત છે તેની સામે અમારો વાંધો છે. જો આ જમીન ની માલિકી અદાણી કંપનીની હોય તો તે સરકારી રેકર્ડ ૭-૧૨ વિગેરે અમોને બતાવે. હજી કંપની પાસે જગ્યા નથી અને કંપની પ્લાન્ટ નાખવાની વાત કરે છે જે "ભેંસ ભાગોળે અને છાસ છાગોળે" કહેવતને અનુરૂપ છે. રિપોર્ટમાં બતાવેલ પ્રોજેકટની જગ્યા તો ઘી અને માખણની વાતો કરે છે.
2. અમે આ પ્રોજેકટમાં તાંબાની બનાવટ દરમિયાન નિકળનાર ઝેરીલા અને ગંધાતા અનેક પ્રકારના ગેસોને લીધે અમને, અમારા બાળકો પરિવારના આરોગ્યને, અમારા પશુધનને, અમારા વિસ્તારની જીવસૃષ્ટિને અને દરિયાકિનારાને ગંભીર ખતરો હોય અમે આ પ્રોજેકટનો સદંતર વિરોધ કરીએ છીએ. ***૪૬ જેટલી 300 ફૂટ ઊંચી મોટી મોટી ચીમનીઓ ૨૪ કલાક ૩૬૫ દિવસ ઝેરીલા વાયુઓ અમારા વિસ્તારમાં ફગાવશે*** જે અમારા ગામો પર પથરાઇને અમારા ફેફસા ખરાબ કરી નાખશે. સલ્ફર ડાયોકસાઈડ જેવા વાયુઓ લોખંડ ક્ટાવી ઓગાળી નાખે તેવા ઘાતક વાયુઓ છે જે લાખો ટનની માત્રામાં સતત નીકળશે અને ગામો પર ફેલાશે અને અમારા ફેફસા કોરી નાખશે. આવ ભયંકર પ્રોજેકટ અમને સોનાનો વિકાસ આપે તો પણ અમારી જાત અને આવનારી પેઢીને ધ્યાને રાખી અમને મંજૂર નથી.
3. વિવિધ પ્રકારના અત્યંત ઝેરી અને નુકશાનકારક એસિડો અને સંખ્યાબંધ વાયુઓ નિકળવાથી અમારો સમગ્ર વિસ્તાર કાળો મેષ થઈ જશે. અ પ્રકારના ધાતુઓ બનાવતા પ્લાન્ટને લીધે દેશમાં અનેક જગ્યાએ પર્યાવરણ અને લોકોને પારાવાર નુકશાન થઈ રહ્યાના ઉદાહરણો હાજ હોવાથી અમો આ પ્લાન્ટનો વિરોધ કરીએ છે. આ કંપનીએ બનાવેલ રિપોર્ટમાં અમારા ગામો અને તેમાં રહેતા લોકોની હાજરી બરાબર બતાવેલ નથી. અને ઝેરી વાયુઓથી શું અસર થશે એ પણ લખેલ નથી. તેથી અમે આ વિષે વધુ કહી શકવાની સ્થિતિએ નથી. અમને મળેલ જાણકાર મુજબ આ પ્લાન્ટના ગેસોથી ફેફસા સુકકા પડી જાશે અને ખેતીમાં ફૂલો ખરી જાશે. એટલે અમને અમારા આરોગ્ય અને આજીવિકાની ચિંતા દે જેને ભારત સરકારે યોગ્ય રીતે સમજી વિચારી નિર્ણય લેવો જોઇયે અને લોકોના હિતમાં અમારા ગામો બચાવી લેવા જોઇયે.
4. AEL કંપનીમાંથી તાંબું બનાવવા માટે જે કાચો માલ લાવવામાં આવશે તેમાંથી અડધાથી વધુ કાચામાલનો કચરો નીકળશે દર વર્ષે લગભગ થી ૧૦ લાખ ટન કચરો (૧ લાખ ખટારા) નીકળશે અને આ કચરો આખા કચ્છ જિલ્લાના વિસ્તારમાં ફેલાશે. અમારા ગામોમાં અમારે ગામ છો ભાગવું પડે એવી પરિસ્થિતીનું નિર્માણ થવા જઇ રહ્યું હોય ત્યારે અમોને આ પ્રોજેકટ સામે વિરોધ છે.
5. ગામના લોકોને પીવા વાપરવાના પાણીના ફાંફા છે. ત્યારે આટલો મોટો પ્લાન્ટ પાણી ક્યાથી લાવશે અને અબજો લિટર પાણી ક્યાં ફેકી દેશે ગામના લોકો માટે રહસ્ય છે. અમોને કંપની જણાવે કે અબજો લિટર પાણી ક્યાથી લાવશે.
6. આ કંપનીમાં 30 એકરનો ઝેરી કચરાને દાટવાનો ઉકરડો પણ બનાવવાનો છે. અમારા ગામો તો આ લાખો ટન કેમિકલ કચરાના ઉકરડા મરી પરવારશે જેની સરકારે ગંભીર નોંધ લેવી. આ ઉકરડો ક્યારે ખાલી થશે એની કોઈ મર્યાદાજ નથી.
7. અદાણિ અને ટાટાના પાવર પ્લાન્ટને લીધે એમજ અમારા ગામો અને લોકોને હયાત હવાના પ્રદૂષણને આરોગ્યની તકલીફ ત્યારે આ નવું પ્ર અમારા બાળકો અને અમને ખતમ કરી નાખશે એ નક્કી છે તેથી અમો આ પ્રોજક્તનો વિરોધ કરીએ છીએ. પાવર પ્લાન્ટને લીધે ખારેક અ ખેતીના પાકોમાં ખૂબ મોટું નુકશાન છે હવે આ તાંબાનો નવો ઝેરીલો પ્લાન્ટ અમારા આરોગ્યને વધુ બગાડી શકે એમ હોય અમે વધુ પ્રદૂષ ફેલાવતા આ પ્લાન્ટનો વિરોધ કરીએ છે.
8. અદાણિ તાંબાની કંપનીમાં સ્થાનિકોને રોજગારી આપવાની વાતો કરી છે. ટાટા અને અદાણીના પાવર પ્લાન્ટ બનાવતી વખતે પણ આવ વાતો કરેલ હતી જે આજ સુધી પૂરી નથી થઈ આમ સ્થાનિક લોકોને મરવા સિવાય છૂટકો જ નથી. તેથી અમને આ પ્લાન્ટ ખપે નહીં.
9. આ પ્લાન્ટથી મર્કયુરી એટલે કે ઝેરી ધાતુ પારો નીકળશે અને હવામાં આ ઝેર ફેલાશે નહીં દેખાતી આ ધાતુથી અમોને ધીમું ઝેર આપવાના પ્લાન્ટનો અમે અમારા ગામો સિવાય બીજે ક્યાક જ્યાં માનવ વસ્તી ન હોય ત્યાં નાખવા માટે સરકારને રજૂઆત કરીએ છે.
10. તાંબાની સાથે સોનું ચાંદી પ્લેટિનમ પણ અહિયાં નીકળશે. આ બધી કીમતી ધાતુઓમાંથી અમો ગામ લોકોને કંપની કેટલો હિસ્સો આપ જેનાથી અમારી દવા દારૂનો ખર્ચ નીકળે. અમારા ભાગની રકમ ટકામાં જણાવવા વિનંતી છે. પેલા ૨૦૦ કરોડના દંડનું શું થયું એ જણાવો?

આમ અમને આ પ્લાન્ટ અને ઔધોગિક વિકાસની જરૂર નથી. અમો અમારો વિકાસ જાતે કરી લઈશું પણ આવો ઝેરી અને સ્વાસ્થ્યને નુકશાનકા પ્રોજેકટ અમને ખપતો નથી એ અમે સરકાર અને અદાણિ કંપની ને જણાવી છે.

આભાર

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C-Q-40

(TRANSLATED)

Date 29-4-2017

To,
District Collector
KUTCH.

SUB: PETITION TAKING OBJECTION AGAINST COPPER REFINARY PROJECT OF M/S. ADANI ENTERPRISE LIMITED (AEL)

Respected Sir,

We, the undersigned herewith oppose the coming up dangerous copper refinery project of M/s Adani Enterprise Limited. We submit herewith our objection taking petition to your good office with the points shown here under and request you to take suitable action as to with-held the project at the earliest possible:

1) The site shown by M/s. Adani Enterprise Limited (AEL) under the SEZ shown at Siracha village is a reserved forest and the only sustainability source of our cattle resulting in our only livelihood and income source. This land is still not allotted to the M/s. Adani Enterprise Limited (AEL) or MPSEZ and there still exist a forest land on the Government records which include the village Danderi forest land and is in government possession. Thus as on date no land is in the name of M/s. Adani Enterprise Limited (AEL) but the MPSEZ have proceeded for allotment of this land to the above company for its copper refinery project and have reported to the Government accordingly. So we are taking objection for this proposed project by M/s. Adani Enterprise Limited (AEL) without proper sanction. If the land in question is in the possession of M/s. Adani Enterprise Limited (AEL) they should have shown 7/12 extract to us. Thus the company has not acquired required land from Government and yet they are trying to set the project which is ridiculous.
2) We are totally against this project as the project will spread most dangerous toxic gas and stinking smell which is dangerous for the health of our children, cattle and other living elements as well as the sea **as its 300 ft high 46 chimneys will spread toxic gas all over the area 24 hours 365 days.**The Sulphur dioxide can even rust the iron, is a deadly gas which will come out from the plant process in lacs of tons and spread over nearby villages and will damage the lungs. Therefore, such project is not agreeable at any cost to us looking to the future of our generation, even if it contains golden features.
3) It is feared that the entire area will be affected by residue of the plant and will spread black power over the agricultural crops and affect it with acidic and many other gaseous pollution also. There are many examples in the country that such metal plant has damaged the atmosphere by creating pollution in many ways and hence we oppose the same. We have come to know that the plant organizers have not made demographic survey of connecting area and not shown the negative points involved in their proposed project and also not shown the

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reactions by toxic gas, We cannot say more due to lack of more scientific knowledge. But we come to know that by this plant's gaseous air pollution there will be effect on flowers of crops and it will not develop naturally to yield the anticipated production quality and quantity. This will affect our livelihood and health naturally which the Indian Government should consider sympathetically and save the villages in the interest of public at large.

4) The company will produce about 50% residue of raw material while making the end product from copper and this residue come to approximately 8-10 lac tons (i.e. 1 lac trucks) and this will affect the entire area of Kutch. In such circumstance there will be no alternate except to leave the village and hence we oppose this project.
5) There is problem of drinking water in our area and it is a question that how the company will manage for water requirement and if managed and what about effluent treatment?
6) We have come to know that they are planning to make an hazardous waste plant for this 30 acre plant which will affect the villages.
7) There are also some problems because of existing power plants in our area by Tata and Adani Group, even though we are going to face a new problem by this new project in the form of hazardous pollution which will affect our children and hence we oppose the project. Due to power plant some agricultural activities like date palm crop are affected but by this project it is sure that gas from copper refinery will affect our health also more make the atmosphere polluted, hence we oppose the project.
8) The company, M/s. Adani Enterprise Limited (AEL) is assuring about local employment butthe earlier companies like Tata group has not fulfilled such promises.
9) We have come to know that there will be residue of mercury and this is a toxic chemical element which will spread in the air, so we are representing our appeal to the Government to please set up such plant in any non-populated area.
10) We have come to know that there are other materials like gold, silver and platinum are also a by-product of the company yet it is useless activity looking the health problem etc.

In view of above we request you to kindly recommend the government to take necessary actions as to cancel this project as we do not need industrial development at the cost of public health.

Thanking you,

Yours faithfully,

NAME: TURK HUSEN IBRAHIM NATHANI

Village- Dhruv, Taluka- Mundra

Dist- Kutchh, Gujarat.

Sd/- TURK HUSEN IBRAHIM

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૨૯-૪-૨૦૧૭

પ્રતિ શ્રી
જિલ્લા કલેક્ટર
કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટ સામે વાંધા/વિરોધ દર્શાવવા બાબત રજૂઆત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે અમો અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના ખતરનાક પ્રોજેકટ સામે વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજેકટને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. AEL કંપનીએ જે જગ્યાએ અદાણી એસઇઝેડની જગ્યા બતાવેલ છે ત્યાં શિરાચા ગામનું આરક્ષિત જંગલ આવેલ છે જેના પર અમારા ગામોનું પશુધન નભે છે અને લોકોની આજીવિકા નિર્ભર છે. આ જંગલ જમીનની માલીકી હજી સુધી ગુજરાત સરકારે કે ભારત સરકારે AEL કે MPSEZને આપેલ નથી. તદ ઉપરાંત શિરાચા ગામનું આરક્ષિત જંગલ અને દંદેરી જંગલ પણ સરકારી રેકર્ડ પર ચાલે છે અને સરકારના કબજામાં છે. આમ આ પ્રોજેકટમાટે કોઈપણ જમીનની માલિકી AEL નથી. તેમ છતાં MPSEZ ઓથોરીટીએ ખોટી રીતે આ જમીન AELને કોપર રિફાઇનરીના પ્રોજેકટ માટે આપી છે તેવી સરકારમાં રજૂઆત કરવામાં આવેલ છે. આમ જમીન માલિકી વગર આ પ્રોજેકટ SEZ અને જંગલની જમીન પર આયોજિત છે તેની સામે અમારો વાંધો છે. જો આ જમીન ની માલિકી અદાણી કંપનીની હોય તો તે સરકારી રેકર્ડ ૭-૧૨ વિગેરે અમોને બતાવે. હજી કંપની પાસે જગ્યા નથી અને કંપની પ્લાન્ટ નાખવાની વાત કરે છે જે "ભેસ ભાંગોળે અને છાસ છાગોળે" કહેવતને અનુરૂપ છે. રિપોર્ટમાં બતાવેલ પ્રોજેકટની જગ્યા તો ઘી અને માખણની વાતો કરે છે.
2. અમે આ પ્રોજેકટમાં તાંબાની બનાવટ દરમિયાન નિકળનાર ઝેરીલા અને ગંધાતા અનેક પ્રકારના ગેસોને લીધે અમને, અમારા બાળકો પરિવારના આરોગ્યને, અમારા પશુધનને, અમારા વિસ્તારની જીવસૃષ્ટિને અને દરિયાકિનારાને ગંભીર ખતરો હોય અમે આ પ્રોજેકટનો સદંતર વિરોધ કરીએ છીએ. ***૪૬ જેટલી ૩૦૦ ફૂટ ઊંચી મોટી મોટી ચીમનીઓ ૨૪ કલાક ૩૬૫ દિવસ ઝેરીલા વાયુઓ અમારા વિસ્તારમાં ફગાવશે*** જે અમારા ગામો પર પથરાઈને અમારા ફેફસા ખરાબ કરી નાખશે. સલ્ફર ડાયોકસાઈડ જેવા વાયુઓ લોખંડ ક્ટાવી ઓગાળી નાખે તેવા ઘાતક વાયુઓ છે જે લાખો ટનની માત્રામાં સતત નીકળશે અને ગામો પર ફેલાશે અને અમારા ફેફસા કોરી નાખશે. આવ ભયંકર પ્રોજેકટ અમને સોનાનો વિકાસ આપે તો પણ અમારી જાત અને આવનારી પેઢીને ધ્યાને રાખી અમને મંજૂર નથી.
3. વિવિધ પ્રકારના અત્યંત ઝેરી અને નુકશાનકારક એસિડો અને સંખ્યાબંધ વાયુઓ નિકળવાથી અમારો સમગ્ર વિસ્તાર કાળો મેષ થઈ જશે. આ પ્રકારના ધાતુઓ બનાવતા પ્લાન્ટને લીધે દેશમાં અનેક જગ્યાએ પર્યાવરણ અને લોકોને પારાવાર નુકશાન થઈ રહ્યાના ઉદાહરણો હાજર હોવાથી અમો આ પ્લાન્ટનો વિરોધ કરીએ છે. આ કંપનીએ બનાવેલ રિપોર્ટમાં અમારા ગામો અને તેમાં રહેતા લોકોની હાજરી બરાબર બતાવેલ નથી. અને ઝેરી વાયુઓથી શું અસર થશે એ પણ લખેલ નથી. તેથી અમે આ વિષે વધુ કહી શકવાની સ્થિતિએ નથી. અમને મળેલ જાણકારી મુજબ આ પ્લાન્ટના ગેસોથી ફેફસા સુકકા પડી જશે અને ખેતીમાં ફૂલો ખરી જશે. એટલે અમને અમારા આરોગ્ય અને આજીવિકાની ચિંતા છે જેને ભારત સરકારે યોગ્ય રીતે સમજી વિચારી નિર્ણય લેવો જોઇએ અને લોકોના હિતમાં અમારા ગામો બચાવી લેવા જોઇએ.
4. AEL કંપનીમાંથી તાંબુ બનાવવા માટે જે કાચો માલ લાવવામાં આવશે તેમાથી અડધાથી વધુ કાચામાલનો કચરો નીકળશે દર વર્ષે લગભગ થી ૧૦ લાખ ટન કચરો (૧ લાખ ખટારા) નીકળશે અને આ કચરો આખા કચ્છ જિલ્લાના વિસ્તારમાં ફેલાશે. અમારા ગામોમાં અમારે ગામ છોડ ભાગવું પડે એવી પરિસ્થિતીનું નિર્માણ થવા જઇ રહ્યું હોય ત્યારે અમોને આ પ્રોજેકટ સામે વિરોધ છે.
5. ગામના લોકોને પીવા વાપરવાના પાણીના ફાફા છે. ત્યારે આટલો મોટો પ્લાન્ટ પાણી ક્યાથી લાવશે અને અબજો લિટર પાણી ક્યાં ફેકી દેશ ગામના લોકો માટે રહસ્ય છે. અમોને કંપની જણાવે કે અબજો લિટર પાણી ક્યાથી લાવશે.
6. આ કંપનીમાં 30 એકરનો ઝેરી કચરાને દાટવાનો ઉકરડો પણ બનાવવાનો છે. અમારા ગામો તો આ લાખો ટન કેમિકલ કચરાના ઉકરડાઓ મરી પરવારશે જેની સરકારે ગંભીર નોંધ લેવી. આ ઉકરડો ક્યારે ખાલી થશે એની કોઈ મર્યાદાજ નથી.
7. અદાણિ અને ટાટાના પાવર પ્લાન્ટને લીધે એમજ અમારા ગામો અને લોકોને હયાત હવાના પ્રદૂષણને આરોગ્યની તકલીફ ત્યારે આ નવું ભ અમારા બાળકો અને અમને ખતમ કરી નાખશે એ નક્કી છે તેથી અમો આ પ્રોજક્તનો વિરોધ કરીએ છીએ. પાવર પ્લાન્ટને લીધે ખારેક અ ખેતીના પાકોમાં ખૂબ મોટું નુકશાન છે હવે આ તાંબાનો નવો ઝેરીલો પ્લાન્ટ અમારા આરોગ્યને વધુ બગાડી શકે એમ હોય અમે વધુ પ્રદૂષ ફેલાવતા આ પ્લાન્ટનો વિરોધ કરીએ છે.
8. અદાણિ તાંબાની કંપનીમાં સ્થાનિકોને રોજગારી આપવાની વાતો કરી છે. ટાટા અને અદાણીના પાવર પ્લાન્ટ બનાવતી વખતે પણ આવી વાતો કરેલ હતી જે આજ સુધી પૂરી નથી થઇ આમ સ્થાનિક લોકોને મરવા સિવાય છૂટકો જ નથી. તેથી અમને આ પ્લાન્ટ ખપે નહીં.
9. આ પ્લાન્ટથી મર્કયુરી એટલે કે ઝેરી ધાતુ પારો નીકળશે અને હવામાં આ ઝેર ફેલાશે નહીં દેખાતી આ ધાતુથી અમોને ધીમું ઝેર આપવાના પ્લાન્ટનો અમે અમારા ગામો સિવાય બીજે ક્યાક જ્યાં માનવ વસ્તી ન હોય ત્યાં નાખવા માટે સરકારને રજૂઆત કરીએ છે.
10. તાંબાની સાથે સોનું ચાંદી પ્લેટિનમ પણ અહિયાં નીકળશે. આ બધી કીમતી ધાતુઓમાંથી અમો ગામ લોકોને કંપની કેટલો હિસ્સો આપશે જેનાથી અમારી દવા દારૂનો ખર્ચ નીકળે. અમારા ભાગની રકમ ટકામાં જણાવવા વિનંતી છે. પેલા ૨૦૦ કરોડના દંડનું શું થયું એ જણાવો?

આમ અમને આ પ્લાન્ટ અને ઔધોગિક વિકાસની જરૂર નથી. અમો અમારો વિકાસ જાતે કરી લઈશું પણ આવો ઝેરી અને સ્વાસ્થ્યને નુકશાનકા પ્રોજેકટ અમને ખપતો નથી એ અમે સરકાર અને અદાણિ કંપની ને જણાવી છે.

આભાર

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C-Q-41

(TRANSLATED)

Date 29-4-2017

To,
District Collector
KUTCH.

SUB: PETITION TAKING OBJECTION AGAINST COPPER REFINARY PROJECT OF M/S. ADANI ENTERPRISE LIMITED (AEL)

Respected Sir,

We, the undersigned herewith oppose the coming up dangerous copper refinery project of M/s Adani Enterprise Limited. We submit herewith our objection taking petition to your good office with the points shown here under and request you to take suitable action as to with-held the project at the earliest possible:

1) The site shown by M/s. Adani Enterprise Limited (AEL) under the SEZ shown at Siracha village is a reserved forest and the only sustainability source of our cattle resulting in our only livelihood and income source. This land is still not allotted to the M/s. Adani Enterprise Limited (AEL) or MPSEZ and there still exist a forest land on the Government records which include the village Danderi forest land and is in government possession. Thus as on date no land is in the name of M/s. Adani Enterprise Limited (AEL) but the MPSEZ have proceeded for allotment of this land to the above company for its copper refinery project and have reported to the Government accordingly. So we are taking objection for this proposed project by M/s. Adani Enterprise Limited (AEL) without proper sanction. If the land in question is in the possession of M/s. Adani Enterprise Limited (AEL) they should have shown 7/12 extract to us. Thus the company has not acquired required land from Government and yet they are trying to set the project which is ridiculous.
2) We are totally against this project as the project will spread most dangerous toxic gas and stinking smell which is dangerous for the health of our children, cattle and other living elements as well as the sea **as its 300 ft high 46 chimneys will spread toxic gas all over the area 24 hours 365 days.** The Sulphur dioxide can even rust the iron, is a deadly gas which will come out from the plant process in lacs of tons and spread over nearby villages and will damage the lungs. Therefore, such project is not agreeable at any cost to us looking to the future of our generation, even if it contains golden features.
3) It is feared that the entire area will be affected by residue of the plant and will spread black power over the agricultural crops and affect it with acidic and many other gaseous pollution also. There are many examples in the country that such metal plant has damaged the atmosphere by creating pollution in many ways and hence we oppose the same. We have come to know that the plant organizers have not made demographic survey of connecting area and not shown the negative points involved in their proposed project and also not shown the reactions by toxic gas, We cannot say more due to lack of more scientific knowledge. But we come to know that by this plant's gaseous air pollution there will be effect on flowers of crops and it will not develop naturally to yield the anticipated

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production quality and quantity. This will affect our livelihood and health naturally which the Indian Government should consider sympathetically and save the villages in the interest of public at large.

4) The company will produce about 50% residue of raw material while making the end product from copper and this residue come to approximately 8-10 lac tons (i.e. 1 lac trucks) and this will affect the entire area of Kutch. In such circumstance there will be no alternate except to leave the village and hence we oppose this project.
5) There is problem of drinking water in our area and it is a question that how the company will manage for water requirement and if managed and what about effluent treatment?
6) We have come to know that they are planning to make an hazardous waste plant for this 30 acre plant which will affect the villages.
7) There are also some problems because of existing power plants in our area by Tata and Adani Group, even though we are going to face a new problem by this new project in the form of hazardous pollution which will affect our children and hence we oppose the project. Due to power plant some agricultural activities like date palm crop are affected but by this project it is sure that gas from copper refinery will affect our health also more make the atmosphere polluted, hence we oppose the project.
8) The company, M/s. Adani Enterprise Limited (AEL) is assuring about local employment butthe earlier companies like Tata group has not fulfilled such promises.
9) We have come to know that there will be residue of mercury and this is a toxic chemical element which will spread in the air, so we are representing our appeal to the Government to please set up such plant in any non-populated area.
10) We have come to know that there are other materials like gold, silver and platinum are also a by-product of the company yet it is useless activity looking the health problem etc.

In view of above we request you to kindly recommend the government to take necessary actions as to cancel this project as we do not need industrial development at the cost of public health.

Thanking you,

Yours faithfully,

NAME: Shri Turk Mohammad Hanif Abdul Kadar Jamadar

Village- Dhruv, Taluka- Mundra

Dist- Kutchh, Gujarat.

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૨૯-૪-૨૦૧૭

પ્રતિ શ્રી

જિલ્લા કલેક્ટર

કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટ સામે વાંધા/વિરોધ દર્શાવવા બાબત રજૂઆત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે અમો અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના ખતરનાક પ્રોજેકટ સામે વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજેકટને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. AEL કંપનીએ જે જગ્યાએ અદાણી એસઇઝેડની જગ્યા બતાવેલ છે ત્યાં શિરાચા ગામનું આરક્ષિત જંગલ આવેલ છે જેના પર અમારા ગામોનું પશુધન નભે છે અને લોકોની આજીવિકા નિર્ભર છે. આ જંગલ જમીનની માલીકી હજી સુધી ગુજરાત સરકારે કે ભારત સરકારે AEL કે MPSEZને આપેલ નથી. તદ ઉપરાંત શિરાચા ગામનું આરક્ષિત જંગલ અને દદેરી જંગલ પણ સરકારી રેકર્ડ પર ચાલે છે અને સરકારના કબજામાં છે. આમ આ પ્રોજેકટમાટે કોઇપણ જમીનની માલિકી AEL નથી. તેમ છતાં MPSEZ ઓથોરીટીએ ખોટી રીતે આ જમીન AELને કોપર રિફાઇનરીના પ્રોજેકટ માટે આપી છે તેવી સરકારમાં રજૂઆત કરવામાં આવેલ છે. આમ જમીન માલિકી વગર આ પ્રોજેકટ SEZ અને જંગલની જમીન પર આયોજિત છે તેની સામે અમારો વાંધો છે. જો આ જમીન ની માલિકી અદાણી કંપનીની હોય તો તે સરકારી રેકર્ડ ૭-૧૨ વિગેરે અમોને બતાવે. હજી કંપની પાસે જગ્યા નથી અને કંપની પ્લાન્ટ નાખવાની વાત કરે છે જે "લેંસ ભાગોળે અને છાસ છાગોળે" કહેવતને અનુરૂપ છે. રિપોર્ટમાં બતાવેલ પ્રોજેકટની જગ્યા તો ઘી અને માખણની વાતો કરે છે.
2. અમે આ પ્રોજેકટમાં તાંબાની બનાવટ દરમિયાન નિકળનાર ઝેરીલા અને ગંધાતા અનેક પ્રકારના ગેસોને લીધે અમને, અમારા બાળકો પરિવારના આરોગ્યને, અમારા પશુધનને, અમારા વિસ્તારની જીવસૃષ્ટિને અને દરિયાકિનારાને ગંભીર ખતરો હોય અમે આ પ્રોજેકટનો સદંતર વિરોધ કરીએ છીએ. ***૪૬ જેટલી 300 ફૂટ ઉંચી મોટી મોટી ચીમનીઓ ૨૪ કલાક ૩૬૫ દિવસ ઝેરીલા વાયુઓ અમારા વિસ્તારમાં ફગાવશે*** જે અમારા ગામો પર પથરાઈને અમારા ફેફસા ખરાબ કરી નાખશે. સલ્ફર ડાયોકસાઈડ જેવા વાયુઓ લોખંડ ક્ટાવી ઓગાળી નાખે તેવા ઘાતક વાયુઓ છે જે લાખો ટનની માત્રામાં સતત નીકળશે અને ગામો પર ફેલાશે અને અમારા ફેફસા કોરી નાખશે. આવ ભયંકર પ્રોજેકટ અમને સોનાનો વિકાસ આપે તો પણ અમારી જાત અને આવનારી પેઢીને ધ્યાને રાખી અમને મંજૂર નથી.
3. વિવિધ પ્રકારના અત્યંત ઝેરી અને નુકશાનકારક એસિડો અને સંખ્યાબંધ વાયુઓ નિકળવાથી અમારો સમગ્ર વિસ્તાર કાળો મેષ થઈ જશે. અ પ્રકારના ધાતુઓ બનાવતા પ્લાન્ટને લીધે દેશમાં અનેક જગ્યાએ પર્યાવરણ અને લોકોને પારાવાર નુકશાન થઈ રહ્યાના ઉદાહરણો હજ હોવાથી અમો આ પ્લાન્ટનો વિરોધ કરીએ છે. આ કંપનીએ બનાવેલ રિપોર્ટમાં અમારા ગામો અને તેમાં રહેતા લોકોની હાજરી બરાબર બતાવે નથી. અને ઝેરી વાયુઓથી શું અસર થશે એ પણ લખેલ નથી. તેથી અમે આ વિષે વધુ કહી શકવાની સ્થિતિએ નથી. અમને મળેલ જાણકા મુજબ આ પ્લાન્ટના ગેસોથી ફેફસા સુકકા પડી જાશે અને ખેતીમાં ફૂલો ખરી જાશે. એટલે અમને અમારા આરોગ્ય અને આજીવિકાની ચિંતા છે જેને ભારત સરકારે યોગ્ય રીતે સમજી વિચારી નિર્ણય લેવો જોઇયે અને લોકોના હિતમાં અમારા ગામો બચાવી લેવા જોઇયે.
4. AEL કંપનીમાંથી તાંબું બનાવવા માટે જે કાચો માલ લાવવામાં આવશે તેમાંથી અડધાથી વધુ કાચામાલનો કચરો નીકળશે દર વર્ષે લગભગ થી ૧૦ લાખ ટન કચરો (૧ લાખ ખટારા) નીકળશે અને આ કચરો આખા કચ્છ જિલ્લાના વિસ્તારમાં ફેલાશે. અમારા ગામોમાં અમારે ગામ છો ભાગવું પડે એવી પરિસ્થિતીનું નિર્માણ થવા જઇ રહ્યું હોય ત્યારે અમોને આ પ્રોજેકટ સામે વિરોધ છે.
5. ગામના લોકોને પીવા વાપરવાના પાણીના ફાફ છે. ત્યારે આટલો મોટો પ્લાન્ટ પાણી ક્યાથી લાવશે અને અબજો લિટર પાણી ક્યાં ફેકી દેશે ગામના લોકો માટે રહસ્ય છે. અમોને કંપની જણાવે કે અબજો લિટર પાણી ક્યાથી લાવશે.
6. આ કંપનીમાં 30 એકરનો ઝેરી કચરાને દાટવાનો ઉકરડો પણ બનાવવાનો છે. અમારા ગામો તો આ લાખો ટન કેમિકલ કચરાના ઉકરડા મરી પરવારશે જેની સરકારે ગંભીર નોંધ લેવી. આ ઉકરડો ક્યારે ખાલી થશે એની કોઇ મર્યાદાજ નથી.
7. અદાણિ અને ટાટાના પાવર પ્લાન્ટને લીધે એમજ અમારા ગામો અને લોકોને હયાત હવાના પ્રદૂષણને આરોગ્યની તકલીફ ત્યારે આ નવું પ્ર અમારા બાળકો અને અમને ખતમ કરી નાખશે એ નક્કી છે તેથી અમો આ પ્રોજક્તનો વિરોધ કરીએ છીએ. પાવર પ્લાન્ટને લીધે ખારેક અ ખેતીના પાકોમાં ખૂબ મોટું નુકશાન છે હવે આ તાંબાનો નવો ઝેરીલો પ્લાન્ટ અમારા આરોગ્યને વધુ બગાડી શકે એમ હોય અમે વધુ પ્રદૂષ ફેલાવતા આ પ્લાન્ટનો વિરોધ કરીએ છે.
8. અદાણિ તાંબાની કંપનીમાં સ્થાનિકોને રોજગારી આપવાની વાતો કરી છે. ટાટા અને અદાણીના પાવર પ્લાન્ટ બનાવતી વખતે પણ આવ વાતો કરેલ હતી જે આજ સુધી પૂરી નથી થઇ આમ સ્થાનિક લોકોને મરવા સિવાય છૂટકો જ નથી. તેથી અમને આ પ્લાન્ટ ખપે નહીં.
9. આ પ્લાન્ટથી મર્કયુરી એટલે કે ઝેરી ધાતુ પારો નીકળશે અને હવામાં આ ઝેર ફેલાશે નહીં દેખાતી આ ધાતુથી અમોને ધીમું ઝેર આપવાના પ્લાન્ટનો અમે અમારા ગામો સિવાય બીજે ક્યાક જ્યાં માનવ વસ્તી ન હોય ત્યાં નાખવા માટે સરકારને રજૂઆત કરીએ છે.
10. તાંબાની સાથે સોનું ચાંદી પ્લેટિનમ પણ અહિયાં નીકળશે. આ બધી કીમતી ધાતુઓમાંથી અમો ગામ લોકોને કંપની કેટલો હિસ્સો આપ જેનાથી અમારી દવા દારૂનો ખર્ચ નીકળે. અમારા ભાગની રકમ ટકામાં જણાવવા વિનંતી છે. પેલા ૨૦૦ કરોડના દંડનું શું થયું એ જણાવો?

આમ અમને આ પ્લાન્ટ અને ઓધોગિક વિકાસની જરૂર નથી. અમો અમારો વિકાસ જાતે કરી લઈશું પણ આવો ઝેરી અને સ્વાસ્થ્યને નુકશાનક પ્રોજેકટ અમને ખપતો નથી એ અમે સરકાર અને અદાણિ કંપની ને જણાવી છે.

ચાલુ

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C-Q-42
(TRANSLATED)
Date 29-4-2017

To,
District Collector
KUTCH.

SUB: PETITION TAKING OBJECTIOJN AGAINST COPPER REFINARY PROJECT OF M/S. ADANI ENTERPRISE LIMITED (AEL)

Respected Sir,

We, the undersigned herewith oppose the coming up dangerous copper refinery project of M/s Adani Enterprise Limited. We submit herewith our objection taking petition to your good office with the points shown here under and request you to take suitable action as to with-held the project at the earliest possible:

1) The site shown by M/s. Adani Enterprise Limited (AEL) under the SEZ shown at Siracha village is a reserved forest and the only sustainability source of our cattle resulting in our only livelihood and income source. This land is still not allotted to the M/s. Adani Enterprise Limited (AEL) or MPSEZ and there still exist a forest land on the Government records which include the village Danderi forest land and is in government possession. Thus as on date no land is in the name of M/s. Adani Enterprise Limited (AEL) but the MPSEZ have proceeded for allotment of this land to the above company for its copper refinery project and have reported to the Government accordingly. So we are taking objection for this proposed project by M/s. Adani Enterprise Limited (AEL) without proper sanction. If the land in question is in the possession of M/s. Adani Enterprise Limited (AEL) they should have shown 7/12 extract to us. Thus the company has not acquired required land from Government and yet they are trying to set the project which is ridiculous.
2) We are totally against this project as the project will spread most dangerous toxic gas and stinking smell which is dangerous for the health of our children, cattle and other living elements as well as the sea **as its 300 ft high 46 chimneys will spread toxic gas all over the area 24 hours 365 days.**The Sulphur dioxide can even rust the iron, is a deadly gas which will come out from the plant process in lacs of tons and spread over nearby villages and will damage the lungs. Therefore, such project is not agreeable at any cost to us looking to the future of our generation, even if it contains golden features.
3) It is feared that the entire area will be affected by residue of the plant and will spread black power over the agricultural crops and affect it with acidic and many other gaseous pollution also. There are many examples in the country that such metal plant has damaged the atmosphere by creating pollution in many ways and hence we oppose the same. We have come to know that the plant organizers have not made demographic survey of connecting area and not shown the negative points involved in their proposed project and also not shown the reactions by toxic gas, We cannot say more due to lack of more scientific knowledge. But we come to know that by this plant's gaseous air pollution there will be effect on flowers of crops and it will not develop naturally to yield the anticipated production quality and quantity. This will affect our livelihood and health naturally which the

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Indian Government should consider sympathetically and save the villages in the interest of public at large.

4) The company will produce about 50% residue of raw material while making the end product from copper and this residue come to approximately 8-10 lac tons (i.e. 1 lac trucks) and this will affect the entire area of Kutch. In such circumstance there will be no alternate except to leave the village and hence we oppose this project.
5) There is problem of drinking water in our area and it is a question that how the company will manage for water requirement and if managed and what about effluent treatment?
6) We have come to know that they are planning to make an hazardous waste plant for this 30 acre plant which will affect the villages.
7) There are also some problems because of existing power plants in our area by Tata and Adani Group, even though we are going to face a new problem by this new project in the form of hazardous pollution which will affect our children and hence we oppose the project. Due to power plant some agricultural activities like date palm crop are affected but by this project it is sure that gas from copper refinery will affect our health also more make the atmosphere polluted, hence we oppose the project.
8) The company, M/s. Adani Enterprise Limited (AEL) is assuring about local employment butthe earlier companies like Tata group has not fulfilled such promises.
9) We have come to know that there will be residue of mercury and this is a toxic chemical element which will spread in the air, so we are representing our appeal to the Government to please set up such plant in any non-populated area.
10) We have come to know that there are other materials like gold, silver and platinum are also a by-product of the company yet it is useless activity looking the health problem etc.

In view of above we request you to kindly recommend the government to take necessary actions as to cancel this project as we do not need industrial development at the cost of public health

Thanking you,

Yours faithfully,

NAME: TURK ISMAIL ABDUL RASHID JAMADAR

Village- Dhruv, Taluka- Mundra

Dist- Kutchh, Gujarat.

Sd/- ISMAIL RASHID JAMADAR

જાડેજા ગજેન્દ્રસિંહ ભીમાજી. 1744
સરપંચ, ગામ: નવીનાળ,
તા:મુંદરા-કચ્છ.

પ્રતિ શ્રી,
મેમ્બર સેક્રેટરી,
ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ,
ગાંધીનગર-ગુજરાત.

વિષય: મેસર્સ અદાણી એન્ટરપ્રાઇઝીઝ લિમિટેડ, અદાણી સ્પેશીયલ ઇકોનોમીક ઝોનની ગામ: નવીનાળ અને શીરાચામાં આવી રહેલ ગ્રીનફીલ્ડ કોપર રીફાઇનરી પ્રોજેક્ટના વાંધા બાબત:

1) <u>ટર્મસ ઓફ રેફરન્સ નું નોન કમ્પલાયંસ અને તા: ૩૧-૦૩-૨૦૧૧ વાળા ભારત સરકાર ના સર્કયુલર નું ભંગ.(બિડાણ-૧)</u>

a) આ પ્રોજેકટ માટે તા:૨૧ જુન ૨૦૧૬ ના રોજ ટી.ઓ.આર.(ટર્મસ ઓફ રેફરંસ) ઇસ્યુ કરવામા આવ્યો, જેમા સેકસન ૫(આઇ) માં સ્પષ્ટ જણાવવામાં આવ્યું છે કે જે ૧૦૨ હેકટર ફોરેસ્ટ ની જમીનનો ઉપયોગ થવાનો છે તેના ક્લીયરંસની નકલ રજુ કરવી.

i) અદાણી એન્ટરપ્રાઇઝ દ્વારા એન્વાયર્મેન્ટ ક્લીયરંસ લેવા માટે જે ફાર્મ ૧(MoEFCC એ પોતાની વેબસાઇટ ઉપર અપલોડ કર્યું છે.) સબમીટ કરવામા આવ્યો છે તેમા ફોરેસ્ટ ક્લીયરંસ અન્ડર ધી પ્રોસેસ છે એવું જણાવવામા આવ્યું છે.

ii) ડ્રાફટ ઈ.આઇ.એ. રીપોર્ટ ના પાના નં. AI 14 પર (ટી.ઓ.આર. નું કમ્પલાયંસ નથી કરવામા આવ્યું) પણ ફોરસ્ટ ક્લીયરંસ પેન્ડીંગ છે એવું જણાવવામા આવ્યું છે.

આમ, ઉપરોકત મુદ્દાઓને લઇને સ્પષ્ટ થાય છે કે અદાણી એન્ટરપ્રાઇઝ દ્વારા ટી.ઓ.આર. નું કમ્પલાયંસ કરવામા નથી આવ્યું માટે જયાં સુધી તી.ઓ.આર. નું કંપલાયંસ ન થાય ત્યાં સુધી પર્યાવરણીય લોક સુનાવણી માન્ય ગણાય નહી.

b) MoEFCC ના તા:૩૧-૦૩-૨૦૧૧ નો સરકયુલર (બિડાણ-૪) માં જણાવ્યા પ્રમાણે કોઇપણ નવો પ્રોજેકટ, જેમાં વન વિભાગની જમીનનો ઉપયોગ થવાનો હોય તો પહેલા ફોરેસ્ટ ક્લીયરંસ લેવું ત્યાર બાદ એન્વાયર્મેન્ટલ ક્લીયરંસ ની પ્રોસેસ કરવી. અદાણી એન્ટરપ્રાઇઝના આ પ્રોજેકટ માટે ૧૦૨ હેકટર જમીન ફોરેસ્ટ ની છે અને ફોરેસ્ટ ક્લીયરંસ પેન્ડીંગ છે. જે બિડાણ-૨ અને બિડાણ-૩ માં સાબિત થાય છે. આમ, ફોરેસ્ટ ક્લીયરંસ પહેલા એન્વાયર્મેન્ટ ક્લીયરંસ ની કોઇપણ પ્રોસેસ કરવી ગેરકાદેસર છે, અને પબ્લીક હેયરીંગ પણ ગેરકાયદેસર ગણવી.

c) ઇ.આઇ.એ. નોટીફીકેશન, ૨૦૦૬ ની સેકશન 8(vi) મા જણાવ્યા મુજબ કોઇપણ માહિતી જાણી જોઇને ગેરમાર્ગે દોરવા માટે છુપાવવામા આવી હોય તો અરજી રદ કરવી. આમ, અદાણી એન્ટરપ્રાઇઝ દ્વારા ગેરમાર્ગે દોરવા જાણી જોઇને ફોરેસ્ટ ક્લીયરંસ ને લગતી ઉપરોકત માહિતી છુપાવવામા આવી છે. આથી તેની પર્યાવરણ ક્લીયરંસ માટેની અરજી રદ થવી જ જોઇએ.

d) ઉપરોકત મુદ્દા નં. ૧. બાબતે મારા દ્વારા તા: ૧૬/૦૪/૨૦૧૭ ના રોજ, (૧) કે. સી. મિસ્ત્રી, મેમ્બર સેક્રેટરી, ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, ગાંધીનગર. અને (૨). અરવીંદ અગ્રવાલ, ચેરમેન, ગુજરાત પ્રદુષણ નિયંત્રણ બોડ, ગાંધીનગર. (૩). રીજનલ ઓફીસર, ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, ગાંધીધામ. (૪). એમ.એ. ગાંધી, કલેકટર, કચ્છ. (૫). એમ.કે.સીંગ, જોઇટ સેક્રેટરી, એમ.ઓ.ઇ.એફ.સી.સી. નવી દીલ્લી. વાળાઓને ઇમેઇલ દ્વારા ફરીયાદ(બિડાણ-૫) કરેલ હોવા છતાં એકશન લેવામા કેમ નથી આવ્યા? એન્વાયર્મેન્ટ ક્લીયરંસ ને લગતી પ્રોસેસ કેમ રોકવામા નથી આવી? પબ્લીક હીયરીંગ કયા આધારે કરવામા આવી રહી છે?

2) ફાર્મ-૧ ની અંદર છુપાવવામા આવેલ માહિતી:

a) બેઝીક ઇન્ફર્મેશનના મુદ્દા નં. ૧૬ અને ૨૬ માં સૂચિત પ્રોજેકટની જમીન પર નવીનાળ ગૌચર જમીનની પી.આઇ.એલ. નં ૧૭ ઓફ ૨૦૧૧ ના જજમેન્ટ પર રીવ્યુ પીટીશન કરવામા આવી, જે હાલમા ચાલુ છે. આ માહિતી છુપાવવામા આવી છે.

b) ફાર્મ-૧ ના એન્વાયર્મન્ટલ સેન્સીટીવીટી ના મુદ્દા ન-૨ અને ૧૦ માં અદાણી દ્વારા દાણેથરી નદી ની માહિતી છુપાવવામા આવી છે, જયારે આ નદી સૂચિત પ્રોજેકટ વિસ્તારની અંદરથી પસાર થઇ રહી છે. આમ, આ માહિતી છુપાવવામા આવી છે.

આમ, ઇ.આઇ.એ. નોટીફીકેશન, ૨૦૦૬ ની સેકશન 8(vi) મા જણાવ્યા મુજબ કોઇપણ માહિતી જાણી જોઇને ગેરમાર્ગે દોરવા માટે છુપાવવામા આવી હોય તો અરજી રદ કરવી. અદાણી ગ્રીનફીલ્ડ કોપર રીફાઇનરી દ્વારા જાણી જોઇને ફાર્મ-૧ માં ઉપરોકત માહિતી છુપાવવામા આવી છે, જેથી તેની અરજી રદ થવી જોઇએ.

3) ઇ.આઇ.એ. રીપોર્ટ ની ક્ષતિઓ:

a) ઇ.આઇ.એ. રીપોર્ટના પેજ નં. C૧-૪ પર મુદ્દા નં. ૧૦ માં અદાણી દ્વારા જણાવવામા આવ્યું છે કે ૧૦ કી.મી.રેડીયસની અંદર આરકયોલોજીકલી ઇમ્પોર્ટન્ટ સ્થળો નથી. જયારે સૂચિત પ્રોજેકટ વિસ્તાર થી ૧ કી.મી. ના અંતરે નવીનાળ રીઝર્વ ફોરેસ્ટની અંદર આરકયોલોજીકલ સ્થળ આવેલો છે. જેને લઇને એમ.એસ. યુનિવર્સિટીના આરકયોલોજીકલ ડીપાર્ટમેન્ટ દ્વારા આ વિસ્તારનો સર્વે કરેલ છે જેનો પ્રાથમિક રીપોર્ટ આ સાથે જોડેલ છે. આમ, આ માહિતી છુપાવવામા આવી છે.

4) સુનિતા નારાયણ કમીટીના રીપોર્ટનું વાયોલેશન.

a) સુનીતા નારાયણ કમીટી રીપોર્ટના પાના નં. ૬૯ પર જણાવવામાં આવ્યું છે કે ભદ્રેશ્વર ખાતે ફીશીંગ બંદર બનાવવું જેથી કરીને આસપાસના ગામોના લોકો ત્યાં માછીમારી કરી શકે. પરંતુ અત્યાર સુધી આવું કંઈપણ કરવામા નથી આવ્યું.

b) સુનીતા નારાયણ કમીટી રીપોર્ટના પાના નં. ૬૯ પર જણાવવામાં આવ્યું છે ક માછીમારો કીનારા પર આવી જઇ શકે તે માટે આવવા જવાની વ્યવસ્થા ઊભી કરવી. જયારે અદાણી દ્વારા આવું કંઈપણ કરવામા આવ્યું નથી.

c) સુનીતા નારાયણ કમીટી રીપોર્ટના પાના નં. ૭૫ પર જણાવવામાં આવ્યું છે કે સામુદાયીક ગૌચર જમીનો સ્વેચ્છાએ પરત આપવી જોઇએ જેથી લોકો પોતાના પશુઓ ચરાવી શકે. પરંતુ આવું કંઈપણ કરવામા આવ્યું નથી.

d) પાના નં. ૭૫ પર જણાવવામા આવ્યું છે કે અત્યારના જેટલા પણ પ્રોજેકટો છે તેનું કયુમ્યુલીટીવ ઇમ્પેકટ અસેસમેંટ(સંકલીત અસરોનો અભ્યાસ) થવું જોઇએ અને તેની પરથી પર્યાવરણીય અસરોના નિરાકરણ માટેના પગલા ભરવા જોઇએ. આમ, અત્યાર સુધી અભ્યાસ કરવામા આવ્યો નથી જેથી નવા પ્રોજેકટો ને મંજુરી મળવી જોઇએ નહી.

e) કમીટીએ રેકોમેન્ડેશન નં. ૭.૨.૨ માં જણાવ્યું છે કે નોર્થ પોર્ટ ની પર્યાવરણીય મંજુરી રદ થવી જોઇએ, કારણ કે તે વિસ્તારમાં બોંચા આઇલેન્ડ આવેલો છે અને ત્યાં મોટા પ્રમાણમાં ચેરીયાઓને નુકશાન પહોંચાડાયો છે. તે છતાં મંજુરી રદ કરવામા આવી નથી.

f) સુનીતા નારાયણ કકમીટીની ભલામણ મુજબ HTL અને LTL નુ મેપીંગ કરી પબ્લીક ડોમેન માં મૂકવું, જે આજ દીવસ સુધી મૂકવામા નથી આવ્યું.

5) *અદાણી એન્ટરપ્રાઇઝ લી. નો પ્રોજેકટ અદાણી પાવર પ્લાન્ટ દ્વારા થઇ રહેલ નુકશાન.*

a) અદાણી પાવરને તા: ૨૧/૧૦/૨૦૦૮ ના રોજ મળેલ પર્યાવરણીય મંજુરીના મુદા નં. ૨ તેમજ ૨૯/૦૫/૨૦૦૮ ના રોજ ઇન્ટેક અને ડીસ્પોસલ ફેસેલીટી ના સી.આર.ઝેડ. કલીયરંસના મુદ્દા નં ૨ માં જણાવવામા આવ્યું છે કે પાઇપલાઇન દ્વારા એફલુઅન્ટ ડીસ્ચાર્જ કરવાનુ છે, જયારે અદાણી પાવર દ્વારા ખુલ્લી કેનાલ બનાવીને એફલુઅન્ટ ડીસ્ચાર્જ કરવામા આવે છે. આમ, પર્યાવરણીય મંજુરીનું વાયોલેશન કરવામાં આવ્યું છે.

b) અદાણી પાવરની ઇન્ટેક ચેનલ બની તેના કારણે ગ્રાઉડ વોટરમાં ખારાશનું પ્રમાણ વધ્યું છે.

c) કોલ હેન્ડલીંગ ગાઇડલાઇનનો ભંગ થઇ રહ્યો છે.

d) CRZ કલીયરંસ ની શર્ત નં. ૭ માં જણાવવામાં આવ્યું છે કે ઇન્ટેક ચેનલ અને એફલુઅન્ટ ડીસ્ચાર્જ પાઇપલાઇનના કારણે લોકલ કોમ્યુનિટી કે માછીમારોને આવવા જવામા હેરાનગતી થવી ન જોઇએ. પરંતુ ઇન્ટેક ચેનલ અને એફલુઅન્ટ ડીસ્ચાર્જ ચેનલના કારણે માછીમારોના રસ્તા બંધ થઇ ગયા છે, વાંઢ ગામના માલધારીઓ ને ચરીયાણ વિસ્તારમા જવાના રસ્તા બંદ થઇ ગયેલ છ તેમજ દરીયા કીનારે આવેલ ધાર્મિક સ્થળ પર આવવા-જવાનો રસ્તો બંદ કરી નાખવામા આવ્યો છે.

e) CRZ કલીયરંસ ની શર્ત નં. ૯ માં જણાવવામાં આવ્યું છે કે પ્રોજેકટના કારણે લોકોનું, ઘરોનું કે માછીમારીનું ડીસ્પ્લેસમેંટ ન થવું જોઇએ. પાઇપલાઇનના કારણે માછીમારો અને તેની બોટો ને અવર-જવરમાં અવરોધ ઉભો ન થવો જોઇએ. જયારે ઇન્ટેક ચેનલ ના કારણે જુનો કોટડી બંદર જેના પર વર્ષોથી માછીમારો ત્યાં વસીને માછીમારી કરતા તે બધાનું સ્થળાંતર કરવામા આવેલ છે. એફલુઅન્ટ ડીસ્ચાર્જ માટે પાઇપલાઇનની જગ્યાએ ખુલ્લી ચેનલ બનાવી નાખવામા આવી છે , અને તે કોતરી ક્રીક ઉપરથી પસાર થતી હોઇ માછીમારોની બોટોની અવર-જવર અવરોધાઇ છે. આમ, આ કંડીશનનું વાયોલેશન કરવામા આવેલ છે.

f) પર્યાવરણીય મંજુરી ની શર્ત નં. ૨૧ માં જણાવવામાં આવ્યું છે કે છ માસિક કંપલાયંસ રીપોર્ટ સબમીટ કરવું. આ કંડીશન નું કંપલાયંસ નથી થઇ રહ્યું.

6) *વન વિભાગની જમીનનો પ્રશ્ન./*

a) અદાણી દ્વારા તા: ૧૯ જૂલાઇ ૨૦૦૪ માં મુંદરા તાલુકાના આઠ ગામોની કુલ્લ ૧૫૩૬.૮૧ હેકટર રીઝર્વ ફોરેસ્ટ ની જમીનની માંગણી કરવામા આવેલ છે, જેનું ફોરેસ્ટ કલીયરંસ અન્ડર પ્રોસેસ છે. આ પ્રોજેકટ માટે જે જમીન નો ઉપયોગ થવાનો છે તે જમીન ૧૫૩૬.૮૧ વાળી માંગણી માની ૧૦૨.૩૮ હેકટર શીરાચા દાણદેરી રખાલ (રીઝર્વ ફોરેસ્ટ) ની છે.

b) વન અધિકાર અધિનિયમ ૨૦૦૬ પ્રમાણે કોઇપણ વન ની જમીન પર પહેલો અધિકાર તેનો ઉપયોગ કરતા ગ્રામજનોનો છે. અને ગ્રામસભાની મંજુરી વગર ઔધોગીક હેતુ કે અન્ય કોઇપણ હેતુ માટે ફાળવી શકાય નહી.

c) વન અધિકાર અધિનિયમ અંતર્ગત કોઇપણ કોમ્યુનિટી વન ની જમીનનો ત્રણ પેઢીથી ઉપયોગ કરતા હોય અથવા આજીવિકા મેળવતા હોય તો તેને હક મળી શકે છે.

d) આ ૧૫૩૬.૮૧ હેકટર ફોરેસ્ટની જમીન નો ઉપયોગ તેની આજુ-બાજુના ગામલોકો પોતાની આજીવિકા ચલાવવા કરે છે તો આ જમીન વન અધિકાર અધિનિયમ અંતર્ગત ઔદ્યોગિક હેતુ માટે ફાળવી શકાય નહી.

e) શીરાચા ગ્રામ પંચાયતે સૂચિત પ્રોજેકટ માટે ઉપયોગ થનાર જંગલની જમીન પર તા:૨૪/૦૪/૨૦૧૭ ના રોજ વન અધિકાર અધિનિયમ હેઠળ કોમ્યુનિટી રાઇટસ સેટલ કરવા પ્રાંત સ્તરીય વન અધિકાર સમિતી પાસે પોતાનો દાવો રજુ કર્યો છે.

f) ૧૫૩૬.૮૧ હેકટર જમીનની માંગણી માં નવીનાળ ગામની પણ ૮૯ હેકટર જમીન આવે છે અને તેના પર નવીનાળ ગ્રામસભા દ્વારા સામુહિક દાવો કરવામા આવ્યો છે.

g) વન અધિકાર અધિનિયમ પ્રમાણે આ જંગલ ની જમીન પર પ્રથમ અધિકાર ગ્રામજનો નો છે, જેથી તેનું ફોરેસ્ટ કલીયરંસ ન મળી શકે અને પ્રોજેકટ માટે ઉપયોગ ન થઇ શકે.

h) આ વિસ્તારમાં આ છેલ્લું રીઝર્વ ફોરેસ્ટ છે. જો તેને ઔધૌગિક હેતુ માટે ફાળવી દેવામાં આવશે તો જંગલ વગરનો વિસ્તાર બની જશે અને ઔધૌગિક વિસ્તારમાં જંગલો વધારે હોવા જરૂરી છે.

7) અદાણી પોર્ટ એન્ડ સ્પેશીમલ ઇકોનોમીક ઝોન ના એન્વાયમેંટ કલીયરંસ નું નોન કંપ્લાયંસ:

a) સ્પેશીફીક કંડીશન (૨) પ્રમાણે વિસ્તારમાં આવતી ક્રીકો, નદીઓ અને ચેરીયાના વિસ્તારનું સરક્ષણ કરવું. જયારે, અદાણી દ્વારા આ વિસ્તારની ક્રીકો, નદીઓ અને ચેરીયાના વિસ્તારનું નિકંદન કાઢેલ છે. જે માં જોડેલ અલગ અલગ વર્ષનાં સેટેલાઇટ ફોટોગ્રાફ્સમાં જોઇ શકાય છે. આમ, આ કંડીશનનું વાયોલેશન કરવામા આવેલ છે.

b) એન્વાયર્મેંટ કલીયરંસ ની સ્પેશીફીક કંડીશન ને.(૩) માં જણાવવામાં આવ્યું છે કે તમામ ક્રીકોમાં પાણી અવર-જવર કરી શકે તે માટે તેના મોઢા ખુલ્લા રાખવા.

i) કોટડી ક્રીકનું મોઢું માટી નાખી છવાવી દેવામા આવ્યું છે.

ii) ભરાડી માતા ક્રીક નાગમતી નદીને જે જગ્યાએ મળે છે તે જગ્યા ઉપર બ્રીજ બનાવવાના કારણે દરીયાનું પાણી ઉપરના વિસ્તારમાં આવી શકતું નથી અને ત્યાં ઉપરના વિસ્તારમાં ચેરીયા હતા તે પણ સુકાઇ ગયા છે.

iii) આમ, આ કન્ડીશનનું વાયોલેશન કરવામા આવ્યું છે.

c) સ્પેશીફીક કંડીશન (૪) માં જણાવ્યા પ્રમાણે દરેક ક્રીકની સ્થિતિ સેટેલાઇટ ઇમેજ-૨૦૦૫ ની સરખામણીએ લાવવી. પરતુ અદાણી પોર્ટ એન્ડ એસ.ઇ.ઝેડ. દ્વારા આ કંડીશનનું પાલન કરવામાં આવેલ નથી.,

d) સ્પેશીફીક કંડીશન નં. (૫) માં જણાવવામા આવ્યું છે કે વર્ષમાં એક વખત તાજેતરનો સેટેલાઇટ નકશો રજુ કરવો જેથી તેની સરખામણી વર્ષ-૨૦૦૫ ના સેટેલાઇટ નકશા સાથે થઇ અને ખાત્રી કરી શકાય કે ક્રીકો, નદીઓ, ચેરીયાઓ અને ક્રીકોના મુખમાં કોઇ ફેરફાર થયો છે કે નહી. એ.પી.એસ.ઇ.ઝેડ. દ્વારા અત્યાર સુધી આવો કોઇ નકશો રજુ કરવામા આવ્યો નથી. આમ, આ કંડીશનનું કંપલાયંસ કરવામા નથી આવ્યું.

e) સ્પેશીફીક કંડીશન (૬) માં જણાવ્યા મુજબ સુનિતા નારાયણ કમીટી દ્વારા રજુ કરવામા આવેલ રીપોર્ટને ધ્યાનમાં રાખીને પર્યાવરણ અને વન મંત્રાલય દ્વારા લાગુ કરવામા આવેલ આદેશનું એપી.એસ.ઇ.ઝેડ. એ પાલન કરવું. જયારે એ.પી.એસ.ઇ.ઝેડ. દ્વારા તેનું પાલન કરવામા નથી આવી રહ્યું.

f) સ્પેશીફીક કંડીશન (૧૨) અને (૧૩) માં જણાવ્યા પ્રમાણે NCSCM/NIOT એ પર્યાવરણ અને વન મંત્રાલય દ્વારા મજુર કરાયેલ એકશન પ્લાનના અમલીકરણ માટેનું નિયંત્રણ અથવા ચકાસણી કરશે. છ માસિક મોનીટરીંગ રીપોર્ટ સાથે એકસન પ્લાનના પાલનનો રીપોર્ટ રજુ કરવાનો રહેશે. આ કંડીશનનું કંપલાયંસ અત્યાર સુધી કરવામા આવ્યું નથી.

g) સ્પેશીફીક કંડીશન (૧૫) માં જણાવ્યા પ્રમાણે નદીના માર્ગમાં કોઇપણ પ્રકારનો ફેરફાર કરવો નહી. જયારે, એ.પી.એસ.ઇ.ઝેડ દ્વારા.....

i) કાંડાગરા વાળી નદી જે અદાણી પાવર વચ્ચેથી નીકળે છે તેનો રૂટ બદલી નાખવામા આવેલ છે.

ii) નવીનાળ અને શીરાચા વચ્ચે આવેલ ડમડવાળા છેલાનો રૂટ બદલવામાં આવેલ છે.

iii) નાગમતી નદીનો એક મૂખ બંધ કરી નાખેલ છે.

iv) ધ્રબ વાળી નદી પર ઓ.સી.સી.એલ. કંપની ઊભી કરી દેવામા આવેલ છે.

v) કેવડી નદી ઉપર અદાણી હોસ્પીટલનનું બાંધકામ કરી નાખવામા આવેલ છે. આમ, આ શરતનું ભંગ કરવામા આવેલ છે.

h) સ્પેશીફીક કંડીશન (૧૮) માં જણાવ્યા પ્રમાણે ચેરીયા વિસ્તારથી ૫૦ મીટર સુધી કોઇપણ ડેવલપમેન્ટ કરવું નહી. જયારે પ્રોજેકટ પ્રપોનન્ટ દ્વારા ઘણી જગ્યાએ બાંધકામ કરી દેવામા આવ્યું છે. જેમ કે, અદાણી હાઉસની બિલ્ડીંગ ઊભી કરી દેવામા આવી છે. આમ, આ કન્ડીશનનું ભંગ કરવામાં આવ્યું છે.

i) સ્પેશીફીક કંડીશન (૧૯) માં જણાવ્યા પ્રમાણે એ.પી.એસ.ઇ.ઝેડ. ને બહારની બાજુ ત્રણ સ્તરના છત્રમાં ગ્રીન બેલ્ટ વિકસાવવાનો છે, જે આજ દિવસ સૂધી કંપલાયંસ કરવામા નથી આવ્યું.

8) ગુજરાત ઇકોલોજી કમીશન નો રીપોર્ટ:

a) કોલ હેન્ડલીંગના કારણે ચેરીયા અને તેની ઇકોસીસ્ટમ પર થઇ રહેલ અસર ની ગુજરાત ઇકોલોજી કમીશન દ્વારા સ્ટડી કરી એક રીપોર્ટ બનાવવામાં આવ્યો છે. તેમાંથી મુંદરા પોર્ટ પણ આ સ્ટડી નો ભાગ હતો.

b) આ રીપોર્ટ મુજબ કોલસાની ડસ્ટના કારણે ચેરીયાની વૃધ્ધી પર અસર થઇ છે.

c) આ રીપોર્ટ એમ કહે છે કે ૨૦૧૦/૧૧ માં BOD(બાયોલોજીકલ ઓક્સિજન ડીમાંડ) ૯.૫૨ હતા જે ૨૦૧૨/૧૩ માં વધીને ૨૭ સુધી પહોંચ્યા છે, જે અભ્યાસ વિસ્તારના પાર્ટસ થી સૌથી વધારે અહીંયા વધ્યા છે.

d) COD (કેમીકલ ઓકસીજન ડીમાન્ડ) પણ ૨૦૧૦/૧૧ માં ૩૮ હતી જે ૨૦૧૨/૧૩ માં વધીને ૯૨.૬૫પહોંચ્યું છે.

e) DO (ડીસોલ્વેડ ઓકસીજન) ૪.૮ થી વધીને ૪.૯૨ પહોંચ્યું છે, જે CPCB ની પરમીશેબલ લાઇન થી ઉચું છે.

f) SO (સસ્પેન્ડેડ સોલીડ, પાણીમાં વધતું ધુંધળાપણું) ૫૬ થી વધીને ૧૬૨ પર પહોચ્યુ છે, જે CPCB ની પરમીશેબલ લાઇન થી ઉચું ગયું છે.

g) નાઇટ્રેટ ૨૦૧૦/૧૧ માં ૦.૩૧૩ હતું જે ૨૦૧૨/૧૩ માં વધીને ૧.૧૫૪ પર પહોચ્યું છે.

9) અદાણી એન્ટરપ્રાઇઝ લી.ના કોપર રીફાઇનરી પ્રોજેકટ માટે નવીનાળ ગામની ગૌચર જમીન હતી તેનો ઉપયોગ થવાનો છે. આ જમીનની મેટર કોર્ટમાં ચાલી રહી છે. તેનો હજી કોઇ પણ પાર્ટીની ફેવરમાં નિકાલ કરવામા નથી આવ્યો.

10) લોકલ લોકોની રોજગારી માટે આટલા બધા ઉદ્યોગો હોવા છતાં પણ કંઇ કરવામા નથી આવ્યું. જેમ કે અદાણી પાવર પ્લાન્ટ માટે આજુબાજુના વિસ્તારની ૪૦૦ હેકટર જેટલી જમીન આપવામા આવી અને માછીમારો, ખેડુતો અને પશુપાલકોને બેરોજગાર બનનાવી તેના બદલામા ૭૦૦૦ લેબર માંથી માત્ર ૫૦૦ લોકલ અને ૧૫૦૦ એમ્પ્લોયર માંથી માત્ર ૧૫ લોકલ છે. તો આ પ્રોજેકટ થી બેરોજગારી અને પ્રદુષણ સિવાય કંઇ નહી મળે.

11) આ વિસ્તાર દરીયાકીનારાનો છે. માટે સી.આર.ઝેડ. કલીયરંસ લેવું જરૂરી છે. કારણ કે વાવાઝોડું તેમજ ભુકંપ કે સુનામી વખતે બચાવ માટેનો એકશન પ્લાન બનાવી શકાય.

12) કંપની દ્વારા ૩૨૮૦૦ કે.એલ.ડી. પાણીનો ઉપયોગ કરવામાં આવશે, અને તેના માટે ડીસેલીનેશન પ્લાનનો ઉપયોગ કરવામા આવશે. તેના ડીસ્ચાર્જના કારણે દરીયાઇ જીવ સૃષ્ટી ઉપર ખરાબ અસર થશે. આ ડીસેલીનેશન પ્લાન કંપની સાથે સંકળાયેલ છે પરંતુ તેની અસરોનો અભ્યાસ કરવામા આવેલ નથી.

13) આ વિસ્તારમાં બે પાવર પ્રોજેકટ અને એશિયાનું મોટું કોલ હેન્ડલીંગ પોર્ટ આવેલું છે પરંતુ ઇ.આઇ.એ. રીપોર્ટમાં બતાવવામાં નથી આવી.

14) અદાણીના બીજા પ્રોજેકટોના એન્વાર્યમેન્ટ કલીયરેસના કંપલાયંસ કરવામાં આવેલ નથી, તો નવા પ્રોજેકટ ને મંજુરી આપી અને આજુ-બાજુના વિસ્તારના લોકોને નુકશાન પહોંચાડી ન શકાય.

15) સૂચિત પ્રોજેકટની ગૌચર જમીન પર અમારા ગામના પશુઓ ચરીયાણ કરતા હતા તે છીનવી આજીવિકા ખતમ કરી નાખવામા આવેલ છે. હવે વધેલી આ ફોરેસ્ટની જમીન પણ આપીને પ્રોજેકટ લગાવવામાં આવશે તો ચરીયાણ રહેશે જ નહી.

16) કોપર રીફાઇનરીના કારણે સલ્ફયુરીક એસીડ જેવા હઇઝારડીઅસ કેમીકલ નીકળવાના છે જેના કારણે આ વિસ્તારમાં પ્રદુષણ વધી જશે અને એસીડ વરસાદ થવાની સંભાવના વધી જશે. જેથી આ પ્રોજેકટ રદ થવો જોઇએ.

17) નદી બંધ કરવાના કારણે આસપાસના વિસ્તારની જમીનનું ધોવાણ થશે અને પૂર જેવી સ્થીતીમાં આજુબાજુના ગામડાઓ ને જોખમ સર્જાસે.

18) જુનારસ્તાઓ બંધ થશે જેમાનો એક નવીનાળ થી કોટડી ક્રીકનો માછીમારોનો રસ્તો બંધ થશે.

19) આ જંગલની અંદર વન્ય પ્રાણીઓ રહે છે તો તેઓના રહેઠાણ નાશ પામશે જેના રેસ્ટોરેશન ને લઇ શુ?

આપનો વિશ્વાસુ

બિડાણઃ

૧. ટર્મસ ઓફ રેફરંસ
૨. ફોર્મ -૧
૩. ટર્મસ ઓફ રેફરંસનું નોન કંપલાયંસ(ઇ.આઇ.એ. પાના નં. AI-14)
૪. તા:૩૧ માર્ચ ૨૦૧૧ વાળો એમ.ઓ.ઇ.એફ. નો ઓફીસ મેમોરેન્ડમ.
૫. મારા દ્વારા કરવામા આવેલ તા:૩૧ એપ્રીલ ૨૦૧૭ વાળી ફરીયાદ.
૬. આરકયોલોજી પ્રોફેસરનો રીપોર્ટ.
૭. ભરાડી ક્રીક અને નાગમતી નદીની વર્ષ ૨૦૦૫ અને ૨૦૧૫ ની ગુગલ અર્થ ઇમેજ.
૮. કોટડી ક્રીક નો વર્ષ ૨૦૧૦ અને ૨૦૧૬ ની ગુગલ અર્થ ઇમેજ.
૯. મોટા કાંડાગરા નદીની વર્ષ ૨૦૦૫ અને ૨૦૧૬ ની ગુગલ અર્થ ઇમેજ.
૧૦. કમંડવાળા છેલાની વર્ષ ૨૦૧૦ અને ૨૦૧૬ ની ગુગલ અર્થ ઇમેજ.
૧૧. નાગમતી નદી ની વર્ષ ૨૦૦૫ અને ૨૦૧૬ ની ગુગલ અર્થ ઇમેજ.
૧૨. ધ્રબ વાળી નદીની વર્ષ ૨૦૦૫ અને ૨૦૧૫ ની ગુગલ અર્થ ઇમેજ.
૧૩. કેવળી નદી નની વર્ષ ૨૦૦૪ અને ૨૦૧૫ ની ગુગલ અર્થ ઇમેજ.
૧૪. અદાણી હાઉસ અને ક્રીક ની ગુગલ અર્થ ઇમેજ.
૧૫. શીરાચા વન અધિકાર સમિતી દ્વારા રજુ કરવામા આવેલ દાવાની નકલ.
૧૬. નવીનાળ વન અધિકાર સમિતી દ્વારા રજુ કરવામા આવેલ દાવાની નકલ.

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F. No. J-11011/113/2016-IA.II(I)
Government of India
Ministry of Environment, Forest and Climate Change
(I.A. Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Aliganj,
New Delhi - 110003
E-mail: satish.garkoti@nic.in
Tel: 011-24695316

Dated: 21st June, 2016

To

M/s Adani Enterprises Limited,
Sambhaav House,
Judges Bungalow Road, Bodakdev ,
Ahmedabad, Gujarat-380015.

Subject: Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat - prescribing of ToRs regarding.

Sir,

This has reference to your online application No. IA/GJ/IND/53004/2016 dated 21st April, 2016 along with the application in prescribed format (Form-I), copy of pre-feasibility report and proposed TORs for undertaking detailed EIA study as per the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at S.No. 3(a), under category 'A' of the Schedule of EIA Notification, 2006 and appraised at the Central level.

2.0 M/s. Adani Enterprises Limited proposes to install a new manufacturing unit for 10 LTPA copper project. It is proposed to set up the plant for Copper Cathode based on Pyrometallurgical process technology and Electro-refining process. The proposed unit will be located at Adani Port Special Economic Zone (APSEZ) land (Siracha and Navinal Villages), Mundra Taluka, Kutch District, Gujarat State. The proponent has provided 3 sites for the project and proposed to set up the plant at Site-II. The land required for the project is 256.58 ha, out of which 154.18 ha is for industrial use and 102.38 ha is forest land. It has been informed that state government has recommended the forest diversion proposal to the Central Government. The proponent has also informed that the merits for selecting Site-II for the project inter-alia include proximity to west port from where major raw material will be imported, major part of land is within the notified SEZ and also the forest land diversion proposal is forwarded by the State government to Central Government. The proposed site lies between 22°48'55.78" N Latitude and 69°34'32.02" E Longitude. There are no national parks/ wildlife sanctuary within 10 km radius. The project area falls under Seismic Zone V. The estimated project cost is Rs. 10,000 Crore and the estimated environment protection cost is Rs. 900 crores. Employment generation from proposed project will be about 2000 direct employment and about 5000 indirect employment. The proposed capacity for different products for new site area as below:

Name of Unit	No. of Units	Capacity of each Unit	Production Capacity
Copper Smelter plant	2	4.5 LTPA	9 LTPA
Copper Refinery plant	2	5.0 LTPA	10 LTPA

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Continuous cast copper rod plant	2/3	2.5/ 1.67 LTPA	5 LTPA
Copper scrap melting facility	2	0.5 LTPA	1 LTPA
Sulphuric acid plant	2	15 LTPA	30 LTPA
Phosphoric acid plant	2	2.5 LTPA (100% P_2O_5)	5 LTPA (100% P_2O_5)
Aluminium Fluoride plant	2	15,000 TPA	30,000 TPA
Selenium Recovery plant	2	144 TPA	288 TPA
Precious metal recovery plant (Gold)	2	25 TPA	50 TPA
Precious metal recovery plant (Silver)	2	250 TPA	500 TPA
Oxygen (Industrial) Plant (95% Purity)	2	45,000 TPM	90,000 TPM
Waste heat recovery boiler	2	25 MW	50 MW

3.0 The electricity load required is 300 MW, out of this, 40 MW will be generated from internal process steam by waste heat recovery; whereas the remaining 260 MW power will be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd. Company has also proposed to install 6 DG Set of 1200 - 2000 KVA Each, as a backup facility.

4.0 Proposed raw material requirement for project are Copper concentrate and Rock phosphate. Requirement would be fulfilled by importing as well as from domestic market. Fuel consumption will be mainly Furnace Oil, LPG/NG and Coal for process requirement. Water Consumption for the proposed project will be 32,800 KLD desalinated water and waste water generation will be nil outside the project boundary. Domestic waste water will be treated through Sewage treatment plant and industrial waste water generated will be treated in the Effluent Treatment Plant & through reverse Osmosis plant and reused in the process. ETP Sludge shall be disposed as per applicable hazardous waste management rules.

5.0 The above proposal was considered by the Expert Appraisal Committee (Industry) during its 6th meeting held on 3rd – 4th May, 2016 for prescribing TORs for undertaking detailed EIA/EMP study.

6.0 Based on the information furnished and presentation made by the project proponent, the Committee recommended prescribing following specific TORs for undertaking detailed EIA and EMP study in addition to the generic TOR enclosed at **Annexure I read with additional TORs at Annexure-2.**

i. The Public Hearing for the project should be conducted by Gujarat Pollution Control Board

ii. The issues raised during public hearing and commitment of the project proponent on the same along with time bound action plan to implement the commitment and financial allocation thereto should be clearly provided.

iii. The project proponent should carry out social impact assessment of the project as per the Office Memorandum No. J-11013/25/2014-IA.I dated 11.08.2014 issued by the Ministry regarding guidelines on Environment Sustainability and CSR related issues. The social impact assessment study so carried out should form part of EIA and EMP report.

iv. Plan for management of Arsenic bearing sludge should be submitted.

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v. Hazardous management plan for handling of all hazardous material including minerals, products and waste, like H_2SO_4 and Arsenic sludge should be prepared by the project proponent and submitted.

7.0 The undersigned is directed to inform that the Ministry of Environment, Forest and Climate Change (MoEFCC) after accepting the recommendation of the EAC (Industry), hereby decided to accord ToRs for the above project.

8.0 It is requested that the draft EIA Report may be prepared in accordance with the above mentioned specific TORs and enclosed generic TORs and additional TORs and thereafter further necessary action including conduct of public consultation may be taken (if required) for obtaining Environment Clearance in accordance with the procedure prescribed under the EIA Notification, 2006 as amended.

9.0 The TORs are valid for a period of three years from today i.e 21.06.2016 and will expire on 20.06.2019, However, this period could be further extended by a maximum period of one year provided an application is made by the project proponent at least three months before the expiry of the validity period, together with updated Form-I, based on proper justification.

21/06/2016

(Dr. Satish C. Garkoti)
Scientist 'F'

Copy to:-

1. The Secretary, Department of Environment, Government of Gujrat.
2. The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, E-5 Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal – 462016.

(Dr. Satish C. Garkoti)
Scientist 'F'

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ANNEXURE –I

GENERIC TERMS OF REFERENCE (TOR) IN RESPECT OF INDUSTRY SECTOR

1. Executive Summary
2. Introduction
   - i. Details of the EIA Consultant including NABET accreditation
   - ii. Information about the project proponent
   - iii. Importance and benefits of the project

3. Project Description
   - i. Cost of project and time of completion.
   - ii. Products with capacities for the proposed project.
   - iii. If expansion project, details of existing products with capacities and whether adequate land is available for expansion, reference of earlier EC if any.
   - iv. List of raw materials required and their source along with mode of transportation.
   - v. Other chemicals and materials required with quantities and storage capacities
   - vi. Details of Emission, effluents, hazardous waste generation and their management.
   - vii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract)
   - viii. Process description along with major equipments and machineries, process flow sheet (quantative) from raw material to products to be provided
   - ix. Hazard identification and details of proposed safety systems.
   - x. Expansion/modernization proposals:
     - a. Copy of all the Environmental Clearance(s) including Amendments thereto obtained for the project from MOEF/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environmental clearances including Amendments shall be provided. In addition, status of compliance of Consent to Operate for the ongoing /existing operation of the project from SPCB shall be attached with the EIA-EMP report.
     - b. In case the existing project has not obtained environmental clearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the SPCB shall be submitted.

4. Site Details
   - i. Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.
   - ii. A toposheet of the study area of radius of 10km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)
   - iii. Co-ordinates (lat-long) of all four corners of the site.
   - iv. Google map-Earth downloaded of the project site.

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v. Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

vi. Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.

vii. Landuse break-up of total land of the project site (identified and acquired), government/private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)

viii. A list of major industries with name and type within study area (10km radius) shall be incorporated. Land use details of the study area

ix. Geological features and Geo-hydrological status of the study area shall be included.

x. Details of Drainage of the project upto 5km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (mega green field projects)

xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.

xii. R&R details in respect of land in line with state Government policy

5. **Forest and wildlife related issues (if applicable):**

i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (if applicable).

ii. Landuse map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (*in case of projects involving forest land more than 40 ha).*

iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted.

iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden thereon.

v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.

vi. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife

6. **Environmental Status**

i. Determination of atmospheric inversion level at the project site and site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall.

ii. AAQ data (except monsoon) at 8 locations for PM10, PM2.5, SO2, NOX, CO and other parameters relevant to the project shall be collected. The monitoring stations shall be based CPCB guidelines and take into account the pre-dominant wind direction, population zone and sensitive receptors including reserved forests.

iii. Raw data of all AAQ measurement for 12 weeks of all stations as per frequency given in the NAQQM Notification of Nov. 2009 along with – min.,

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max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.

iv. Surface water quality of nearby River (60m upstream and downstream) and other surface drains at eight locations as per CPCB/MoEF&CC guidelines.

v. Whether the site falls near to polluted stretch of river identified by the CPCB/MoEF&CC.

vi. Ground water monitoring at minimum at 8 locations shall be included.

vii. Noise levels monitoring at 8 locations within the study area.

viii. Soil Characteristic as per CPCB guidelines.

ix. Traffic study of the area, type of vehicles, frequency of vehicles for transportation of materials, additional traffic due to proposed project, parking arrangement etc.

x. Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. If Schedule-I fauna are found within the study area, a Wildlife Conservation Plan shall be prepared and furnished.

xi. Socio-economic status of the study area.

7. Impact Assessment and Environment Management Plan

i. Assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features. In case the project is located on a hilly terrain, the AQIP Modelling shall be done using inputs of the specific terrain characteristics for determining the potential impacts of the project on the AAQ. Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. Details of the model used and the input data used for modeling shall also be provided. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.

ii. Water Quality modelling – in case, if the effluent is proposed to be discharged in to the local drain, then Water Quality Modelling study should be conducted for the drain water taking into consideration the upstream and downstream quality of water of the drain.

iii. Impact of the transport of the raw materials and end products on the surrounding environment shall be assessed and provided. In this regard, options for transport of raw materials and finished products and wastes (large quantities) by rail or rail-cum road transport or conveyor-cum-rail transport shall be examined.

iv. A note on treatment of wastewater from different plant operations, extent recycled and reused for different purposes shall be included. Complete scheme of effluent treatment. Characteristics of untreated and treated effluent to meet the prescribed standards of discharge under E(P) Rules.

v. Details of stack emission and action plan for control of emissions to meet standards.

vi. Measures for fugitive emission control

vii. Details of hazardous waste generation and their storage, utilization and disposal. Copies of MOU regarding utilization of solid and hazardous waste shall also be included. EMP shall include the concept of waste-minimization, recycle/reuse/recover techniques, Energy conservation, and natural resource conservation.

viii. Proper utilization of fly ash shall be ensured as per Fly Ash Notification, 2009. A detailed plan of action shall be provided.

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ix. Action plan for the green belt development plan in 33 % area i.e. land with not less than 1,500 trees per ha. Giving details of species, width of plantation, planning schedule etc. shall be included. The green belt shall be around the project boundary and a scheme for greening of the roads used for the project shall also be incorporated.

x. Action plan for rainwater harvesting measures at plant site shall be submitted to harvest rainwater from the roof tops and storm water drains to recharge the ground water and also to use for the various activities at the project site to conserve fresh water and reduce the water requirement from other sources.

xi. Total capital cost and recurring cost/annum for environmental pollution control measures shall be included.

xii. Action plan for post-project environmental monitoring shall be submitted.

xiii. Onsite and Offsite Disaster (natural and Man-made) Preparedness and Emergency Management Plan including Risk Assessment and damage control. Disaster management plan should be linked with District Disaster Management Plan.

8. Occupational health

i. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved.

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometry, Vision testing (Far & Near vision, colour vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.

iii. Annual report of heath status of workers with special reference to Occupational Health and Safety.

iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

9. Corporate Environment Policy

i. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.

ii. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.

iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details of this system may be given.

iv. Does the company have system of reporting of non compliances / violations of environmental norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

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10. Details regarding infrastructure facilities such as sanitation, fuel, restroom etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.

11. Any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

12. 'A tabular chart with index for point wise compliance of above TORs.

13. The TORs prescribed shall be valid for a period of three years for submission of the EIA-EMP reports along with Public Hearing Proceedings (wherever stipulated).

The following general points shall be noted:

i. All documents shall be properly indexed, page numbered.
ii. Period/date of data collection shall be clearly indicated.
iii. Authenticated English translation of all material in Regional languages shall be provided.
iv. The letter/application for environmental clearance shall quote the MOEF file No. and also attach a copy of the letter.
v. The copy of the letter received from the Ministry shall be also attached as an annexure to the final EIA-EMP Report.
vi. The index of the final EIA-EMP report must indicate the specific chapter and page no. of the EIA-EMP Report
vii. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MOEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry shall also be followed.
viii. The consultants involved in the preparation of EIA-EMP report after accreditation with Quality Council of India (QCI) /National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA-EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. Name of the Consultant and the Accreditation details shall be posted on the EIA-EMP Report as well as on the cover of the Hard Copy of the Presentation material for EC presentation.
ix. TORs' prescribed by the Expert Appraisal Committee (Industry) shall be considered for preparation of EIA-EMP report for the project in addition to all the relevant information as per the 'Generic Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006. Where the documents provided are in a language other than English, an English translation shall be provided. The draft EIA-EMP report shall be submitted to the State Pollution Control Board of the concerned State for conduct of Public Hearing. The SPCB shall conduct the Public Hearing/public consultation, district-wise, as per the provisions of EIA notification, 2006. The Public Hearing shall be chaired by an Officer not below the rank of Additional District Magistrate. The issues raised in the Public Hearing and during the consultation process and the commitments made by the project proponent on the same shall be

x. included separately in EIA-EMP Report in a separate chapter and summarised in a tabular chart with financial budget (capital and revenue) along with time-schedule of implementation for complying with the commitments made. The final EIA report shall be submitted to the Ministry for obtaining environmental clearance.

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ANNEXURE-2

METALLURGICAL INDUSTRY (FERROUS AND NON-FERROUS)

1. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs & outputs (material and energy balance).
2. Emission from sulphuric acid plant and sulphur muck management.
3. Details on installation of Continuous Emission Monitoring System with recording with proper calibration system
4. Details on toxic metals including fluoride emissions
5. Details on stack height
6. Details on ash disposal and management
7. Complete process flow diagram describing process of lead/zinc/copper/ aluminium, *etc.*
8. Details on smelting, thermal refining, melting, slag fuming, and Waelz kiln operation
9. Details on Holding and de-gassing of molten metal from primary and secondary aluminum, materials pre-treatment, and from melting and smelting of secondary aluminium
10. Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
11. Trace metals in waste material especially slag.
12. Plan for trace metal recovery
13. Trace metals in water

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Format for Executive Summary

Executive summary of the report in about 8-10 pages incorporating the following:

i. Project name and location (Village, Dist, State, Industrial Estate (if applicable)
ii. Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC.
iii. Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)
iv. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
v. Measures for mitigating the impact on the environment and mode of discharge or disposal.
vi. Capital cost of the project, estimated time of completion
vii. Site selected for the project – Nature of land – Agricultural (single/double crop), barren, Govt/private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note – in case of industrial estate this information may not be necessary)
viii. Baseline environmental data – air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
ix. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
x. Likely impact of the project on air, water, land, flora-fauna and nearby population
xi. Emergency preparedness plan in case of natural or in plant emergencies
xii. Issues raised during public hearing (if applicable) and response given
xiii. CSR plan with proposed expenditure.
xiv. Occupational Health Measures
xv. Post project monitoring plan

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APPENDIX I

(See Paragraph-6)

FORM 1

Note : If space provided against any parameter is inadequate,Kindly upload supporting document under 'Additional Attachments if any' at the last part of the Form1. Please note that all such Annexures must be part of single pdf document.

(I) Basic Information

S.No.	Item	Details
	Whether it is a violation case and application is being submitted under Notification No. S.O.804(E) dated 14.03.2017 ?	No
1.	Name of the Project/s Brief summary of project Proposal Number Project Cost (in lacs)	Proposed 10 LTPA Copper Project Annexure-Brief summary of project IA/GJ/IND/53004/2016 1000000
2.	S. No. in the schedule Project Sector	3(a) Metallurgical industries (ferrous & non ferrous) Industrial Projects - 1
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number or wells to be drilled	Proposed Production Capacity: a. Copper Smelter Plant - 9 LTPA b. Copper Scrap Melting Facility - 1 LTPA c. Copper Refinery Plant - 10 LTPA d. Continuous Cast Copper Rod Plant - 5 LTPA e. Sulphuric Acid Plant - 30 LTPA f. Phosphoric Acid Plant - 5 LTPA g. Aluminum Fluoride Plant - 30,000 TPA h. Selenium Recovery Plant - 288 TPA i. Precious Metal Recovery Plant i. Gold – 50 TPA ii. Silver – 500 TPA j. Oxygen (Industrial) Plant – 90,000 TPM (95% Purity) k. Waste Heat recovery boiler b ha.
4.	New/Expansion/Modernization	New
5.	Existing Capacity/Area etc.	-1 ha.
6.	Category of project i.e. 'A' or 'B'	A
7.	Does it attract the general condition? If yes, please specify	No
8.	Does it attract the specific condition? If yes, please specify	No
9.	Location of the project Shape of the project land Uploaded GPS file Uploaded copy of survey of India Toposheet Plot/Survey/Khasra No. Town / Village State of the project	Mundra, Gujarat Block (Polygon) Annexure-GPS file Annexure-Survey of india toposheet APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), un-surveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL Siracha and Navinal Gujarat

Details of State of the project

S.no	State Name	District Name	Tehsil Name
(1.)	Gujarat	kutch	Mundra

10.	Nearest railway station along with distance in kms	Adipur/Gandhidham, 65 km
	Nearest airport along with distance in kms	Bhuj, 55 km
11.	Nearest Town/City/District Headquarters along with distance in kms	Mundra , 22 km
12.	Village Panchayats, Zila Parishad, Muncipal Corporation, Local body (Complete postal address with telephone nos. to be given)	
13.	Name of the Applicant	Santosh
14.	Registered Address	Adani House, Near Mithakali Circle, Navrangpura, Ahmedabad 380009, Gujarat
15.	**Address for correspondance:**	
	Name of the Company	ADANI ENTERPRISES LTD
	Name of the Applicant	Santosh
	Designation (Owner/ Partner/ CEO)	Head Env and Authorised Signatory for AEL
	Pin code	380015
	E-mail	prasad.suryarao@adani.com
	Telephone No.	079-26565555
	Fax No.	079-25555500
	Copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User Agency .	NIL
16.	Details of Alternative Sites examined, if any. Location of these sites should be shown on a toposheet	Yes
	Uploaded details	Annexure-Uploaded details
17.	Whether part of Interlinked projects?	No
18.	Whether separate application of Interlinked project has been submitted?	N/A
19.	If Yes, MoEF file number	N/A
	Date of submission	N/A
20.	If No, Reason	N/A
21.	**Whether the proposal involves Approval/ Clearance under: if yes, details of the same and their status to be given**	
	(i) Whether the proposal involves approval/clearance under the Forest (Conservation) Act,1980?	Yes
	Status	Forest Clearance Under Process
	MoEF file number	8-04/2016-FC
	MoEF file number	1576.81ha.
	(ii) Whether the proposal involves approval/clearance under the wildlife (Protection) Act,1972?	No
	(iii) Whether the proposal involves approval/clearance under the C.R.Z notification, 2011?	No
22.	Whether there is any Government Order/Policy relevent/relating to the site?	No

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23.	Whether any Forest Land Involved? Area of Forest land Involved (hectares)	 N/A
24.	Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	No
	(a) Name of the Court	N/A
	(b) Name of the Sub court	N/A
	(c) Case No.	N/A
	(d) Orders/directions of the court, if any and relevance with the proposed project	N/A

(II) Activity

1 Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S.No	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Permanent change in land cover and topography will occur due to construction of the proposed industry. Further, forest land of 253 acres (102.38 ha) is also involved which will be converted for industrial use. Forest Clearance is under pursuance, file number is 8-04/2016-FC.
1.2	Clearance of existing land, vegetation and buildings?	Yes	Some shrubs / weeds (mainly prosopis juliflora) present at the site shall be cleared.
1.3	Creation of new land uses?	Yes	381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Permanent change in land cover and topography will occur due to construction of the proposed industry. Further, forest land of 253 acres (102.38 ha) is also involved which will be converted for industrial use. Forest Clearance is under pursuance, file number is 8-04/2016-FC.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	Yes	Will be done prior to construction
1.5	Construction works?	Yes	Construction of manufacturing plants and related ancillary facilities will be carried out
1.6	Demolition works?	No	Not envisaged
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	The temporary labour colony will be constructed for construction workers.
1.8	Above ground buildings, structures or earthworks including linear structures,cut and fill or excavations and fill or excavations	Yes	Construction of manufacturing plants and related ancillary facilities will be carried out.
1.9	Underground works including mining or tunneling?	No	Not envisaged
1.10	Reclamation works?	No	Not envisaged

1.11	Dredging?	No	Not envisaged
1.12	Offshore structures?	No	Not envisaged
1.13	Production and manufacturing processes?	Yes	Covered in Pre-feasibility report
1.14	Facilities for storage of goods or materials?	Yes	There will be storage of Copper Concentrate and Rock Phosphate in covered sheds, storage and handling area, other required raw materials & chemical, Furnace Oil, LPG/ NG for process requirement and HSD for DG set as power backup.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	Solid waste management and effluent treatment will be provided and the details are given in the Pre-Feasibility Report.
1.16	Facilities for long term housing of operational workers?	No	About 2000 operation workers will be employed. No separate township has been planned for Copper complex. The house for O&M personnel would be provided at APSEZ existing township by augmenting the township, which is around 30 km away from the proposed Copper Complex.
1.17	New road, rail or sea traffic during construction or operation?	Yes	New approach road will be constructed.
1.18	New road, rail, air water borne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	Yes	New approach road will be constructed. In addition, conveyor belt for transfer of Copper Concentrate and Rock Phosphate from existing Adani West Port to the site will be built.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	Not anticipated.
1.20	New or diverted transmission lines or pipelines?	Yes	New transmission line shall be constructed for construction and operational power tapping from APSEZ Ltd through M/s. Mundra Utility Pvt Ltd.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No	Not envisaged
1.22	Stream crossings?	Yes	Natural drainage passing through the site will be suitably trained and maintained. There will not be any diversion. Further, conveyer for Copper Concentrate and Rock Phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required.
1.23	Abstraction or transfers of water from ground or surface waters?	No	Desalinated water will be supplied by APSEZ Ltd.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	Not envisaged
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Existing approach road to site shall be initially used for movement of personal and transport. For permanent and long term movement of personal and transport of material, new approach road construction or strengthening of existing approach road shall be done as submitted above in Sr. No. 1.17. During operational phase, Copper Concentrate and Rock Phosphate supply will be through conveyor belt and transportation of products through Trucks/ Trailers and tankers etc.
1.26	Long-term dismantling or decommissioning or restoration works?	No	Not envisaged
1.27	Ongoing activity during decommissioning which could have an impact on the	No	Not envisaged

	environment?		
1.28	Influx of people to an area in either temporarily or permanently?	Yes	Approximately 3000 persons will be employed during construction phase and about 2000 people will be employed during operation phase.
1.29	Introduction of alien species?	No	Not envisaged
1.30	Loss of native species or genetic diversity?	No	Not envisaged
1.31	Any other actions?	No	Not envisaged

2 Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	The total land required for Copper project is 634 acres (256.57 ha). Identified land area is not an agricultural land but part of land already designated/recorded as Industrial Land under APSEZ and presently undeveloped. Remaining part of the above land is reserve forest land (253 acres (102.38 ha)), which has been applied for forest clearance.
2.2	Water (expected source & competing users) unit: KLD	Yes	Total 32,800 KLD desalinated water will be sourced from APSEZ Ltd.
2.3	Minerals (MT)	Yes	Total Copper Concentrate consumption for Copper plant is about 32 LTPA and will be imported from Chile/ Brazil/ Canada/ Australia, etc. and also from domestic market as available. Total Rock Phosphate consumption for Phosphoric Acid Plant is about 17.5 LTPA and will be imported from Morocco/ Jordan/ Egypt/ Australia, etc. and also from domestic market as available.
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	Yes	Construction material such as sand, steel, aggregates, etc. will be used. However, the quantification of these materials will be done during detailed engineering stage. These materials will be sourced from local areas.
2.5	Forests and timber (source – MT)	No	Not envisaged
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT),energy (MW)	Yes	Construction phase: The construction power need of around 20 MW would be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd. Operational phase: The estimated power demand for the Copper Smelter plant is 300 MW. Out of this, 40 MW will be generated from internal process steam by heat recovery. Whereas, the remaining 260 MW power will be sourced from APSEZ Ltd. through M/s. Mundra Utility Pvt Ltd.
2.7	Any other natural resources (use appropriate standard units)	Yes	Silica Sand – 320,000 TPA Quartz – 144,000 TPA Limestone – 80,000 TPA

3 Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate

			km, S) Nagavanti Nadi (4.7 km, E) Phot Nadi (8.7 km, ENE)
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Yes	Mundra Mangrove RF (south of project area)
4	Inland, coastal, marine or underground waters	Yes	Gulf of Kachchh (3.9 km, S) Kotri creek (0.5 km, S)
5	State, National boundaries	No	Nil
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	Nil
7	Defence installations	No	Nil
8	Densely populated or built-up area	Yes	Mundra (22 km)
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Yes	Hospitals, schools, places of worship and other general community facilities exist in the study area.
10	Areas containing important, high quality or scarce resources.(ground water resources,surface resources,forestry,agriculture,fisheries,tourism,minerals)	Yes	Kotri creek (0.5 km, S) Khari Nadi (1.9 km, W) Gulf of Kachchh (3.9 km, S) Nagavanti Nadi (4.7 km, E) Phot Nadi (8.7 km, ENE)
11	Areas already subjected to pollution or environmental damage.(those where existing legal environmental standards are exceeded)	No	Nil
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions) similar effects	Yes	The project area falls under seismic zone-V as per IS: 1893 (Part-1): 2002.

(IV) Proposed Terms of Reference for EIA studies

1	**Uploaded Proposed TOR File**	Annexure-TOR file
2	**Uploaded scanned copy of covering letter**	Annexure-scanned copy of covering letter
3	**Uploaded Pre-Feasibility report(PFR)**	Annexure-PFR
4	**Uploaded additional attachments(only single pdf file)**	NIL

(V) Undertaking

I hereby give undertaking that the data and information given in the application and enclosures are true to be best of my knowledge and belief and I am aware that if any part of the data and information found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost.

V. (i)	**Name of Applicant**	Santosh
	Designation	Head Env and Authorised Signatory for AEL
	Name of Company (Applicant Name should not be given here)	ADANI ENTERPRISES LTD
	Address	Adani House, Near Mithakali Circle, Navrangpura, Ahmedabad 380009, Gujarat

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ANNEXURE-I
TOR LETTER AND ITS COMPLIANCE

Sr. No.	Terms of Reference(TOR)	Compliance
	green field projects)	
	xi. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	381 acres (154.18 ha) of identified land for this project belongs to the APSEZ (an Adani Group Company). Balance 253 acres is forest land for which State Govt. has recommended for Forest Clearance (FC) and is at Central Government file number is 8-04/2016-FC.
	xii. R&R details in respect of land in line with state Government policy	There is no Resettlement and Rehabilitation involved in the project.
5	**Forest and wildlife related issues (if applicable)**	
	i. Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department. (If applicable).	Forest land of 253 acres (102.38 ha) is also involved which will be converted for industrial use, State Govt. has recommended for Forest Clearance (FC) and is at Central Government, file number is 8-04/2016-FC.
	ii. Land use map based on High resolution satellite imagery (GPS) of the proposed site delineating the forestland (in case of projects involving forest land more than 40 ha).	Land use map based on 5 m resolution showing the forest land is shown in Figure-3.3.2 of Chapter-3.
	iii. Status of Application submitted for obtaining the stage I forestry clearance along with latest status shall be submitted	State Govt. has recommended for Forest Clearance (FC) and is at Central Government file number is 8-04/2016-FC.
	iv. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden-thereon.	There are no National Parks, Sanctuaries, Biosphere Reserves within 10 km radius study area. Toposheet showing the 10 km radius study area map on 1:50,000 scale is shown in Figure-1.2 of Chapter-1
	v. Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area.	As per the primary data collected and also from the secondary data sources, Peacock belongs to Sch-I as per Wildlife Protection Act, 1972. Conservation measures are provided in Section-4.2.7.3 of Chapter-4.
	vi. Copy of application submitted for clearance under the Wildlife (Protection) Act,1972, to the Standing Committee of the National Board for Wildlife	Not applicable
6.	**Environmental Status**	
	i. Determination of atmospheric	Report is enclosed as Annexure-VIII.

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No. J-11015/200/2008-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110003.
Telefax: 24362434

Dated the 31st March, 2011

Office Memorandum

Sub: Consideration of projects for grant of environmental clearance under EIA Notification, 2006 which involve forestland – Procedure to be followed – Regarding.

Ref: Office Memorandum no. J-11013/41/2006-IA.II(I) dated 2nd December, 2009 regarding Procedure for consideration of proposals for grant of environmental clearance under EIA Noti9fication, 2006, which involve forestland and or wildlife habitat.

The issue regarding consideration of proposals especially mining project for grant of environmental clearance under EIA Notification, 2006, which also involve diversion of forestland has been under consideration for quite some time and circulars / guidelines have been issued in the past in this regard from time to time. In this regard, reference is also invited to para 8 (v) of the EIA Notification, 2006 reads as follows:

"Clearances from other regulatory bodies or authorities shall not be required prior to receipt of applications for prior environmental clearance of projects or activities, or screening, or scoping, or appraisal, or decision by the regulatory authority concerned, unless any of these is sequentially dependent on such clearance either due to a requirement of law, or for necessary technical reasons."

According to the above provision, the environmental clearance under EIA Notification, 2006 is independent of other clearances and submission of clearances under other relevant Acts and Rules as may be applicable to a project is not a pre-requisite for obtaining environmental clearance except in specific cases where it is sequentially dependent on such clearance either due to requirement of law or for necessary technical reason. This aspect was earlier discussed and deliberated and the office memorandum dated 2nd December, 2009 referred to above was an outcome of the same.

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However, in view of the complexity of the issues involved, the matter has been considered further in the Ministry and in supersession of the earlier instructions, it has now been decided to adopt the following procedure for consideration of such projects.

I. Projects in Pipeline:

(A) Projects received for TORs and yet to be considered by EAC:
In case of the proposals which have been received for prescribing TORs and involve forestland, in part or in full, and are yet to be considered by the EAC, during consideration of such proposals, clarifications will be obtained from the project proponent regarding feasibility of undertaking the project only in non forestland. In case, the project proponent confirms to undertake the project in non forest area only, the proponent may be advised to submit the revised proposal by deleting the forestland involved in the project. In case, it is not possible to undertake the project without involving diversion of forestland, the project proponent will be asked to first apply for stage-I forestry clearance for the forestland involved in the project and thereafter submit the proposal for obtaining terms of reference as per the procedure prescribed under EIA Notification, 2006.

(B) Projects for which TORs have already been prescribed but the proposal for environmental clearance is yet to be submitted:

In case of the proposals, which involve forestland, in part or in full, and for which TORS have already been prescribed, the project proponents are advised to ensure that the requisite stage-I forestry clearance has been granted and its copy is submitted along with their application / proposal for environment clearance. Alternatively, the proponent should delete from their land requirement, the forestland involved in the project and the proposal so amended without any forestland may be submitted for appraisal by the EAC.

In case of projects where forest diversion (Stage I Clearance) has been approved for part of the total forestland involved in the project, the proposal will be considered only for the land for which forest diversion has been approved and the non forestland, if any. For the purpose, the onus of demonstrating that the project activities will be limited to that much area only would lie with the project proponent and necessary supporting documents will be submitted in this regard.

(C) Projects submitted for environmental clearance based on the TORs prescribed by EAC:

The proposals already submitted for environmental clearance will be appraised by the EAC on their merit and in case of involvement of forestland, the proponent will be asked either to delete the forestland and submit the revised proposal or approach the EAC after the stage-I forestry clearance for

the forestland involved in the project has been granted, till which time the proposal will stand delisted.

In case of projects for which diversion of forestland has been granted for part of the forestland, the proposal will be appraised taking into account that much of land only (land for which FC granted + Non forestland) for the project activities and the proponent should demonstrate the viability of the project with requisite supporting documents.

(D) Projects already considered by EAC and recommended for grant of environmental clearance:

In accordance with the recommendations of EAC, such projects will be processed on file for obtaining approval of the MEF for grant of environment clearance. After MEF has approved, a communication will be sent to the project proponent informing that the Competent Authority has approved the project; however, the formal environmental clearance will be issued only after the stage-I forestry clearance for the forestland involved in the project has been obtained and submitted. For the purpose, a maximum time limit of one year will be provided to the proponent during which time the proposal will be kept in abeyance. In case, the formal forestry clearance is not submitted within this time frame, the proposal will stand rejected and the process for obtaining environmental clearance will have to be initiated, de-novo, as per the procedure prescribed under EIA Notification, 2006.

II. Expansion Projects:

(i) Mining Projects involving enhancement of production by increasing the depth and or number of shifts, without any increase in lease area and having already obtained the forestry clearance for the forestland involved in the mine lease, shall be considered on merit and decision taken.

(ii) The Expansion projects involving horizontal spread with additional land requirement will be dealt with as green field projects, if additional forestland is to be diverted.

III. Greenfield Projects:

(i) If any green field project does not envisage any diversion of forest land, it would be considered as per the provisions of EIA Notification, 2006.

(iii) In case of any green field project, which involves diversion of forest land, the project proponents are advised to re-examine the requirement of forestland and submit the proposal without forestland for consideration of the EAC. Otherwise, the proponent should submit the proposal for TORs under the EIA Notification, 2006 only after

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applying the stage-I forestry clearance for the forestland involved in the project.

(iii) All cases of grant / renewal of EC for any abandoned mine or sick project under revival etc. would be considered as a green field project for appraisal under EIA Notification, 2006 and the procedure mentioned above will be followed.

This issues with the approval of the Competent Authority.

(Dr. S.K. Aggarwal)
Director

To

1. All the Officers of IA Division
2. Chairpersons / Member Secretaries of all the SEIAAs/SEACs

Copy to:-

1. PS to MEF
2. PPS to Secretary (E&F)
3. PPS to SS(JMM)
4. Advisor (NB)
5. Website, MoEF
6. Guard File

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1471

11th April 2017

K.C. Mistry
Member Secretary
Gujarat Pollution Control Board (GPCB)
ParyavaranBhawan, Sector 10 A,
Gandhinagar, Gujarat
Email: membersecretarygpcb@gmail.com; ms-gpcb@gujarat.gov.in

Subject: Cancellation of public hearing scheduled for 29.4.2017 and rejection of EIA related to Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in MundraTaluka, Kutch, Gujarat

Dear Sir,

This is with reference to the public hearing for the above mentioned copper refinery project scheduled for 29.4.2017 in Mundrataluka, Kutch [Attached as Annexure 1]. We would like to present to you certain facts and request you to immediately cancel the public hearing and reject the EIA on clear legal grounds.

Non compliance of ToR and violation of MoEFCC circular dated 31.11.2011

- Section 5 (i) of the Terms of Reference (ToR) issued for the project on 21st June 2016, clearly indicates that the project proponent has to provide a copy of the*"Permission and approval for the use of forest land (forestry clearance), if any, and recommendations of the State Forest Department, (if applicable)."*[Attached as Annexure 2]
- Further as per the EDS by MoEFCC uploaded on the website athttp://environmentclearance.nic.in/auth/FORM_A_PDF.aspx?cat_id=IA/GJ/IND/53004/2016&pid=Newand accessed on 8.4.2017, it is clearly indicated that "Forest Clearance Under Process". The file is under process in file number 8-04/2016-FC. A copy of this web page is attached with this letter. [Attached as Annexure 3]
- In the EIA report on Page No. AI-14, it has also been stated that the forest clearance is pending at the level of the central government [Attached as Annexure 4]

This clearly indicates the project proponent is yet to obtain forest clearance and **has not complied with the Terms of Reference (ToR)**, making the EIA report liable for rejection.

In this regard we would also like to bring your attention to (attached) to an Office Memorandum of the **MoEFCC dated 31.11.2011** which clearly emphasizes the need for forest clearance prior to either appraising or granting environmental clearance. In the case of greenfield projects like the copper refinery**Section III (iii) of this circular**[Attached as Annexure 5] clearly states that:*"In case of any green field project, which involves diversion of forest land, the project proponents are advised to re-examine the requirement of forestland and submit the proposal without forestland for consideration of the EAC. Otherwise, the proponent should submit the proposal for TORs under the EIA Notification, 2006 only after applying the stage-1 forestry clearance for the forestland involved inthe project."*

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As you are aware **Section 8 (vi) of the EIA notification, 2006** clearly states: *"Deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis..."*

We therefore request you to take immediate action by:

1. Cancelling the public hearing scheduled for 29.4.2017 in Mundra
2. Reject the application attracting the Section 8 (vi) of the EIA notification.

We look forward to your immediate action and cooperation in this regard.

Sincerely,

Gajendrasinh Jadeja,
Sarpanch, Navinal Village,
MundraTaluka, Kutch District
Gujarat

CC:

1. ShriArvindAgarwal, Chairman, GPCB, Gujarat (chairman-gpcb@gmail.com)
2. Regional Officer, GPCB, Gujarat (collector-kut@gujarat.gov.in)
3. M.A. Gandhi, District Collector, Kutch (rogpcb.eastkutch@gmail.com)
4. M.K.Singh, Joint Secretary, MoEFCC New Delhi (mk.singh65@ias.nic.in)

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AN INSIGHT INTO THE CRAFT INDICATORS FROM HARAPPAN SETTLEMENT AT NAVINAL IN KACHCHH DISTRICT, GUJARAT, WESTERN INDIA

Rajesh S.V., Brad Chase, Saleem Shaikh, V.S. Rawat, Ambika B. Patel, Abhayan G.S., Ajit Kumar, Haseen Raja R., Chanmita Gadekar, Akinori Uesugi, P. Ajithprasad, Prabhin Sukumaran and Renjinimol M.N.

1478

Location of Navinal in Kachch, Gujarat
Navinal
GULF OF KACCH
GULF OF KHAMBHAT
ARABIAN SEA
22°N
72°E
70°E
KM

1476

Details of Previous Studies

Navinal

Discoverer : P. P. Pandya in 1950s

First Reporter : Dr. S. R. Rao in 1963
(Ancient India 18 & 19)

In Ancient India 18 & 19 : Rangpur IIB Phase Site

Surface Surveys : The Maharaja Sayajirao
University of Baroda,
Kachchh University,
University of Kerala,
Albion College – USA and
NIO Goa in 2011, 2012 and 2013

1476

Objectives

Coexistence of Classical Harappans and Regional Chalcolithic traditions

How the residents of Navinal were integrated into the interregional interaction networks of the Integration Era

How these patterns of social interaction changed during the subsequent Localization Era

Craft production existed at Navinal during Integration and Localization Eras

Variations within regional Chalcolithic traditions

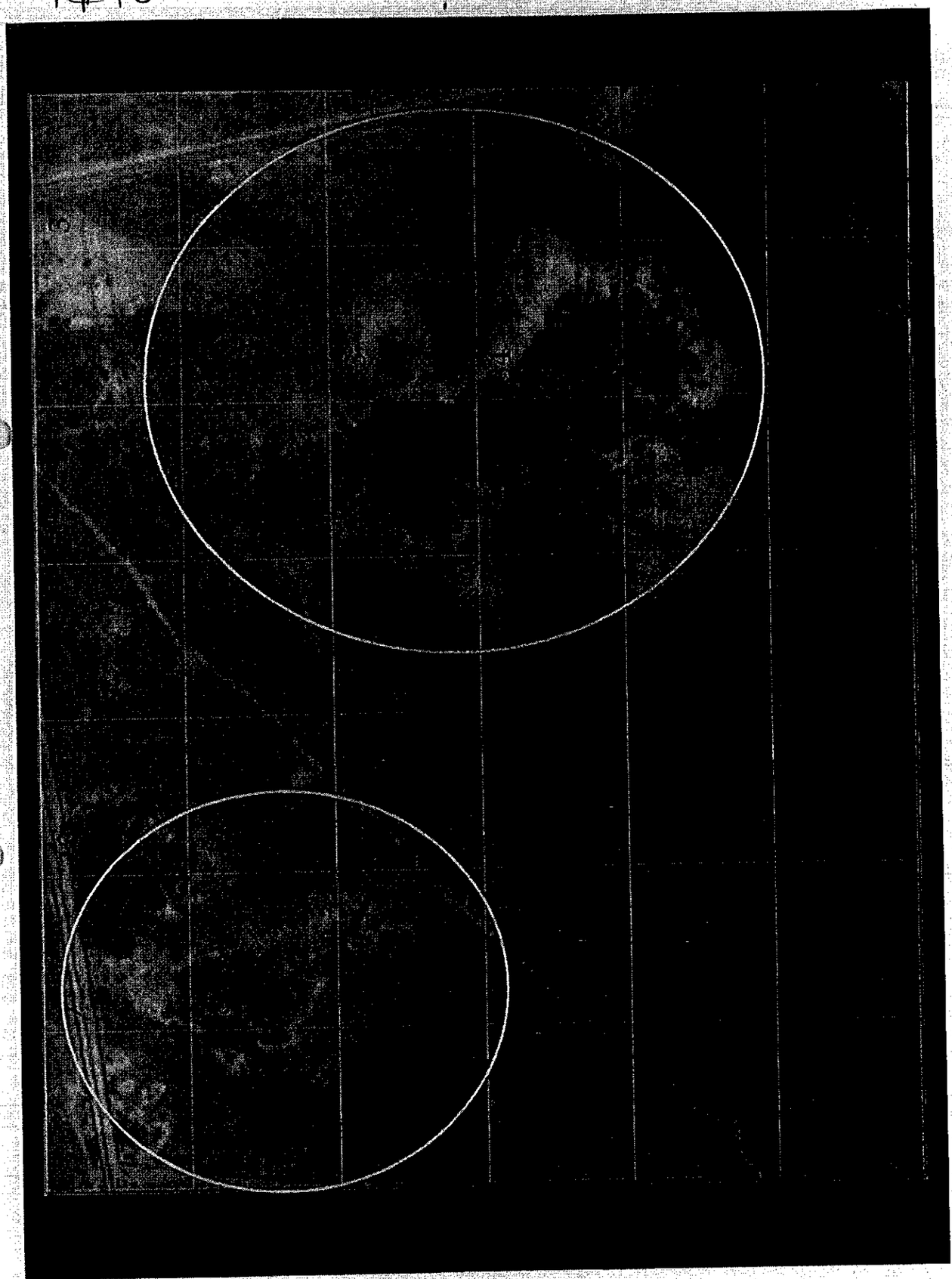
Understand the chronology of the site

Preserve the cultural materials

Educate the general public and development officials regarding the importance of preserving the national heritage

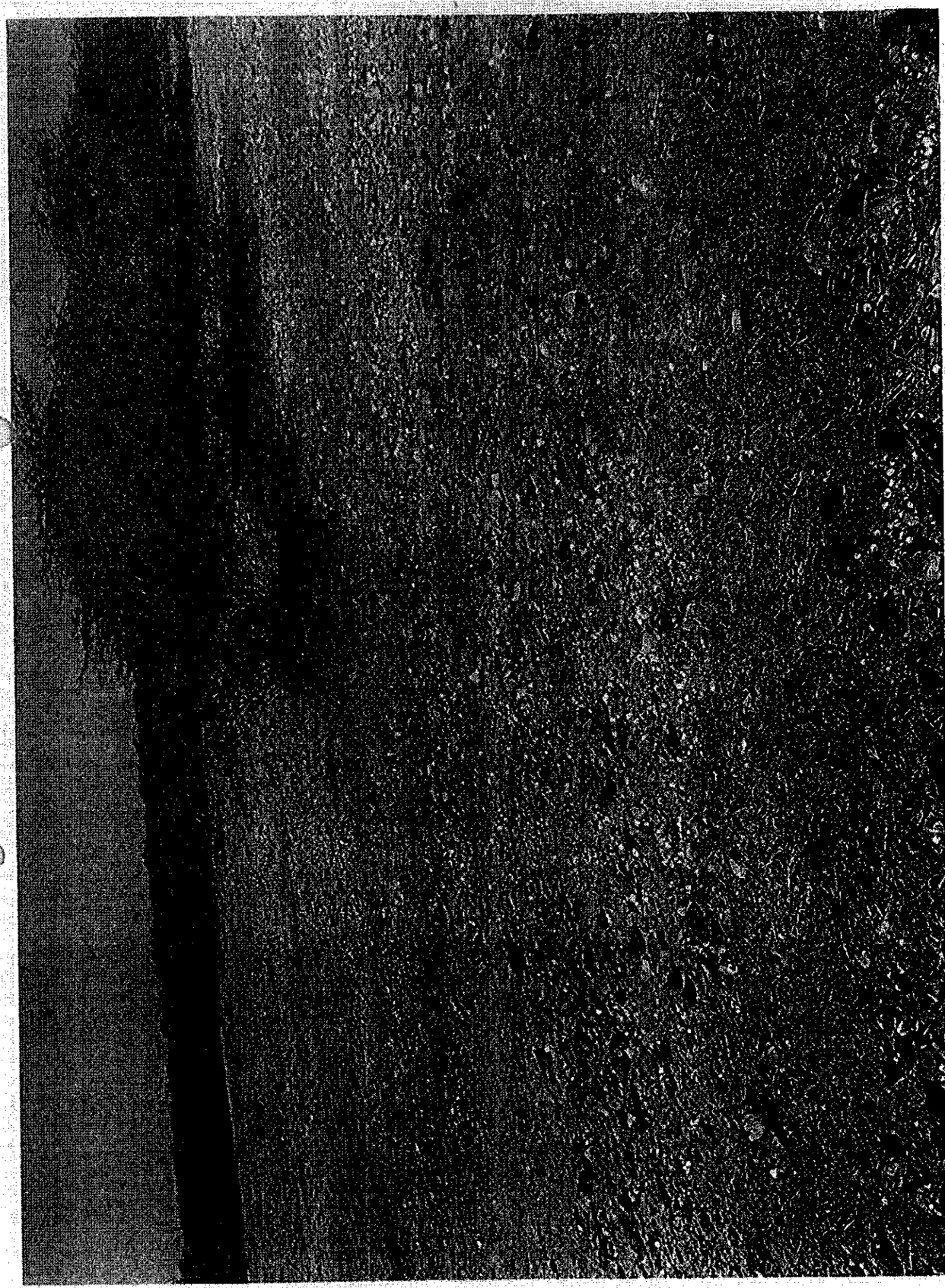
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22.825
22.824
22.823
22.822
22.821
22.82
22.819
22.818
69.59
69.591
69.592
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0Meters
250Meters
500Meters



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Exploration at Navinal 2013-14

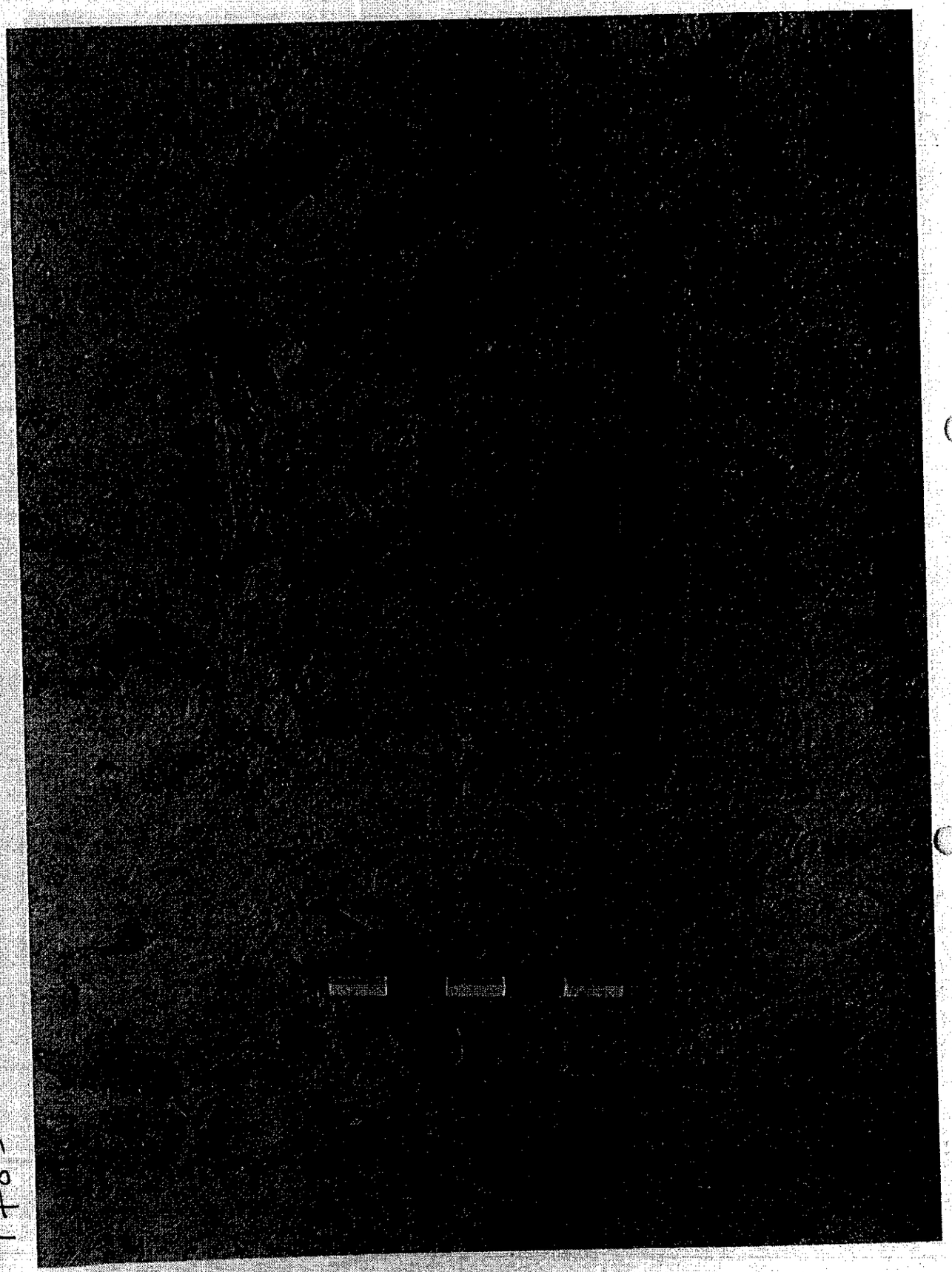
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Remains of Stone Structures

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Remains of Stone Structure

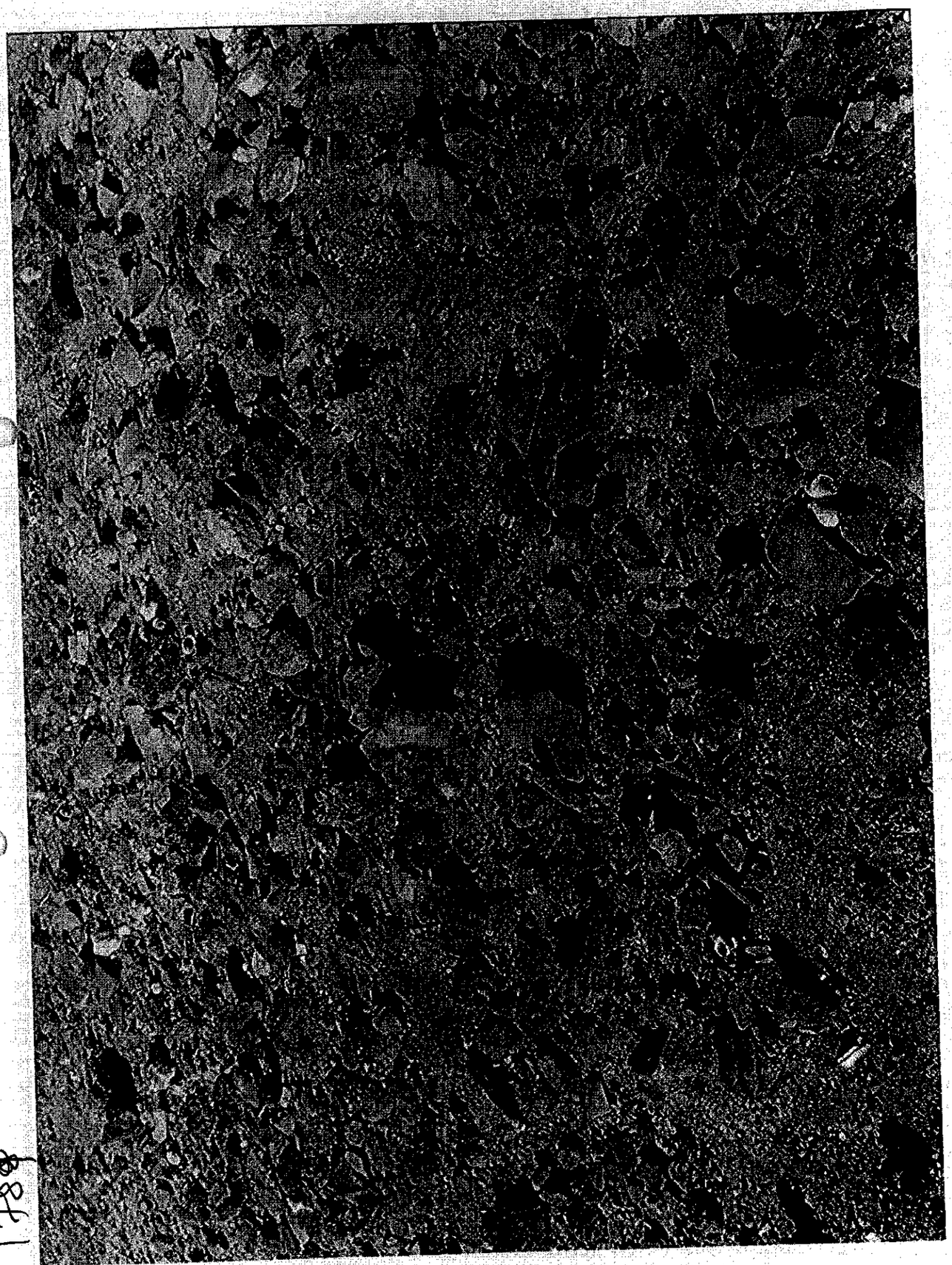


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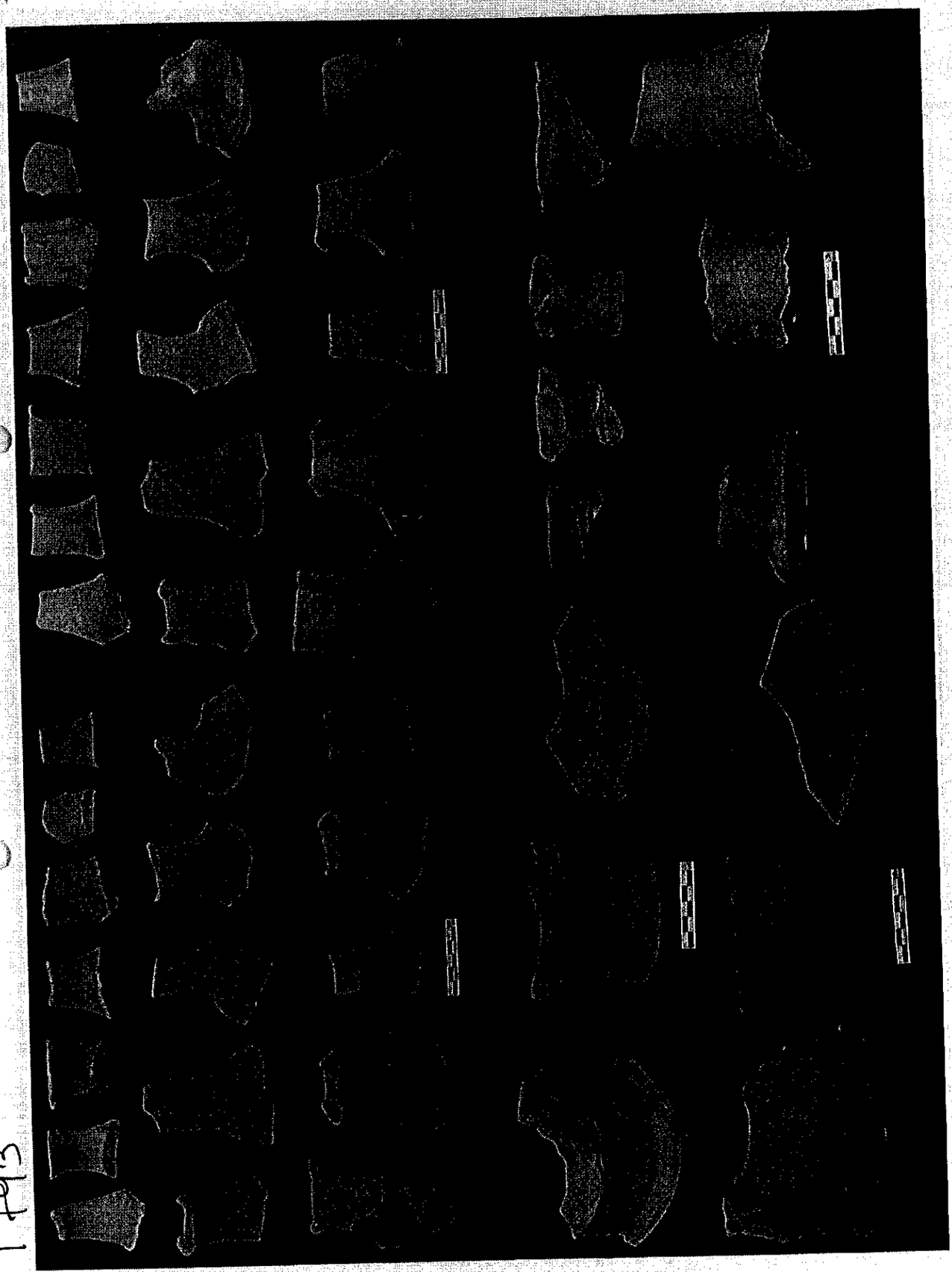
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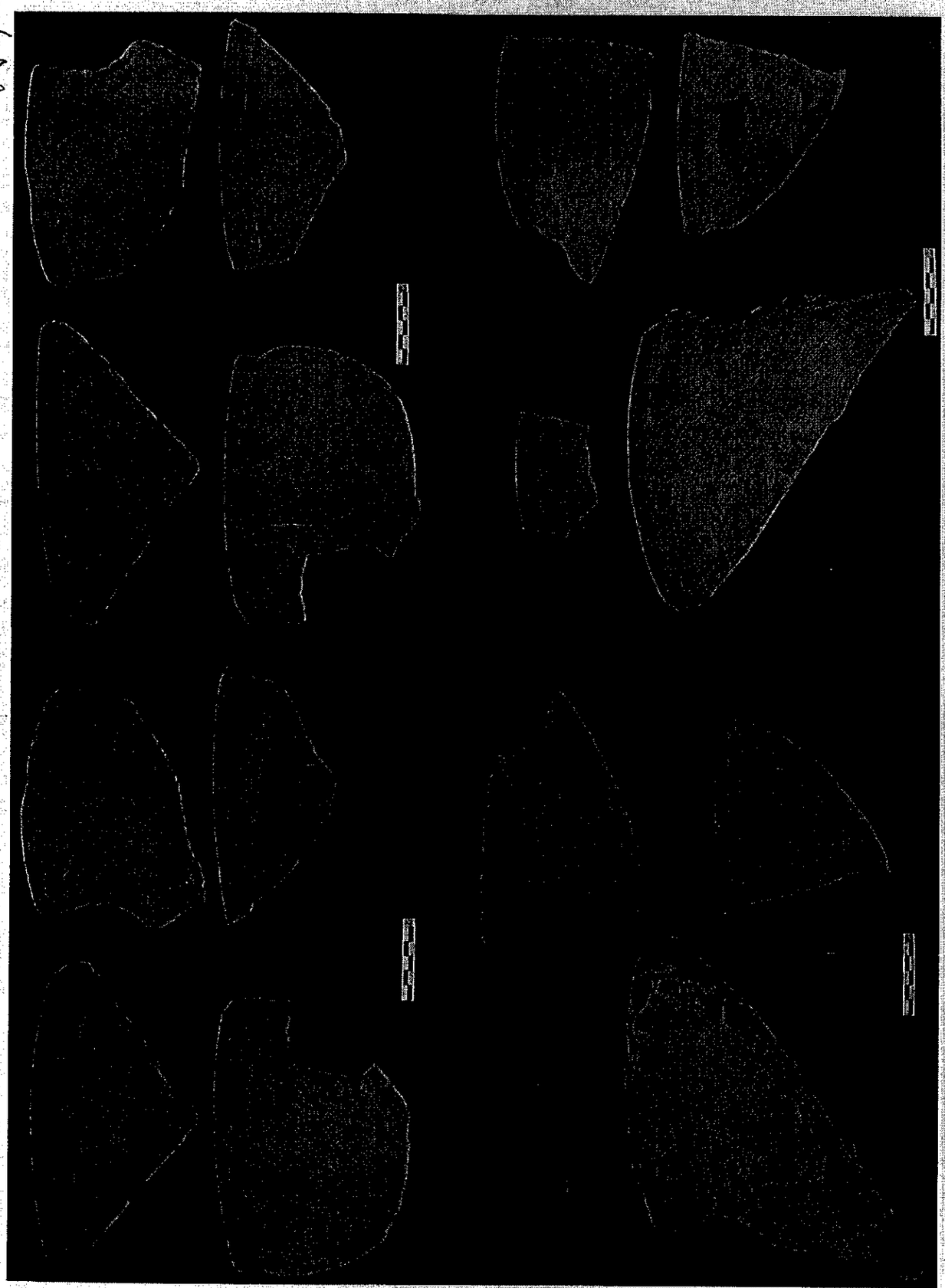
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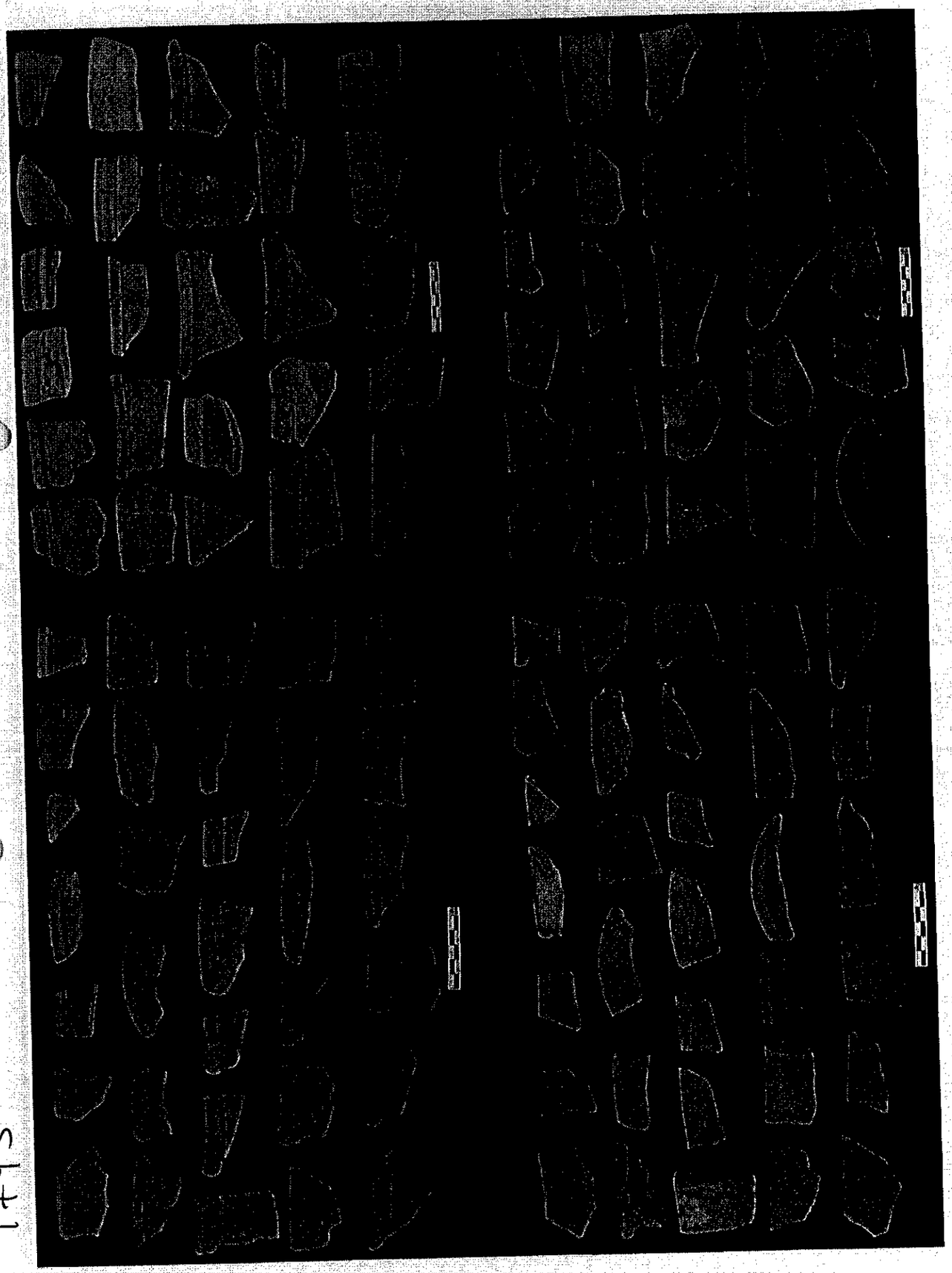
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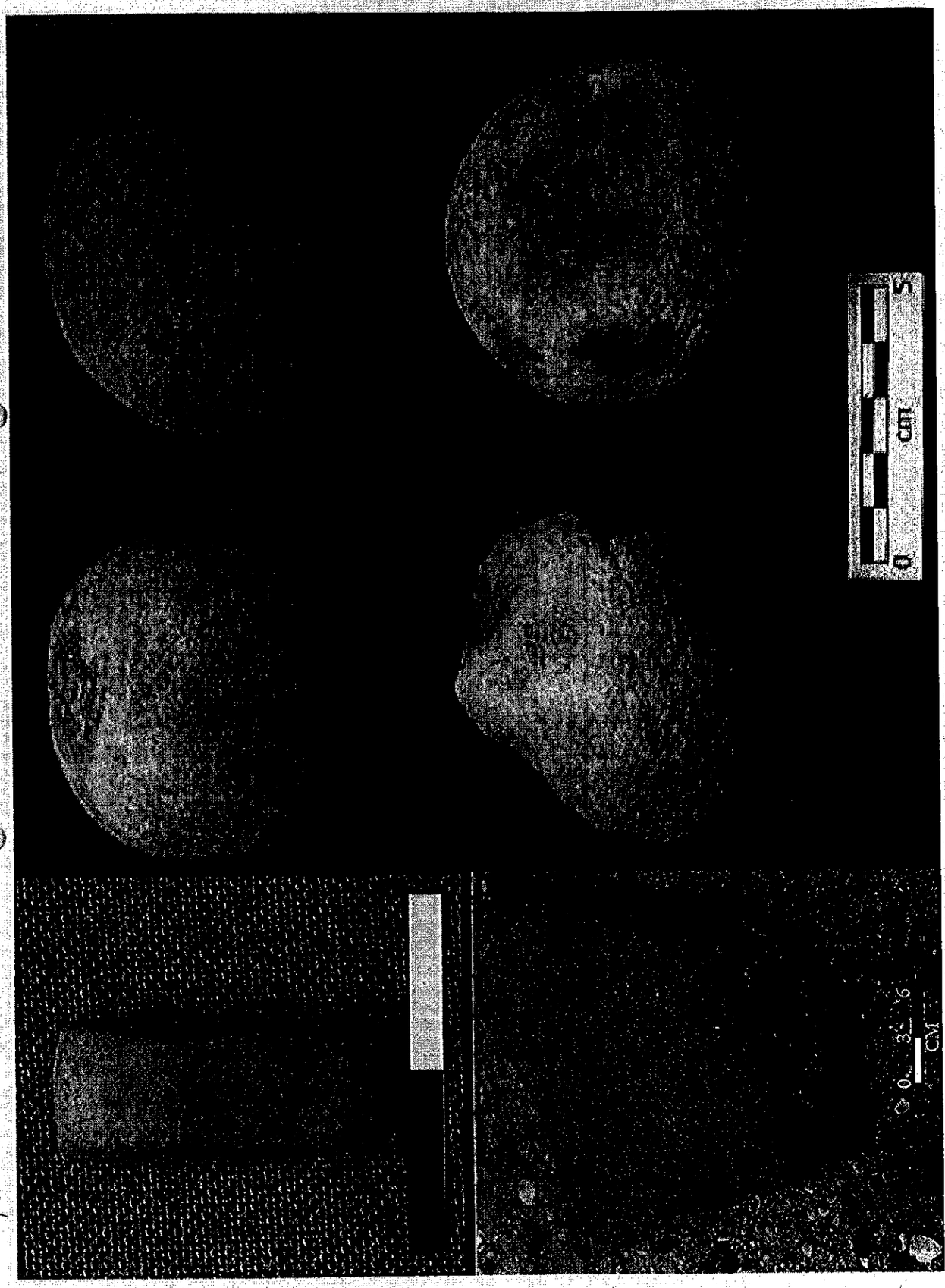
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Blades and Geometric Tools
Non-Geometric Tools
Scrapers
Blade and Flake cores
Rolnt Chert Core
0 5 cm
0 5 cm
0 2 cm
0 2 cm
0 5 cm

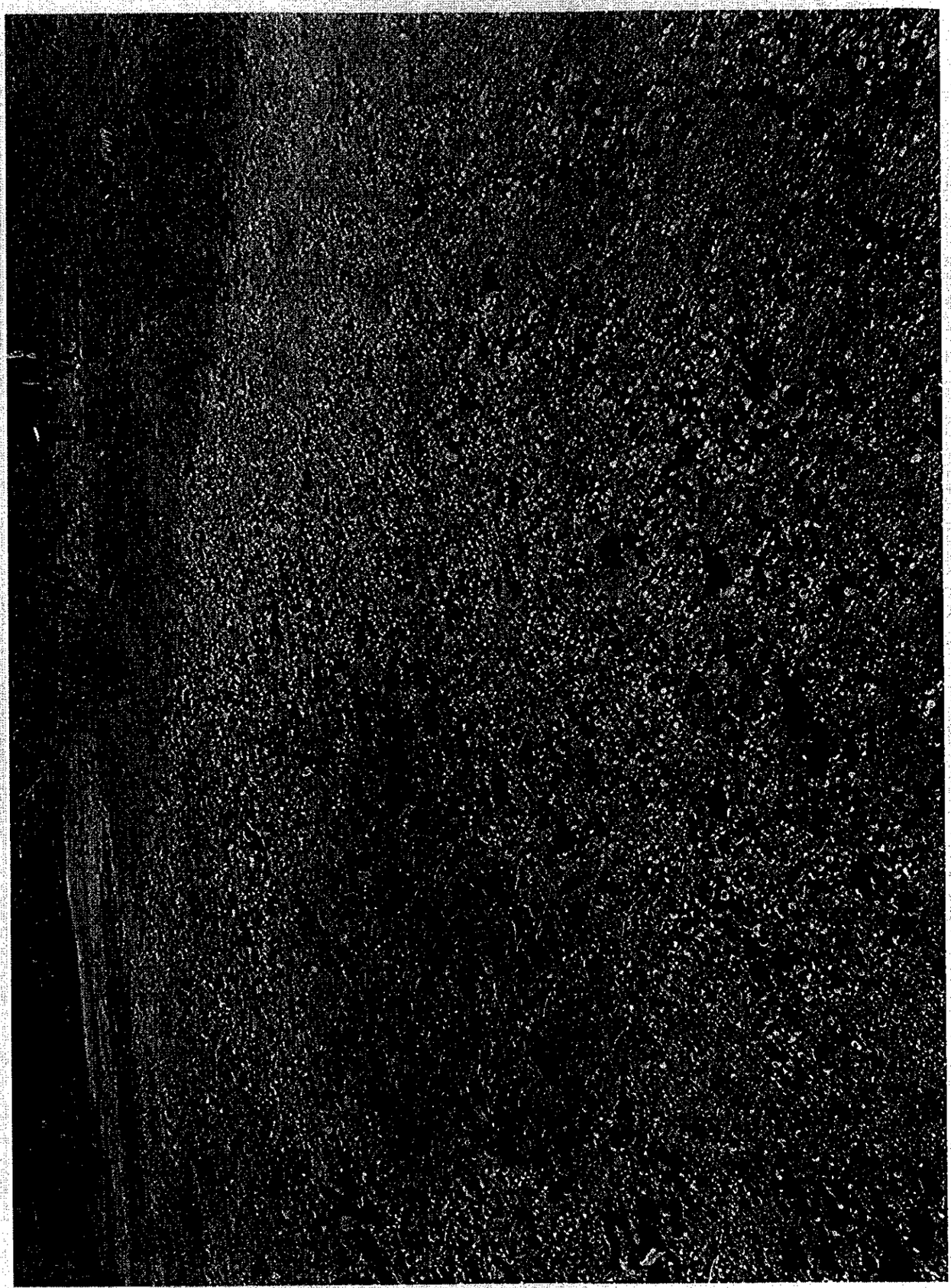
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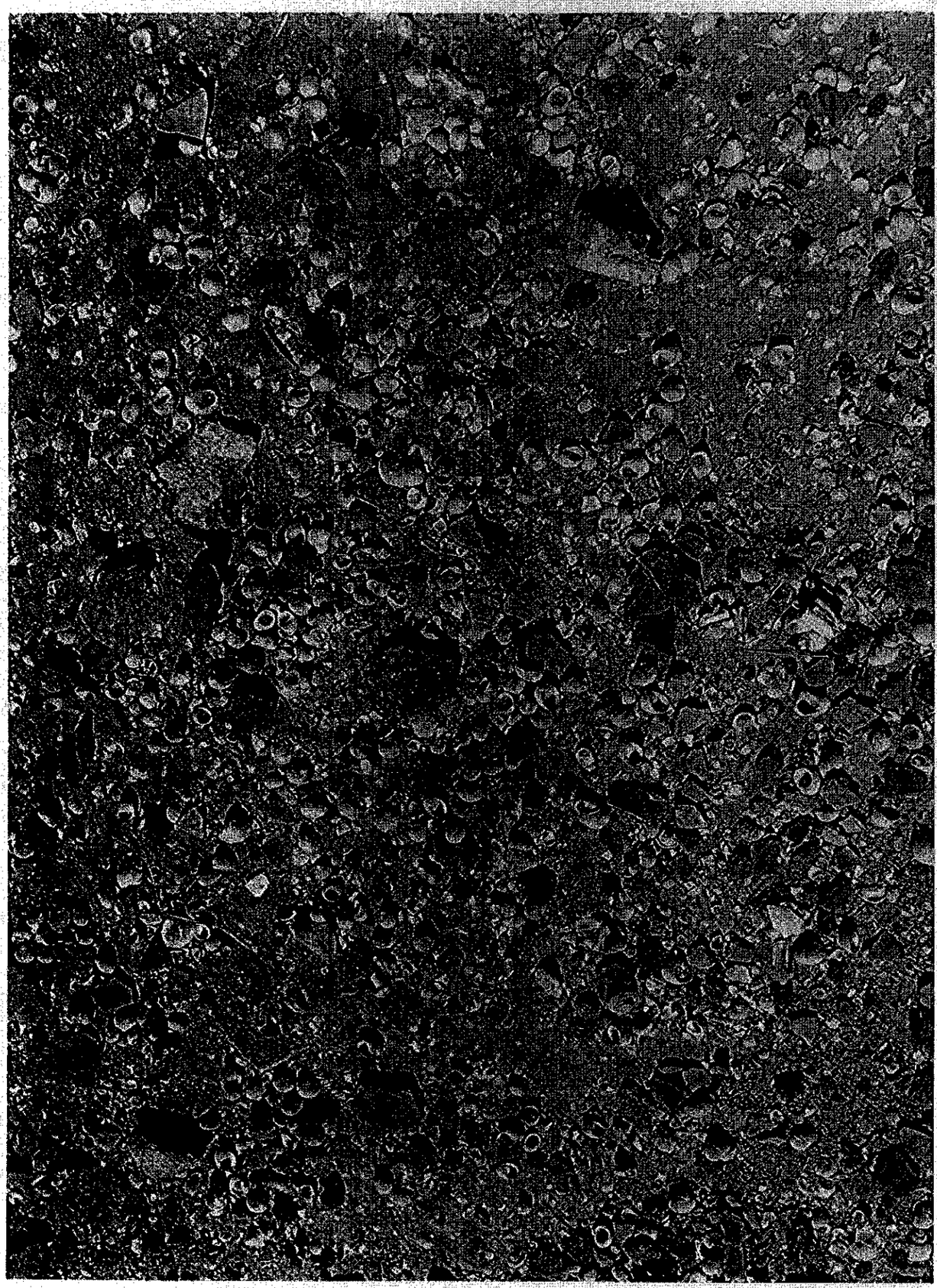
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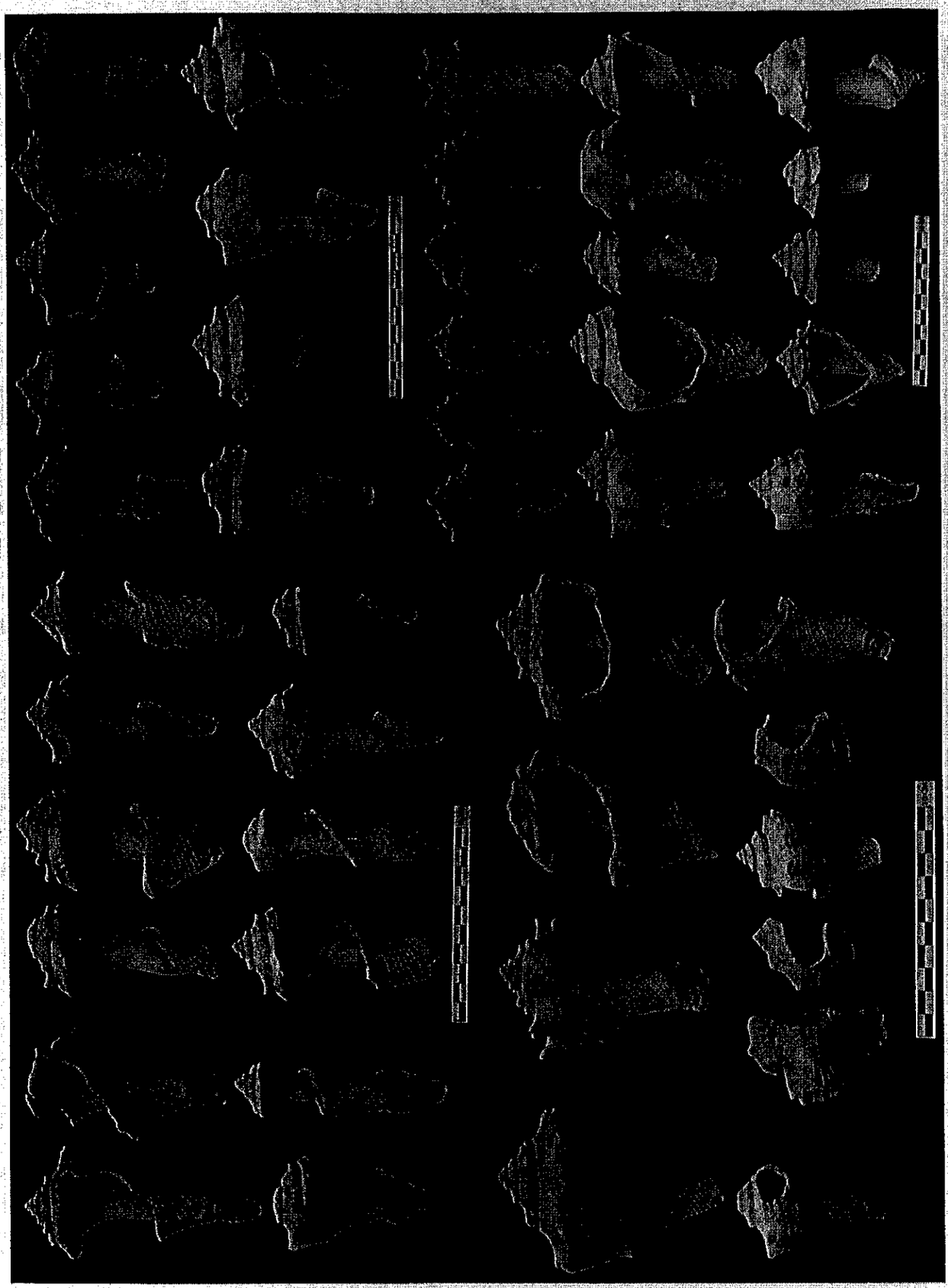
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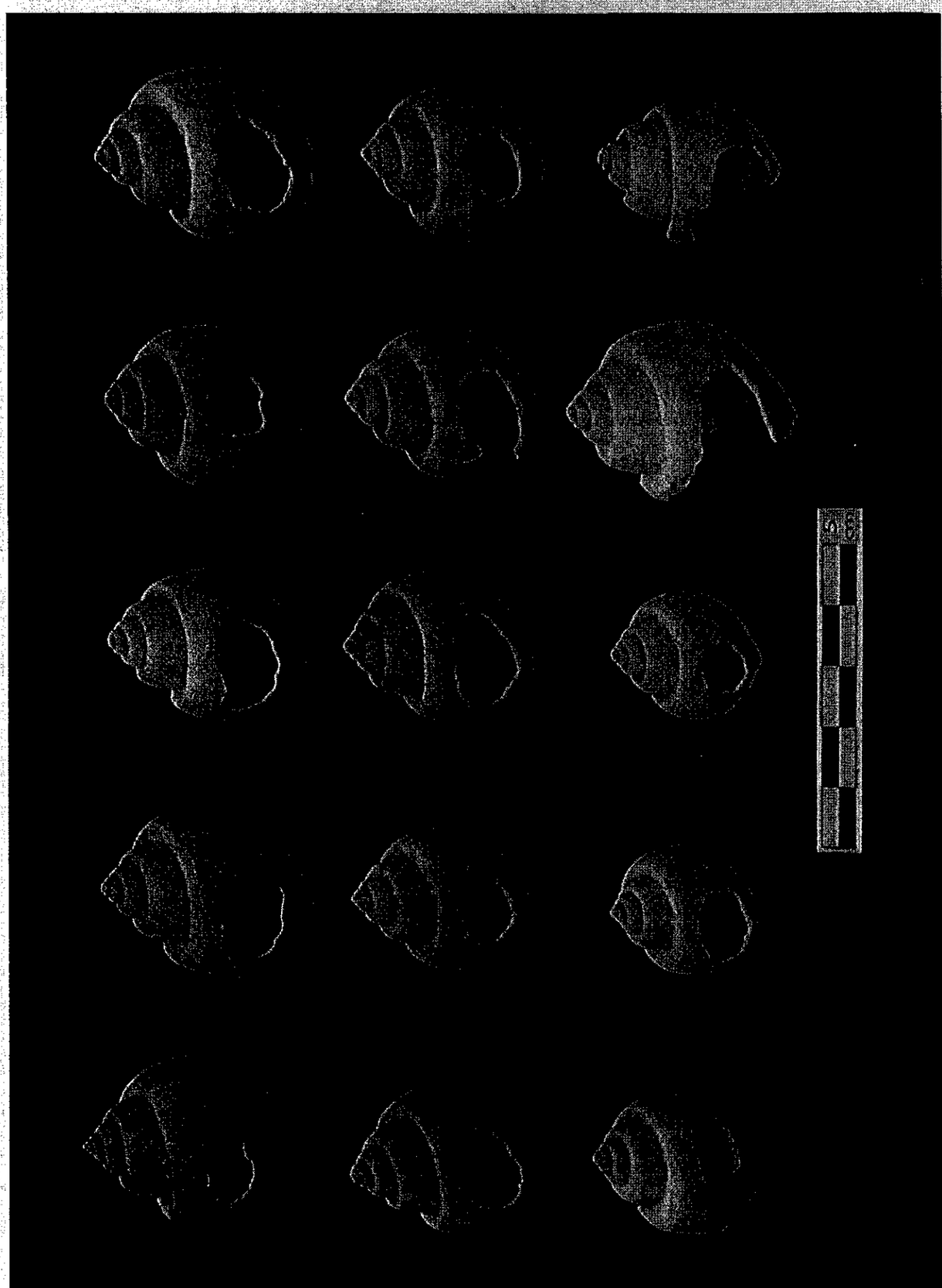


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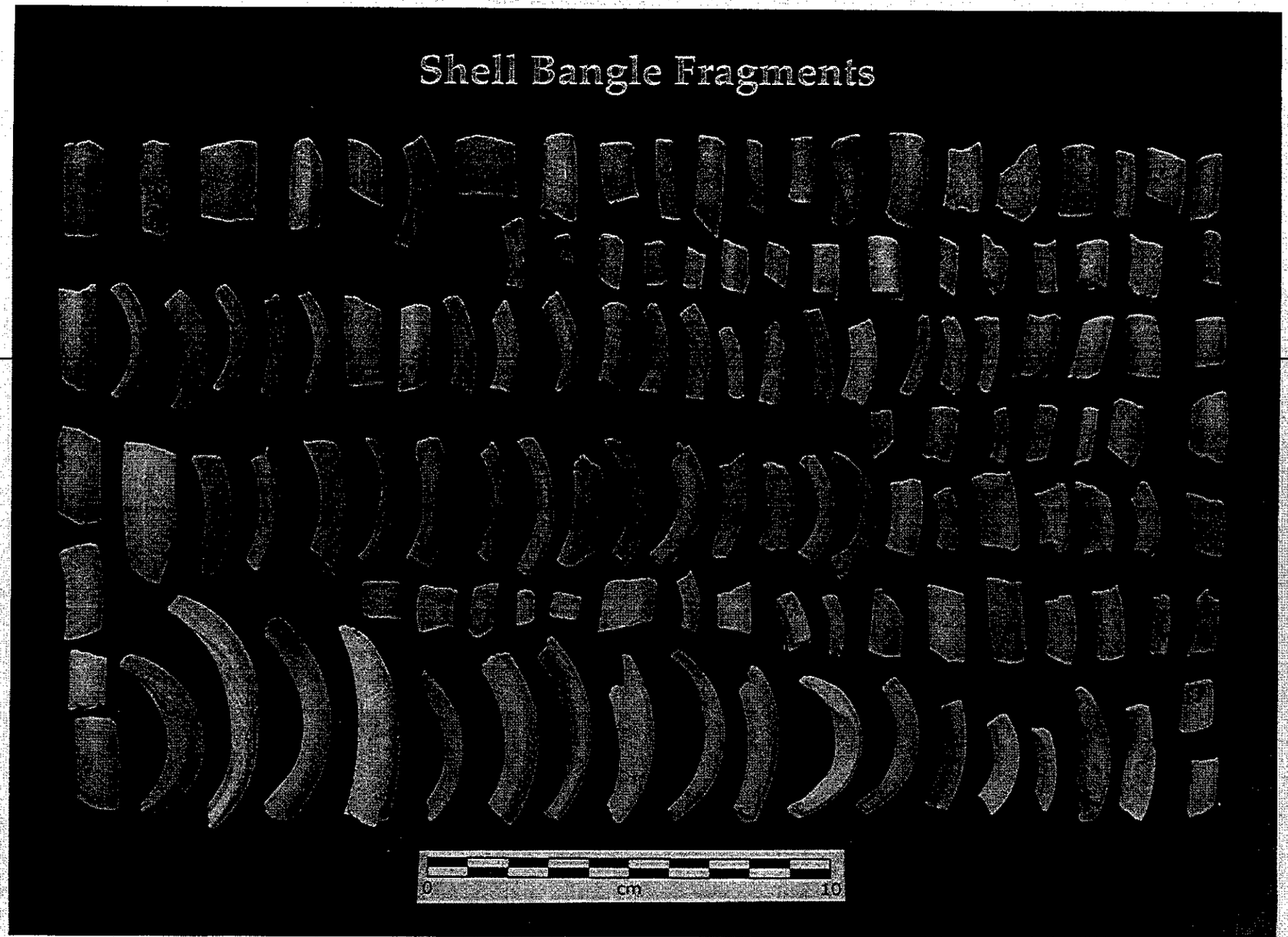
Umbonium sp.
Oliva sp.
Cardium sp.
Telescopium telescopium
Pugilina buchephala
Thais carinifera
Natica sp.

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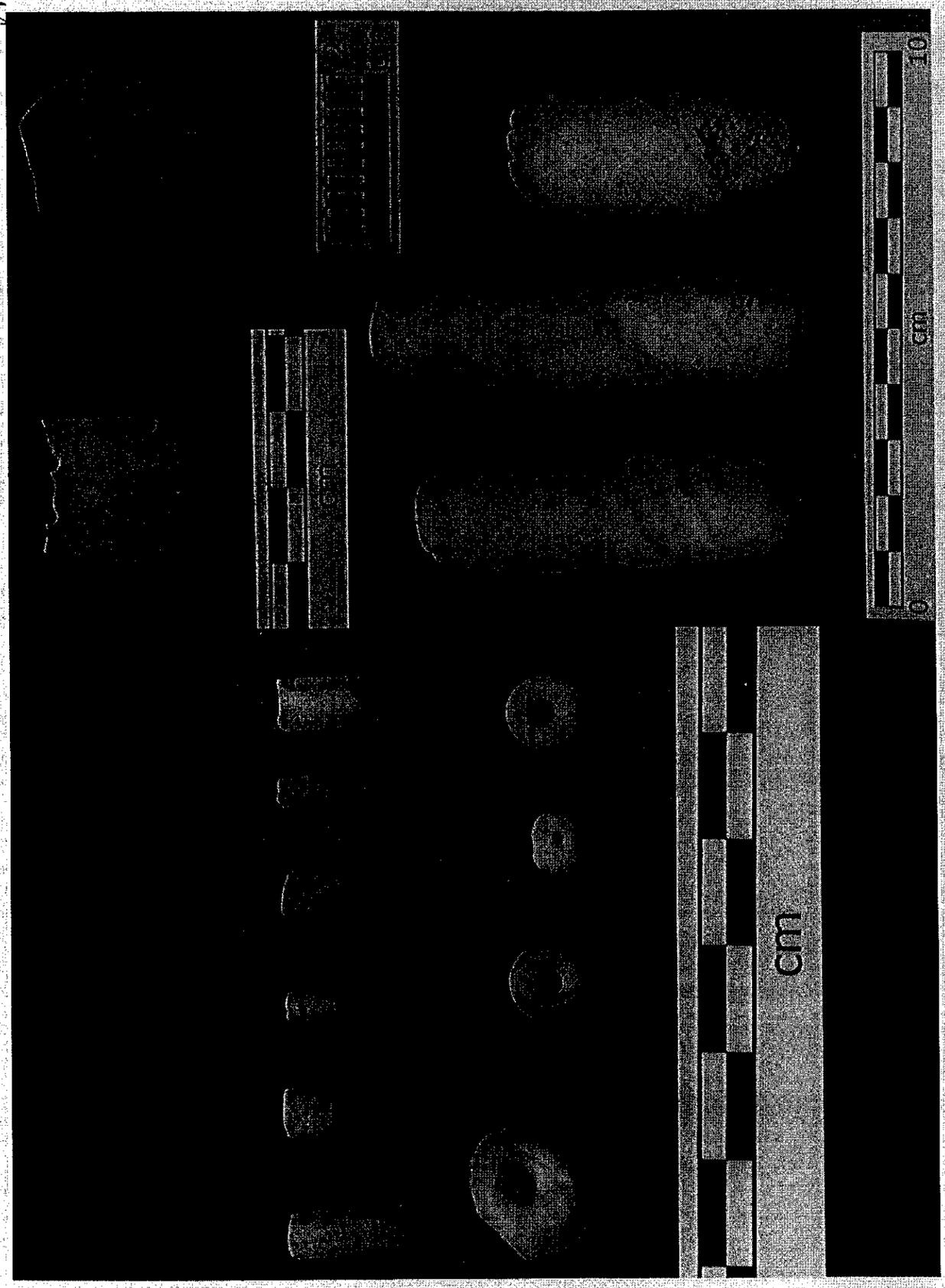
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Width of Bangles
cm
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10
cm
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35
30
25
20
15
10
5
0


cm
cm
cm

1600

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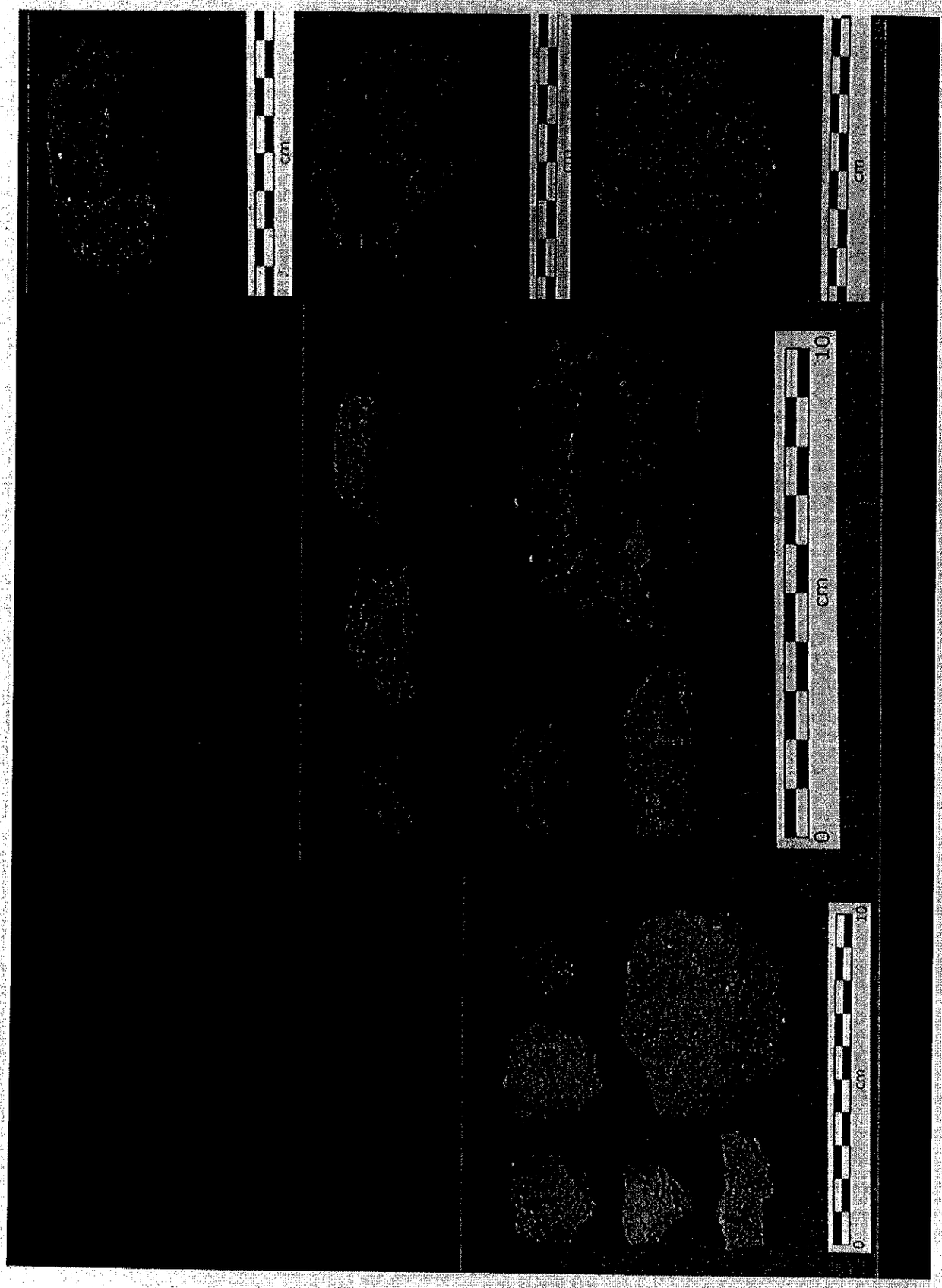
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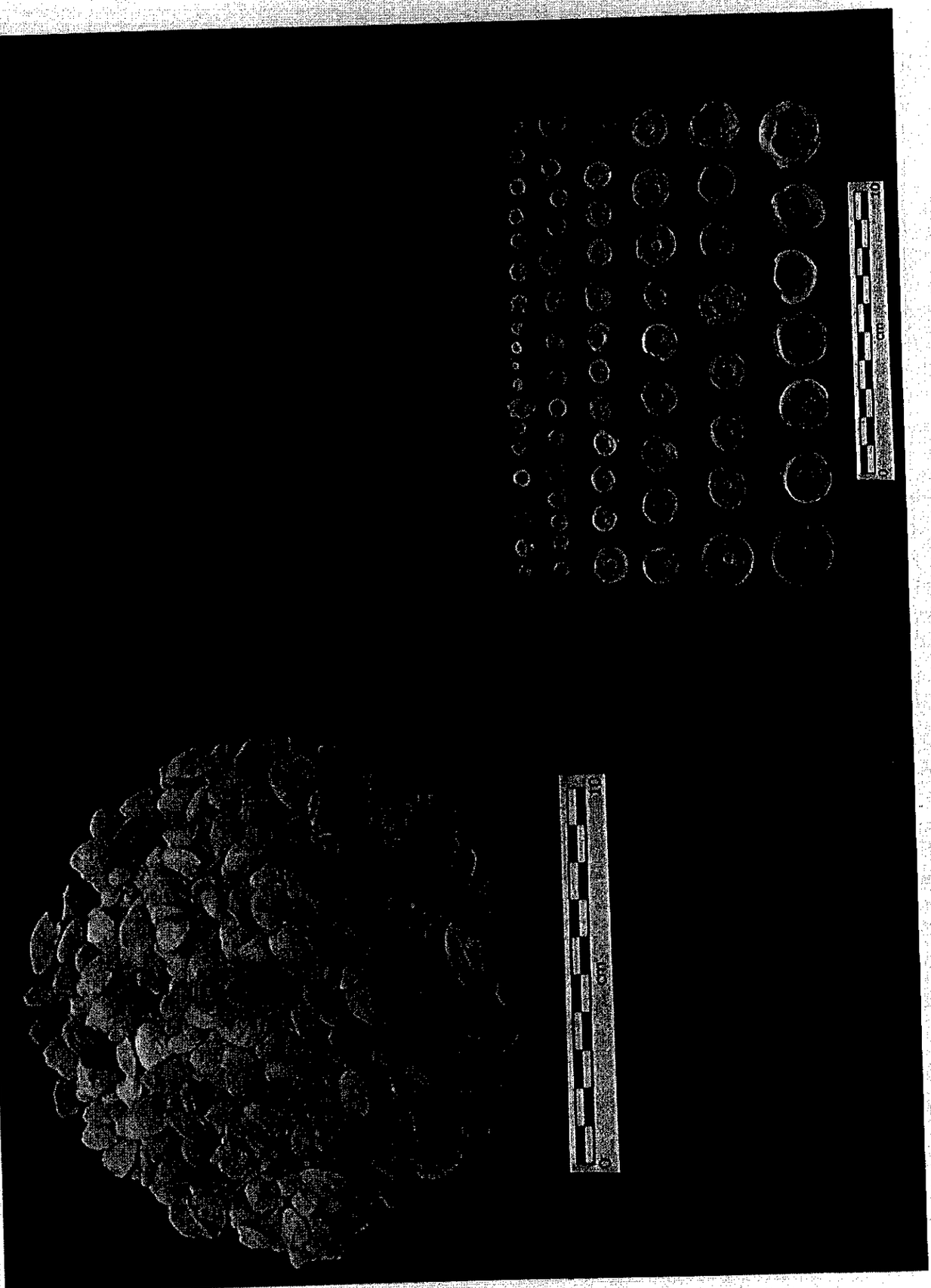
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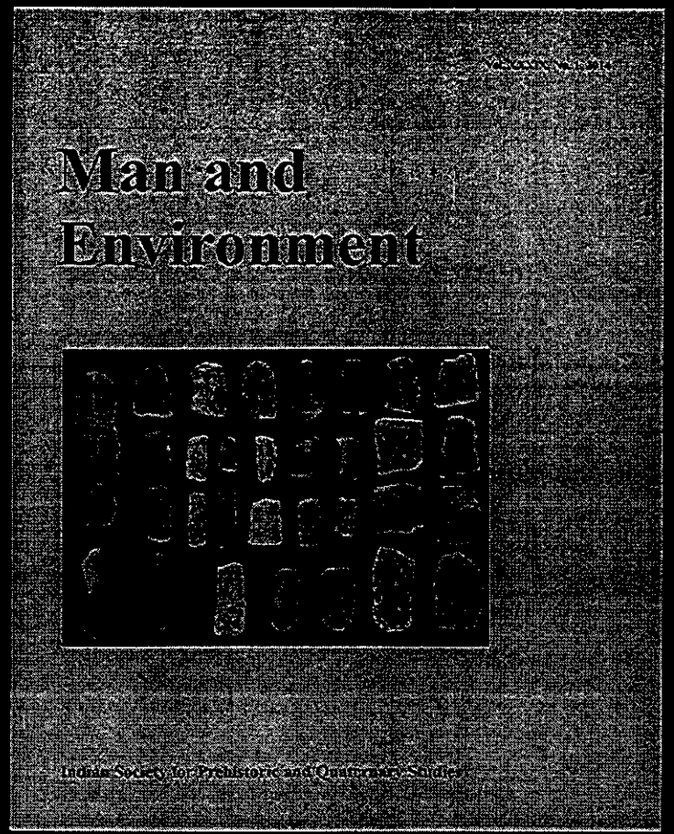
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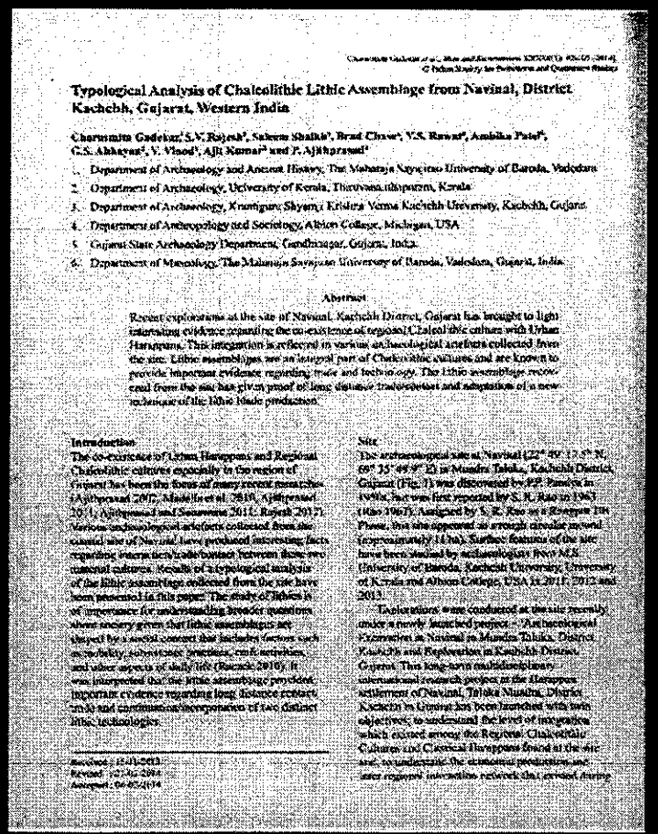
Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 377792 SAMPLE : NVL-13-14-4 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (shell): acid etch 2 SIGMA CALIBRATION : Cal BC 1860 to 1485 (Cal BP 3810 to 3435)	3380 +/- 30 BP	+4.0 o/oo	3860 +/- 30 BP
Beta - 377793 SAMPLE : NVL-13-14-5 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (otolith): acid etch 2 SIGMA CALIBRATION : Cal BC 2325 to 1920 (Cal BP 4275 to 3870)	3860 +/- 30 BP	-3.5 o/oo	4210 +/- 30 BP
Beta - 377790 SAMPLE : NVL-13-14-2 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (shell): acid etch 2 SIGMA CALIBRATION : Cal BC 2030 to 1660 (Cal BP 3980 to 3610)	3580 +/- 30 BP	+1.0 o/oo	4010 +/- 30 BP
Beta - 377791 SAMPLE : NVL-13-14-3 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (shell): acid etch 2 SIGMA CALIBRATION : Cal BC 1825 to 1460 (Cal BP 3775 to 3410)	3430 +/- 30 BP	-0.1 o/oo	3840 +/- 30 BP

1606

1819

Publications





Typological Analysis of Chalcolithic Lithic Assemblage from Navinal, District Kachchh, Gujarat, Western India

Charusmita Gadekar[1], S.V. Rajesh[2], Saleem Shaikh[3], Brad Chase[4], Y.S. Rawat[5], Ambika Patel[6], G.S. Abhayan[2], V. Vinod[2], Ajit Kumar[2] and P. Ajithprasad[1]

1. Department of Archaeology and Ancient History, The Maharaja Sayajirao University of Baroda, Vadodara
2. Department of Archaeology, University of Kerala, Thiruvananthapuram, Kerala
3. Department of Archaeology, Krantiguru Shyamji Krishna Verma Kachchh University, Kachchh, Gujarat
4. Department of Anthropology and Sociology, Albion College, Michigan, USA
5. Gujarat State Archaeology Department, Gandhinagar, Gujarat, India
6. Department of Museology, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India

Abstract

Recent explorations at the site of Navinal, Kachchh District, Gujarat has brought to light interesting evidence regarding the co-existence of regional Chalcolithic culture with Urban Harappans. This integration is reflected in various archaeological artefacts collected from the site. Lithic assemblages are an integral part of Chalcolithic cultures and are known to provide important evidence regarding trade and technology. The Lithic assemblage recovered from the site has given proof of long distance trade contacts and adaptation of a new technique of lithic blade production.

Introduction

The co-existence of Urban Harappans and Regional Chalcolithic cultures especially in the region of Gujarat has been the focus of many recent researches (Ajithprasad 2007; Mandelia et al. 2010; Ajithprasad 2011; Ajithprasad and Sharma 2011; Rajesh 2012). Various archaeological artefacts collected from the coastal site of Navinal has produced interesting facts regarding interrelationship between these two contrasting cultures. Results of a typological analysis of the lithic assemblage collected from the site have been presented in this paper. The study of lithics is of importance for understanding broader questions about society given that lithic assemblages are shaped by a myriad context and includes factors such as technology, economic organization, craft specialization, and other aspects of daily life (Rasmussen 2010). It was also noted that lithic assemblage provided important evidence regarding long distance contacts and continuous incorporation of two distinct lithic technologies.

Site

The archaeological site at Navinal (23° 49' 13.5" N, 69° 35' 49.9" E) in Mundra Taluka, Kachchh District, Gujarat (Fig. 1) was discovered by R.P. Pandya in 1956, but was first reported by S. R. Rao in 1963 (Rao 1963). Assigned by S. R. Rao as a Harappan Port Town, this site appeared as a roughly circular mound (approximately 1 km). Surface features of the site have been studied by archaeologists from M.S. University of Baroda, Kachchh University, University of Kerala and Albion College, USA in 2011, 2012 and 2013.

"Explorations were conducted at the site recently under a newly launched project - 'Archaeological Excavation in Navinal in Mundra Taluka, District Kachchh and Exploration in Kachchh District, Gujarat. This long-term multidisciplinary research project in the Harappan settlement of Navinal, Taluka Mundra, District Kachchh in Gujarat has been launched with twin objectives, to understand the level of integration which existed among the Regional Chalcolithic Cultures and Classical Harappans found at the site and, to understand the economic production and inter regional interaction network that existed during

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Rajesh S.V., Saleem Shaikh, Brad Chase, Y.S. Rawat, Ambika Patel, Abhayan G.S., Ajit Kumar, Charusmita Gadekar, Haseen Raja R., Akinori Uesugi, Vinod V., Renjinimol M.N. and Prabhin Sukumaran. 2014. Craft Production at Navinal: A Harappan Settlement in Kachchh District, Gujarat. *Atulya Varso* 2 (3) (In press).

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Presentations

Presented a paper (jointly with Saleem Shaikh, Brad Chase, Y.S. Rawat, Ambika B. Patel, Abhayan G.S., Ajit Kumar, Charusmita Gadekar, Akinori Uesugi, Haseen Raja R., P. Ajithprasad, Prabhin Sukumaran and Renjinimol M.N.) entitled A Glance into the Archaeological Field Investigations of Harappan Settlement at Navinal (2013-14) in Kachchh District, Gujarat, Western India in the International Seminar on Archaeology and Language and the Joint Annual Conference of IAS, ISPQS, IHCS at Pune from 6-9 October, 2014.

Presented a paper (jointly with Charusmita Gadekar, Saleem Shaikh, Brad Chase, Y.S. Rawat, Ambika B. Patel, Abhayan G.S., Vinod V., Ajit Kumar, P. Ajithprasad, Haseen Raja R. and Renjinimol M.N.) entitled Diagnostic Stone Tools and Lithic Debitage from Harappan Settlement at Navinal (2013-14) in Mundra Taluka, Kachchh District, Gujarat in the Fifth International Conference of the Society of South Asian Archaeology (SOSAA) at Raipur from 14-18 February, 2014.

Presented a paper (jointly with Saleem Shaikh, Brad Chase, Y.S. Rawat, Ambika B. Patel, Abhayan G.S., Ajit Kumar, Vinod V., J.M. Kenoyer and P. Ajithprasad) entitled Excavations at Navinal in Kachchh and Explorations in Kachchh District, Gujarat: An Introduction to Multidisciplinary International Archaeological Research Project in International Conference entitled Harappan and Regional Chalcolithic Cultures of Greater Indus Region: An International Conference on Indus Civilization organized by the Department of Archaeology, University of Kerala at Kazhakuttom, Thiruvananthapuram from 25th to 27th November 2013.

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Acknowledgements

Archaeological Survey of India
University of Kerala
ARCPIP Project
All team members and students
Gajendra Singh – Sarpanch, Navinal
Villagers - Navinal

Thank You...



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સિરાચા વન અધિકાર સમિતિ

ગામઃ સિરાચા, તા. મુંદરા જિ. કચ્છ, ભુજ

પ્રમુખ:- ચૌહાણ જોરૂભા પ્રેમસંગજી મંત્રી:- ચૌહાણ પ્રવિણસિંહ ભુરૂભા

તા:- 24/04/17

પ્રતિ,
અધ્યક્ષશ્રી પ્રાન્ત સ્તરીય સમિતિ (વન અધિકાર કાનુન _ ૨૦૦૬),
પ્રાંત કચેરી મુંદરા
જિલ્લા સેવા સદન _ મુંદરા - કચ્છ.

વિષયઃ- આદિવાસી અને અન્ય પરંપરાગત વન નિવાસી (વન અધિકારોની માન્યતા ધારો- ૨૦૦૬) હેઠળ મુંદરા તાલુકાના સિરાચા ગામનો વન વિસ્તાર ઉપર સામુદાયિક સંશોધનોના ઉપયોગ, વ્યવસ્થાપન કરવા અંગેનો દાવો રજુ કરવા બાબતે.

ઉપરોકત વિષયના અનુસંધાને જણાવવાનું કે ઉપરોકત અધિનિયમ હેઠળ અમારા ગામની વન અધિકાર સમિતિ દ્વારા ગામની ઉત્તર દિક્ષામાં વિસ્તારમાં ફેલાયેલ ગામના દાણ ડેરી રખાલ વન વિસ્તાર ઉપર વન સંશોધનોના ઉપયોગ, વ્યવસ્થાપન માટે કલમ નિયમઃ ૧૧ (૧) (એ) અને (૪) તેમજ કલમ ૩ (૧) (આઇ) અને નિયમ ૧૧ (૧) અને ૪ (એ) મુજબ દાવો તૈયાર કરવામાં આવ્યો છે. આ દાવાને અમારા ગામની ગ્રામસભા દ્વારા નિયમ મુજબ ઠરાવ પસાર કરીને દાવોને મંજુરી આપવામાં આવી છે.

અમારા ગામની વન અધિકાર સમિતિ દ્વારા તૈયાર કરાયેલ સામુદાયિક દાવાની ફાઇલને આ સાથે આપણી સમક્ષ આજ રોજ રજુ કરીએ છીએ. આ દાવા ફાઇલમાં નીચે મુજબના દસ્તાવેજો સામેલ કરેલ છે.

૧. સામુદાયિક અધિકાર માટેના દાવા ફોર્મ ।બ* ડીટેઇલ જોડાણ સાથે.
૨. સામુદાયિક વન સંશાધન અધિકાર માટેનું દાવા પત્રક ફોર્મ ।ક* ડીટેઇલ સાથે.
૩. વન અધિકારોની ઓળખ, હદ, ઉપયોગ વગેરે સ્વીકૃતિ માટેનો ગ્રામસભાનો ઠરાવ.
૪. નકશો.
૫. અન્ય પરંપરાગત વન નિવાસીઓના વન સંશોધનો ઉપર આધારીતતા દર્શાવવા માટે અલગ અલગ પ્રકારના ૪ લેખિત દસ્તાવેજોનો એક સેટ.
૬. ગામની ગ્રામસભાના સભ્યોની યાદી.

લિ.

પ્રમુખ
વન અધિકાર સમિતિ
મું. સીરાચા તા. મુંદરા - કચ્છ

મંત્રી

નવીનાળ વન અધિકાર સમિતી

ગામ:-નવીનાળ,તા.મુંદરા, જી-કચ્છ.

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તા.-20/5/2016

પ્રતિ,
શ્રી પ્રાન્ત સ્તરીય સમિતી(વન અધિકાર કાનૂન-૨૦૦૬),
મુંદરા પ્રાન્ત,
પ્રાન્ત કચેરી, મુંદરા-કચ્છ.

વિષય:- આદિવાસી અને અન્ય પરંપરાગત વન નિવાસી(વન અધિકારોની માન્યતા ધારો-૨૦૦૬) હેઠળ નવીનાળ ભરાડી માતાના હુવા પરનો દાવો આપવા બાબત.

ઉપરોક્ત વિષયના અનુસંધાને જણાવવાનું કે ઉપરોક્ત અધિનીયમ હેઠળ અમારા ગામની વન અધિકાર સમિતી દ્વારા ભરાડીમાતાના હુવા ઉપર નવીનાળ ગ્રામજનોના વન સંશાધનોના ઉપયોગ, વ્યવસ્થાપન માટે કલમ નિયમ: ૧૩(૧) (ઓ) અને (૪) તેમજ કલમ ૩(૧) (આઇ) અને નિયમ ૧૧(૧) અને ૪(એ) મુજબ દાવો તૈયાર કરવામાં આવ્યો છે.આ દાવાને અમારા ગામની ગ્રામસભા દ્વારા નિયમ મુજબ ઠરાવ પસાર કરીને દાવાને મંજૂરી આપવામાં આવી છે.

અમારા ગામની વન અધિકાર સમિતી દ્વારા તૈયાર કરાયેલ સામુદાયિક દાવાની ફાઇલને આ સાથે આપણી સમક્ષ આજ રોજ રજુ કરીએ છીએ.આ દાવા ફાઇલમાં નીચે મુજબના દસ્તાવેજો સામેલ કરેલ છે.

પરિશિષ્ટ :૧. સામુદાયિક અધિકાર માટેનો દાવા ફોર્મ "બ" ડીટેઇલ માહિતીના જોડાણ સાથે.
પરિશિષ્ટ :૨. સામુદાયિક વન સંશાધન અધિકાર માટેનું દાવા પત્રક ફોર્મ "ક".
પરિશિષ્ટ :૩. વન અધિકારોની ઓળખ,હદ,ઉપયોગ વિશેરે સ્વીકૃતિ માટેનો ગ્રામસભાનો ઠરાવ સહી સાથે.
પરિશિષ્ટ :૪ સામુદાયિક વન સંશાધનોના ઓળખ,હદ નકકી કરવા માટે નોટીફિકેશન મુજબ હદ,ચર્તુદિશા દર્શાવતો નકશો.
પરિશિષ્ટ :૫. અન્યપરંપરાગત વન નિવાસીઓના વન સંશાધનો ઊપર આધારીતતા દર્શાવવા માટે અલગ અલગ પ્રકારના લેખિત દશ્તાવેજો નો એક સેટ.
પરિશિષ્ટ :૬. ગામના ગ્રામસભાના સભ્યોની યાદી
પરિશિષ્ટ :૭. ભરાડીમાતા હુવાનો સંરક્ષણનો અહેવાલ.
વન અધિકાર સમિતિનો ઠરાવ

લિ. પ્રમુખ
વન અધિકાર સમિતી નવીનાળ

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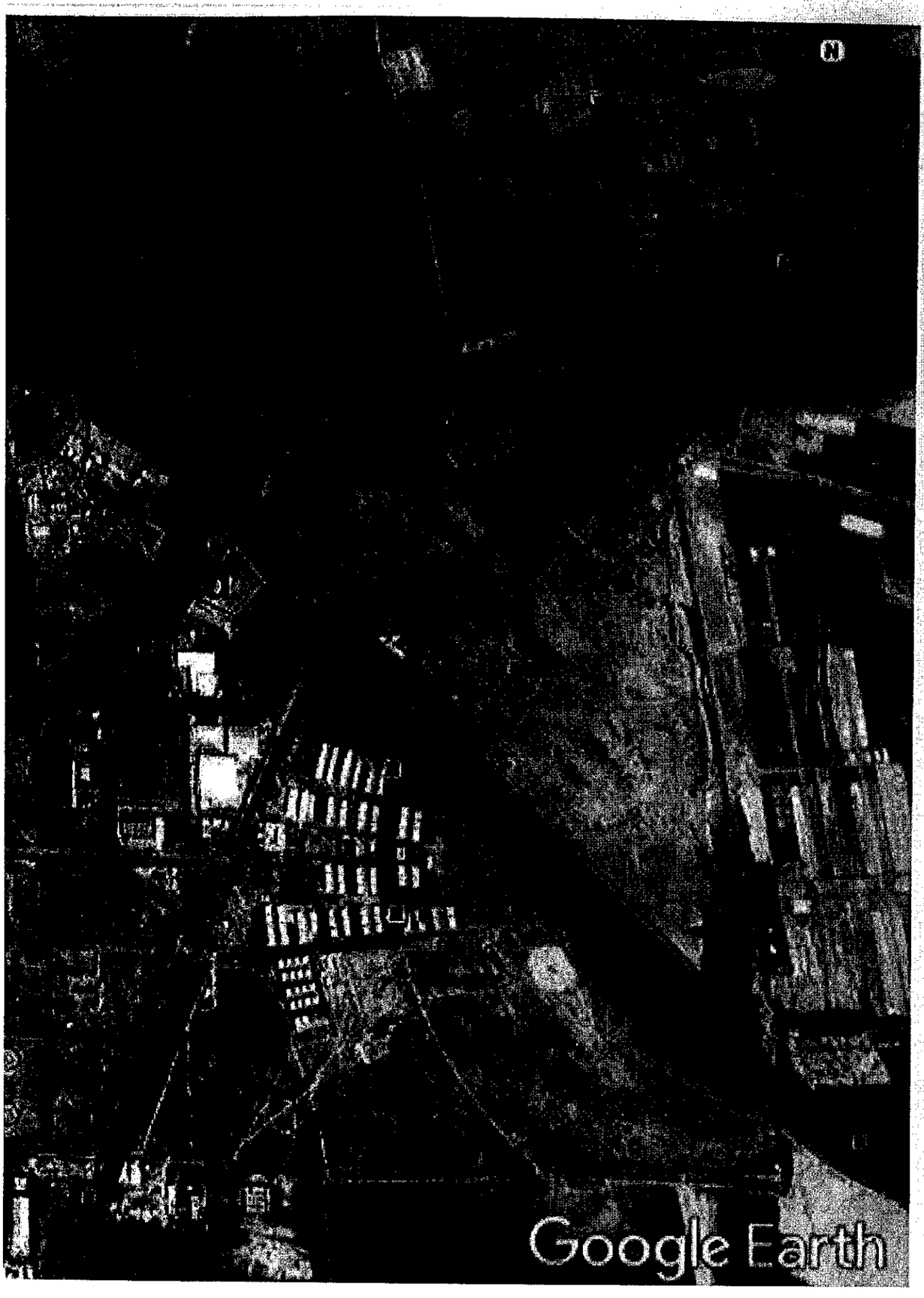
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(TRANSLATED)

Jadeja Gajendrasinh Bhimaji,

Sarpanch, Navinal,

Kapuriya Wadi,

Tal: Mundra Kutch

To,

The Member Secretary,

Gujarat Pollution Control Board,

Gandhinagar - Gujarat

Subject: Objections for Greenfield Copper Refinery Project coming in M/s. Adani Enterprises Limited, Adani Special Economic Zone in village: Shiracha and Navinal.

1. **<u>Non compliance of Terms of Reference and Breach of Circular dt. 31-03-2011 of the Government of India (Encl.: 1)</u>**

   a) T.O.R. (Terms of Reference) was issued for this project of dt. 21st June, 2016, in which it was clearly stated in Section 5(I) that clearance for forest land of 102 hectare should be submitted.

      i) It is declared in Form No.1 (MoEFCC uploaded by them on their website) to obtain Environment Clearance by Adani Enterprise that forest clearance is under the process.

      ii) It is declared on draft E.I.A. report on page no. AI 14 that (The Compliance of TOR has not done) but forest clearance is pending.

      Thus, considering the above mentioned issued it is clear that T.O.R.by Adani Enterprise. So, Environmental Public Hearing is not valid until the T.O.R. compliance is not made.

   b) According to Circular dt. 31-03-2011 of MoEFCC (Encl: 4) that forest clearance should be obtained first for any new project, in which the land of forest department is to be utilized and the environmental clearance process should be made thereafter. The land of 102 Hectare is of Forest in this project of Adani Enterprise and Forest Clearance is pending. It is proved by Encl: 2 and Encl:3. Thus, any environment clearance process made before forest clearance is illegal and Public Hearing may also be treated illegal.

c) As per Section 8(iv) of E.I.A. Notification, 2006 if any information is concealed deliberately, the application should be cancelled. Thus, the above mentioned information pertaining to forest clearance is concealed by Adani Enterprise deliberately to misguide. Hence, their application for environment clearance must be cancelled.

d) Why any action is not taken in spite of the complaint (encl.:5) regarding above mentioned point no. 1 is made by me by e-mail on 11/04/2017 to (1) K. C. Mistry, Member Secretary, Gujarat Pollution Control Board, Gandhinagar and (2) Arvind Agrawal, Chairman, Gujarat Pollution Control Board, Gandhinagar, (3) Regional Officer, Gujarat Pollution Control Board, Gandhidham, (4) M. A. Gandhi, Collector, Kutch, (5) M. K. Sing, Joint Secretary, MoEFCC., New Delhi?. Why the process pertaining to Environment Clearance is not stopped? On what basis Public Hearing is arranged?

2. **Information concealed in Form-1**

a) Review Petition is filed on judgment of P.I.L. No.17 of 2011 of the grazing land of Navinal on the land proposed in point no. 16 and 26 of basic information. It is concealed that it is under proceeding.

b) The information of Daneshwari River is concealed by Adani in point nos. 2 and 10. But, this river passes through the proposed project. Thus, the information is concealed.

Thus, as per Section 8(iv) of E.I.A. Notification, 2006 if any information is concealed deliberately, the application should be cancelled. The above mentioned information is deliberately concealed in Form No.1 by Adani Greenfield Copper refinery. Hence, their application deserves to be cancelled.

3. **Deficiencies in E.I.A. report**

a) It is declared by Adani in point no. 10 on page Nos. 1-4 of E.I.A. report that there is no archeologically important place within the radius of 10 km. But, an archeological place is situated in Navinal Reserve Forest, about 1 km. from the proposed project area. Accordingly, survey of this area is made by archeological department of M. S. University. The primary report is attached herewith. Thus, this information is concealed.

4. **Violation of Sunita Narayan Committee**

a) It is mentioned on page no. 69 of Sunita Narayan Committee Report that fishing port should be made at Bhadreshwar so that people of surrounding villages may make fishing activity there. But nothing such is made there.

b) It is mentioned on page no. 69 of Sunita Narayan Committee Report that arrangement of coming and going should be made so that fishermen may move on coast. But nothing such is made there by Adani.

c) It is mentioned on page no. 75 of Sunita Narayan Committee Report that collective grazing land should be given back voluntarily so that people may graze their animals. But nothing such is made there.

d) It is mentioned on page no. 75 of Sunita Narayan Committee Report that Cumulative Impact assessment studied is to be required and compliance of the same. So permission for new project should not be granted.

e) The committee has mentioned in recommendation no. 7.2.2 that environment permission for north port should be cancelled, because Bocha Island is situated there and mangrove is caused heavy damage there. In spite of that permission is not withdrawn.

f) As per the Sunita Narayan Committee report mapping of HTL and LTL should be made and kept in public domain, which is not placed till date.

5. **Damage caused by Adani Power Plant Project of Adani Enterprise Ltd.**

a) It is mentioned in point no. 2 of permission granted to Adani Power on dt. 21/10/2008 and point no. 2 of C.R.Z. clearance of Intake and Disposal Facility dt. 29/05/2008 that effluent discharge should be made through pipeline. But effluent discharge is made by constructing open channel by Adani Power. Thus, environment permission is violated.

b) The ground water has become more salty due to intake channel construction by Adani Power.

c) Breach is found in guideline of coal handling.

d) It is mentioned in condition no. 7 of CRZ clearance that no trouble someness should be caused to the local community due to Intake Channel and Effluent Discharge pipeline. But the roads are closed by Intake Channel and Effluent Discharge pipeline. The road to approach grazing land is closed for cattle breeders are closed and road to approach religious place on sea shore is closed.

e) It is mentioned in condition no. 9 of CRZ clearance that no displacement of house of the people or fishermen should be caused due to project. Hindrance should not be caused due to pipeline in coming and going of fishermen and the officer boats. All those fishermen dwelling on old Kotdi Bandar since long are displaced due to intake channel. Open channel is built in place of pipeline for Effluent discharge and as it passes through Kotdi creek, the movement of boats of fishermen is interrupted. Thus, this condition is violated.

f) It is mentioned in condition 21 of the environment permission that half yearly compliance report should be submitted. The compliance thereof is not followed.

6. **Issue of land of forest department**

a) A demand of land of reserve forest of 8 villages aggregating to 1576.81 hectare is made by Adani on dt. 19th July, 2004. Its forest clearance is under process. Out of 1576.81 hectare of demanded land to be used for project, 102.38 Hectare of land is of Shiracha Danderi Rakhal (Reserve forest).

b) According to Forest Privilege Act, 2006 the villagers making use of the land have prior right on it and it cannot be allotted for industrial or other use without permission of the village meeting.

c) According to Forest Privilege Act, any community in use of the land for last three generations or earning livelihood from it may have right on it.

d) The villagers of surrounding are making use of this forest land of 1576.81 Hectare. So this land cannot be allotted for industrial purpose according to Forest Privilege Act

e) Siracha Gram Panchayat has put it claim before Prant Stariya Van Adhikar Samiti to settle its community rights on the forest land to be used for proposed project.

f) Out of the 1576.81 hectare of land under demand, 89 hectare of land is of Navinal village and Navinal Village Committee has put collective claim on it.

g) According to Forest Privilege Act, the villagers have prior right on it. So, its forest clearance cannot be availed and it cannot be used for the project.

h) It is the last reserve forest in the area. If it is allotted for industrial purpose, the area will remain without forest and more forest are essential for industrial area.

7. **Noncompliance of Environment Clearance of Adani Port and Special Economic Zone**

a) As per specific condition (2) conservation of creeks, rivers mangroves coming within the area is to be made. It can be seen from the photographs of different years taken from satellite annexed herewith that the creeks, rivers mangroves coming within the area are exterminated by Adani. Thus, the condition is violated.

b) It is directed in the specific condition (3) of Environment Clearance that mouth should be kept open so as the water may move in all creeks.

i) Mouth of Kotdi creek is closed by filling clay

ii) Due to bridge built on the point where Bharadi Mata creek meet Nagmati River sea water does not come to upper area and mangrove in that upper are withered.

iii) Thus, the condition is violated.

c) As per specific condition (4) condition of every creek should be kept in comparison with the satellite image 2005. But, the condition is not followed by the Adani Port and S.E.Z.

d) It is directed in Specific Condition (5) that a recent satellite map should be submitted once a year so that it can be compared with the Satellite map of year 2005 and confirmed whether there is any change in creeks, rivers, mangrove and mouth of creek. No such map is submitted by APSEZ till date. Thus, condition compliance is not followed.

e) As per condition (6) APSEZ must observe order passed by the Ministry of Environment and Forest considering the report submitted by Sunita Narayan Committee. But, it is not followed by APSEZ

f) As directed in condition (12) and (13) NCSCM/NIOT will control and verify the implementation as per action plan approved by Ministry of Environment and Forest. Execution Report of Action Plan will be required to be submitted with six monthly monitoring reports. This condition is not complied till date.

g) As per condition (15) no change should be made in flow of river. But,

   a) The route of river of Kandagara passing through Adani Power is changed.

   b) The Kamandwala flow between Navinal and Shiracha is changed.

   c) The mouth of Nagmati River is closed.

   d) O.C.C.L. Company is established on river of Dhrab.

   e) Construction of Adani Hospital is made on Kevdi River. Thus, breach of this condition is made.

h) As per condition (18) no development should be made up to 50 meter from mangrove area. But, many constructions are erected by project proponent such as construction of Adani House building. Thus, breach of this condition is made.

i) As per condition (19) three tire shelter greenbelt are required to be developed. But, no compliance is made till date.

8) Report of Gujarat Ecology Commission.

a) A report is prepared by Gujarat Ecology Commission upon study of effect on mangrove and its ecology due to coal handling. Mundra Port is a part of it.
b) According to the report, growth of mangrove is affected by coal dust.
c) As per the report BOD (Biological Oxygen Demand) was 9.52 in 2010/11 which has reached to 27 in 2012/13 which is the highest in the areas under survey.
d) COD (Chemical Oxygen Demand) was also 38 in 2010/11 which reached to 92.65 in 012-13.
e) DO (Dissolved Oxygen) has reached to 4.92 from 4.8. which is is higher than permissible limit of CPCB.
f) SS(Suspended Solid, turbidity in water) has reached to 162 from 56 which is higher than permissible limit of CPCB.

g) Nitrate 0.313 in 2010-11 has reached to 1.154 in 2012-13.

9) The grazing land of Navinal village will be used for Copper Refinery Project of Adani Enterprise Ltd. The matter of land is sub- judice. No judgment is passed in favor of any party.

10) In spite of having so many industries, nothing is made for the employment to local people. i.e. 400 Hectare of land of surrounding villages is given to Adani Power and fishermen, farmers, cattle breeders are left unemployed. In reward thereof only 500 out of 7000 laborers and 15 out of 1500 employees are local. Consequently, nothing but unemployment and pollution will be available from this project.

11) This is a coastal area. So, C.R.Z. clearance is required so as to make action plan for salvage against earthquake or tsunami.

12) 32800 K.L.D. will be utilized by the company and desalination plant will be used for it, which will affect the marine-life adversely. This desalination is connected with the company. But no study of its effect is made.

13) There are two power projects and biggest coal handling port in Asia is situated here but it is not mentioned in E.I.A. report.

14) Environment Clearance Compliance of other projects of Adani is not made. So, people in surrounding should not be caused damage by giving permission to new project.

15) The livestock of our villages were grazing on the grazing land of the proposed project. The livelihood is ruined by snatching it. Now there will be no grazing land by giving remaining forest land to new project.

16) The hazardous chemical such as sulphuric acid will come out due to copper refinery. The possibility of pollution and acid rain will increase. So, this project should be cancelled.

17) The land in surrounding will be washed out due to closure of the river and danger of flood will increase in surrounding villages.

18) Old roads will be closed. One of which from Navinal to Kotdi creek will be closed.

19) Wild animals are living in this area, what about their restoration?

Yours faithfully,
Sd/- illegible.

Encl.:

1. Terms of Reference
2. Form No. 1.
3. Non Compliance of Terms of Reference (E.I.A. Page No. A1 to A14)
4. Office Memorandum of M.O.E.F dt. 31/03/2011
5. My complaint dt. 31/04/2017
6. Archeology professor's report
7. Google earth image of the year 2005 and 2015 of Bharadi Creek and Nagmati river.
8. Google earth image of the year 2010 and 2016 of Kotdi Creek.
9. Google earth image of the year 2005 and 2016 of Mota Kandagara river.
10. Google earth image of the year 2005 and 2016 of Kamandwala flow.
11. Google earth image of the year 2005 and 2016 of Nagmati river.
12. Google earth image of the year 2005 and 2015 of Dhrabwali river.
13. Google earth image of the year 2004 and 2015 of Kevdi river.
14. Google earth image of Adani House and creek
15. Copy of the suit filed by Shiracha Forest Right Committee.
16. Copy of the suit filed by Navinal Forest Right Committee.

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SIRACHA FOREST RIGHT COMMITTEE

VILLAGE: SIRACHA TALUKA:MUNDRA DISTRCIT: KACHCHH-BHUJ

President : Chauhan Jorubha Premsanghji Secretary: Chauhan Pravinsinh Bhurubha

Dt. 24/04/2017

To,
The President,
Regional Level Committee (Forest Right Code-2006)
Regional Office, Mundra
District Collector Office, Mundra.

Subject: Regarding representation of claim for collective research and management for forest area of village Siracha Tal. Mundra village under Adivasi and other traditional Forest dwelling (Forest recognition Code-2006).

On the subject mentioned above we would like to state that the FOREST RIGHT COMMITTEE of our village has prepared our claim for collective research and management for DAN DAIRY RAKHAL FOREST AREA on the northern side of our village under section 11 (1) (a) and (4) and Section 3 (1) (i) and 4 (a). This claim has been passed has been passed by VILLAGE COMMITTEE by passing resolution as per rules.

We are producing herewith file of collective claim prepared by FOREST RIGHT COMMITTEE of our village. The following documents are included in this claim file.

1. Claim FORM B for collective rights* with detail annexures.
2. Claim FORM C for collective forest research right* with details.
3. The resolution of village committee regarding acquaintance, limit and use of forest rights.
4. Map.
5. One set of various 4 (four) types of written documents showing other traditional forest research on forest living people.
6. List of members of Village Committee.

Sd/- Sd/-
President **Secretary**

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FOREST RIGHTS COMMITTEE, SIRACHA, TAL. MUNDRA - KACHCHH.

NAVINAL FOREST RIGHTS COMMITTEE

Village - Navinal, Taluka - Mundra District - Kutch

Date 10.5.2016

TO
The Regional Committee (Forest Rights Act 2006)
Mundra Regional Office
MUDNRA – KUTCH

Sub: Claim proposal for Navinal, Bharadi Mata's Dhuvo under the Schedule Tribe and other traditional forest dwellers (Forest Right Act 2006)

With reference to the above subject we have to state that as per the above act a claim proposal is prepared for the Bharadi Mata's Dhuva at Navinal for the use and management of forest resources as per the sec. 11 (1) (A) and (4) and sec. 3(1) (I) rule 11 (1) and 4 (A) Necessary resolutions has been passed in the local Gram Sabha (Village Assembly) as per provision of the act.

We are submitting herewith you the file prepared by the Forest Rights Committee which contains following documents:

Schedule: 1 Claim form "B" with detailed information for community rights

Schedule: 2 Form "C" for the forest resource rights of the community

Schedule: 3 Resolution by Gram Sabha (Village Assembly) accepting the introduction, its limit and the use of forest rights

Schedule: 4 four directional map as per notification showing its limits and use of forest rights.

Schedule: 5 a set of various documents showing dependency of the traditional forest dwellers living since generations

Schedule: 6 Members List of Gram Sabha (Village Assembly)

Schedule: 7 Report of conservation of Bharadi Mata' Dhuva

Resolution passed by Forest Rights Committee.

Sd/-
Chairman Secretary
Forest Rights Committee, Navinal

Sd/-
Sarpanch (Village Head)
Gram Panchayat, Nainal
Block-Mandvi, District - Kutch

C-Q-44

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પ્રવિણસિંહ ભૂરૂભા ચૌહાણ
મુ પોસ્ટ શિરાચા તા મુંદ્રા જી કચ્છ
Ph 94269-02562
૨૯-૪-૨૦૧૭

પ્રતિ શ્રી
જિલ્લા કલેક્ટર સાહેબ,
કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) કોપર રિફાઇનરીના પ્રોજેકટથી સ્થાનિક લોકોને થનાર નુકશાન બાબતે લેખિત વાંધા/વિરોધ મૂકવા બાબત

માનનીય સાહેબ,

સવિનય જણાવવાનું કે કચ્છ જિલ્લામાં નવીનાળ અને શિરાચા ગામમાં આવનાર અદાણી એન્ટરપ્રાઇઝ લિમિટેડના કોપર રિફાઇનરીના પ્રોજેકટને લીધે સ્થાનિક લોકો, વન પર નિર્ભર સમુદાય, માછીમારો અને દરિયાઈ પટ્ટીના પર્યાવરણ અને જીવસૃષ્ટિ સામે ગંભીર ખતરો છે. જે બાબતને ડ્રાફ્ટ ઇઆઇએ રિપોર્ટમાં ઘણી ખામીઓ અને ભૂલો તેમજ ખોટી માહિતીઓ છે. આ અભ્યાસ રિપોર્ટમાં દેખાય છે કે આ દરિયાકિનારે આવો મોટો ઉધોગ સ્થાપવાથી માનવ સ્વાસ્થ્ય, પશુ-પંખીઓ અને સમગ્ર જીવસૃષ્ટિને ગંભીર અને કાયમી નુકશાન થાય એમ છે. તેની ભરપાઈ થઈ શકે એમ નથી. સ્થાનિક ગામોમાં રહેતા લોકોની આવનારી પેઢી લુલી, લંગડી અને નપુંસક પેદા થાય એવો ભયજનક પ્રદૂષણ ફેલાવતો આ પ્રોજેકટ છે. તેથી આ સ્થળે અમે આ પ્રોજેકટનો વિરોધ કરીએ છે. અમે અમારો લેખિત વિરોધ નીચે મુજબના મુદ્દાઓ પર રજૂ કરીએ છીએ અને આ પ્રોજકેટનું સ્થળ યોગ્ય ન હોવાથી તેને અહી આવતો અટકાવવાની માંગ મૂકીએ છે.

1. અદાણી એન્ટરપ્રાઇઝ લિમિટેડના (AEL) દ્વારા પ્રોજેકટની જગ્યા માટે પસંદગી માટે આરક્ષિત વનની જગ્યા પસંદ કરવા સામે મારો વિરોધ છે. જમીન માટેના વિકલ્પોજ ખોટા પસંદ કરવામાં આવેલ છે. આ પ્રોજેકટ દરિયાકિનારાને મૂકી ને સ્થાપવો જોઇયે. કાચામાલને પરિવહન માટે ક્લોઝ પાઇપલાઇન કન્વેયર સિસ્ટમ હયાત હોય આ પ્રોજેકટને દરિયા કિનારાથી દૂર વધુ અંદર સ્થાપી શકાય એમ હોવા છતાં આ પ્રોજેકટને દરિયાનજીક નાખવાનું કંપનીના સંચાલકો એ નક્કી કરેલ છે જે અયોગ્ય છે. ઉધોગ માટે પાણી અને વીજળી પણ સરળતાથી ત્યાં આપી શકાય અને પાણીનો નિકાલ શૂન્ય હોય કોઈ પાણી બહાર ફેકવાની સમસ્યાનો પણ સવાલ નથી. દરિયાકાંઠે આવો ઉધ્યોગ સ્થાપવોજ જોખમી છે અને દરિયાઈ પર્યાવરણને નુકશાન કરી દરિયાઈ જમીનને રેતી પૂરી સમથળ કરી તેના પર આવો પ્રોજેકટ સ્થાપવો નુકશાનકારક છે. આથી અમે વન અધિકાર કાયદા 2006 હેઠળ ગામના સ્થાનિક લોકો કે જે વન પર નિર્ભર છે તેમની આજીવિકા જોખમમાં છે તેઓ આ પ્રોજકેટનો વિરોધ કરીએ છીએ. વનની જમીનો ઓછી થતી જાય છે તેથી અમારા ગામનું દંડેરી અને શિરાચાનું જંગલ કંપનીએ ને અન્ય ઔધોગિક હેતુઓ માટે મળવું જોઇયે નહી. ગામના

ઢોર અને ગાયો આ જંગલમાં ચરે છે. તેથી અમો આ વનનો કંપનીના હેતુ માટે ઉપયોગ સામે વિરોધ બતાવીએ છીએ.

2. <u>મેંગરૂવના ઝાડો કાપી નાખી, ખાડીઓ પૂરી તેમને કાયમી નુકશાન પહોંચાડવાનું કામ અદાણી કંપનીએ કરેલ છે. નવીનાળના દરિયા કિનારે જંગલમાં મોજૂદ રેતીના ઢુવાઓ તોડી નાખી તે રેતીનો ઉપયોગ પોર્ટ બનાવવા કરેલ છે જેને લીધે સમગ્ર દરિયાઈ વિસ્તારની ભૌગોલિક પરિસ્થિતી બદલાઈ ગયેલ છે અને તે માટે અમારો કેસ માનનીય સુપ્રીમ કોર્ટમાં આજે ચાલે છે.</u> આ એપીએસઇઝેડ બનાવતી વખતે થયેલ આ વિસ્તારના પર્યાવરણ, દરિયાકિનારાને થયેલ ભારે નુકશાન, લોકોની આજીવિકાને અદાણી કંપનીએ પહોંચાડેલ હાનિ બદલ અમને આ કંપની અને તેના આવનાર પ્રોજેકટ સામે વિરોધ છે. આ કંપની પર્યાવરણને નુકશાન પહોંચાડીને અને જીવસૃષ્ટિને નુકશાન પહોંચાડી ઉધોગો સ્થાપે છે એ વાત કોર્ટ અને સરકારમાં પણ સાબિત છે. તેથી આ વિવાદિત કંપની અને તેના ખરડાયેલા ભૂતકાળને ધ્યાને રાખી આ પ્રોજેકટ નામંજૂર કરવામાં આવે.
3. આ પ્રોજેકટ કયા કયા સર્વે નંબરમાં કરવામાં આવનાર છે તમામ સર્વે નંબરની વિગતો રિપોર્ટ માં બતાવેલ નથી. કેમ? જેતે ગામ સહિતની વિસ્તાર દર્શાવતી તમામ વિગતો અમને આપશો.
4. પ્રોજેકટ માટે APSEZની કેટલી જમીન AEL ને આપવામાં આવેલ છે. તે તમામ પ્લોટના નંબર અને તેનું ક્ષેત્રફળ જણાવો અને તેનો પ્રત્યક્ષ કબ્જો કોની પાસે છે તે પ્લોટ દીઠ કાગળ પર લેખિતમાં બતાવશો.
5. હાલમાં APSEZ માં જેટલા પ્લોટ હોય તે તમામ પ્લોટનો વિસ્તાર બતાવતી માહિતી આપશો. કેટલા પ્લોટ વેચાઇ ગયા અને કેટલા પ્લોટ વેચાણ વગરના છે તેની પણ માહિતી આપશો.
6. આ પ્રોજેકટ જગ્યા કે જે APSEZની માલિકીની છે તેના પર પર આજની તારીખે SEZ નોટિફાઇ છે કે નહીં? તે નોફિકેશનની નકલ આપશો.
7. આ પ્રોજેકટ જગ્યા કે જે APSEZ AELને આપશે તે એસઇઝેડમાં ગણાશે કે નહીં ? જરૂરી માહિતી સરકારી રેકર્ડ અને સ્થિતિ પ્રમાણે આપશો.
8. આ જગ્યા કે જ્યાં પ્રોજેકટ કરવામાં આવશે તે જગ્યાની APSEZની માલિકી દર્શાવતા સરકારી દસ્તાવેજ આપશો.
9. MPSEZ દ્વારા , જે તે સમયે શિરાચા, દંદેરી ફોરેસ્ટની ગેર કાયદેસર રીતે પચાવી પાડેલી જમીનની વિગતો આપશો. જે જમીન ભારત સરકારે ડીનોટિફાય કરેલ ન હોય પણ કંપનીએ કબ્જો કરેલ હોય તેવી જમીનની વિગતો આપશો.
10. APSEZ દ્વારા SEZ ડીનોટિફાય કરવામાટે (AEL ના પ્રોજેકટ વિસ્તાર માટે) ભારત સરકારની કોઈ મંજૂરી માંગવામાં આવેલ હોયતો દરખાસ્તની તારીખ આપશો.
11. AEL નો કોપર પ્લાન્ટ માટે શિરાચા, દંદેરી જંગલની જમીન લઈ તેના પર પ્રોજેકટ કરવાનું પ્રયોજન અને તર્ક આપશો.
12. MPSEZ ને જેતે સમયે ભારત સરકારે જંગલની જમીન તેમજ અન્ય જમીન પર રિક્લેમેશનની પરવાનગી આપી હોય તો તેની નકલ આપશો.

13. ફોર્મ 1 માં બતાવેલ પ્રોજેકટની જગ્યામાં અનામત જંગલ બતાવેલ નથી જ્યારે નકશા અને ઇઆઇએ રિપોર્ટમાં બતાવેલ છે. આમ વિરોધાભાષી માહિતી કેમ આપવામાં આવેલ છે?
14. કંપનીએ ફરજિયાત 30% ગ્રીનબેલ્ટ બનાવવાનું છે. તો 526 હેક્ટરના 30% એટલે 157 હેક્ટર ગ્રીનબેલ્ટ બનાવવાનું થાય. કુલ 526 હેક્ટર પૈકી 102 હેક્ટર તૈયાર અનામત જંગલ લઈ કંપની ગ્રીન બેલ્ટ તરીકે બતાવવા માંગે છે?? જો હા તો બીજા 55 હેક્ટર અનામત જંગલ ક્યાથી લાવશે? આમ આ કંપની ખોટી રીતે ફોરેસ્ટ પચાવી પાડવા માંગે છે.
15. ઇઆઇએ રિપોર્ટના પાનાં સી-3 16માં બતાવ્યા મુજબ આ પ્રોજેકટનો મોટાભાગનો વિસ્તાર શિરાચા, દંદેરી જંગલની જમીન પર આવે છે. શું આ નક્શો ખોટો છે? તો સાચો નક્શો આપશો.
16. ઉપરોક્ત મુદ્દા માટે APSEZને મળેલ ફોરેસ્ટ કલિયરન્સની નકલ આપશો.
17. જંગલની જમીન બીજા ઔધોગિક ઉપયોગ માટે ડી નોટિફાય કરવા માટે મુકેલ છે તો તે બાબતે સ્થાનિક પંચાયતો એ આપેલ નો ઓબ્જેક્શન સર્ટિફિકેટ ની નકલ આપશો.
18. <u>વન અધિકાર અધિનિયમ 2006 હેઠળ જરૂરી જિલ્લા કલેકટરે જંગલ સિવાય બીજી ખાનગી કે સરકારી જમીન આ વિસ્તારમાં ઉપલબ્ધ નથી તે બાબતે આપેલ પ્રમાણપત્રની નકલ આપશો.</u>
19. MPSEZ સામે SLP 28788 /2016 થી સુપ્રીમ કોર્ટ અને WP (PIL) 12/ 2011 થી ગુજરાત હાઇકોર્ટમાં ચાલતા કેસની વિગતો અને વિવાદ શેનો છે તેની માહિતી આપશો.
20. સુનિતા નારાયણ કમિટી દ્વારા વન અને પર્યાવરણ મંત્રાલયને થયેલ ભલામણ મુજબ કંપનીએ કેટલો દંડ સરકારમાં ભરેલ છે? આ દંડની હાલની સ્થિતિ દર્શાવશો અને આ બાબતે કાયદાકીય રીતે માહીતી આપશો.
21. પ્રોજેકટ સાઇટ માટે પસંદ કરવામાં આવેલ જમીન અને જંગલની જમીનમાં કેટલા કુદરતી નદી નાળા છે તેની વિગતો ઇઆઇએ રિપોર્ટ સિવાય વધારામાં જણાવશો જેથી કોઈ પણ નદી નાળા જાણ બહાર ફાઇનલ ઇઆઇએ રિપોર્ટમાં રહી ના જાય. વધુ ચોકસાઇથી પુનઃ અભ્યાસ કરવાની અમારી માંગ છે અને ગામ અને ગામ લોકો પર થનાર અસરો બાબતે ચકાસણી ફરી કરવામાં આવે એવી અમારી માંગ છે. નદી નાળા અને કોતરો વરસાદી પાણી ના નિકાલ ની વ્યવસ્થાઓ APSEZ માં બંધ કરવામાં આવેલ હતા પૂરી દેવાયેલ હતા. જે ફરીથી ખોલવા મારી અરજ છે. નવા કોઈ પણ વહેણ બંધ કરવાથી અમો કંપની સામે કાયદાકીય પગલાં ભરીશું.
22. AELના પ્રોજેકટની નજીક દરિયા વિસ્તારના GCZMA માન્ય CZMPની નકલ આપશો.
23. NIO દ્વારા બનાવાયેલ CRZ મેપની વિસ્તૃત વાંચી સમજી શકાય એવી કલર નકલ હાર્ડ કોપીમાં આપશો.
24. મેંગરૂવના ઝાડો કે જે સીઆરઝેડ ૧એ માં આવે છે તેનાથી આ પ્રોજેકટનું નજીકમાં નજીક અંતર બતાવશો. અને તે માટે જરૂરી રેકર્ડની નકલ આપશો.
25. આ દરિયાઈ વિસ્તારમાં વસતા માછીમારોની સંખ્યા અને તેમના હયાત ધંધા રોજગાર વિષે માહિતી આપશો.
26. MPSEZ ના પ્રોજકેટને લીધે આ વિસ્તારમાં બેકાર થયેલ માછીમારોની સંખ્યા બતાવશો.
27. પ્રોજેકટની નજીક આ વિસ્તારમાં કેટલા માછીમારો પગડિયા માછીમારી કરે છે તેની સંખ્યા જણાવશો.

28. આ પ્રોજેકટથી માછીમારી માટે આવવા જવાના કેટલા રસ્તા બંધ થાય છે? કે ભૂતકાળમાં બંધ કરવામાં આવેલ છે?
29. આ પ્રોજેકટથી જંગલ પર નભનારા પશુઓ અને જંગલનો સામુદાયિક ઉપયોગ કરતાં લોકો પર કેવી અસર થશે અને આવા કેટલા લોકો છે તેની માહિતી આપશો. FRA 2006 હેઠળ થયેલ કાર્યવાહીની નકલ આપશો.
30. કોપર સ્લેગ અને ફોસફોજીપ્સમનો વપરાશ પ્લાન બતાવશો.
31. ગુજરાત રાજ્ય જૈવ વિવિધતા બોર્ડ દ્વારા નવીનાળ જંગલને જૈવવિવિધતા વારસા જગ્યા જાહેર કરવામાં આવેલ છે કે કેમ કે તેની દરખાસ્ત ચાલે છે કે કેમ તેની વિગત આપશો.
32. નવીનાળ-શિરાચા દરિયાઈ વિસ્તારની કેરિંગ કેપેસિટી વિષે કોઈ અભ્યાસ હાથ ધરવામાં આવેલ છે કે નહીં? જો અભ્યાસ થયેલ હોય તો તેની માહિતી આપશો. AEL ના પ્રોજેકટ પછી કેટલી કેપીસીટી બચશે તેની માહિતી આપશો.
33. અદાણી અને ટાટાના પાવર પ્લાન્ટના કારણે હવા, પાણીના પ્રદૂષણ અને AEL ના કોપર પ્લાન્ટ પછી પેદા થતાં હવા પાણીના પ્રદૂષણની સંયુક્ત અસરો વિષે બંને પ્રોજેકટના ઇઆઇએ રિપોર્ટની તુલના કરવામાં આવેલ છે કે કેમ તેની માહિતી આપશો.
34. આ પ્રોજેકટ વિષે અંગ્રેજીમાંથી ગુજરાતી ભાષાંતર કરવામાં આવેલ પર્યાવરણને લગતા સાહિત્યની નકલો ક્યાં મૂકવામાં આવેલ હતી તેની માહિતી આપશો. ઇએસીની મિટિંગ મિનિટ્સમાં જણાવ્યા મુજબ.
35. અત્યાર સુધી અદાણિ ગ્રૂપ દ્વારા મેંગરુવ પુનઃ સ્થાપન કાર્યક્રમ હેઠળ ટોટલ કેટલા હેક્ટર મેંગરુવ રોપેલા છે અને ક્યાં ક્યાં રોપેલા છે ? તેની વિગતવાર માહિતી આપશો.
36. શું એપીએસઇઝેડમાં આવતી પાવર ટ્રાન્સમિશન લાઇનો AELના પ્રોજેકટને લીધે ખસેડવામાં આવશે? વધુ વિગતો આપશો.
37. અત્યંત પ્રદુષિત એવા કોપર રિફાઇનરીના પ્લાન્ટના પર્યાવરણ વ્યવસ્થાપન પ્લાન માટે જરૂરી સ્ટાફ (૪ માણસો) ઇઆઇએ રિપોર્ટમાં બતાવ્યા મુજબ યોગ્ય છે? પ્રદૂષણની બાબતોને અદાણી સમૂહ કેટલી ગંભીરતાથી લે છે તેનો આ એક ઉત્તમ નમૂનો છે.
38. શું અદાણી પોર્ટનો સ્ટાફ પણ આ AEL પ્રોજેકટમાં પર્યાવરણ અને પ્રદૂષણની બાબતો જોશે? હાલમાં એવો કેટલો સ્ટાફ છે જે અદાણી સમૂહમાં નોકરી કરે છે અને સમૂહના તમામ પ્રોજેકટોમાં (પોર્ટ, એસઇઝેડ, પાવર પ્લાન્ટ વિગેરે) તેમની નોકરી અને પ્રદાન હોય છે? શું કાયદાકીય રીતે આ શક્ય છે ?
39. કેમિકલના 30 એકરના ઝેરી ઉકરડાના SLF પ્લાન વિષે TOR માં કે અન્ય કોઈ જગ્યા એ કેમ કોઈ માહિતી આપવામાં એવલ નથી ? વગર TOR આ પ્લાન શક્ય છે?
40. ૪૬થી વધુ યીમનીઓમાંથી સલ્ફ્યુરિક એસિડ અને અન્ય ઝેરી ધુમાડા અને ટનોબંધી રોજનો સલ્ફર ડાયોક્સાઇડ વાયુ હવાની દિશામાં આજુબાજુના વિસ્તારમાં ફેલાઈ ગામોને બરબાદ કરી નાખશે તે માટે કોણ જવાબદાર રહેશે?

41. લોકોના ફેફસા પર આ ઝેરીલા ગેસોની શું અસરો પડશે એ વિષે અભ્યાસ કરેલ હોય તો તેની નકલ આપશો અને ન કરેલ હોય તો તે અભ્યાસ કરાવી પછીજ તે આધારે આ પ્રોજેકટને મંજૂરી નકારી કાઢવાની અમારી માંગ છે.
42. ઝેરી ધાતુઓના હવામાં માપવાના સાધનો GPCB પાસે છે ? જો GPCB આ ધાતુઓનું પ્રમાણ માપી જ શકવામાં અસમર્થ હોય તો આ પ્રદૂષણ કોણ માપશે ? એની વિગતો આપશો.
43. શું આ સ્મેલ્ટર પ્રોજેકટનું ગંદુ પાણી સીધી કે આડકતરી રીતે દરિયામાં નાખવામાં આવશે?
44. આખા પ્રોજેકટમાંથી નીકળતું ઔધોગિક ગંદુ પાણી શુધ્ધ થવાનું છે તે સીઇટીપીની ડિઝાઇન આ ઇઆઇએમાં બતાવેલ નથી. તો તે ડિઝાઇનની નકલ આપશો.
45. પાણીના રિસાઇક્લિંગ પ્લાન્ટની માહિતી કે ડિઝાઇન પણ આપવામાં આવેલ નથી. તેની માહિતી આપશો.
46. સ્થાનિક ગામ લોકોના હાલના આરોગ્યનો અભ્યાસ કંપનીએ કરેલ હોય તો તેની નકલ આપશો. સ્થાનિક ગામલોકોને આ પ્રોજેકટ વિષેની માહિતી સરળ ભાષામાં આપવામાં આવેલ છે કે સમજાવવામાં આવેલ છે કેમ તેની વિગતો જણાવશો?
47. સ્થાનિક લોકોને APSEZ માં આજદિન સુધી કેટલી નોકરીઓ મળી છે તેની સંખ્યા બતાવશો.
48. સ્થાનિક લોકોને APSEZ માં કેટલા કોન્ટ્રાક્ટ મળેલ છે તેની સંખ્યા અને ગામ લોકોનો જે વિકાસ થયેલો હોય તેવા ઉદાહરણો નામ અને ગામ સહિત આપશો.
49. સ્થાનિક લોકોને અને પર્યાવરણને થયેલ નુકશાન બાબત સ્થાનિક ગ્રામ પંચાયતોના વાંધા વિરોધ બાબતે ઇઆઇએ રિપોર્ટમાં કેમ કશુજ લખેલ નથી. તેની સંપૂર્ણ માહિતી આપશો.

ઉપરોક્ત પ્રોજેકટથી થતાં ફાયદા કરતાં સ્થાનિક લોકો, પશુપાલન, આરોગ્ય, પર્યાવરણ અને દેશને નુકશાન મોટું હોય ફાયદાકીય ગૂંચવાળો આ પ્રોજેકટ પડતો મૂકવા મારી અરજ છે. અમો ભવિષ્યમાં થનાર પ્રદૂષણને લીધે ભોગ બનવા માંગતા ન હોય અમારે આ પ્રોજેકટ અને તેનો વિકાસ જોઈતો નથી.

આભાર સહ અને આ પર્યાવરણ લોક સુનાવણીમાં મારો વાંધો રજૂ કરી આગળની કાર્યવાહી કરવાની અપેક્ષા સહ.

આપનો વિશ્વાસુ

પ્રવીણસિંહ ચૌહાણ.

ગામ: શિરાચા. તા. મુંદ્રા જી. કચ્છ.

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C-Q-44
(TRANSLATED)

Pravinsinh Bhurubha Chauhan
At Siraya, Tal. Mundra
Dist:Kutch
Ph. 94269-02562
Dt. 29-4-17

To,
District Collector
KUTCH.

Sub: Objections in writing towards the damage likely to occur to the local public due to proposed Copper Refinery Project of Adani Enterprise Limited (AEL)

Honourable Sir,

It is humbly submitted that, due to Copper Refinery Project of Adani Enterprise Limited (AEL) proposed to be established in the district of Kutch in the villages of Navinal and Siracha is a serious danger to the local public, local community depending on the forest, fishermen, and environment and coastal ecology. There are many discrepancies, mistakes and wrong information in the draft EIA report. It transpires from the study report that if such a big project is established on the sea shore human health, animal – birds, and coastal life as a whole will be jeopardized seriously and permanently that cannot be compensated. This is such a dangerous pollution emanating project that the future generations of locals residing in the surrounding villages may be crippled , lame and impotent. Therefore we are objecting establishment of the project at this location. We are submitting our written objection on the basis of the points mentioned below. And we demand to prevent establishment of this project at this location as it is not suitable here.

1. We object selection of land of reserved forest as project site by Adani Enterprise Limited (AEL). The options selected for the project site are wrong. This project shall be established away from the sea shore. As close pipeline conveyor system for transportation of raw material is already in existence it is possible to establish this project away from sea shore in spite

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of that the company management has decided to establish it near sea shore. It is not fair. Water and electricity also can be supplied there easily and water disposal being zero there is no problem of water discharge. It is dangerous to establish such an industry on the sea shore. Damaging the environment of the sea and creating land by reclamation using sand and establishing such project on it is harmful. So we object the project under Forest Rights Act 2006 as livelihood of people of village who are dependent on the forest is under risk. Forest lands are reducing so the land of Danderi and Shiracha forest should not be given to the company for other industrial purpose. Cattle of the village graze in this forest. So we are taking strong objection against the use of the forest for the company.

2. Adani company has done permanent damage by cutting the Mangrove trees and filling up the creeks. Sand dune available in the forest on the sea shore of Navinal has been used for development of port. So the whole geography of the coastal area has changed. And as on date our case is pending with Hon. Supreme Court in the matter. During development of APSEZ the damage has been done to the environment, the sea shore and livelihood of the people, so we object the company and the proposed project. The matter has been proved in the court and the government that the company is establishing industries by damaging environment and coastal life. Therefore considering the company being disputed and its spoiled past this project deserves to be rejected.
3. Why the details of all survey numbers of land in which the said project is proposed to come up is not mentioned in the report. Please provide the entire detail about the area including the respective villages.
4. Please mention plot numbers and its area in respect of APSEZ land given to AEL for the project and also provide plot wise details of land ownership in writing.
5. Furnish area wise details of all the plots which are with APSEZ at present. Also furnish details of plots sold out and unsold.

6. Is the land proposed for the project and owned by the APSEZ, a notified SEZ? Provide the copy of the notification.

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7. Is the area of the project that shall be given by APSEZ to AEL, to be considered under the SEZ? Provide the relevant details as per the Government record and status.

8. Provide the government documents showing the ownership of APSEZ for the land where the project is to be established.

9. Provide the details of the land that is illegally encroached by MPSEZ at Shiracha, Danderi forest. Provide the details of the land that is not denotified by the Government of India but has been taken into possession by the company.

10. Provide the date of the submission in case if the APSEZ would have sought approval of SEZ denotification (for AEL project area) from the Government of India.

11. Provide the planning and logic for undertaking project for AEL copper plant while obtaining the land at Shiracha, Daderi forest.

12. Provide the copy of the permission for reclamation provided by the Government of India, if any, to the MPSEZ for forest land and other land.

13. The reserved forest is not mentioned in Form 1 of the project but it is shown in map and EIA report. Why such contradictory information is provided?

14. The company has to make 30% green belt compulsorily. Therefore 157 hector comes as 30% of green belt of 526 hector. Out of the 526 hector does the company wish to obtain 102 hector of reserve forest and show it as green belt? If yes, from where will the company bring the rest of the 55 hector of reserve forest? Thus, this company wants to encroach the forest illegally.

15.. As shown under the EIA report page no. C-3 16, most part of the project falls in Shiracha, Dedari forest land. Is this map false? If so, provide a correct map.

16. Provide the forest clearance copy that was received by the APSEZ for the above mentioned point.

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17. If the forest land proposed to be denotified for other industrial use, then provide the copy of no objection certificates given by local Panchayats in this regard.

18. Please provide a copy of the certificate given by the district collector under the Forest Rights Act, 2006, stating that private or Government land is not available in this area other than the forest in this area.

19. Provide the information about what is the dispute under the SLP 28788/2016 being heard in the Supreme court and WP (PIL) 12/2011 being heard in the Gujarat High Court against MPSEZ.

20. What is the amount of penalty paid by the company to the Government on the basis of the recommendation provided by Sunita Narayan committee to the Forest and Environment ministry? Provide the current status of the penalty and provide the legal information about the same.

21. Apart from the EIA report, please provide the additional details about how many natural rivers, drains are located in the land selected for Project Site and forest land, so that no river, drains would be left to be mentioned in the final EIA report out of knowledge. Our demand is to re-study with more accuracy and the demand is made to make re investigation about possible effects that may incur to village and villagers. Our demand is to re open all closed canals, bays and creeks again. We will take legal actions against the company on any new closer of water flow.

22. Please provide copy of GCZMA approved CZMP for of the seaside area near the AEL project.

23. Please provide a readable and understandable hard color copy of the CRZ map prepared by NIO.

24. Mention the shortest distance of mangrove area which fall in CRZ 1A from the proposed project. And provide a copy of the records for it.

25. Provide information about the number of fishermen residing in the coastal area and about their existing business.

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26. Provide the number of fishermen who have become unemployed due to MPSEZ project

27. Provide the number of fishermen who do Pagadiya fishing near the project.

28. How many access roads used by fisherfolks for commuting will be closed due to this project? or have been closed in the past?

29. What type of impacts will be there on animals and people collectively relying on forests and how people and animals will be affected due to this project. And provide the copy of procedures followed under FRA 2006.

30. Provide the consumption plan of Copper Slag and Phospho gypsum.

31. Provide the detail as to whether the Navinal forest has been declared as biodiversity heritage place by the Gujarat State Biodiversity Board, or it is being under proposal.

32. Whether a study has been conducted to identify carrying capacity of the Navinal- Shiracha coastal area? Provide information if the study is undertaken. Provide information on how much capacity will be left after AEL's project.

33. Provide the information on whether the comparison is made on EIA reports of both projects for the combined impact of air- water pollution caused due to the power plant of Adani and Tata Power, air, water pollution and after AEL's Copper plant.

34. Provide the information about where the copies of the environmental literature of this project were kept which were translated from English to Gujarati according to the EAC meeting minutes.

35. So far, how many hectare of Mangrove afforestation is carried out by Adani Group and where is plantation done? Provide the detailed information.

36. Will the power transmissions line of APSEZ be moved due to AEL's project? Provide more details.

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37. The staff required (8 persons) for the Environmental Management Plan of highly polluted Copper Refinery Plant is proper as shown in the EIA report? This is a best example of how serious the Adani group is to the pollution issues

38. Will Adani Port staff also look into environmental and pollution issues in this AEL project? Currently, how many staff are there who serves in the Adani Group and also have contributions in all the projects of the group (port, SEZ, power plant etc.)? Is it appropriate to perform such jobs. Is it legally allowed?.

39. Why no information is given in TOR or any other place about the 30 acres of SLF? Is this plan possible Without TOR?.

40. Who will be responsible for destroying surrounding villages located in wind direction by spreading sulfuric acid and other toxic gases and other tons of sulfur dioxide gas from more than 46 chimneys? .

41. If you have studied about the impact of these Toxic Gases on people's lungs, then provide the copy of it and if not, then our demand is that the approval or rejection should be given on the basis of such study.

42. Does the GPCB have the instruments to measure toxic gases concentration in air? If GPCB is unable to measureconcentrations of metals then who will measure the pollution? Provide the detail about it.

43.. Will the effluent of the Smelter project be directly or indirectly discharged in the sea?

44. The CEPT design in which industrial waste water will be treated is not mentioned in EIA. So, provide the copy of that design.

45. The information or design of the water recycling plant is also not provided. Provide its information.

46. Provide the copy if the company has done the study of the existing health conditions of the local village people. Provide the details if the local village people have been explained the information in the simple language about this project.

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47. Provide number of total employment given to locals by APSEZ till date.

48. The number of contracts received by local people in APSEZ and the detail of development activities including examples with name and village.

49. Why nothing has been written in the EIA report about the objections of local village panchayat about the loss of local people and environmental damage? Provide the complete information about it.

As the local people, animal-husbandry, health, environment and country may be adversely affected rather than benefits from above mentioned project, hence it is my submission that the project be abandoned. As we do not want to suffer from the pollution in future, we do not want the project and the development from it.

Thanking you and with the expectation by representing my objection in this environmental public hearing and to take further actions,

Yours faithfully

Sd/- (Chauhan Pravinsinh Bhurubha)

Chauhan Pravinsinh

Village: Siraya, Tal. Mundra, Dis. Kutch.

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Annexure D

Reply by Project Proponent for Representations Received Before and During the Public Hearing

Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
1	Shri Ravilal K. Maheswari (Advocate & Notary, B.A., L.L.B), Adarsh Tower, Mundra- Kutch (In Gujarati)	**Before**	**D-A-1**
2	(A) Shri P.C Gadhavi, Ex. President, Taluka Panchayat, Lakhpat (in English) (B) Shri P.C Gadhavi, Ex. President, Taluka Panchayat, Lakhpat (in Gujarati)	**Before**	**D-A-2**
3	Shri Mahesh Pandya, Paryavaran Mitra, Ahmedabad (In English)	**Before**	**D-A-3**
4	Shri Gajendrasinh Jadeja (Sarpanch), Navinal Village, Mundra Taluka, Kutch District, Gujarat (In English)	**Before**	**D-A-4**
5	Shri Sanjay S. Bapat, Adarsh Tower, Mundra, Taluka: Mundra- Kutch (In Gujarati)	**Before**	**D-A-5**
6	A) Shri Naran B. Gaghavi, (President) Keti Vikas Seva Trust. (In Gujarati) B) Copy of Same representation was submitted during Public Hearing also.	**Before**	**D-A-6**
7	Shri Debi Goenka, (Executive Trustee), Conservation Action Trust, 5 Sahakar Bhavan, 1st Floor Lbs Marg, Narayan Nagar, Ghatkopar (West) Mumbai (In English)	**Before**	**D-A-7**
8	Shri Dharmesh Mistri, Block no: 14, house no. 1340, Narmada Apartment, Opp. Mamlatdar office, Bharuch (In Gujarati)	**Before**	**D-A-8**

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Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
9	Shri Nagshi Punshi Gadhvi (On Behalf Of Sonbaiben Punshi Gadhvi), Sarpanch, Mota Bhadiya, Taluka-Mandvi (In Gujarati)	During	D-A-9
10	Shri Abdreman Jusab Turk, Drub Village Sarpanch (In Gujarati)	During	D-A-10
11	Siracha Gram Panchayat Village: Siracha Tal. Mundra-Kachchh. (In Gujarati)	During	D-A-11
12	Shri Punshi Khetshi Turiya, Gadhavi. Membershri, Taluka Panchayat Mandvi Kachchh, Post Mota Bhadiya, Tal. Mandvi, Kutch (In Gujarati) Addressed to: District Collector	During	D-A-12
13	Shri Punshi Khetshi Turiya, Gadhavi. Membershri, Taluka Panchayat Mandvi Kachchh, Post Mota Bhadiya, Tal. Mandvi, Kutch (In Gujarati) Addressed to: Executive Director/ COO - SEZ	During	D-A-13
14	Shri Valbai Shamji, Sarpanch, Nana Kapaya Juth Gram Panchyat Cluster Villages: Nana Kapaya, Borana Tal. Mundra – Kachchh (In Gujarati)	During	D-A-14
15	Shri Bairajba Lakhubha Jadeja, Sarpanch, Village – Tragadi, Mandvi, Kachchh (In Gujarati)	During	D-A-15
16	Shri Atul Pandya, President, Rotary Club Of Mundra, Kutch (In Gujarati)	During	D-A-16
17	Shri Karvan-E- Mustafa, Medical and	During	D-A-17

Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
	Educational Trust, Near Jama Masjid, Mundra (In Gujarati)		
18	Letter from Lions Club Of Mundra, Poonam Arcade, 1st Floor, Baroi Road, Mundra, Kutch (In Gujarati)	**During**	**D-A-18**
19	Shri R. M. Sama, Mystical Corporation, All Type Of Civil Works And Material Supply, Office No.5, Rajiv Complex, Baroi Road, Mundra (In Gujarati)	**During**	**D-A-19**
20	K.G.N. Construction, R.C.C. Construction – R.C.C. Alivation Load Bearing, Village Tragadi, Tal. Mandvi, Kutch (In Gujarati)	**During**	**D-A-20**
21	Shri Daya Ranshi Gadhvi, Civil Contractor And Supplier, Village- Zarpara, Ta. Mundra, Kutch (In Gujarati)	**During**	**D-A-21**
22	Shri Gadhvi Kalyan, President, Shri Butbhavani khedut mandal, Mota Bhadiya, Tal. Mandvi – Kachchh (In Gujarati)	**During**	**D-A-22**
23	Mithani Enterprise, Civil Contractor And Manpower Supply, M-2, Golden Arcade, near Zero Point, Adani Port Road, Mundra-Kutch (In Gujarati)	**During**	**D-A-23**
24	Shri M. L. Baraiya, Director, Vivekanand Rural Development Institute, N.H.No.8a, Near Jain Ashram, Mandvi, Kutch (In Gujarati)	**During**	**D-A-24**
25	Shri Salim Mamad (President), Ekta Machhimar Seva Vikas Samiti Tragadi Bundar, Gundiyali, Tal. Mandvi, Kutch (In Gujarati)	**During**	**D-A-25**

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Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
26	Shri Dayabhai Gadhvi, Kandagara, Kutch (In Gujarati)	During	D-A-26
27	Shri Ashariya Lakha Gilva, Kapuriya Wadi, Village: Zarpara, Mundra Kutch (In Gujarati)	During	D-A-27
28	Shri Girish D. Nagda (C.E.O), Bhagwan Mahavir Pashu Raksha Kendra, Pragpur Road Junction, Tal. Mundra 370415, Kutch, Gujarat (In Gujarati)	During	D-A-28
29	Shri Naran B. Gadhavi, (President), Kheti Vikas Seva Trust, Village Zarpara, Tal: Mundra, Dist-Kutch (In English)	During	D-A-29
30	Shri Mahesh Pandya, Paryavaran Mitra, 502, Raj Avenue, Bhaikaka Nagar Road, Nr. Thaltej Cross Road, Thaltej, Ahmedabad (In English)	During	D-A-30
31	Shri Ibrahim Abdulkadar Turk, Jamadarwadi, At Post Dhrab Ta Mundra Dist, Kutch (In English)	During	D-A-31
32	Shri Debi Goenka, (Executive Trustee), Conservation Action Trust, 5 Sahakar Bhavan, 1st Floor LBS Marg, Narayan Nagar, Ghatkopar (West) Mumbai through Sh. Maheshwari Mithubhai Jakhubhai, Mundra	During	D-A-32
33	Shri Chauhan Pravinsinh Bhurubha, Pramukh, Van Adhikar Samiti, Village: Siracha, Tal. Mundra, Dis. Kutch (In English)	During	D-A-33
34	Shri Chauhan Pravinsinh Bhurubha, Village: Siraya, Tal. Mundra, Dis. Kutch (In Gujarati)	During	D-A-34
35	Shri Vijay K Gadhavi, President, Kutch Charan	During	D-A-35

Sr. No.	Letters Received from different Person/Organisation/NGO regarding Public Hearing	Before / During Public Hearing	Annexure
	Sabha, Mandvi Naliya Road, Mandvi –Kutch (In Gujarati)		
36	Shri Usmangani H. Sheraseeya (Secretary), National Fisherfolk Forum, At Post Kankot, Taluka Vakaner, District Morbi (In Gujarati)	**During**	**D-A-36**
37	Shri Vijay K Gadhavi, Mandvi –Kutch (In Gujarati)	**During**	**D-A-37**
38	Shri Chauhan Pravinsinh Bhurubha, Village: Siracha, Tal. Mundra, Dis. Kutch (In Gujarati)	**During**	**D-A-38**
39	Shri Jadeja Jaypalsinh (In Gujarati)	**During**	**D-A-39**
40	Shri Turk Husen Ibrahim Nathani, Village Dhrab (In Gujarati)	**During**	**D-A-40**
41	Shri Turk Mohammad Hanif Abdul Kadar Jamadar, Village- Dhrab (In Gujarati)	**During**	**D-A-41**
42	Shri Turk Ismail Abdul Rashid Jamadar, Village-Dhrab (In Gujarati)	**During**	**D-A-42**
43	Shri Jadeja Gajendrasinh Bhimaji, Sarpanch - Navinal, Tal: Mundra Kutch (In Gujarati)	**During**	**D-A-43**
44	Chauhan Pravinsinh Bhurubha, Village: Siracha Taluka: Mundra District: Kutch (In Gujarati)	**During**	**D-A-44**

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adani

સંદર્ભ:AEL/Copper/Mundra/EC/PH/D-A-1

પ્રતિ,
શ્રી રવિલાલ કે. મહેક્ષ્વરી
૧૫, ગ્રાઉન્ડ ફ્લોર, આદર્શ ટાવર,
મુંદરા - કચ્છ.

વિષય : આપના દ્વારા ગ્રીનફિલ્ડ કોપર રીફાઇનરી પ્લાન્ટ-૧ મેટીપીએના ઉત્પાદન માટેના પ્રોજેકટ કેટેગરી-એ સબંધીત પર્યાવરણીય લોક સુનાવણી સબંધે રજુ કરવામાં આવેલ વાંધાઓની પુર્તતા બાબત.

સંદર્ભ : આપશ્રીની અરજી તા.૦૪/૦૪/૨૦૧૭

મહોદયશ્રી,

જયભારત સાથ ઉપરોકત વિષય અન્વયે જણાવવાનું કે,ગ્રીનફિલ્ડ કોપર રીફાઇનરી પ્લાન્ટ-૧ મેટીપીએના ઉત્પાદન માટેના પ્રોજેકટ કેટેગરી-એ સબંધીત પર્યાવરણીય લોક સુનાવણી સબંધે આપના તરફથી રજુ કરવામાં આવેલ વાંધાઓની પુર્તતા નીચે મુજબ છે.

૧. અમો પ્રોજેકટના ગામ તેમજ આસપાસના ગામોના રહેવાસીઓનું હાર્દિક અભિવાદન કરીએ છીએ. કારણ કે તેઓ આ પ્રોજેકટના મહત્વના સહભાગીઓ છે.

૨. આ પ્રોજેકટમાં ક્ષારરહિત પાણી ઉપયોગમાં લેવામાં આવશે. ભુગર્ભ જળનો ઉપયોગ કરવામાં આવશે નહી. પ્રોજેકટમાંથી નિકળેલ કચરો રિસાયકલ કરવામાં આવશે. આ પ્રોજેકટમાંથી કોઇપણ પ્રવાહી પ્રકારનો કચરો નિકળશે નહી. પર્યાવરણને નુકશાનકર્તા કેમિકલ અને જોખમી કચરાને પર્યાવરણ પર કોઇ ગંભીર અસર ન થાય તે રીતે ધ્યાનપૂર્વક નિકાલ કરવામાં આવશે.

3. આ પ્રોજેકટમાં SO2 અને NOx જેવા કેમિકલ નિકળશે. SO2 નો ઉપયોગ સલ્ફયુરિક એસિડ ઉત્પાદિત કરવામાં થશે. PM અને NOx ના ઉત્સર્જન ઘટાડવા માટે સ્કબરનો ઉપયોગ કરવામાં આવશે. ઓપરેશન સ્ટેજ વખતે ઉત્સર્જીત થનારા કેમિકલને નિયંત્રિત કરવામાં આવશે અને

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NAAQ અનુસાર એમ્બીઅન્ટ એર કવાલીટી અનુસાર જાળવણી કરવામાં આવશે અને આથી કોઇ લાંબાગાળાની અસર થશે નહી.

૪. જોખમી કેમિકલની હેરફેર વખતે વૈધાનિક જોગવાહી પ્રમાણે યોગ્ય પગલા લેવામાં આવશે. જે માટે ડિઝાસ્ટર મેનેજમેન્ટ પ્લાન તેમજ રિસ્કએનાલિસિસ પ્લાન પણ તૈયાર કરી લેવાયો છે. જેનો ઇઆઇએ ના ચેપટર-૭ માં સમાવેશ કરાયો છે. બોઇલર ફાટવાનાં જે અકસ્માતનો ઉલ્લેખ કરવામાં આવેલ છે તે પૂરતી સુરક્ષા વ્યવસ્થા છતાં થયેલ એક દુર્ભાગ્યપુર્ણ ઘટના છે.

૫. જંગલ વિસ્તારમાં આ પ્રોજેકટનું બાંધકામ અંતિમ મંજુરી મળ્યા બાદ જ શરૂ કરવામાં આવશે. આ જમીન રૂપાંતરણની અરજી ભારત સરકાર પાસે પેન્ડીંગ છે. કંપની ભારત સરકારના નિર્ણયથી બાધિત રહેશે.

૬. આ કેસ એપીએસઇઝેડ સંબંધીત છે. શો કોઝ નોટિસનો કેટલાક નિર્દેશાનુસાર નિકાલ કરવામાં આવેલ હતો. જે કંપનીએ અનુસરવાના રહે છે. આ નોટિસમાં પર્યાવરણીય મંજુરી ન મળવા બાબતે ઉલ્લેખ કરવામાં આવેલ નથી.

૭. આ પ્રોજેકટ નોટીફાઇડ એસ.ઇ.ઝેડ. માં આવેલ છે અને જંગલની જમીન બિનજંગલ હેતુ માટે રૂપાંતરીત કરવા રજુઆત કરવામાં આવેલ છે. અહીં રજુ કરવામાં આવેલ મુદો લેન્ડ રેવન્યુનો છે. અને તેનો પર્યાવરણ સાથે કોઇ સંબંધ નથી.

૮. આ પ્રોજેકટ નોટીફાઇડ એસ.ઇ.ઝેડ. માં આવેલ છે અને જંગલની જમીન બિનજંગલ હેતુ માટે રૂપંતરીત કરવા રજુઆત કરવામાં આવેલ છે. મહેસુલી લેણા, કર વગેરે સમયાનુસાર ભરપાઇ કરી આપવામાં આવશે.

૯. ધન કચરાનું વ્યવસ્થાપન હેઝાર્ડસ્ટ વેસ્ટ મેનેજમેન્ટ હેન્ડલીંગ એન્ડ મુવમેન્ટ રુલ્સ મુજબ કરાશે.

૧૦. પ્રોજેકટના સમયગાળા દરમ્યાન કંપની ભરવાપાત્ર થતા બધા કરવેરાની ભરપાઇ કરશે. આ વેરાની ભરપાઇ સમયાનુસાર ભારત સરકારશ્રીના નિયમોનુસાર કરાશે.

૧૧. સ્થાનિક રહેવાસીઓને તેમની આવડત અને કૌશલ્ય પ્રમાણે નોકરીની તકો પુરી પાડવામાં આવશે. સ્થાનિક લોકોની કાર્ય કુશળતા વધારવા કૌશલ્ય વર્ધન કાર્યક્રમોનું આયોજન કરાશે.

૧૨. કંપનીએ આઠ કરોડ રૂપિયાની જોગવાઈ સીએસઆરની કામગીરી માટે રાખેલ છે. જેમાં શિક્ષણ, આરોગ્ય, સ્વચ્છતા વગેરેનો સમાવેશ કરાશે.

PAA

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૧૩. પર્યાવરણીય સંરક્ષણ માટે ૧૦૪૪ કરોડ રૂપિયાનું બજેટછે. જેમાં વોટર પોલ્યુશન કંન્ટ્રોલ સિસ્ટમ, ધન કચરાની વ્યવસ્થાની સિસ્ટમ, ગ્રીન બેલ્ટ મેનેજમેન્ટ વગેરેની વિગતવાર માહિતી ઇ.આઇ.એ. ના ટેબલ નં.૬.૪ માં અપાયેલ છે.

૧૪. અગાઉ આ પ્રોજેકટ સાથે જોડાયેલ કોઇ પ્રવૃત્તિ મુંદરામાં કરાઇ નથી. APSEZ ના શો કોઝ ઇસ્યુનો MOFECC દ્વારા નિકાલ કરાયો છે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા.

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-1

To,
Shri Ravilal K. Maheshwari
15, Ground Floor, Adarsh Tower,
Mundra-Kutch.

Subject: With regard to the reply to the submissions made by you for the environmental public hearing for Green Field Copper Refinery Plant-1 MTPA production project Category-A.

Reference: Your application dated 04.04.2017.

Sir,
It is hereby stated with reference to the above mentioned subject that the reply to the submissions made by you for the environmental public hearing for Green Field Copper Refinery Plant 1.0 MTPA production project Category-A are provided hereby.

1. We heartily congratulate the villages related to the project and the villages around it as they are important stakeholders of the project.
2. Desalinated water will be used in this project. Ground water will not be used. The waste that comes out of the project will be recycled. No liquid waste will be generated from this project. The chemicals and the hazardous that damage the environment will be disposed off in a manner that will not harm the environment.
3. In the proposed project SO2 and NOx will be released. Sulphuric Acid will be manufactured by using SO2. To reduce PM and NOx, scrubber will be used. The emissions generated during operation stage will be controlled as per NAAQ standards for maintaining ambient air quality by using APCM and therefore there will not be any long term effect.
4. All precautions as per statutory provisions will be taken at the time of transport of hazardous chemicals. Disaster management plan and risk analysis have been conducted. This has been included in Chapter-7 of the EIA report. The reported accident is not in relation to the proposed project activity.
5. The application for diversion of forest land is pending before the government of India. The company will comply with the decision taken by the government of India. The construction in the forest land for the proposed project will only be done after obtaining final approval.

PAA

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6. This has no relevance to the proposed project and it is outside the scope of EIA report.
7. The proposed project area is partly notified SEZ and partly forest land for which clearance is under process by APSEZ. APSEZ has in principle agreed to provide the land for the project. All procedures related to land will be complied.
8. Reply is as per point no. 7 above.
9. The hazardous waste management will be done as per prescribed procedures and based on approvals granted. It is proposed to develop Secured Land Fill (SLF) within the project area for the management of specific hazardous waste. Details are given in the EIA report.
10. The company will pay all the taxes on time, as applicable from time to time, to Govt of India.
11. Direct and indirect employment opportunities will be generated due to proposed project. Local employment will be provided for proposed project based on eligibility and vacancies.
12. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.
13. Project will be implemented with all environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.
14. The proposed project is outside CRZ. The points raised by you do not relate to proposed project activity.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Ref: AEL/Copper/Mundra/EC/PH/D-A-2

To,

Sh PC Gadhavi

Sub: Public Hearing of proposed Greenfield Copper Refinery Project

Ref: Letter from Sh P.C. Gadhavi, Leader of Ruling Party, EX President Taluka Panchayat Lakhapat

Dear Sir,

We thank you for raising the concerns and providing us valuable suggestions for the development of the project and the area. With reference to your letter, we would like to submit point wise response as desired by you.

1. Rs 1044 crores has been allocated as capital expenditure for environment management measures for the proposed project which is more than 10% of the total project cost. We assure that world class and efficient process equipment shall be installed along with pollution control devices in all facilities of the project.
2. Commitment letter has been obtained by Adani Enterprises Limited (AEL) from the APSEZ for allotment of land for the proposed project. Allotment of the land and ownership transfer shall be implemented only after compliance with all regulatory requirements including statutory payments and due fee for transfer.
3. Application for diversion of forest land has been already filed as also mentioned in TOR in MoEFCC. All compliance shall be ensured as per procedure, Forest Diversion is recommended by State Government and Approved by Central Government after ensuring all compliance by the user agency.
4. APSEZ has approval for desalination plant. APSEZ has in principally agreed for augmentation of needful infrastructure and provide desalinated water for this project as clearly mentioned in the water allotment letter in Annexure No 4 of EIA report.
5. We assure that wastewater will be treated in state of the art effluent treatment facilities to make suitable before being used for greenbelt.
6. Plant layout showing the green belt is provided in the EIA report in Fig 2.1. Forest department will be consulted for choice of species for plantation.

PAD

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7. Risk Identification and Risk Assessment (HIRA) study has been conducted for this project, including Oxygen plant, through functional area expert and former faculty of Regional Labour Institute (RLI). All regulatory permissions, as applicable will be obtained. Risk assessment and disaster management plan has been incorporated Section 7.2 of the EIA.

8. Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure 1, page AI-14 of EIA report) that "Forest land of 102.38 ha is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central Government through File No. 8-04/2016-FC". The requirement of Office Memorandum of MoEFCC dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance...". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR. We submit that there is no deviation from EIA Notification 2006 and we understand that Public Hearing can be organised by State Pollution Control Board after TOR is obtained by the project proponent.

9. We would like to submit that compensatory afforestation is integral part of the forest diversion and we understand that Forest Clearance shall be granted by the Central Government only after compliance of all conditions by the user agency and compliance of all conditions of Stage-1 and Stage-2 forest clearance.

10. Commitment letter has been obtained from the APSEZ for allotment of land for the proposed project. Ownership of the land shall be transferred only after compliance with all regulatory requirements including statutory payments and due fee for transfer.

11. Project proponent, Adani Enterprises Limited (AEL), is not collecting any toll near MokhaChokdi. CSR budget of Rs 8 crore per annum has been proposed by M/s AEL for proposed copper refinery project, which is over and above the existing budget of Adani Foundation for CSR activities in the area. We also assures local community members that proposed CSR budget will be utilised in consultation with local community members in the areas of development of rural infrastructure, health care, education and livelihood as desired.

12. Presently, Adani Foundation runs Mobile Health Care Units, Rural Clinics, Special Innovative Projects i.e Health Card to Senior Citizens and Kidney Stone Project and Variety of Health Related Camps. To increase availability of quality health care services to the remote villages, foundation runs mobile health care unit. These mobile units cover 36 Villages and 4 Fisherman settlements. There are 8 rural clinics in Luni, Vadala, Bhadreshwar, TundaWandh, Tunda, Siracha, Navinal and Nana Kapaya.

    As Rs 8 crores per annum has been proposed for CSR budget for the proposed project in addition to the existing CSR budget of the Adani Foundation, existing healthcare activities shall be augmented in the area and new activities shall be launched as per the needs of the area and consultation with local communities.

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13. People from local area will be given priority based on the skill sets available. Efforts also will be made to train the local youths. Priority will be given to local youths based on the skill sets and vacancy available.
14. Proposed project completion is of 30 months from the start of the construction activity at project site. Start date of the project will be decided after obtaining all the statutory clearances and tie up of the finance for the project.
15. The baseline data on environmental parameters was collected for all the ongoing activities during post monsoon season of 2016. An assessment has been done for the incremental load due to this project. It has been found that the environmental parameters will be within the statutory limits after operation of the project

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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સંદર્ભ:**AEL/Copper/Mundra/EC/PH/D-A-2**

રીખ:૨૯/૦૪/૨૦૧૭

પ્રતિ,
શ્રી પી. સી. ગઢવી
શાસક પક્ષના નેતા
માજી પ્રમુખ, તાલુકા પંચાયત,
લખપત – કચ્છ

વિષય :- પ્રસ્તાવિત ગ્રીન ફીલ્ડ કોપર રીફાઈનરી પ્રોજેકટની પર્યાવરણ લોક સુનવણી અંગે.
સંદર્ભ :- આપશ્રીની અરજી તા.૦૬/૦૪/૨૦૧૭

માનનીય સાહેબશ્રી,

અદાણીના પ્રોજેકટ વિશે તમે ઉઠાવેલ મુદ્દાઓ માટે અને પ્રોજેકટ તેમજ વિસ્તારના વિકાસ માટે તમે આપેલા સુચનો મુજબ અમો તમારો આભાર વ્યકતકરીએ છીએ. તમારા પત્ર સંદર્ભે તમારી અપેક્ષા મુજબનો મુદ્દાવાર પ્રતિભાવ નીચે આપેલ છે.

(૧) ૧૦૪૪ કરોડ રૂપિયા પર્યાવરણ સંરક્ષણના ખર્ચ માટે ફાળવવામાં આવેલ છે. પર્યાવરણ સંરક્ષણ ખર્ચ પ્રોજેકટના કુલ ખર્ચના ૧૦ % થી પણ વધારે છે. અમે ખાતરી આપીએ છીએ કે, કચરાને ઘટાડવા માટે અને ધુમાડાને પ્રમાણિત માત્રા કરતા પણ નીચે રાખવા માટે વૈશ્વિક સ્તરના સાધનો અને પ્રક્રિયાઓને લાગુ કરવામાં આવશે.

(૨) ભવિષ્યમાં જમીન ફાળવણી માટે અદાણી એન્ટરપ્રાઈઝ લી. ધ્વારા અદાણી પોર્ટ એન્ડ સ્પે. ઈ.ઝોન પાસેથી બાંહેધરી પત્ર મેળવી લેવામાં આવેલ છે. બધાં જ નિયમો અને શરતોનું પાલન કર્યા પછી જ તેમજ ભરવાપાત્ર બધા જ વેરાઓ ભરપાઈ કર્યા બાદ જમીનના માલિકી હકકનું તબદીલ કરવામાં આવશે.

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(૩) પ્રસ્તાવિત પ્રોજેકટની જમીનનું કેટલોક હિસ્સો જંગલમાં આવેલો હોવાથી ટીઓઆર મેળવવા માટે ફોર્મ- ૧ મુજબ જંગલની જમીનના રૂપાંતરણ માટેની અરજી અપાઈ ગયેલ છે. આની નોંધ એમઓઈએફસીસી ધ્વારા લેવાય છે તેમજ ટી ઓ આરમાં નોંધાયેલ છે. વન્યજીવન સરંક્ષણ અધિનિયમ ૧ પ્રમાણે મોરના સરંક્ષણ માટે નો મેનેજમેન્ટ પ્લાન ઈઆઈએ ના રીપોર્ટમાં ૪.૨.૭.૩ માં દર્શાવેલો છે. આ સરંક્ષણ યોજના મુજબ મોરને વસવાટ કરવા યોગ્ય ઘટાદાર વૃક્ષો ઉછેરવામાં આવશે. કુદરતી રીતે ઉગી નિકળતા અને મોટા પ્રમાણમાં જોવા મળતી વનસ્પતિનું સરંક્ષણ અને જતન કરવામાં આવશે. મોરનો ખોરાક એવા જીવજંતુઓને અનુકુળ વનસ્પતિનો ઉછેર તેમજ મોર અને અન્ય પ્રાણીઓ માટે ઓછામાં ઓછા બે કાયમી પાણીથી ભરેલા રહે તેવા તળાવ બનાવવામાં આવશે.

(૪) એપીએસઈઝેડ પાસે ડીસેલીનેશન પ્લાન્ટ માટે પર્યાવરણ કલીયરન્સ છે. જરૂરી કલીયરન્સ મેળવ્યા બાદ આ પ્રસ્તાવિત પ્રોજેકટ માટે ક્ષાર રહિત પાણી ઉપલબ્ધ કરાવવા જરૂરી ઈન્ફ્રાસ્ટ્રકચર ઉભુ કરવા માટે એપીએસઈઝેડની મેસર્સ એ.ઈ.એલ.સાથે સૈધાંતિક સમજૂતિ થયેલ છે. ઈઆઈએ ના રીપોર્ટમાં એનેક્ષર નં. ૪ માં જળફાળવણી અંગેના પત્રમાં આની સ્પષ્ટ નોંધ કરાયેલ છે.

(૫) અમે ખાત્રી આપીએ છીએ કે, દૂષિત પાણી ગ્રીન બેલ્ટ માટે વાપરતા પહેલા તેનું યોગ્ય પધ્ધતિ વડે નિયમોનુંસાર શુધ્ધિકરણ કરવામાં આવશે.

(૬) ઈઆઈએ રીપોર્ટમાં ચિત્ર ૨.૧ માં ગ્રીન બેલ્ટનો પ્લાન લે-આઉટ દર્શાવવામાં આવેલ છે. વૃક્ષારોપણ માટે વનસ્પતિની પ્રજાતિને પસંદ કરતી વખતે વન વિભાગની સલાહ લેવામાં આવશે. આ પ્રકારના પ્રોજેકટ માટે તેની બાઉન્ડ્રી પર ત્રિ-સ્તરીય ગ્રીન બેલ્ટ વિકસાવવામાં આવે છે.

(૭) રીસ્ક આઈડન્ટીફિકેશન અને રીસ્ક એસેસમેન્ટ તેમજ ઓકિજન આપતા વૃક્ષોનો અભ્યાસ રીઝીનલ લેબર ઈન્સ્ટીટયુટની ફેકલ્ટી અને ફન્કશનલ એરીયા નિષ્ણાંત ધ્વારા કરવામાં આવેલ છે આના માટે લાગુ પડતી મંજુરીઓ મેળવવમાં આવશે. રીસ્ક એસેસમેન્ટ એન્ડ ડીઝાસ્ટર મેનેજમેન્ટ પ્લાન ઈઆઈએના સેકશન ૭.૨ માં સામેલ કરાયેલ છે.

(૮) જંગલની જમીનના સ્ટેટસ વિષયે જણાવવાનું કે, ટી ઓ આર ના ફોર્મ ૧ અને ટી ઓ આર કમ્પલાયન્સ (એનેક્ષર -૧,પાના ન. એઆઈ-૧૪,ઈઆઈએ રીપોર્ટ) માં આ સ્પષ્ટ પણે દર્શાવાયુ છે કે, જંગલની ૧૦૨.૩૮ હેકટર જમીન પણ આમા સામેલ છે કે જેને ઔદ્યોગિક ઉપયોગ માટે રૂપાંતરીત કરવામાં આવશે. આ અંગે રાજય સરકારે જંગલના કલીયરન્સ માટે ભલામણ કરી છે અને તે અત્યારે કેન્દ્ર સરકાર પાસે છે. (ફાઇલ નં. ૮-૦૪/૨૦૧૬ –એફ.સી.) આ ફાઈલનું સ્ટેટસ

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એમ ઓ ઈ એફ સી સી ફોરેસ્ટ કલીયરન્સ પર ઓનલાઈન જાણી શકાય છે. તારીખ-૩૧/૦૩/૨૦૧૧ ના ઓ એમ મુજબ ફોરેસ્ટ કલીયરન્સ સ્ટેજ ૧ માટે અરજી કર્યા બાદ જ ટી ઓ આર માટેની પ્રપોઝલ રાખવી જોઈએ આમ, આ શરતનું પાલન કરવામાં આવ્યું છે. કારણ કે, ટી ઓ આર માટેની અરજી કર્યાના ઘણા વખત અગાઉ જ ફોરેસ્ટ કલીયરન્સ માટેની અરજી કરી દેવામાં આવી હતી. ઈઆઈએ નોટીફીકેશન ૨૦૦૬ નું કયાંય ઉલઘન કરાયું નથી અને અમે સમજીએ છીએ કે પ્રોજેકટ પ્રોપોનંન્ટ ધ્વારા ટી ઓ આર મેળવ્યા બાદ જ પ્રદુષણ નિયંત્રણ બોર્ડ ધ્વારા લોક સુનવણી હાથ ધરી શકાય છે.

(૯) અમે જણાવવા માંગીએ છીએ કે, વની કરણ એ વનરૂપાંતરનું અભિન્ન અંગ છે અને આ પ્રક્રિયા જરૂરથી પુરી કરવામાં આવશે. તદ્ઉપરાંત ફોરેસ્ટ કલીયરન્સના સ્ટેજ-૧ અને સ્ટેજ –૨ નું પણ સંપર્ણ પણે પાલન થશે.

(૧૦) એપીએસઈઝેડ પાસેથી ભવિષ્યમાં જમીન અધિકરણ માટેનો બાંહેધરી પત્ર મેળવી લેવામાં આવ્યો છે. બધા જ નિયમો અને શરતોનું પાલન કર્યા પછી જ તેમજ ભરવાપાત્ર બધા જ વેરાઓની ભરપાઈ કર્યા બાદ જ જમીનના માલિકી હકકનું તબદીલ કરવામાં આવશે.

(૧૧) અદાણી એન્ટર પ્રાઈઝ લી. મોખા ચોકડી પાસે કોઈ ટોલ ઉઘરાવતું નથી પ્રસ્તાવિત કોપર રીફાઈનરી પ્રોજેકટ માટે મે. અદાણી એન્ટરપ્રાઈઝ લી ધ્વારા આઠ કરોડ રૂપિયાના સી એસ આર બજેટની જોગવાઈ કરાઈ છે જે હાલના અદાણી ફાઉન્ડેશનના સી એસ આર પ્રવૃતિના બજેટ કરતાં પણ વધારે છે. વાર્ષિક આઠ કરોડના બજેટ માંથી ચાર કરોડ રૂપિયા ગ્રામિણ ઈન્ફ્રાસ્ટ્રકચરના વિકાસ માટે તેમજ પંચાયતના રોડની જાળવણી માટે ફાળવવામાં આવેલ છે. અમે સ્થાનિક લોકોને ખાત્રી આપીએ છીએ કે, આ સી એસ આર બજેટનો ઉપયોગ સ્થાનિક લોકો સાથે ચર્ચા કર્યા બાદ વિવિધ પ્રવૃતિઓ માટે કરવામાં આવશે.

(૧૨) હાલમાં, અદાણી ફાઉન્ડેશન ધ્વારા મોબાઈલ હેલ્થ કેર યુનિટ, ગ્રામીણ દવાખાના, સિનીયર સીટીજન માટે ના હેલ્થ કાર્ડ, કીડનીની પથરી માટેનો પ્રોજેકટ અને અન્ય સ્વાસ્થ અંગેના કેમ્પ વિગેરે ચલાવવામાં આવે છે. અંતરીયાળ ગામડામાં ગુણવતાયુકત સ્વાસ્થય સુવિધાઓ ઉપલબ્ધ કરાવવા માટે અદાણી ફાઉન્ડેશન મોબાઈલ હેલ્થ કેર યુનિટ ચલાવે છે. આ મોબાઈલ યુનિટ છત્રીસ ગામડાઓ અને ચાર માછીમાર વસાહતોને આવરી લે છે. લુણી, વડાલા,ભદ્રેશ્વર, ટુંડા –વાંઢ, શીરાચા, નવીનાળ અને નાના કપાયા એમ આઠ જગ્યાએ ગ્રામીણ દવાખાના ચલાવાય છે. અદાણી ફાઉન્ડેશનના સીએસઆર બજેટ ઉપરાંત પ્રસ્તાવિત પ્રોજેકટ માટે આઠ કરોડ રૂપિયાનું સીએસઆર બજેટ

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ફાળવવામાં આવેલું છે. આથી હાલમાં ઉપલબ્ધ સ્વાસ્થય સુવિધાઓ તો ચાલુ રહેશે જ વધુમાં, જે તે વિસ્તરના લોકોની જરૂરિયાત અને તેમના સુચનો અનુસાર નવી પ્રવૃતિઓ પણ શરૂ કરવામાં આવશે.

(૧૩) સ્થાનિક વિસ્તારના લોકોને તેમના કૌશલ્ય મુજબ પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક યુવાનો ને તાલીમ આપવા માટે પ્રયત્નકરવામાં આવશે અને તેમને તેમના કૌશલ્ય અનુસાર અને વેકેન્સી મુજબ રોજગાર પુરો પાડવામાં આવશે.

(૧૪) પ્રસ્તાવિત પ્રોજેકટ તેના સાઇટ પરના બાંધકામથી શરૂ કરી પુર્ણ થવામાં આશરે ત્રીસ માસ જેટલો સમય લાગશે. પ્રોજેકટ શરૂ થવાની તારીખ કાયદાકીય કલીયરન્સ મળયા પછી અને નાણાંકીય જોગાવાઈ થયા બાદ નકકી થશે.

(૧૫) અત્યારે ચાલી રહેલી બધી જ પ્રવૃતિઓ માટેના પર્યાવરણીય માનકો અંગેના આંકડા વર્ષ – ૨૦૧૬ ના ચોમાસા બાદ પ્રાપ્ત કરવામાં આવ્યા હતા. પ્રસ્તાવિત પ્રોજેકટના આવવાથી પર્યાવરણ પર થવાની અસરનું પણ મૂલ્યાંકન કરવામાં આવ્યું છે. તેના પરથી એ જાણવા મળ્યુ છે કે, પ્રસ્તાવિત પ્રોજેકટ શરૂ થઇ ગયા પછી પર્યાવરણીય માનકો કાયદાકીય નકકી કરાયેલી મર્યાદની અંદર જ રહેશે.

આપનો આભાર,

અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)

અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-3

Shri Mahesh Pandya
Paryavaran Mitra (Regd No. E/20934/Ahmedabad)
502, Raj Avenue, Bhaikaka Nagar Road
Nr. Thaltej Cross Road, Thaltej
Ahmedabad-380059

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. The previous land use of the proposed project has been converted to Industrial by APSEZ and APSEZ has consented to allot this land to AEL.

   Present land use of the land for proposed project is 154.18 ha (381 acres) of APSEZ land (Land allotment letter is enclosed as Annexure-III in EIA Report) and 102.38 ha (253 acres) of Forest land (Stage-I Forest clearance in process) which is State Govt. has recommended for Forest Clearance (FC) and is at Central Government [File number is 8-04/2016-FC].

2. Reply is as per point no. 1 above.

3. The online application for prior EC (application No: IA/GJ/IND/53004/2016: Form-1 and Pre-Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April, 2016 and same was reviewed by the Expert Appraisal Committee (Industry I) held during 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. The Environmental Clearance is under process.

4. After receiving Environment Clearance from MOEF&CC. The necessary NOC (Consent to Establishment (CTE) or Consent to Operate (CTO) form GPCB shall be applied, as applicable.

5. The Forest Clearance is still under process. The details are available on the website of MoEF & CC (File No. 8-04/2016-FC).

PAP

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Based on the survey which was carried out by Centre for Earth Science Studies (CESS, Thiruvanantpuram), which is an authorized agency by MoEF&CC, the proposed project site is outside CRZ and doesn't attract CRZ clearance.

6. Proposed project area is devoid of mangroves. There is no question of mangrove destruction.

7. The anticipated impacts and mitigation measures during construction and operation phase is given in Chapter-4 of EIA report.

8. The monitoring is conducted during 1st October, 2016 to 31st December 2016, is the study period for the Environmental Baseline data collection. The location and Ambient Air Quality and levels are given in Annexure-VI of EIA Report. All the environmental attributes such as sampling of air quality, water sampling (ground and surface), noise levels, and soil quality were carried out during the study period.

9. The coal will be sourced from the local market and transported through trucks. Around 3000 tonnes of coal will be stored. Further details of fuel consumption quantity and source are given in Table-2.5 of Chapter-2 (Project Description).

10. The question is not relevant and therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to the permissions granted.

11. Maximum domestic and service water requirement for the proposed project is 1000 KLD. The final requirement will be re-assessed during detail engineering.

12. The process details and schematic flow diagram of ETP is given in Figure-2.20 of Chapter-2.

13. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.

14. The solid waste generation (quantity and mode of disposal) and waste characteristic is presented in Chapter-2 of the EIA report. The Secured Land Fill (SLF) is proposed over 30 acres within the project premises for disposal of ETP waste sludge and spent catalyst. Other Hazardous waste will be disposed through the approved recyclers.

15. Details on potential employment are mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.

16. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation.

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The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

17. Reply is as per point no. 16 above.

18. Environment management cell structure has been provided in Chapter-9 of the EIA Report who will be responsible for implementation of EMP.

19. In the matter of Sunita Narain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015.

20. This is outside the scope of the EIA report for the proposed project.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Praveen Anant

From:	Praveen Anant
Sent:	17 April 2017 17:22
To:	'collector-kut@gujarat.gov.in'; 'chairman-gpcb@gmail.com'; 'rogpcb.eastkutch@gmail.com'; 'mk.singh65@ias.nic.in'
Cc:	'rogpcb.eastkutch@gmail.com'; Santoshkumar Singh
Subject:	FW: Public Hearing dated 29th April 2017 for Greenfield Copper Refinery Plant (1 MTPA) proposed by M/s Adani Enterprises Limited
Attachments:	Annexure 5. MoEF circular, FC before EC, 31.3.2011.pdf; Letter to RO reg compliant in PH.pdf

Dear Sir,

I am forwarding you our reply submitted to Regional Officer, GPCB, Kutch-East with reference to Public Hearing dated 29th April 2017 for Greenfield Copper Refinery Plant and complaint received from Sh Gajendrasinh Jadeja, Sarpanch, Navinal Village, MundraTaluka.

Thaking you.
For,

(Santosh Kumar Singh)
Authorized Signatory
Adani Enterprises Limited

From: Santoshkumar Singh
Sent: 12 April 2017 19:07
To: rogpcb.eastkutch@gmail.com
Cc: Mukesh Saxena
Subject: RE: Public Hearing dated 29th April 2017 for Greenfield Copper Refinery Plant (1 MTPA) proposed by M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land

To,

Regional Officer, Kutch – East
Gujarat Pollution Control Board
Room No 215/16, Kandla Port Trust,
Sec 8, Gandhidham, Kutch – 370201, Gujarat
rogpcb.eastkutch@gmail.com

Subject: Public Hearing dated 29th April 2017 for Greenfield Copper Refinery Plant (1 MTPA) proposed by M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land

Ref: Your email Date: Tue, Apr 11, 2017 at 9:43 PM regarding the complaint from Sh Gajendrasinh Jadeja, Sarpanch, Navinal Village, Mundra Taluka.

Dear Sir,

With reference to the subject matter and your email, we submit that all requirements for obtaining the TOR from MoEFCC were fulfilled. After obtaining TOR, Environment Impact Assessment has been completed and all conditions of TOR has been complied with by project proponent for the purpose of public hearing.

- Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure 1, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest

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clearance and it is now at Central government through File No. 8-04/2016-FC". The file status is also available online at MoEFCC Forest Clearance.

- As the project is proposed by M/s Adani Enterprises Limited in APSEZ land, Forest Clearance has already been applied for this land by APSEZ (erstwhile Mundra SEZ Ltd.). The requirement of OM dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance...". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR.
- At no stage there is any concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application by the project proponent. There is no deviation from the Section 8 (vi) of EIA Notification 2006 also.

Hence, we submit that required process for TOR has been fulfilled by now and requirements shall also be fulfilled for EC application. This reply, duly signed by authorized signatory, is also being submitted to your office and scan copy is also attached herewith for ready reference.

Sincerely,

Authorized Signatory

For, Adani Enterprises Limited

(Santosh Kumar Singh)

From: Mukesh Saxena
Sent: Wednesday, April 12, 2017 11:59 AM
To: Santoshkumar Singh; Prasad Suryarao
Cc: Rakshit Shah
Subject: Fwd: Cancellation of public hearing scheduled for 29.4.2017 and rejection of EIA related to Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in MundraTaluka, Kutch, Guj...

FYI. As discussed please make an reply of mail of Gajuba to RO GPCB

Sent from my iPhone

Begin forwarded message:

From: "ROGPCB EASTKUTCH ." <rogpcb.eastkutch@gmail.com>
To: "Mukesh Saxena" <Mukesh.Saxena@adani.com>
Subject: Fwd: Cancellation of public hearing scheduled for 29.4.2017 and rejection of EIA related to Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in MundraTaluka, Kutch, Guj...

--------- Forwarded message ---------
From: P2 Branch <gpcbpublichearing@gmail.com>
Date: Tue, Apr 11, 2017 at 9:43 PM
Subject: Fwd: Cancellation of public hearing scheduled for 29.4.2017 and rejection of EIA related to Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in MundraTaluka, Kutch, Gujarat
To: Rogpcb Eastkutch <rogpcb.eastkutch@gmail.com>, <gpcbpublichearing@gmail.com>, R V PATEL M GPCB <rajgpcb@gmail.com>, <scienofficer3-gpcb@gujarat.gov.in>

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Ref: AEL/Copper/Mundra/EC/PH/D-A-4

To,

Shri Gajendrasinh Jadeja,
Sarpanch, Navinal Village,
MundraTaluka, Kutch District, Gujarat

Subject: Public hearing scheduled for 29.4.2017 and rejection of EIA related to Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in MundraTaluka, Kutch, Guj

Ref: Your email Dated Apr 11, 2017 addressed to MS, GPCB regarding the subject matter

Dear Sir,

With reference to the subject matter and your email, we submit that all requirements for obtaining the TOR from MoEFCC were fulfilled. After obtaining TOR, Environment Impact Assessment has been completed and all conditions of TOR has been complied with by project proponent for the purpose of public hearing.

- Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure 1, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC". The file status is also available online at MoEFCC Forest Clearance.
- As the project is proposed by M/s Adani Enterprises Limited in APSEZ land, Forest Clearance has already been applied for this land by APSEZ (erstwhile Mundra SEZ Ltd.). The requirement of OM dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance...". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR.
- At no stage there is any concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application by the project proponent. There is no deviation from the Section 8 (vi) of EIA Notification 2006 also.

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Hence, we submit that required process for TOR has been fulfilled by now and requirements shall also be fulfilled for EC application.

We also assure that all applicable environmental legal requirements shall be complied with.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

CC: Regional Officer, Gujarat Pollution Control Board, Kutch – East, Room No 215/16, Kandla Port Trust, Sec 8, Gandhidham, Kutch – 370201, Gujarat, rogpcb.eastkutch@gmail.com

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સંદર્ભ: **AEL/Copper/Mundra/EC/PH/D-A-5**

પ્રતિ,
શ્રી સંજય એસ. બાપટ
૧૯, આદર્શ ટાવર,
મુંદરા – કચ્છ.

વિષય : અદાણી એન્ટરપ્રાઇઝ લિમિટેડની ગ્રીનફીલ્ડ કોપર રિફાઈનરી પ્લાન્ટ સ્થાપવા અંગેની લોકસુનાવણી રદ કરવા અંગે..

મહોદયશ્રી,

જય ભારત સાથે ઉપરોકત વિષય અન્વયે જણાવવાનું કે, અદાણી એન્ટરપ્રાઇઝ લિમિટેડની ગ્રીનફીલ્ડ કોપર રિફાઈનરી પ્લાન્ટ સ્થાપવા અંગેની લોકસુનાવણી રદ કરવા અંગે આપના તરફથી રજુ કરવામાં આવેલ વાંધાઓની પુર્તતા નીચે મુજબ છે.

ઇઆઇએના અભ્યાસો MOEF&CC દ્વારા મંજૂર થયેલા TOR પર આધારીત છે. જે માટેની જરૂરી પરવાનગીઓ મેળવ્યા બાદ પ્રોજેક્ટને અમલમાં મુકવામાં આવશે અને જેનું પાલન મળેલ પરવાનગી મુજબ કરવામાં આવશે.

સૂચિત પ્રોજેક્ટ વિસ્તાર સીઆરઝેડની બહાર છે તેમજ ચેર અને દલદલ હાજરી આ સૂચિત પ્રોજેક્ટ વિસ્તારમાં નથી. રાષ્ટ્રીય રીમોટ સેન્સિંગ સેન્ટર (એનઆરએસસી) ના રાષ્ટ્રીય ધોરણો મુજબ જમીનને ઉપયોગમાં લેવામાં આવેલ છે અને જે અંગેની માહિતી ઇઆઇએ રિપોર્ટના પ્રકરણ -૩ દર્શાવવામાં આવેલ છે. સાઇટ પસંદગી ઇઆઇએ રિપોર્ટના અભ્યાસ અને માપદંડ મુજબ કરવામાં આવેલ છે. જેની વિગતો ઇઆઇએ રિપોર્ટમાં દર્શાવવામાં આવેલ છે.

ફોરેસ્ટ જમીન ની સ્થિતિ ટીઓઆર માટે ફોર્મ-૧ માં વિગતવાર દર્શાવેલ છે. અને ટીઓઆરની પરવાનગી (રિપોર્ટ એનેક્ષર-૧ પાના નં.એઆઇ-૧૪) માં જણાવ્યુંછે કે ૨૫૩ એકર ફોરેસ્ટ જમીન પણ ઔદ્યોગીકરણના હેતુ માટે રૂપાંતરીત થશે. રાજય સરકારે વન મંજુરી માટે ભલામણ કરેલ છે. તે હવે ફાઇલ નં.૮-૦૪/૨૦૧૬-

PAD

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એફસી ભારત સરકાર પાસે છે. આ વન મંજુરીની ફાઇલનું સ્ટેટસ ઓનલાઇન પણ ઉપલબ્ધ છે. એપીએસઇઝેડ દ્વારા એઇએલને જમીનની ફાળવણીની કરવામાં આવી રહી છે. જેના પત્રવ્યવહાર ઇઆઇએ ના એનેક્ષર-૩ માં સામેલ છે.

અમો ખાત્રી પુર્વક જણાવીએ છીએ કે પ્રોજેકટના સ્થાપન અને સંચાલનમાં તમામ પ્રકારની પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આભાર સહ,

આપનો આભાર,

અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)

અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-5

Shri Sanjay S. Bapat
19, Adarsh Tower
Mundra, Taluka: Mundra- Kutch

Subject: **Regarding canceling of the public hearing on Adani Enterprise Limited, setting up of Greenfield Copper Refinery Plant.**

Dear Sir,

We are herewith responding para wise to the issues raised by you:

EIA studies have been carried based on TOR granted by MoEF&CC. Project will be implemented after obtaining required permissions and compliance will be done based on permissions granted.

The proposed project area is outside CRZ and therefore no presence of mangroves and mudflats. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in Chapter – 3 of the EIA report. Site selection is based on suitability criteria as studied and provided in the EIA report.

Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure 1, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC." The file status is also available online at MoEF&CC Forest Clearance.

The land allocation is being granted to AEL by APSEZ, the correspondence is given in EIA report as annexure-III.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Praveen Anant

From: Santoshkumar Singh
Sent: 28 April 2017 16:11
To: collector-kut@gujarat.gov.in
Cc: Kanu Bhai Chaudhary
Subject: Reply to Kheti Vikas Seva Trust
Attachments: Naran gadhvi reply english.docx

Dear Sir,

I am enclosing herewith the reply to the representation of Kheti Vikas Seva Trust.

Regards
Santosh Kumar Singh.

From: Hiral.Patel@adani.com
Sent: 28 April 2017 3:53 PM
To: Santosh.Singh1@adani.com; Praveen.Anant@adani.com; Prasad.Suryarao@adani.com
Cc: Shalinm.Shah@adani.com; RN.Shukla@adani.com; Mukesh.Patel@adani.com
Subject: RE: Copper PH

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સંદર્ભ:**AEL/Copper/Mundra/EC/PH/D-A-6**

પ્રતિ,
શ્રી નારાણ બી. ગઢવી
પ્રમુખશ્રી,
ખેતી વિકાસ સેવા ટ્રસ્ટ
ગામ : ઝરપરા
મુંદરા – કચ્છ.

વિષય : કચ્છ જિલ્લાના મુંદરા તાલુકાના સિરાચા અને નવીનાળ ગામે અદાણી પોર્ટ સ્પેશિયલ ઇકોનોમિક ઝોનની જમીન ખાતે પ્રસ્તાવિક ગ્રીનફિલ્ડ કોપર રીફાઇનરી પ્રોજેકટની લોક સુનાવણી રદ કરવા બાબત.

સંદર્ભ : આપશ્રીની અરજી તા.૨૭/૦૪/૨૦૧૭

મહોદયશ્રી,

જયભારત સાથ ઉપરોકત વિષય અન્વયે જણાવવાનું કે,કચ્છ જિલ્લાના મુંદરા તાલુકાના સિરાચા અને નવીનાળ ગામે અદાણી પોર્ટ સ્પેશિયલ ઇકોનોમિક ઝોનની જમીન ખાતે પ્રસ્તાવિક ગ્રીનફિલ્ડ કોપર રીફાઇનરી પ્રોજેકટની લોક સુનાવણી રદ કરવા આપનાતરફથી રજુ કરવામાં આવેલ કરવામાં આવેલ વાંધાઓની પુર્તતા નીચે મુજબ છે.

ખેતી વિકાસ ટ્રસ્ટે જાહેર હિતની અરજી રિટ પિટિશન (પીઆઇએલ) નં.૧૨, ૨૦૧૧ નામદાર ગુજરાત હાઇકોર્ટમાં કરેલ હતી. આ અરજીમાં અરજદારે એપીએસઇઝેડ અને અદાણી પાવર વિરૂધ્ધ વિવિધ વાંધા ઉઠાવેલ છે. આ વાંધાઓ માંનો એક વાંધો પક્ષ્યિમ ભાગમાં ચેરીયાના જંગલના નાશનો છે.

પીઆઇએલ માં ચેરિયા જંગલનો નાશ,ક્રીકને પુરવી પર્યાવરણીય નિયમોનું ઉલ્લંઘન કરવું અને એપીએસઇઝેડની પ્રવૃતિ વિરૂધ્ધ સ્ટેટ ઓથોરીટીની નિષ્ક્રીયતાનો ઉલ્લેખ છે. આ અરજીમાં એમ પણ કહેવાયું

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છે કે ખુલ્લી ઇન્ટેક ચેનલનાં કારણે ભુગર્ભ જળમાં ક્ષારનું પ્રમાણ વધશે અને ખેતી લાયક જમીનની ફળદ્રુપતાને નુકશાન થશે. આ અંગે એક સમિતિની રચના કરવાની ભલામણ કરાઇ છે.

વધુમાં, અરજદારે એપીએસઇઝેડ અને એપીએલ વિરૂધ્ધ અરજી નં. ૯૧૨૪, ૨૦૧૧ ભારતીય બંધારણના આર્ટીકલ ૨૦૧૫ અનુસાર કરી છે. જેમાં અરજદારે નામદાર ગુજરાત હાઇકોર્ટના તા.૧૨/૦૭/૨૦૧૧ ના હુકમનો અનાદર કરવાની વાત કરી છે. અરજદારે આ અરજીમાં જણાવ્યું છે કે એપીએસઇઝેડ અને એપીએલ એ કચ્છના મુંદરા તાલુકામા ચેરિયાના જંગલોનો નાશ કર્યો છે. ખેતી વિકાસ ટ્રસ્ટેઆ સિવાય કોઇ બીજો વાંધો ઉઠાવેલ નથી.

એપીએસઇઝેડ એ તેનો જવાબ ફાઇલ કર્યો છે. આ એપીએસઇઝેડની મુંદરામાં થતી પ્રવૃતિઓ અંગે છે. અને વિવિધમંજુરીઓ સંબંધીત અધિકારીઓ પાસેથી સમયસર મેળવાયેલ છે. એપીએસઇઝેડની પ્રવૃતિઓ મંજુરી મેળવાયા વગરની છે. તેવું અરજદાર સાબિત કરી શકેલ નથી.

આ પીટીશન પેન્ડીંગ રહેલ તે દરમ્યાન એમઓઇએફ એન્ડ સીસી એ સુનીતા નારાયણના નેતૃત્વ હેઠળ એક સમિતીની રચના કરી હતી. સમિતીએ સાઇટની મુલાકાત લીધી અને તેનો રિપોર્ટ એમઓઇએફ એન્ડ સીસી ને તા.૧૮/૦૪/૨૦૧૩ ના રજુ કર્યો. એમઓઇએફ એન્ડ સીસી એ ત્યાર બાદ શો કોઝ નોટીસ મોકલાવેલ હતી. જેનો ચુકાદો પેન્ડીંગ રહેલ હતો.

પીઆઇએલ ને તા.૧૭/૦૪/૨૦૧૭ના રોજ રદબાતલ કરવામાં આવેલ છે. ગુજરાત હાઇકોર્ટએ આ અરજી એમઓઇએફ એન્ડ સીસી દ્વારા એક સમિતી બનાવવાની શરતે રદ બાતલ કરી હતી. એમઓઇએફ એન્ડ સીસી યોગ્ય પગલા લીધેલ અને એક શો કોઝ નોટીસ ઇસ્યુ કરેલ હતી. એમઓઇએફ એન્ડ સીસીએ આ રિપોર્ટ ધ્યાને લઇ યોગ્ય પગલા લેવાના રહે છે. અને આરીતે આવી કોઇ પીટીશન હવે બાકી રહેતી નથી.

એમઓઇએફ એન્ડ સીસી એ આપેલ અંતિમ નિર્દેશ પ્રમાણે અને તા.૧૮/૦૯/૨૦૧૫ ના આદેશ અન્વયે એપીએસઇઝેડ ને અમુક શરતોનું પાલન કરવા આદેશ આપેલ છે. અને આમ આ શો કોઝ નોટિસ રદ બાતલ થાય છે. આ સાથે ચેરિયાના જંગલો નાશ કરવા સહિતના આક્ષેપોનો યોગ્યરીતેએમઓઇએફ એન્ડ સીસી દ્વારા યોગ્ય રીતે નિકાલ કરેલ છે. એમઓઇએફ એન્ડ સીસી એ આપેલા હુકમને પડકારવાની સમયસીમા પુર્ણ થઇ ગયેલ હોતા કાનુની રીતે લેવાયેલ નિર્ણય અંતિમ બની રહેલ છે.

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અરજદારોએ નામદાર ગુજરાત હાઇકોર્ટની વિરૂધ્ધ કરેલ તા.૧૭/૦૪/૨૦૧૫ ની અરજી તા.૧૮/૦૩/૨૦૧૬ ના રોજ રદબાદલ કરેલ છે. આમ આ મેટરને નામદાર સુપ્રીમ કોર્ટ દ્વારા રદ બાતલ કરાતા ખેતી વિકાસ ટ્રસ્ટની અરજી પાયા વિહોણીથઇ જાય છે.

નામદાર ગુજરાત હાઇ કોર્ટે તા.૧૫/૧૦/૨૦૧૫ ના સીવીલ એપ્લીકેશન નં. ૯૧૨૪/૨૦૧૧ માં જણાવ્યું છે કે તેઓ શ્રી એપીએસઇઝેડ અને એપીએલ પર લાગાવેયલા કોર્ટ હુકમના અનાદરના આક્ષેપો વિરૂધ્ધ આક્ષેપ કરી શકાશે નહી.

નામદાર ગુજરાત હાઇકોર્ટે પોતાના તા.૦૫/૧૧/૨૦૧૫ ના અપાયેલ આદેશમાં એપીએસઇઝેડને કેટલાક પગલા લેવા સૂચિત કરેલ અને નિષ્ણાંતોની એક સમિતી પોર્ટ અને એસઇઝેડનો સર્વે. કરવા નિયુકત કરેલ. આ સમિતિનો મુળ ઉદેશ્ય. ચેરિયાના વૃક્ષોના મુદા પર ધ્યાને કેન્દ્રીત કરવાનો હતો. આ નિષ્ણાંત સમિતીએ પોતાનો રિપોર્ટ નામદાર કોર્ટને તા.૦૮/૦૬/૨૦૧૬ ના આપી દીધેલ છે. અને એપીએસઇઝેડ એ તેનો જવાબ તા.૧૮/૦૭/૨૦૧૬ ના દિવસે રજુ કરી દીધેલ છે. સમિતીનો રિપોર્ટ અને એપીએસઇઝેડનો જવાબનામદાર કોર્ટમાં પેન્ડીંગ રહેલ છે.

દુર્ભાગ્યવશ નિષ્ણાંતોની સમિતીએ નામદાર કોર્ટના તા.૦૫/૧૧/૨૦૧૫ ના આદેશમાં જણાવેલ એરીયાથી વધુ એરિયા તપાસ કરેલ છે. આ તથ્ય તા.૧૮/૦૭/૨૦૧૬ ની અમારી એફીડેવીટમાં જણાવાયેલ છે. જેથી એ સાબિત થાય છે કે સમિતીએ આપેલ રિપોર્ટ બદઇરાદા પુર્વકનો છે અને એપીએસઇઝેડ અને એપીએલની પ્રતિસ્ઠા ને હાનિ પહોંચાડવાનો છે. વધુમાં જણાવવાનું કે નિષ્ણાંતોની સમિતીના સભ્યો માંથી એક સભ્યા એપીએસઇઝેડને અપાયેલઅગાઉની મંજુરીની પ્રક્રીયામાં સામેલ હતાં. અને આમ તેઓએ પોતેજ આપેલી મંજુરી વિરૂધ્ધ કોઇ ભલામણ કરી શકે નહીં.

ઉપરોકત જણાવેલ વિગતો પરથી સાબિત થાય છે કે નામદાર કોર્ટમાંકરાયેલ સીવીલ એપ્લીકેશન નં. ૯૧૨૪/૨૦૧૧ નો માત્ર ચેરીયા ઉછેરનો મુદો જ એપીએસઇઝેડ દ્વારા કરવાનો બાકી રહેલ છે. નામદાર કોર્ટમાં પેન્ડીંગ રહેલ મેટરમાં ૧૬ હેકટર અથવા વધુ વિસ્તારમાં કોર્ટના આદેશ મુજબ ચેરીયા ઉછેરનીવાત છે આ ઉછેર સમિતીએ ભલામણ કરેલ જમીન પર કરવાનોછે. આ મેટરમાં અન્ય કોઇ જમીનના ચેરિયાનો ઉલ્લેખ નથી.

PAA

સીઆરઝેડ એરીયા અંગે.

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આ પ્રોજેકટમાં એસઇઝેડનીનોટીફાઇડઅને જંગલની જમીનનો ઉપયોગ થવાનો છે. ઇઆઇએ ના રિપોર્ટમાં ફીગર નં. ૨.૧ ના પાનાનંબર સી-૨/૩ પર સુચિત પ્લાનને સીઆરઝેડના અધિકૃત નકશા પર અંકીત કરેલ છે.

નિયમોના પાલન અંગે.

એપીએસઇઝેડ અને એપીએલ એ સમયસર વિવિધ પ્રકારની મંજુરીઓ અધિકૃત અધિકારીઓ પાસેથી લીધેલ છે અને એપીએસઇઝેડ તથા એપીએલ યોગ્ય પ્રકારનારિપોર્ટ વર્ષમાં બે વખત સંબંધીત સરકારી ખાતાઓને રજુ કરેલ છે.

એમઓઇએફ એન્ડ સીસી એ સુનિતાનારાયણના રિપોર્ટ તેમજ તેના અનુસંધાને અપાયેલ એપીએસઈઝેડ અને એપીએલના રીપોર્ટને જોયેલ છે અને આદેશો આપેલ છે તેમા એક આદેશ મુંદરા વિસ્તાર પરના કયુમ્યુલેટીવી ઈમ્પેકટ એસેસમેન્ટ અભ્યાસનો છે. એપીએસઈઝેડ એ જીસીઝેડએમએ તરફથી ટીઓઆર મેળવેલ છે અને એનએબીઈટી એ અધિકૃત કરેલા કન્સલટન્ટ ધ્વારા તેનો અભ્યાસ પણ શરૂ કરી દેવાયેલ છે.

આઅંગે લેવાયેલ પગલા નો રીપોર્ટ એમઓઈએફ એન્ડ સીસી ને સમય અનુસાર રજુ કરાયેલ છે. વધુમાં, આ અભ્યાસની પ્રક્રિયા ચાલુમાં છે અને તે પુર્ણ થતા તેનો અંતીમ રીપોર્ટ યોગ્ય ઓથોરીટીને રજુ કરવામાં આવશે

સીએસઆર પ્રવૃતિઅંગે

અદાણી ફાઉન્ડેશનએ અદાણી ગૃપની સીએસઆર પ્રવૃતિ કરતી સંસ્થા છે. અદાણી ફાઉન્ડેશન અદાણી ગૃપ ના પ્રોજેકટના લોકેશનના સ્થાનિક રહીશોના સામાજીક ઉત્કર્ષ માટેના વિવિધ ચાર ક્ષેત્રમાં કામ કરે છે જેમાં શિક્ષણ, આરોગય, સામાજીક કાર્ય અને ગ્રામીણ ઈન્ફ્રાસ્ટકચર ના વિકાસનો સમાવેશ કરાય છે. એમઓઈએફ એન્ડ સીસીના ઓફિસ મેમોરેન્ડમ તેમજ સીએસઆર પ્રવૃતિઓ અંગેના કંપની એકટના અનુસંધાને જણાવવાનું કે, અદાણી ફાઉન્ડેશન ધ્વારા યોજીત અને કરવાની મુંદરાની અને મુંદરા આસપાસની પ્રવૃતિઓનો ઉલ્લેખ ઈઆઈએ રીપોર્ટનાચેપ્ટર આઠ માં કરાયેલ છે.

ફોરેસ્ટ કલીયરન્સ અંગે

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ઈઆઈએના ૨૦૦૬ના નોટીફીકેશન તેમજ તેના અનુસંધાને થયેલા અન્ય સુધારાઓ અને સબંધિત નોટીફીકેશન પરિપત્રો અને એમઓઈએફ અને સીસીના ઓફીસ મેમોરેન્ડમની પ્રક્રિયા અનુસંધાને એ સ્પષ્ટ થાય છે કે, પર્યાવરણ મંજુરીઓની પ્રક્રિયા ત્યારે જ આગળ વધારી શકાય જયારે જંગલની જમીનનું રૂપાંતરણની અરજી કરાય અને જંગલની જમીન પરની પ્રવૃતીઓ સહીત તમામ પ્રવૃતિઓની પર્યાવરણીય મંજુરી સમયાનુંસાર જંગલ કલીયરન્સના સ્ટેટસને આધારે કરી શકાશે. યોગ્ય પ્રક્રિયાનું પાલન કરી શકાશે. તેમજ પર્યાવરણીય કલીયરન્સ તેમજ વન કલીયરન્સનુંધ્યાન રખાશે

ઉપરોકત કલેરીફીકેશનના સંદર્ભે એ સ્પષ્ટ થાય છે કે, જરૂરી પ્રક્રિયાઓનું પર્યાવરણીય કલીયરન્સ લેવામાં પાલન થાય છે અને આ જન સુનાવણી તેનો જ ભાગ છે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-6

To,
Kheti Vikas Seva Trust,
Vill: Zarpara, Tal: Mundra, Dist: Kutch

Kind Attn: Mr. NaranbhaiGadhvi

Subject: Your letter dated 27.04.2017 with respect to Public Hearing of Copper Smelter project

Dear Sir,
Withrespect to the above stated subject matter, please note that reply to the representationmadefor the proposed ship recycling project is as follows:

About High court cases:

Kheti Vikas Trust had filed alleged public interest litigation, being Writ Petition (PIL) No.12 of 2011, before Hon'ble Gujarat High Court. In the main petition, the Applicant had made various allegations against APSEZ and Adani Power Limited. One such allegation made in the main petition was in respect of the alleged "deforestation of mangrove forests which forms the main part of mangrove forest of western region".

PIL alleging destruction of mangrove, filling up of creeks and violation of Environmental Laws & inaction of the State Authorities against the activities of APSEZ. It also alleged that due to construction of open intake channel, the salinity of ground water has increased and is damaging the fertility of the agricultural land. A prayer was made to appoint a committee.

Subsequently, the Applicant filed the captioned Civil Application No.9124 of 2011 purportedly under the provisions of Article 215 of the Constitution of India, against APSEZ and APL, for alleged 'wilful and deliberate contempt' of the authority of Hon'ble Gujarat High Court. It is the case of the Applicant in the present civil application that APSEZ and APL had allegedly continued their operation of cutting/destruction of thick cover of Mangrove forest existing in MundraTaluka of Kutchch District in violation of the aforesaid order dated 12.7.2011 passed by this Hon'ble Gujarat High Court. KhetiVikas Trust has made no other allegations in present civil application, besides the allegation of destruction of mangroves of certain area in breach of the order dated 12.7.2011.

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APSEZ filed its reply and refuted the allegations. It was the case of APSEZ that the activities carried out by it at Mundra is permitted by various clearances granted by the concerned authorities from time to time. The petitioner failed to prove that any of the activities of APSEZ is not permissible.

During the pendency of the petition, MoEF&CC appointed a committee headed by Ms. SunitaNarain which visited the site and submitted its report to MoEF&CC on 18.4.2013. MoEF&CC thereafter issued a Show Cause Notice dated 30.9.2013 to APSEZ which was pending for adjudication.

Subject PIL was dismissed on 17.4.2015. The Gujarat High Court dismissed the petition on the premise that the prayer to appoint the committee is already granted by virtue of appointment of committee by MoEF&CC. MoEF&CC has already taken action and issued the show cause notice. It is for MoEF&CC to consider the report and take appropriate action and the petition does not survive any further.

MoEF&CC has given final directions to APSEZ to comply with certain conditions vide their order dated 18.09.2015 thereby disposed off the pending show cause. With this, all allegations including that of destruction of mangrove are appropriately dealt with by MoEF&CC. The statutory authority has taken a considered view which has become final as the time limit to challenge the said order of MoEF&CC had expired way back.

Appeal filed in Supreme Court by the petitioners against Gujarat High Court order dated 17.4.2015 which was dismissed on 18.3.2016. Upon dismissal of the matter by the Hon'ble Supreme Court, KhetiVikasSeva Trust cannot be heard to say that there is any merit in their case against APSEZ.

Thereafter, in its order dated 15.10.2015 in Civil Application No.9124 of 2011, the Gujarat High Court recorded that it would not be able to frame charges against APSEZ and APL for alleged contempt for breach of the order dated 12.7.2011.

Hon'ble Gujarat High Court by its order dated 5.11.2015 proposed certain measures to be undertaken by APSEZ and appointed a committee of experts to survey the area in and around the Port/SEZ developed by the APSEZ, with a special focus on the question of mangroves in the area. Said committee of experts has already filed its report before this Hon'ble Court on 8.6.2016 and APSEZ has also filed its response to the said report on 18.07.2016. The said report and the response of the APSEZ are pending before this Hon'ble Court.

Unfortunatelyhowever, the Committee has travelled much beyond the scope of the terms of reference delineated by this Hon'ble Court in its order dated 5.11.2015, which is demonstrated through our affidavit dated 18.07.2016 which clarifies that the contents of the report submitted by the Committee further reflects that the Committee has in fact proceeded with mala fides and with a view to pin down APSEZ and APL. In fact, one of the committee members was party to the earlier clearances

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granted to APSEZ and is therefore, barred from raising any objection or giving any finding contrary to his own recommendations.

In view of the aforesaid it becomes evident that the only issue pending before this Hon'ble Court in Civil Application No.9124 of 2011 is as to the extent of the measures (the extent and the place where mangroves can be planted by way of compensatory plantation) to be undertaken by APSEZ. The matter pending before the Hon'ble Gujarat High Court is limited to plantation of 100 ha of mangroves or more as may be directed by the Hon'ble Court at the location identified by the Committee. No other area is subject matter of this matter.

About CRZ area:

The project will be developed using notified SEZ area and forest land. The proposed layout superimposed on authorized CRZ map is presented in the EIA report as Figure 2.1 on page C2-3. From the said figure, it is clear that the entire project area is outside CRZ.

About compliance:

APSEZ as well as APL have obtained requisite clearances from time to time from respective authorities and have been submitting their compliance reports twice in a year to all concerned government authorities.

MoEF&CC has dealt with the SunitaNarain Committee report and subsequent submissions of APSEZ as well as APL and has finally issued an order with certain directions. One of which is to carry out Cumulative Impact Assessment study for Mundra region. APSEZ has obtained ToR from GCZMA and started studies through NABET accredited consultant. Progress has been submitted to MoEF&CC from time to time. Study is in progress and on completion final report will be submitted to concerned authorities.

About CSR activities:

Adani Foundation is the CSR wing of Adani group. Adani Foundation works in four main areas for social upliftment of communities around all project locations of the Adani Group. They are Education, Community health, Social Livelihood and Rural Infrastructure development. With reference to the mentioned Office Memorandum of MoEF&CC and companies act with respect to the Corporate Social Responsibility, details about the activities carried out and planned by Adani Foundation in and around Mundra are mentioned in chapter 8 of the EIA report.

About Forest clearance:

As per procedures of EIA notification 2006, its subsequent amendments and other related notifications / circulars / office memorandums of MoEF&CC, it is clear that

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Environmental Clearance procedure can be carried out once application has been made for forest land diversion and environment clearance can be granted to any project activities involving forest land by reviewing the status of forest clearance at respective time. Proper procedures are being followed for proposed project with respect to obtaining environment clearance as well as forest clearance.

In view of the above clarifications, it is clear that the required procedures are being followed for obtaining prior environmental clearance for the proposed project activity and Public Hearing is part of the process.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

Copy to: (1) District Collector, Bhuj
(2) Member Secretary, Gujarat Pollution Control Board, Gandhi Nagar

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Ref: AEL/Copper/Mundra/EC/PH/**D-A-7**

Shri Debi Goenka
Executive Trustee, Conservation Action Trust
5, Sahakar Bhavan, 1st Floor
LBS Marg, Narayan Nagar
Ghatkopar (West) Mumbai 400086

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Out of total area proposed for the project 256.58 ha area is notified SEZ and 102.38 ha is forest land for which forest clearance application is in process.
2. The layout has been marked on the CRZ map given in Figure-1.5 of Chapter-1 in the EIA report. The proposed project area is outside CRZ.
3. GCZMA is the custodian of approved CZMP for the proposed project area. However project layout is superimposed on CRZ map prepared by authorized agency of MOEF&CC as per CRZ notification 2011 and same is provided in figure-1.5 of Chapter-1 of EIA report.
4. The proposed project layout has been marked on the authorized CRZ map given in Figure-1.5 of Chapter-1 in the EIA report. Same is in colour.
5. The latest satellite imagery of the 21 Jan 2016/14 Feb 2016 is given in Figure-3.3.1 of Chapter 3 of EIA report
6. The land use details of the study area are given in Figure-3.3.2 of Chapter-3 of EIA report
7. The proposed project area is outside CRZ.
8. There are no ecologically sensitive areas in the proposed project area. However mangroves are present outside the project area but within the study area. The land use break-up details as per satellite image classification for the study area is given in chapter-3 of EIA report.

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9. The proposed project area is outside CRZ area therefore no presence of mangroves and mudflats.

10. Mangroves are present at 100 m away in the southern side of the project area.

11. Salt pans are located at a distance of around 5KM in WSW direction from the project area.

12. The fish species in the study area have been listed in Chapter-3 of the EIA report. Details on existing fisherman will be included in the Final EIA report.

13. Proposed Project area is outside CRZ and there are no mudflats and mangroves in the project area. Alternative site analysis is done for the project and site is selected based on its suitability. Project area includes forest land for which APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance.

14. The alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors.

15. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1.

16. The proposed project is planned over notified SEZ and Forest land that applied for diversion. No reclamation is proposed as part of proposed project activity. Details on present land use are provided in Chapter - 3 of the EIA report.

17. Proposed project area is devoid of mangroves. There is no question of mangrove destruction.

18. The alternate site analysis was carried out. The site selection criteria and the study of alternate sites is detailed in chapter-5 of the EIA report.

19. The proposed project area is outside CRZ and therefore no presence of mangroves and mudflats. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in Chapter – 3 of the EIA report. Site selection is based on suitability criteria as studied and provided in the EIA report.

20. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in chapter – 3 of the EIA report.

21. The forest related information as asked in point no. 22 is replied properly.

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22. There is no case pending against the proposed project.
23. The question is not related to proposed project.
24. The question is not related to proposed project. No reclamation is proposed in the project under discussion.
25. As a part of the requirement for the proposed project the existing roads will be strengthened by widening or upgrading and extended to approach the proposed site.
26. The raw material transportation is proposed to be received from the approach road within notified SEZ which will be strengthened. The overall layout of the proposed plant is given in Figure-2.1 of EIA report.
27. The widening of existing road is within the notified SEZ and it is considered as part of the overall impact assessment of the proposed project. However, impact will be insignificant.
28. Power will be sourced from existing transmission lines by extending it to the proposed project site by using existing area of APSEZ. Same will be outside CRZ.
29. Natural drainage will not be disturbed due to the proposed project. The natural topography will be maintained. The proposed project location is notified SEZ and forest land for which necessary clearance is under progress.
30. The copper concentrate and rock phosphate will be transported through state of art pipe conveying method. The required EMP measures will be implemented as mentioned in Chapter-6. Project will be implemented after obtaining required clearances from concerned statutory authorities and complied with.
31. The locals will be given preference as per the eligibility. The skill development program will be implemented as a part of CSR program to improve employability.
32. During construction phase, workers will be sourced through contractors and it will be ensured that workers get required facilities.
33. All the facilities including sanitation and others will be provided.
34. This is outside the scope of the EIA report for the proposed project. However, local employment will be provided for the proposed project based on eligibility.
35. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1.
36. There is no notified/ declared turtle nesting site present within 15KM of the proposed project area.
37. The details of pagadiya fishermen will be included in the final EIA report. No fishermen will be impacted due to the proposed project.

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38. This is outside the scope of the EIA report for the proposed project.

39. The proposed project area is outside CRZ. We do not have any information on fishing boats in the surrounding area. However, proposed project activity will have no impact on fisheries.

40. The sand for the proposed construction will be sourced from local available markets.

41. The land use pattern of the study area covering 10 km radius is given in Figure-3.3.2, Chapter -3 of the EIA report. Same is in color. Mudflats and mangroves are mentioned in Table 3.3.2, Chapter-3 of EIA report.

42. Project area is notified SEZ and forest land for which diversion is under process. Mangroves and other RF are mentioned as part of Form-1 and EIA report. Mangroves are not present within the proposed project area.

43. All the utility corridors will be part of notified SEZ. However, they will be finalized as part of detail engineering and only after obtaining required clearance for the proposed project.

44. Reply is as per point no. 43.

45. Leveling of the land profile will be done as part of detailed engineering for the proposed project.

46. Map showing the creek in the satellite imagery and land use map are provided in Chapter-3 of the EIA report.

47. Proposed project area is devoid of any human habitation. The fishermen in the surrounding areas will not be disturbed due the proposed project.

48. Details on potential employment are mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.

49. Based on the eligibility and available vacancies, jobs will be provided.

50. Training will be integral part of all the employees. The skill development program will be implemented as a part of CSR program to improve employability.

51. Based on the eligibility and available vacancies, jobs will be provided.

52. Salt pans are present in the south west direction of the project area at a distance of around 5KM.

53. The coal will be sourced from the local market and transported through trucks. Around 3000 tonnes of coal will be stored. Coal is taking part in the smelting process

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and hence there is no ash generation. The details about mitigation measures have been covered as a part of EMP in the EIA report.

54. There is no generation of ash in the process.

55. The requested details are part of detail engineering. Preliminary water balance diagram is given in figure-2.2 of the EIA report.

56. Environmental sensitivity analysis is done for 15KM area from the project boundary and same is provided in Form-1. The alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors.

57. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors.

58. This is outside the scope of the EIA report for the proposed project.

59. This is outside the scope of the EIA report for the proposed project.

60. Yes, the present proposal will include the indigenous species.

61. STP will be part of ETP and same is shown in the layout map provided in the EIA report.

62. The sewage sludge will be utilized as manure for the greenbelt.

63. The sewage sludge will be used within the plant itself and the particulars will be available post detail engineering.

64. The plant will be designed for Zero Liquid Discharge. The rejects from the RO plant will be sent to multi-effect evaporator. There is no discharge of any treated water into sea. Preliminary water balance diagram is given in figure-2.2 of the EIA report.

65. Reject from secondary stage RO containing higher TDS will be sent to multi-effect evaporator where water will be separated and re-used and salts (mainly calcium) will be stored in the SLF within the project area.

66. Tail gas scrubbers will be installed to scrub residual gases from Sulphuric Acid Plant to produce Gypsum used in cement industries and high efficiency gas scrubbers will be installed in Phosphoric Acid Plant to produce Hydro Fluro Silicic acid which is used in manufacturing of Aluminum Fluoride.

67. Copper slag can be used as a building material (added in concrete as well as in ready mix), road construction and shot blasting. The same is covered in EIA report. As per MoEF&CC notification dated 4th April, 2016, copper slag does not fall under

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hazardous waste category and separate guidelines on the management of copper slag will be issued by CPCB separately and same is awaited.

68. Phosphogypsum is used for cement manufacturing, gypsum board manufacturing and fertilizer. The same is covered in EIA report. The "Guidelines for Management, Handling, Utilisation and Disposal of Phosphogypsum Generated from Phosphoric Acid Plants" published by CPCB is available online at: http://cpcb.nic.in/wast/hazardouswast/GuidelineforM,H,Utili&%20DisposalofPhosphogypsumfromPAPlants.pdf

69. An area of 30 acres has been demarcated for the SLF and shown in the plant layout in Chapter-2 of the EIA report, which takes care of the generated ETP cake and scrubber cake.

70. Reply is as per point no. 69 above.

71. Total area required for the plant is 256.58 ha. Three alternative sites were proposed. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. The site selection criteria and the study of alternate sites are detailed in chapter-5 of EIA report.

72. Project area includes forest land for which APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. The proposed project site is away from biodiversity heritage site as proposed by Gujarat State Biodiversity Board. However, project will be implemented by taking all environmental safeguards.

73. Total area required for the plant is 256.58 ha. Three alternative sites were proposed. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. The site selection criteria and the study of alternate sites are detailed in chapter-5 of EIA report.

74. ETP cake and scrubber cake will be stored in the secured land fill (SLF). An area of 30 acres has been demarcated for the SLF and shown in the plant layout in Chapter-2 of the EIA report. Storage of copper slag, phosphogypsum and SLF is proposed within the project boundary. The proposed project site is outside CRZ. Forest clearance for the forest land in the proposed project has been applied. Environment clearance is under progress.

75. The preliminary composition of the waste generated such as scrubber cake and ETP cake is provided in Chapter-2 of EIA report.

76. ETP cake will be stored in SLF. Secured land fill is proposed to be developed over an area of 30 acres within the proposed project area. SLF will be constructed and

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operated as per the CPCB guidelines for treatment, storage and disposal facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done. Monitoring of environmental parameters will also be carried out. Therefore, there are no possibilities of contamination of ground water.

77. Total area required for the plant is 256.58 ha. Forest land requirement is part of the total land estimated for the project. Greenbelt requirement on 33% of the area is proposed and shall be complied as per EC conditions. For the compensatory afforestation for the forest land shall also done as per established procedure.

78. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Based on studies under EIA, ambient air quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.

79. Proposed project is outside CRZ area, therefore there is no question of reclamation of mudflats and mangroves. Project will be implemented with all environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.

80. Map showing the study area with satellite imagery and land use map are shown in in the Chapter-3 of the EIA report. Authorized CRZ map is also provided in figure-1.5 of Chapter-1 of EIA report. Mangroves are present at 100 m away in the southern side of the project area.

81. This is outside the scope of the EIA report for the proposed project.

82. The proposed project site is outside CRZ. Forest clearance for the forest land in the proposed project has been applied. Environment clearance is under progress. Wild life clearance is not applicable for the proposed project.

83. This is outside the scope of the EIA report for the proposed project.

84. This is outside the scope of the EIA report for the proposed project.

85. Proposed project is outside CRZ. Project is developed on notified SEZ area and forest land for which clearance is under progress. No reclamation is proposed in the proposed project activity.

86. This is outside the scope of the EIA report for the proposed project.

87. This is outside the scope of the EIA report for the proposed project.

88. The impact analysis has been carried out for the proposed project as per TOR granted by MoEF&CC in which baseline conditions are monitored and prediction of

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impacts has been carried out with respect to proposed project activity. The details have been provided in Chapter-4 of the EIA report.

89. EIA studies have been carried based on TOR granted by MoEF&CC. Project will be implemented after obtaining required permissions and compliance will be done based on permissions granted.

90. Representations received from fishing community were addressed during public hearing as well as in written responses. There are no complaints or grievances from the fishing community for the proposed project activity.

91. Project is located in notified SEZ area. APSEZ has obtained EC and CRZ clearances from MoEF&CC vide their letter dated 15th July, 2014 for multi-product SEZ at Mundra. Proejct area also includes forest land for which APSEZ is in the process of obtaining forest clearance. Wild life clearance is not applicable.

92. Reply is as per point no. 91 above.

93. This is outside the scope of the EIA report for the proposed project.

94. This is outside the scope of the EIA report for the proposed project.

95. The impacts due the additional traffic of the proposed project have been considered while calculating the cumulative impact and the details are available in Chapter 4 of the EIA report. There will not be any significant impact due to increase of traffic due to proposed project.

96. The impacts due the additional traffic of the proposed project have been considered while calculating the cumulative impact and the details are available in Chapter 4 of the EIA report. Existing railway lines will be used based on requirement. Existing port facility available at west port and south port of APSEZ will be utilized for transportation of materials.

97. The plant design will be done considering seismic zone-V as per IS 1893 (part-1)-latest edition. Disaster management plan has been prepared and available in Chapter-7 of the EIA report.

98. Ecological study has been carried out during the study period by an EIA agency approved by QCI-NABET. The NABET certificate and personnel involved in the ecological study is available in Chapter-11 of the EIA report.

99. EIA studies have been carried based on TOR granted by MoEF&CC. Socio economic study has been carried out as part of EIA and same is available in Chapter-3 of the EIA report.

100. This is outside the scope of the EIA report for the proposed project. However, coordinates of the proposed project boundary are provided in Chapter-1 of the EIA report.

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101. All the infrastructural facilities like parking, washing, repairs and maintenance etc will be part of detail engineering and same will be carried out after obtaining required clearances.

102. Separate truck parking and rest rooms will be provided to the drivers and cleaners involved in the transportation of the raw material and end products.

103. The proposed plant will operate on Zero discharge concept. There is no discharge of any treated water into creeks or Gulf of Kachchh.

104. This is outside the scope of the EIA report for the proposed project.

105. The proposed project is outside CRZ area and no mangroves are present at the proposed project site.

106. The proposed project will be implemented in notified SEZ and forest land. The land terrain is gently sloping and no major cutting and filling for leveling of land will be involved. Impact on land environment is carried out and details are in chapter-4 of the EIA report.

107. The NABET certificate of the EIA consultant (NABET/EIA/1619/RA0043 Valid upto 19 May 2019) is provided in Chapter-11 of EIA report.

108. TOR granted by MoEF&CC vide their letter dated 21st June, 2016 has been followed for preparation of draft EIA report.

109. All documents have been provided in English. The representations received in local language will be translated into English and same will be authenticated.

110. This is outside the scope of the EIA report for the proposed project.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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સંદર્ભ: AEL/Copper/Mundra/EC/PH/ D-A-8

શ્રી ધર્મેશ મિસ્ત્રી
બ્લોક 14, હાઉસ નં 1340, નર્મદા એપાર્ટમેન્ટ
ભરૂચ, ગુજરાત.

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેક્ટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ અને પર્યાવરણીય રક્ષણ માટે નવીનતમ ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. સંકળાયેલા પર્યાવરણીય સલાહકારો QCI NABET માન્ય છે અને EIA સલાહકાર (NABET / EIA / 1619 / RA0043 19 મે 2019 સુધી માન્ય) નું પ્રમાણપત્ર ઇઆઇએ અહેવાલના પ્રકરણ -11 માં પૂરું પાડવામાં આવ્યું છે. વિમતા લેબ્સ દ્વારા રોકાયેલા નિષ્ણાત કામગીરી ક્ષેત્રની ટીમના નામો અને લાયકાતો અંતિમ ઇઆઇએ અહેવાલમાં દ્વારા પૂરા પાડવામાં આવશે
2. વિગતો ઉપરના મુદ્દા નં. 1 મુજબ છે.
3. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.
4. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.
5. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.
6. એનએબીઈટી અધિકૃત સલાહકાર દ્વારા ડ્રાફ્ટ ઇઆઇએ અહેવાલ તૈયાર કરવામાં આવ્યો છે અને તે જાહેર સુનાવણી માટે રજૂ કરવામાં આવ્યો છે. જાહેર સુનાવણી ઇઆઇએ (EIA) જાહેરનામા 2006 અને તેનાં અનુગામી સુધારા પર આધારિત છે. સાર્વજનિક સુનાવણી દરમિયાન જનતાની ચિંતાઓને ધ્યાન

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પર લેવામાં આવી છે અને તે અંતિમ ઇઆઇએ અહેવાલમાં સામેલ કરવામાં આવશે જે એનએબીઈટી અધિકૃત સલાહકાર દ્વારા પણ તૈયાર કરવામાં આવશે.

7. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.

8. વિગતો ઉપરના મુદ્દા નં. 1 મુજબ છે.

9. વિગતો ઉપરના મુદ્દા નં. 1 મુજબ છે.

10. ઇઆઇએ (EIA) નો અહેવાલ 2006 અને પછીના સુધારા મુજબ ઈઆઈઆઈ અહેવાલ તૈયાર કરવામાં આવ્યો છે. જાહેર સુનાવણી દરમિયાન પ્રોજેક્ટના પ્રસ્તાવના પ્રતિનિધિઓની ઓળખ કરવામાં આવી છે અને તેમને એમએમ (MOM) ના ભાગ તરીકે સામેલ કરવાની જરૂર નથી.

11. આ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે.

12. સૂચિત પ્રોજેક્ટ માટે જી.પી.સી.બી દ્વારા કોઈ કારણદર્શક નોટિસ અને સમાપન નોટિસ આપવામાં આવેલી નથી.

13. આ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે.

14. ઉત્પાદન પ્રક્રિયાના ભાગરૂપે ઓળખી કાઢવામાં આવેલા ઉત્તેજક જોખમી રસાયણો માટે જોખમ વિશ્લેષણ હાથ ધરવામાં આવ્યું છે. તે અનુસૂચિ 9 માં આપવામાં આવેલ છે અને પ્રારંભિક હેઝાર્ડ વિશ્લેષણ ઇઆઇએ અહેવાલના પ્રકરણ -7 માં આપવામાં આવ્યું છે. ઇઆઇએ અહેવાલમાં ઉપશમનને લગતા પગલાઓ સૂચવવામાં આવ્યા છે અને તેમને ચૂસ્તપણે અમલમાં મૂકવામાં આવશે. ઇઆઇએ અહેવાલના ભાગ રૂપે આપત્તિ વ્યવસ્થાપન યોજનાની પણ દરખાસ્ત મૂકવામાં આવેલ છે.

15. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.

16. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.

17. સૂચિત યોજનાના ભાગ રૂપે 33% વિસ્તારમાં ગ્રીનબેલ્ટ વિકસાવવામાં આવશે. વાવેતરના પ્રકારની વિગતો ઇઆઇએ અહેવાલના પ્રકરણ -4 ને આપવામાં આવેલી છે. પ્રોજેક્ટના અમલીકરણના તબક્કા દરમિયાન છોડ વાવવાની પ્રવૃત્તિ હાથ ધરવામાં આવશે.

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18. ઇએસી, એમઓઈએફ અને સીસી દ્વારા મંજૂર કરેલી શરતો (ટીઓઆર)નું પાલન કરવામાં આવે છે અને ઇઆઇએ અહેવાલના અનુસૂચિ -1 માં પાલનની શરતો જણાવવામાં આવેલી છે.

19. વિગતો ઉપરના મુદ્દા નં. 18 મુજબ છે.

20. સૂચિત યોજનાના ભાગ રૂપે કોઈ ખાનગી જમીન સંપાદનની યોજના નથી

21. સૂચિત પ્રોજેક્ટ માટે પાત્રતા મુજબ સ્થાનિક લોકોને રોજગારી આપવામાં આવશે..

22. સૂચિત પ્રોજેક્ટ સામે કોઈ કેસ બાકી નથી. ઉઠાવવામાં આવેલા મુદ્દાઓ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહારના છે.

23. તમારા પત્રમાં ઉઠાવવામાં આવેલા મુદ્દાઓ સૂચિત પ્રોજેક્ટ સાથે સંબંધિત નથી. આ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે.

24. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.

25. આ સૂચિત પ્રોજેક્ટ માટે ઈઆઈએ રિપોર્ટના કાર્યક્ષેત્રની બહાર છે.

26. જાહેર સુનાવણી ઇઆઇએ (EIA) જાહેરનામા 2006 અને તે પછીના સુધારા પર આધારિત છે.

27. અભ્યાસના વિસ્તાર માટે વસ્તી ગણતરીના 2011ના આંકડા પર આધારીત જનસંખ્યક માહિતી ઇઆઇએ અહેવાલના પ્રકરણ -3 માં આપવામાં આવી છે; જો કે તે જાણવું શક્ય નથી કે કેટલા લોકો અંગ્રેજી સમજી શકે છે.

28. અભ્યાસના વિસ્તાર માટે વસ્તી ગણતરીના 2011ના આંકડા પર આધારીત જનસંખ્યક માહિતી ઇઆઇએ અહેવાલના પ્રકરણ -3 માં આપવામાં આવી છે.

29. અભ્યાસના વિસ્તાર માટે વસ્તી ગણતરીના 2011ના આંકડા પર આધારીત જનસંખ્યક માહિતી ઇઆઇએ અહેવાલના પ્રકરણ -3 માં આપવામાં આવી છે.

30. સૂચિત પ્રોજેક્ટ માટે જોખમ વિશ્લેષણ હાથ ધરવામાં આવ્યું છે. જે અનુસૂચિ 9 માં આપવામાં આવેલ છે અને પ્રારંભિક જોખમ વિશ્લેષણ ઇઆઇએ અહેવાલના પ્રકરણ -7 માં આપવામાં આવ્યું છે. ઇઆઇએ અહેવાલમાં ઉપશમનને લગતા પગલાઓ સૂચવવામાં આવ્યા છે અને તેમને ચૂસ્તપણે અમલમાં

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મૂકવામાં આવશે. ઇઆઇએ અહેવાલના ભાગ રૂપે આપત્તિ વ્યવસ્થાપન યોજનાની પણ દરખાસ્ત મૂકવામાં આવેલ છે.

31. વિગતો ઉપરના મુદ્દા નં. 30 મુજબ છે.

32. કન્સલ્ટન્ટની જવાબદારી એમઓઈએફ અને સીસી દ્વારા મંજૂર કરાયેલ ટીઓઆર મુજબ ઇઆઇએ અહેવાલ તૈયાર કરવાની છે

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના અમલીકરણ અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,

અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)

અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/ **D-A-8**

Shri Dharmesh Mistri
Block 14, House No 1340, Narmada Apartment
Bharuch, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. The environmental consultants engaged are QCI NABET approved and the certificate of the EIA consultant (NABET/EIA/1619/RA0043 Valid upto 19 May 2019) is provided in Chapter-11 of EIA report. Names and Qualifications of the team of functional area experts engaged by Vimta Labs will be provided in the final EIA report.
2. Details are as per point no. 1 above.
3. This is outside the scope of EIA report for the proposed project.
4. This is outside the scope of EIA report for the proposed project.
5. This is outside the scope of EIA report for the proposed project.
6. The draft EIA report has been prepared by NABET accredited consultant and same was submitted for public hearing. The public hearing is conducted based on the EIA notification 2006 and its subsequent amendments. The concerns of public have been addressed during public hearing and same will be incorporated in the final EIA report which will also be prepared by NABET accredited consultant.
7. This is outside the scope of EIA report for the proposed project.
8. Details are as per point no. 1 above.
9. Details are as per point no. 1 above.
10. EIA report has been prepared as per EIA notification 2006 and subsequent amendments. During public hearing the identification of representatives from project proponent has been made and it is not required to include them as part of the MOM.
11. This is outside the scope of EIA report for the proposed project.

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12. No show cause notice and closure notice issued by GPCB for proposed project.
13. This is outside the scope of EIA report for the proposed project.
14. Risk analysis has been carried out for identified representative hazardous chemicals as part of the manufacturing process. Same has been provided in Annexure-9 and Preliminary Hazard Analysis is provided in Chapter-7 of the EIA report. Mitigation measures have also been suggested in the EIA report and same will be strictly implemented. Disaster management plan is also proposed as part of the EIA report.
15. This is outside the scope of EIA report for the proposed project.
16. This is outside the scope of EIA report for the proposed project.
17. As part of the proposed project, greenbelt will be developed in 33% area. Details of type of plantation are given Chapter-4 of the EIA report. Plantation activity will be carried out during the implementation phase of the project.
18. Terms of Reference (TOR) granted by EAC, MOEF&CC has been complied and compliance is provided in Annexure-1 of the EIA report.
19. Details are as per point no. 18 above.
20. No private land acquisition is planned as part of the proposed project.
21. Local employment will be provided for proposed project based on eligibility.
22. There are no cases pending against the proposed project. The points raised are outside the scope of EIA report for the proposed project.
23. The points raised in your letter are not relevant to the proposed project. This is outside the scope of EIA report for the proposed project.
24. This is outside the scope of EIA report for the proposed project.
25. This is outside the scope of EIA report for the proposed project.
26. The public hearing is conducted based on the EIA notification 2006 and its subsequent amendments.
27. Demographic details based on census data 2011 for the study area are provided in Chapter-3 of the EIA report; however it is not possible to know exactly how many people are able to understand English.
28. Demographic details based on census data 2011 for the study area are provided in Chapter-3 of the EIA report.
29. Demographic details based on census data 2011 for the study area are provided in Chapter-3 of the EIA report.

PAA

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30. Risk analysis has been carried out for the proposed project. Same has been provided in Annexure-9 and Preliminary Hazard Analysis is provided in Chapter-7 of the EIA report. Mitigation measures have also been suggested in the EIA report and same will be strictly implemented. Disaster management plan is also proposed as part of the EIA report.

31. Details are as per point no. 30 above.

32. Consultant's responsibility is to prepare EIA report as per TOR granted by MOEF&CC.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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Ref: AEL/Copper/Mundra/EC/PH/ **D-A-9**

Smt Sonbaiben Punshi Gadhvi
Sarpanch, Mota Bhadiya Gram Panchayat
Village: Mota Bhadiya, Taluka Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Madam,

We acknowledge the receipt of your representation and have noted your concerns.

We assure you that all the environmental safeguards will be put into place before operation of the project. There are many such projects operating in the world, including the developed countries. We will also be adopting the latest technology for pollution control. We are confident of operating this plant with all the safeguards to mitigate the pollution.

Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We assure you that all the environmental standards will be complied during plant implementation and operation.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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રેફ : AEL/Copper/Mundra/EC/PH/ **D-A-9**

શ્રીમતી સોનબાઈબેનપુંશીગઢવી
સરપંચ, મોટા ભાડીયા ગ્રામ પંચાયત
ગામ: મોટભાડીયા, તાલુકા માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી પહેલાં બધી પર્યાવરણીય સલામતીઓનો અમલમાં મૂકવામાં આવી છે. વિકસિત દેશો સહિત, વિશ્વમાં કાર્યરત આવા ઘણાં બધાં પ્રોજેક્ટ્સ છે. અમે પ્રદૂષણ નિયંત્રણ માટે નવીનતમ ટેકનોલોજી પણ અપનાવીશું. અમે પ્રદૂષણને ઘટાડવા માટે તમામ સલામતિઓ સાથે આ પ્લાન્ટને સંચાલિત કરવા માટે વિશ્વાસ રાખીએ છીએ.

લાયકાતના આધારે આ પ્રોજેક્ટમાં રોજગાર માટે સ્થાનિક લોકોને પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવા માટે એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની એક યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

અમે ખાત્રી આપીએ છીએ કે પ્લાન્ટના અમલીકરણ અને કામગીરી દરમિયાન તમામ પર્યાવરણીય ધોરણોનું પાલન કરવામાં આવશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

P.A.Suryavanshi

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/ **D-A-10**

Shri Abdul Rehman Jusab Turk
Sarpanch, Dhrub Gram Panchayat
Village Dhrub, Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-10

શ્રી અબ્દુલ રહેમાન જુસબ તુર્ક
સરપંચ, ધુબ ગ્રામ પંચાયત
ગામ ધુબ, મુંદ્રા
જિલ્ કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/ **D-A-11**

Shri
Sarpanch, Siracha Gram Panchayat
Taluka-Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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1706

રેફ : AEL/Copper/Mundra/EC/PH/**D-A-11**

શ્રી
સરપંચ, સિરાચા ગ્રામ પંચાયત
તાલુકા-મુંદ્રા
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.૪.૦ કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

Adani Enterprises Ltd
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Ref: AEL/Copper/Mundra/EC/PH/ **D-A-12**

Shri Punshi Khetshi Turiya (Gadhvi)
Member, Taluka Panchayat (Mandvi - Kutchh)
At & Post Bhadiya, Taluka Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

Adani Enterprises Ltd
Adani House,
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1708

રેફ : AEL/Copper/Mundra/EC/PH/ D-A-12

શ્રી પન્શી ખતેશી તુરિયા (ગઢવી)
સભ્ય, તાલુકા પંચાયત (માંડવી - કચ્છ)
ગામ ભડીયા, તાલુકા માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

Adani Enterprises Ltd
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Registered Office : Adani House, Nr. Mithakhali Circle, Navrangpura, Ahmedabad 380 009, Gujarat, India

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-13

Shri Punshi Khetshi Turiya (Gadhvi)
Member, Taluka Panchayat (Mandvi - Kutchh)
At & Post Bhadiya, Taluka Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-13

શ્રી પન્શી ખતેશી તુરિયા (ગઢવી)
સભ્ય, તાલુકા પંચાયત (માંડવી - કચ્છ)
ગામ ભડીયા, તાલુકા માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

Adani Enterprises Ltd
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Ref: AEL/Copper/Mundra/EC/PH/ D-A-14

Smt Valbai Shamji
Sarpanch, Shri Nana Kapaya Juth Gram Panchayat
Cluster Villages: Nana Kapaya, Borana
Village: Nana Kapaya, Tal. Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Madam,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-14

શ્રીમતી વાલબાઈ શામજી
સરપંચ, શ્રી નાના કપાયા જૂથ ગ્રામ પંચાયત
જૂથ ગામો: નાનાકપાયા, બોરાના
ગામ: નાના કપાયા, તા. મુંદ્રા
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

P.A.Suryarao

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-15

Smt Bai Rajbha Lakhubha Jadeja
Sarpanch, Shri Tragadi Gram Panchayat
At & Post: Tragadi, Tal. Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Madam,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-15

શ્રીમતી બાઈ રાજભા લખુભા જાડેજા
સરપંચ, શ્રી ત્રાગડી ગ્રામ પંચાયત
ગામ: ત્રાગડી, તા. માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

Adani Enterprises Ltd
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Ref: AEL/Copper/Mundra/EC/PH/ D-A-16

Shri Atul Pandya,
President, Rotary Club of Mundra
Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-16

શ્રી અતુલ પાંડ્યા,
પ્રમુખ, રોટરી ક્લબ ઓફ મુંદ્રા
મુંદ્રા
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-17

Shri
Karvan-E-Mustafa, Medical and Educational Trust
Near Jama Masjid, Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-17

શ્રી
કારવાં-એ-મુસ્તફા, મેડિકલ એન્ડ એજ્યુકેશનલ ટ્રસ્ટ
જામા મસ્જિદની નજીક, મુંદ્રા
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.૪.૦ કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

P A Suryarao

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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1930

Ref: AEL/Copper/Mundra/EC/PH/ D-A-18

Shri President
Lions Club of Mundra City
Poonam Arcade, Baroi Road
Mundra, Dist- Kutchh
Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-18

શ્રી રાષ્ટ્રપતિ
લાયન્સ ક્લબ ઓફ મુન્દ્રા સિટી
પૂનમ આર્કેડ, બરોઈ રોડ
મુંદ્રા, જિ. કચ્છ
ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.૪.૦ કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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adani

1932

Ref: AEL/Copper/Mundra/EC/PH/ D-A-19

Shri R. M. Sama
Proprietor, Mystical Corporation
Rajivia Complex, Baroi Road
Mundra, Dist- Kutchh
Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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1933

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1722

રેફ : AEL/Copper/Mundra/EC/PH/ D-A-19

શ્રી આર. એમ. સમા
પ્રોપ્રાઈટર, મિસ્ટિકલ કોર્પોરેશન
રાજીવિયા કોમ્પલેક્ષ, બારોઈ રોડ
મુંદ્રા, જિ. કચ્છ
ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.૪.૦ કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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adani

1934

Ref: AEL/Copper/Mundra/EC/PH/ D-A-20

Shri
K.G.N Construction, Village Tragadi
Taluka Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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1724

રેફ : AEL/Copper/Mundra/EC/PH/ D-A-20

શ્રી
કે.જી.એન. કન્સ્ટ્રકશન, ગામ ત્રાગડી
તાલુકા માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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1936

રેફ : AEL/Copper/Mundra/EC/PH/ D-A-21

શ્રી દયા રણશી ગઢવી
ગામ-ઝારપરા,
તાલુકા-મુંદ્રા
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેક્ટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

Adani Enterprises Ltd
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1937

adani

1726

Ref: AEL/Copper/Mundra/EC/PH/ D-A-21

Shri Daya Ranshi Gadhvi
Village-Zarpara,
Taluka-Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Gujarat, India
CIN: L51100GJ1993PLC019067

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1938

રેફ : AEL/Copper/Mundra/EC/PH/ D-A-22

શ્રી ગઢવી કલ્યાણ
રાષ્ટ્રપતિ, શ્રી બૂટ ભવાની ખેડૂત મંડલ
મોટો ભડિયા
તાલુકા-માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેક્ટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

Adani Enterprises Ltd
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1939

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-22

Shri Gadhvi Kalyan
President, Shri But Bhavani Khedut Mandal
Mota Bhadiya
Taluka-Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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1940

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-23

શ્રી
મિથાની એન્ટરપ્રાઇઝ
તાલુકા-મુંદ્રા
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.૪.૦ કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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1941

adani

Ref: AEL/Copper/Mundra/EC/PH/ D-A-23

Shri
Mithani Enterprise
Taluka-Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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1942

adani

રેફ : AEL/Copper/Mundra/EC/PH/ D-A-24

શ્રી એમ. એલ. બારૈયા
ડીરેક્ટર, વિવેકાનંદ રૂરલ ડેવલપમેન્ટ ઈન્સ્ટીટયુટ
જૈન આશ્રમ નજીક, માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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1732

Ref: AEL/Copper/Mundra/EC/PH/ D-A-24

Shri M. L. Baraiya
Director, Vivekananda Rural Development Institute
Near Jain Ashram, Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

The project will also provide various business opportunities as mentioned by you. We will be happy to support the same.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-25

Shri Salim Hasan
President, Ekta Machhimar Seva Vikas Samiti
Tragadi Bundar, Gundiyali
Taluka-Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-25

શ્રી સલીમ હસન
પ્રમુખ, એકતા મચ્છિમાર સેવા વિકાસ સમિતિ
ત્રાગડી બંદર, ગુન્દિયાલી
તાલુકા-માંડવી
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આ પ્રોજેક્ટ તમારા દ્વારા ઉલ્લેખિત વિવિધ વ્યવસાયની તકો પણ આપશે. અમે તેને સમર્થન આપવા માટે ખુશી અનુભવીશું

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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સંદર્ભ: AEL/Copper/Mundra/EC/PH/ D-A-26

શ્રી ડાયાભાઈ ગઢવી
ગામ કંદગ્રા, તાલુકા મુંદ્રા
જિલ્લો: કચ્છ ,ગુજરાત.

વિષય: અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. વિકસિત દેશો સહિત વિશ્વમાં ઘણા આવા ઘણા પ્રોજેક્ટ્સ છે. તમારા દ્વારા ઉલ્લેખ કરાયેલાં ભય કોઈ પણ છોડમાં ક્યારેય બન્યાં નથી. અમે પ્રદૂષણને ઘટાડવા માટે તમામ સલામતીઓ સાથે આ પ્લાન્ટને સંચાલિત કરવાનો વિશ્વાસ રાખીએ છીએ. અમે પ્રદૂષણ નિયંત્રણ માટે નવીનતમ ટેકનોલોજી પણ અપનાવીશું.:
આપના દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓના પેરાવાઇઝ જવાબ અમો અત્રે આપી રહ્યા છીએ.

1. હવા અને જળ પ્રદૂષણ ઘટાડવા માટેનાં તમામ પગલાંઓ અપનાવવામાં આવશે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી.

2. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાંટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે. સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્બ્બિંગ પછી, ચીમનીમાથી છોડવામાં આવશે. સ્ટેક દ્વારા બાકી રહેલા વાયુઓને છોડતાં પહેલાં, હાઈડ્રો ફ્લુરો સિલિકિક એસિડનું ઉત્પાદન કરવા હાઈડ્રોજન ફ્લુરાઇડને સ્કબ કરવા માટે ફોસ્ફોરિક એસિડ પ્લાન્ટમાં ઉચ્ચ કાર્યક્ષમતાવાળા ગેસ સ્કબર્સ ઈન્સ્ટોલ કરવામાં

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આવશે. આ પ્રોજેક્ટના ભાગ રૂપે સૂચિત વિવિધ સ્ટેક્સ /વેન્ટ્સ છોડતા ઉત્સર્જનો, સેન્ટ્રલ પોલ્યુશન કંટ્રોલ બોર્ડ (CPCB) ના નિર્ધારિત ધોરણોને પૂર્ણ કરશે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે.

3. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ દ્વારા લાગુ કરવામાં આવશે. સૂચિત પ્લાન્ટમાંથી ઉત્પન્ન થયેલ કચરો સિક્યોર્ડ લેન્ડ ફિલ (એસએલએફ) માં સંગ્રહિત કરવામાં આવશે, જે સૂચિત પ્રોજેક્ટ વિસ્તારની અંદર 30 એકર વિસ્તારમાં વિકસાવવામાં આવશે. સારવાર, સંગ્રહ અને નિકાલની સુવિધા (ટીએસડીએફ) માટે CPCB માર્ગદર્શિકા મુજબ એસએલએફ નિર્માણ અને સંચાલન કરવામાં આવશે. તેની ક્ષમતા મુજબ ભરાઈ ગયા પછી, એસએલએફને ઉપરથી ઢાંકી દેવામાં આવશે અને સોઈલ કવર ફેલાવી દેવામા આવશે અને ઉછેરકામ કરવામાં આવશે. પર્યાવરણીય પરિમાણોનું મોનિટરિંગ પણ હાથ ધરવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો વૈધાનિક મર્યાદાની અંદર હશે.

4. લાયકાતના આધારે આ પ્રોજેક્ટમાં રોજગાર માટે સ્થાનિક લોકોને પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવા માટે એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની એક યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-26

Shri Dayabhai Gadhvi
Village Kandagra, Taluka Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. There are many such projects in the world, including the developed countries. The apprehensions mentioned by you have never happened at any of the plants. We are confident of operating this plant with all the safeguards to mitigate the pollution. We will also be adopting the latest technology for pollution control.

We are herewith responding para wise to the issues raised by you:

1. All measures for mitigating the air & water pollution will be adopted. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem.
2. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing. High efficiency gas scrubbers will be installed in Phosphoric Acid plant to scrub Hydrogen Fluoride to produce Hydro Fluro Silicic Acid before releasing the residual gases through the stack. The emissions leaving the various stacks/ vents proposed as part of this project will be meeting the prescribed norms of Central Pollution Control Board (CPCB). Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.
3. The project will be implemented with Zero Liquid Discharge. Waste produced from the proposed plant will be stored in Secured Land Fill (SLF) which will be developed over the area of 30 Acres within the proposed project area. SLF will be constructed and

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operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done. Monitoring of environmental parameters will also be carried out. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits.

4. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-27

Shri Ashariya Lakha
Kapuriya Wadi,
Village: Zarpara, Taluka Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We are submitting para wise response to the issues raised by you:

1. Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. No streams will be closed or blocked by the project.

2. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.

3. All measures for mitigating the air & water pollution will be adopted. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem.

4. The project is estimated to emit 0.53 Million Tons of CO2 equivalent of GHG per year from proposed project which is insignificant in the context of Local or Global Warming. Heat available from the plant process will be converted to produce power with the waste heat recovery boiler as well as hot water for plant process requirements.

5. All measures for mitigating the air & water pollution will be adopted. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality

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Standards and thus not expected to have any long term impact on the surrounding ecosystem.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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સંદર્ભ: AEL/Copper/Mundra/EC/PH/ D-A-27

શ્રી અશારીય લખા
કપૂરીયાવાડી,
ગામ: ઝારપરા, તાલુકા મુંદ્રા
જિલ્લો: કચ્છ ,ગુજરાત.

વિષય: અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

1. અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. આપના દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓના પેરાવાઇઝ જવાબ અમો અત્રે આપી રહ્યા છીએસૂચિત સાઇટના પશ્ચિમ ભાગમાં ધનેશ્વરી, મોસમી નદી વહે છે. ઇઆઇએ અહેવાલના પૃષ્ઠ C2-3 પરના પ્લાન્ટ લેઆઉટમાં દર્શાવ્યા મુજબ નદીના પ્રવાહને જાળવવામાં આવશે. પ્રોજેક્ટ દ્વારા કોઈપણ વહેણ બંધ અથવા બ્લોક કરવામાં આવશે નહીં

2. ઈ.આઈ.એ.ના ભાગરૂપે વનસ્પતિ અને પ્રાણીસૃષ્ટિનો અભ્યાસ હાથ ધરવામાં આવ્યો છે અને મેનેજમેન્ટ પ્લાન ઇઆઇએ અહેવાલમાં પણ આપવામાં આવ્યો છે. વન મંજૂરીની તમામ શરતો એકવાર મેળવી લેવામાં આવે પછી, જંગલની જમીનના માર્ગાંતરને કારણે અસર ઘટાડવા અમલ કરવામાં આવશે. તમામ કાર્યપદ્ધતિઓ પૂર્ણ કર્યા બાદ અને એમઓઇએફ અને સીસી દ્વારા મંજૂર કર્યા પછી રાજ્ય સરકાર દ્વારા વન માર્ગાન્તરની ભલામણ કરી શકાય છે.

3. હવા અને જળ પ્રદૂષણ ઘટાડવા માટેનાં તમામ પગલાંઓ અપનાવવામાં આવશે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી.

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4. પ્રસ્તાવિત પ્રોજેક્ટમાંથી દર વર્ષે જીએચજીના 0.53 મિલિયન ટન CO2 સમકક્ષ સીએમએસનું સ્રાવ બહાર કાઢવાનું અનુમાન છે, જે સ્થાનિક અથવા ગ્લોબલ વોર્મિંગના સંદર્ભમાં નજીવું છે. વનસ્પતિ પ્રક્રિયામાંથી ઉપલબ્ધ ગરમી પ્લાન્ટની પ્રક્રિયા આવશ્યકતાઓ માટે વેસ્ટ હીટ રિકવરી બોયલર તેમજ ગરમ પાણી સાથે ઉર્જા પેદા કરવા માટે રૂપાંતરિત કરવામાં આવશે.

5. હવા અને જળ પ્રદૂષણ ઘટાડવા માટેનાં તમામ પગલાંઓ અપનાવવામાં આવશે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-28

Shri Girish D Nagda
CEO, Bhagwan Mahavir Pashu Raksha Kendra
Pragpur Road Junction
Taluka-Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your appreciation to the efforts of Adani Group for development of the area.

We assure you that we will continue to comply with environmental standards set by state pollution control board/ central pollution control board for proposed copper refinery project.

As part of improving employability within local youth, there is a plan to set up a Skill Development Centre through Adani Foundation. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

We thank you for your support and would like to continue our engagement with the community for development of the area.

Thanking you,
For Adani Enterprises Ltd,

P.A. Suryarao

(Prasad Suryarao)
Authorized Signatory

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રેફ : AEL/Copper/Mundra/EC/PH/ D-A-28

શ્રી ગિરીશ ડી નાગડા
સી.ઓ.ઈ., ભગવાન મહાવીર પશૂરક્ષા કેન્દ્ર
પ્રાગપુર રોડ જંક્શન
તાલુકા-મુંદ્રા
જી કચ્છ, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને વિસ્તારના વિકાસ માટે અદાણી જૂથના પ્રયત્નો માટે તમારા ઉચ્ચ અભિપ્રાય ની નોંધ લીધી છે.

અમે તમને ખાતરી આપીએ છીએ કે અમે સૂચિત કોપર રિફાઇનરી પ્રોજેક્ટ માટે રાજ્ય પ્રદૂષણ નિયંત્રણ બોર્ડ / સેન્ટ્રલ પ્રદૂષણ નિયંત્રણ બોર્ડ દ્વારા સ્થાપિત પર્યાવરણીય ધોરણોનું પાલન કરવાનું ચાલુ રાખીશું.

સ્થાનિક યુવાનોની રોજગારીમાં સુધારો કરવાના ભાગ રૂપે, અદાણી ફાઉન્ડેશન દ્વારા.એક કૌશલ્ય વિકાસ કેન્દ્રની સ્થાપના કરવાની યોજના છે. સ્થાનિક સમુદાયના વિકાસ માટે અદાણી ફાઉન્ડેશન દ્વારા કોર્પોરેટ સોશિયલ રિસ્પોન્સિબિલિટી હેઠળ વાર્ષિક રૂ.8.0 કરોડના બજેટની જોગવાઇ કરવામાં આવી છે. હસ્તક્ષેપના વિસ્તારોમાં શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, ટકાઉ આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ હશે.

અમે તમારા સમર્થન માટે તમારો આભાર માનીએ છીએ અને વિસ્તારના વિકાસ માટે સમુદાય સાથે અમારી પ્રતિબદ્ધતા જાળવી રાખવા માગીએ છીએ.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-29

Shri Naran Gadhavi
Kheti Vikas Seva Trust (R.G no. Gujarat/2030/Kutch)
Village: Zarpara, Tal: Mundra
Dist-Kutch-370405

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1. Proposed project area is devoid of mangroves. There is no question of mangrove destruction.

2. Impact Assessment has been carried out covering 10 km area surrounding the project site and it includes water bodies (if any), local residents and villages. There is no proposal of closing any creeks.

3. There are no sand dunes in the proposed project site. Hence, there is no question of demolition of sand dunes.

4. No fishermen will be impacted due to proposed project and will have no impact on fisheries.

   Project will be implemented with all the environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.

5. Project will be implemented with all the environmental safeguards. There is no proposal of using groundwater for the proposed project. Water requirement for the proposed project will be supplied through desalination plant of APSEZ.

   The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for Air and Water and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

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6. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

7. Proposed project will directly source the copper concentrate from outside which will be transported through state of art pipe conveying method. Thus, the process in this plant will directly start from smelting and will not involve mining, commination operation, floatation, etc. Project will be implemented with all environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems. The proposed project is based on Zero liquid discharge system and hence there will be no discharge of any effluent outside the proposed project boundary.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Ref: AEL/Copper/Mundra/EC/PH/D-A-30

Shri Mahesh Pandya
Paryavaran Mitra (Regd No. E/20934/Ahmedabad)
502, Raj Avenue, Bhaikaka Nagar Road
Nr. Thaltej Cross Road, Thaltej
Ahmedabad-380059

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. The previous land use of the proposed project has been converted to Industrial by APSEZ and APSEZ has consented to allot this land to AEL.

   Present land use of the land for proposed project is 154.18 ha (381 acres) of APSEZ land (Land allotment letter is enclosed as Annexure-III in EIA Report) and 102.38 ha (253 acres) of Forest land (Stage-I Forest clearance in process) which is State Govt. has recommended for Forest Clearance (FC) and is at Central Government [File number is 8-04/2016-FC].

2. Reply is as per point no. 1 above.

3. The online application for prior EC (application No: IA/GJ/IND/53004/2016: Form-1 and Pre-Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April, 2016 and same was reviewed by the Expert Appraisal Committee (Industry I) held during 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. The Environmental Clearance is under process.

4. After receiving Environment Clearance from MOEF&CC. The necessary NOC (Consent to Establishment (CTE) or Consent to Operate (CTO) form GPCB shall be applied, as applicable.

5. The Forest Clearance is still under process. The details are available on the website of MoEF & CC (File No. 8-04/2016-FC).

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Based on the survey which was carried out by Centre for Earth Science Studies (CESS, Thiruvanantpuram), which is an authorized agency by MoEF&CC, the proposed project site is outside CRZ and doesn't attract CRZ clearance.

6. Proposed project area is devoid of mangroves. There is no question of mangrove destruction.

7. The anticipated impacts and mitigation measures during construction and operation phase is given in Chapter-4 of EIA report.

8. The monitoring is conducted during 1st October, 2016 to 31st December 2016, is the study period for the Environmental Baseline data collection. The location and Ambient Air Quality and levels are given in Annexure-VI of EIA Report. All the environmental attributes such as sampling of air quality, water sampling (ground and surface), noise levels, and soil quality were carried out during the study period.

9. The coal will be sourced from the local market and transported through trucks. Around 3000 tonnes of coal will be stored. Further details of fuel consumption quantity and source are given in Table-2.5 of Chapter-2 (Project Description).

10. The question is not relevant and therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to the permissions granted.

11. Maximum domestic and service water requirement for the proposed project is 1000 KLD. The final requirement will be re-assessed during detail engineering.

12. The process details and schematic flow diagram of ETP is given in Figure-2.20 of Chapter-2.

13. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.

14. The solid waste generation (quantity and mode of disposal) and waste characteristic is presented in Chapter-2 of the EIA report. The Secured Land Fill (SLF) is proposed over 30 acres within the project premises for disposal of ETP waste sludge and spent catalyst. Other Hazardous waste will be disposed through the approved recyclers.

15. Details on potential employment are mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.

16. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation.

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The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

17. Reply is as per point no. 16 above.

18. Environment management cell structure has been provided in Chapter-9 of the EIA Report who will be responsible for implementation of EMP.

19. In the matter of Sunita Narain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015.

20. This is outside the scope of the EIA report for the proposed project.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Ref: AEL/Copper/Mundra/EC/PH/D-A-31

Shri Ibrahim Abdulkadar Turk
Jamadarwadi, At Post Dhrab Taluka Mundra
Dist Kutch 370421

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. The alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors.

   Project area includes forest land also for which APSEZ has applied for Forest clearance and same is under process. As a process, State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance.

   As per OM of MoEF&CC, after making an application for forest land project proponent can apply for obtaining ToR for the proposed project and proceed with the precedures as per EIA notification 2006 and subsequent amendements. Same is complied fully.

2. As a process, State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. Compliance will be done as per forest clearance and Compensatory afforestation for the forest land will be done as per established procedure.

3. Proposed project layout is superimposed on CRZ map of the area prepared by authorized agency of MOEF&CC as per CRZ notification 2011 and same is provided in Chapter-1 of the EIA report. CRZ map is prepared by NCESS in June 2011. .

4. The details provided with respect to distance of various streams/rivers/coasts/creeks in Form-1 and EIA report are factual in nature. We will again verify the details and same will be reported in the final EIA report.

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5. SLF will be constructed and operated as per the CPCB guidelines for treatment, storage and disposal facility (TSDF). All required approvals will be taken from concerned authorities. The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done. This was disclosed in Form-1; Aspects related to ground water has been studied and relevant information has been provided. Regular monitoring will be carried out as per Environment monitoring programme. Further detailing is part of detail engineering. The proposed project is outside CRZ area.

6. Details on production quantity of copper slag and phosphogypsum are provided in the EIA report. The uses of copper slag and phosphogypsum are also mentioned in the EIA report. Both the materials will be handled with all precautions as they are valuable raw materials for several applications.

7. Gypsum storage area will be constructed as per the "Guidelines for Management, Handling, Utilisation and Disposal of Phosphogypsum Generated from Phosphoric Acid Plants" published by CPCB and which is available online at: http://cpcb.nic.in/wast/hazardouswast/GuidelineforM,H,Utili&%20DisposalofPhosphogypsumfromPAPlants.pdf. Compliance will be done as per permissions granted from statutory authorities. There will not be any impact on soil and ground water due to operation of gypsum storage area.

8. MUPL will be supplying water for the proposed project from its approved desalination plant capacity. Approved capacity is 300 MLD.

9. The proposed project is based on Zero Liquid Discharge (ZLD) system. Preliminary water balance diagram is given in figure-2.2 of the EIA report. The treated water from ETP will be further treated into the RO plant. The purified water from the RO plant will be reused in the proposed project and rejects will be sent to multi-effect evaporator to achieve zero discharge. There is no discharge of any treated water into the sea.

10. Copper scrap and E-scrap will be sourced domestically as well as from import market based on availability. All the applicable rules and regulations will be complied with.

11. Environment friendly technology will be selected and pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.

    The list of products manufactured from the proposed project facility is mentioned in Chapter-1 of the EIA report.

12. EIA has been conducted as per the TOR granted by MoEF&CC and all conditions of the same have been complied with. Project will be implemented in line with the permissions granted and all the conditions will be complied as per permissions.

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13. Effluent from PMR plant will be treated in the state of art ETP as shown in Chapter-2 of the EIA report. The waste generated from Kaldo furnace will be recycled in the proposed plant.

14. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.

15. The impact analysis has been carried out for the proposed project as per TOR granted by MoEF&CC in which baseline conditions are monitored and prediction of impacts has been carried out with respect to proposed project activity. The details have been provided in Chapter-4 of the EIA report. Proposed project is outside CRZ area and there will not be any impact on marine ecology.

16. Air quality monitoring is done based on ToR granted and is as per CPCB and MoEF&CC guidelines. Details are provided in the EIA report.

17. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.

18. Standards laid down by CPCB and SPCB will be complied.

19. Proposed Environment management cell is as per requirements. Apart from the employees in environment management cell, line managers in Operations & Maintenance will also be well trained for environment protection.

20. Budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility for development of the local community through Adani Foundation. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure.

21. Reply is as per point no. 20 above.

22. Arsenic bearing sludge will be stabilized and stored in the secured land fill (SLF). Mercury will be recovered as Calomel as well as mercury metal and will be sold in the market. SLF will be constructed and operated as per the CPCB guidelines for

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treatment, storage and disposal facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done.

23. Profile of the area has been provided in the EIA report. Suitable information will be obtained from Government authorities and if available same will be incorporated in the final EIA report.

24. Reply is as per point no. 9 above.

25. Good housekeeping will be maintained in the plant premises; road sweeping machine will be used to clean roads.

26. The break-up of land has been provided in the PFR. However, the same will be included as a part of final EIA report. 33% of the project area is proposed for green belt.

27. Project will be implemented in line with the permissions granted and same will be complied fully.

28. Our reply same as per point 27 above.

29. Our reply same as per point 27 above.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-32

Shri Debi Goenka
Executive Trustee, Conservation Action Trust
5, Sahakar Bhavan, 1st Floor
LBS Marg, Narayan Nagar
Ghatkopar (West) Mumbai 400086

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Out of total area proposed for the project 256.58 ha area is notified SEZ and 102.38 ha is forest land for which forest clearance application is in process.
2. The layout has been marked on the CRZ map given in Figure-1.5 of Chapter-1 in the EIA report. The proposed project area is outside CRZ.
3. GCZMA is the custodian of approved CZMP for the proposed project area. However project layout is superimposed on CRZ map prepared by authorized agency of MOEF&CC as per CRZ notification 2011 and same is provided in figure-1.5 of Chapter-1 of EIA report.
4. The proposed project layout has been marked on the authorized CRZ map given in Figure-1.5 of Chapter-1 in the EIA report. Same is in colour.
5. The latest satellite imagery of the 21 Jan 2016/14 Feb 2016 is given in Figure-3.3.1 of Chapter 3 of EIA report
6. The land use details of the study area are given in Figure-3.3.2 of Chapter-3 of EIA report
7. The proposed project area is outside CRZ.
8. There are no ecologically sensitive areas in the proposed project area. However mangroves are present outside the project area but within the study area. The land use break-up details as per satellite image classification for the study area is given in chapter-3 of EIA report.

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9. The proposed project area is outside CRZ area therefore no presence of mangroves and mudflats.

10. Mangroves are present at 100 m away in the southern side of the project area.

11. Salt pans are located at a distance of around 5KM in WSW direction from the project area.

12. The fish species in the study area have been listed in Chapter-3 of the EIA report. Details on existing fisherman will be included in the Final EIA report.

13. Proposed Project area is outside CRZ and there are no mudflats and mangroves in the project area. Alternative site analysis is done for the project and site is selected based on its suitability. Project area includes forest land for which APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance.

14. The alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors.

15. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1.

16. The proposed project is planned over notified SEZ and Forest land that applied for diversion. No reclamation is proposed as part of proposed project activity. Details on present land use are provided in Chapter - 3 of the EIA report.

17. Proposed project area is devoid of mangroves. There is no question of mangrove destruction.

18. The alternate site analysis was carried out. The site selection criteria and the study of alternate sites is detailed in chapter-5 of the EIA report.

19. The proposed project area is outside CRZ and therefore no presence of mangroves and mudflats. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in Chapter – 3 of the EIA report. Site selection is based on suitability criteria as studied and provided in the EIA report.

20. Land use as per the utilization has been categorized based on classification systems of National standards of National Remote Sensing Center (NRSC) and details has been provided in chapter – 3 of the EIA report.

21. The forest related information as asked in point no. 22 is replied properly.

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22. There is no case pending against the proposed project.

23. The question is not related to proposed project.

24. The question is not related to proposed project. No reclamation is proposed in the project under discussion.

25. As a part of the requirement for the proposed project the existing roads will be strengthened by widening or upgrading and extended to approach the proposed site.

26. The raw material transportation is proposed to be received from the approach road within notified SEZ which will be strengthened. The overall layout of the proposed plant is given in Figure-2.1 of EIA report.

27. The widening of existing road is within the notified SEZ and it is considered as part of the overall impact assessment of the proposed project. However, impact will be insignificant.

28. Power will be sourced from existing transmission lines by extending it to the proposed project site by using existing area of APSEZ. Same will be outside CRZ.

29. Natural drainage will not be disturbed due to the proposed project. The natural topography will be maintained. The proposed project location is notified SEZ and forest land for which necessary clearance is under progress.

30. The copper concentrate and rock phosphate will be transported through state of art pipe conveying method. The required EMP measures will be implemented as mentioned in Chapter-6. Project will be implemented after obtaining required clearances from concerned statutory authorities and complied with.

31. The locals will be given preference as per the eligibility. The skill development program will be implemented as a part of CSR program to improve employability.

32. During construction phase, workers will be sourced through contractors and it will be ensured that workers get required facilities.

33. All the facilities including sanitation and others will be provided.

34. This is outside the scope of the EIA report for the proposed project. However, local employment will be provided for the proposed project based on eligibility.

35. Information related to mangroves is given in sub-clause of environmental sensitivity which is part of Form-1.

36. There is no notified/ declared turtle nesting site present within 15KM of the proposed project area.

37. The details of pagadiya fishermen will be included in the final EIA report. No fishermen will be impacted due to the proposed project.

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38. This is outside the scope of the EIA report for the proposed project.

39. The proposed project area is outside CRZ. We do not have any information on fishing boats in the surrounding area. However, proposed project activity will have no impact on fisheries.

40. The sand for the proposed construction will be sourced from local available markets.

41. The land use pattern of the study area covering 10 km radius is given in Figure-3.3.2, Chapter -3 of the EIA report. Same is in color. Mudflats and mangroves are mentioned in Table 3.3.2, Chapter-3 of EIA report.

42. Project area is notified SEZ and forest land for which diversion is under process. Mangroves and other RF are mentioned as part of Form-1 and EIA report. Mangroves are not present within the proposed project area.

43. All the utility corridors will be part of notified SEZ. However, they will be finalized as part of detail engineering and only after obtaining required clearance for the proposed project.

44. Reply is as per point no. 43.

45. Leveling of the land profile will be done as part of detailed engineering for the proposed project.

46. Map showing the creek in the satellite imagery and land use map are provided in Chapter-3 of the EIA report.

47. Proposed project area is devoid of any human habitation. The fishermen in the surrounding areas will not be disturbed due the proposed project.

48. Details on potential employment are mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.

49. Based on the eligibility and available vacancies, jobs will be provided.

50. Training will be integral part of all the employees. The skill development program will be implemented as a part of CSR program to improve employability.

51. Based on the eligibility and available vacancies, jobs will be provided.

52. Salt pans are present in the south west direction of the project area at a distance of around 5KM.

53. The coal will be sourced from the local market and transported through trucks. Around 3000 tonnes of coal will be stored. Coal is taking part in the smelting process

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and hence there is no ash generation. The details about mitigation measures have been covered as a part of EMP in the EIA report.

54. There is no generation of ash in the process.

55. The requested details are part of detail engineering. Preliminary water balance diagram is given in figure-2.2 of the EIA report.

56. Environmental sensitivity analysis is done for 15KM area from the project boundary and same is provided in Form-1. The alternate site analysis was carried out. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors.

57. Details on alternative site analysis are provided in the Chapter – 5 of the EIA report. Site is selected on the basis of suitability from number of factors.

58. This is outside the scope of the EIA report for the proposed project.

59. This is outside the scope of the EIA report for the proposed project.

60. Yes, the present proposal will include the indigenous species.

61. STP will be part of ETP and same is shown in the layout map provided in the EIA report.

62. The sewage sludge will be utilized as manure for the greenbelt.

63. The sewage sludge will be used within the plant itself and the particulars will be available post detail engineering.

64. The plant will be designed for Zero Liquid Discharge. The rejects from the RO plant will be sent to multi-effect evaporator. There is no discharge of any treated water into sea. Preliminary water balance diagram is given in figure-2.2 of the EIA report.

65. Reject from secondary stage RO containing higher TDS will be sent to multi-effect evaporator where water will be separated and re-used and salts (mainly calcium) will be stored in the SLF within the project area.

66. Tail gas scrubbers will be installed to scrub residual gases from Sulphuric Acid Plant to produce Gypsum used in cement industries and high efficiency gas scrubbers will be installed in Phosphoric Acid Plant to produce Hydro Fluro Silicic acid which is used in manufacturing of Aluminum Fluoride.

67. Copper slag can be used as a building material (added in concrete as well as in ready mix), road construction and shot blasting. The same is covered in EIA report. As per MoEF&CC notification dated 4th April, 2016, copper slag does not fall under

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hazardous waste category and separate guidelines on the management of copper slag will be issued by CPCB separately and same is awaited.

68. Phosphogypsum is used for cement manufacturing, gypsum board manufacturing and fertilizer. The same is covered in EIA report. The "Guidelines for Management, Handling, Utilisation and Disposal of Phosphogypsum Generated from Phosphoric Acid Plants" published by CPCB is available online at: http://cpcb.nic.in/wast/hazardouswast/GuidelineforM,H,Utili&%20DisposalofPhosphogypsumfromPAPlants.pdf

69. An area of 30 acres has been demarcated for the SLF and shown in the plant layout in Chapter-2 of the EIA report, which takes care of the generated ETP cake and scrubber cake.

70. Reply is as per point no. 69 above.

71. Total area required for the plant is 256.58 ha. Three alternative sites were proposed. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. The site selection criteria and the study of alternate sites are detailed in chapter-5 of EIA report.

72. Project area includes forest land for which APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. The proposed project site is away from biodiversity heritage site as proposed by Gujarat State Biodiversity Board. However, project will be implemented by taking all environmental safeguards.

73. Total area required for the plant is 256.58 ha. Three alternative sites were proposed. The alternate sites have been discussed in detail during the Terms of reference meeting and shortlisted site for the proposed project has been accepted by the Honorable EAC committee of MoEF&CC, New Delhi. The site selection criteria and the study of alternate sites are detailed in chapter-5 of EIA report.

74. ETP cake and scrubber cake will be stored in the secured land fill (SLF). An area of 30 acres has been demarcated for the SLF and shown in the plant layout in Chapter-2 of the EIA report. Storage of copper slag, phosphogypsum and SLF is proposed within the project boundary. The proposed project site is outside CRZ. Forest clearance for the forest land in the proposed project has been applied. Environment clearance is under progress.

75. The preliminary composition of the waste generated such as scrubber cake and ETP cake is provided in Chapter-2 of EIA report.

76. ETP cake will be stored in SLF. Secured land fill is proposed to be developed over an area of 30 acres within the proposed project area. SLF will be constructed and

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operated as per the CPCB guidelines for treatment, storage and disposal facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and landscaping will be done. Monitoring of environmental parameters will also be carried out. Therefore, there are no possibilities of contamination of ground water.

77. Total area required for the plant is 256.58 ha. Forest land requirement is part of the total land estimated for the project. Greenbelt requirement on 33% of the area is proposed and shall be complied as per EC conditions. For the compensatory afforestation for the forest land shall also done as per established procedure.

78. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Based on studies under EIA, ambient air quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.

79. Proposed project is outside CRZ area, therefore there is no question of reclamation of mudflats and mangroves. Project will be implemented with all environmental safeguards. EMP is provided in Chapter-9 of the EIA report. Rs 1044 Crores has been budgeted towards the pollution control systems.

80. Map showing the study area with satellite imagery and land use map are shown in in the Chapter-3 of the EIA report. Authorized CRZ map is also provided in figure-1.5 of Chapter-1 of EIA report. Mangroves are present at 100 m away in the southern side of the project area.

81. This is outside the scope of the EIA report for the proposed project.

82. The proposed project site is outside CRZ. Forest clearance for the forest land in the proposed project has been applied. Environment clearance is under progress. Wild life clearance is not applicable for the proposed project.

83. This is outside the scope of the EIA report for the proposed project.

84. This is outside the scope of the EIA report for the proposed project.

85. Proposed project is outside CRZ. Project is developed on notified SEZ area and forest land for which clearance is under progress. No reclamation is proposed in the proposed project activity.

86. This is outside the scope of the EIA report for the proposed project.

87. This is outside the scope of the EIA report for the proposed project.

88. The impact analysis has been carried out for the proposed project as per TOR granted by MoEF&CC in which baseline conditions are monitored and prediction of

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impacts has been carried out with respect to proposed project activity. The details have been provided in Chapter-4 of the EIA report.

89. EIA studies have been carried based on TOR granted by MoEF&CC. Project will be implemented after obtaining required permissions and compliance will be done based on permissions granted.

90. Representations received from fishing community were addressed during public hearing as well as in written responses. There are no complaints or grievances from the fishing community for the proposed project activity.

91. Project is located in notified SEZ area. APSEZ has obtained EC and CRZ clearances from MoEF&CC vide their letter dated 15th July, 2014 for multi-product SEZ at Mundra. Proejct area also includes forest land for which APSEZ is in the process of obtaining forest clearance. Wild life clearance is not applicable.

92. Reply is as per point no. 91 above.

93. This is outside the scope of the EIA report for the proposed project.

94. This is outside the scope of the EIA report for the proposed project.

95. The impacts due the additional traffic of the proposed project have been considered while calculating the cumulative impact and the details are available in Chapter 4 of the EIA report. There will not be any significant impact due to increase of traffic due to proposed project.

96. The impacts due the additional traffic of the proposed project have been considered while calculating the cumulative impact and the details are available in Chapter 4 of the EIA report. Existing railway lines will be used based on requirement. Existing port facility available at west port and south port of APSEZ will be utilized for transportation of materials.

97. The plant design will be done considering seismic zone-V as per IS 1893 (part-I)-latest edition. Disaster management plan has been prepared and available in Chapter-7 of the EIA report.

98. Ecological study has been carried out during the study period by an EIA agency approved by QCI-NABET. The NABET certificate and personnel involved in the ecological study is available in Chapter-11 of the EIA report.

99. EIA studies have been carried based on TOR granted by MoEF&CC. Socio economic study has been carried out as part of EIA and same is available in Chapter-3 of the EIA report.

100. This is outside the scope of the EIA report for the proposed project. However, coordinates of the proposed project boundary are provided in Chapter-1 of the EIA report.

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101. All the infrastructural facilities like parking, washing, repairs and maintenance etc will be part of detail engineering and same will be carried out after obtaining required clearances.

102. Separate truck parking and rest rooms will be provided to the drivers and cleaners involved in the transportation of the raw material and end products.

103. The proposed plant will operate on Zero discharge concept. There is no discharge of any treated water into creeks or Gulf of Kachchh.

104. This is outside the scope of the EIA report for the proposed project.

105. The proposed project is outside CRZ area and no mangroves are present at the proposed project site.

106. The proposed project will be implemented in notified SEZ and forest land. The land terrain is gently sloping and no major cutting and filling for leveling of land will be involved. Impact on land environment is carried out and details are in chapter-4 of the EIA report.

107. The NABET certificate of the EIA consultant (NABET/EIA/1619/RA0043 Valid upto 19 May 2019) is provided in Chapter-11 of EIA report.

108. TOR granted by MoEF&CC vide their letter dated 21st June, 2016 has been followed for preparation of draft EIA report.

109. All documents have been provided in English. The representations received in local language will be translated into English and same will be authenticated.

110. This is outside the scope of the EIA report for the proposed project.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory.

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Ref: AEL/Copper/Mundra/EC/PH/D-A-33

Shri Pravinsinh Bhurubha Chauhan
Village- Siracha
Taluka- Mundra
Dist- Kutchh, Gujarat

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Forest land involved in the project is a terrestrial forest as mentioned in Chapter-4 of the EIA report. As mentioned in Chapter-2 of EIA report, State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC".
2. The plant design will be done considering seismic zone-V as per IS 1893 (part-I)-latest edition. Disaster management plan has been prepared and available in Chapter-7 of the EIA report.
3. Study area map on a larger size paper will be provided in final EIA report.
4. Raw materials requirement and sources has been provided in Chapter-2 of the EIA report.
5. Reply is as per point no. 4 above.
6. The copper concentrate and rock phosphate will be transported through state of art pipe conveying method. The required EMP measures will be implemented as mentioned in Chapter-6. Project will be implemented after obtaining required clearances from concerned statutory authorities and complied with.
7. Reply is as per point no. 6 above.
8. As per TOR, the study area is 10 km around the proposed site and major industries and ports within 10KM radius study area of the proposed project have been given in chapter-1 of the EIA report. Full list of industries in study area, as desired, will be given in final EIA report

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9. As per TOR, details of 10KM radius study area are covered.

10. The impact analysis has been carried out for the proposed project as per TOR granted by MoEF&CC in which baseline conditions, which reflect emissions from existing industries, are monitored and prediction of impacts has been carried out with respect to proposed project activity. The details have been provided in Chapter-4 of the EIA report.

11. As per TOR, details of 10KM radius study area are covered. Environmental sensitivity is identified for 15KM radius area as per TOR.

12. The maximum baseline concentration of PM2.5 in ambient air, in the study area, is given in Chapter-3 of the EIA report.

13. Incremental concentrations for PM10, SO2, and NO2 have been given in Chapter-4 of the EIA report.

14. There is no separate desalination plant proposed for the project. APSEZ will be supplying water for the proposed project from its approved desalination plant capacity. Therefore there will not be additional impact due to proposed project.

15. Besides the water balance diagram, technical scheme to achieve Zero Liquid Discharge (ZLD) is also given in Chapter-2 of the EIA report. The rejects from the RO plant will be sent to multi-effect evaporator to achieve zero discharge and salts (mainly calcium) will be stored in the SLF within the project area. There is no discharge of any treated water into the sea.

16. Project area includes forest land for which APSEZ has applied for Forest clearance and same is under process. As a process State Government gives recommendation for diversion of forest land after completing all procedures and central government is granting the clearance. As per procedure, EC shall be obtained from MoEF&CC after compliance of applicable requirements.

17. As per TOR, forest land involved for the proposed project has been mentioned in Chapter-1 and in Land Use for the proposed project is given in Chapter-2 of the EIA report.

18. As per TOR, baseline environment of the study area and environmental impacts of the proposed project have already been studied and provided in EIA report.

19. This is outside the scope of the EIA report for the proposed project.

20. This is outside the scope of the EIA report for the proposed project.

21. This is outside the scope of the EIA report for the proposed project.

22. This is outside the scope of the EIA report for the proposed project.

23. This is outside the scope of the EIA report for the proposed project.

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24. This is outside the scope of the EIA report for the proposed project.

25. Adani Enterprises Limited has not violated any provision of Environment (Protection) Act, 1986.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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સંદર્ભ:**AEL/Copper/Mundra/EC/PH/D-A-34**

શ્રી પ્રવિણસિંહ ભૂરૂભા ચૌહાણ
ગામ:- સિરાચા
તાલુકો:- મુંદ્રા
જિલ્લો:- કચ્છ,ગુજરાત.

વિષય:-અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ.

માનનીય સાહેબ,,

આપના દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓના પેરાવાઇઝ જવાબ અમો અત્રે આપી રહ્યા છીએ.

1. અમારી રજૂઆત છે કે MoEFCCપાસેથી TOR મેળવવાની તમામ જરૂરિયાત સંતોષવામાં આવી હતી.TOR મેળવ્યા પછી, એન્વાયરમેન્ટ ઇમ્પેક્ટ એસેસ્સમેંટ (પર્યાવરણ અસર મૂલ્યાંકન) પૂર્ણ કરવામાં આવેલ છે અને TOR ની તમામ શરતોનો પ્રોજેક્ટના પ્રયોજકો દ્વારા લોકસુનાવણીના ઉદ્દેશ માટે અમલ કરવામાં આવેલ છે.

   ફોરેસ્ટ જમીનના દરજ્જા અંગે, આ TOR માટેના ફોર્મ-1 માં અને ઉપરાંત TOR કોમ્પલાયન્સ (EIA રિપોર્ટના એનેક્ષર 1, પેજ A1-14) માં સ્પષ્ટપણે જાહેર કરવામાં આવેલ છે કે "ફોરેસ્ટ જમીન 253 એકર પણ સામેલ છે જે ઔદ્યોગિક હેતુ માટે તબદીલ કરવામાં આવશે.રાજ્ય સરકારે ફોરેસ્ટકલીયરન્સ માટે ભલામણ કરેલી છે અને તે હવે કેન્દ્ર સરકાર સમક્ષ ફાઇલ નંબર-04/2016-FCથી છે" ફાઇલનું સ્ટેટસ પણ ઓનલાઇનMoEFCCપરવન્યમંજૂરી અર્થેઉપલબ્ધ છે. APSEZ ના પત્ર તારીખ 15 એપ્રિલ 2016 થી APSEZ એ સૈદ્ધાંતિક રીતે AEL ના પ્રોજેકટ માટે જમીન ફાળવવાનું કબુલ કરેલ છે, જે EIA રિપોર્ટમાં સામેલ છે.
   મેસર્સ અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ દ્વારા પ્રોજેકટ APSEZની જમીનમાં દરખાસ્ત કરવામાં આવેલ હોવાથી આ જમીન ફોરેસ્ટકલીયરન્સ માટે APSEZ(ભુતપૂર્વ મુંદ્રા એસઇઝેડ લિમિટેડ) દ્વારા જ અરજી કરી દેવામાં આવેલ હતી.તારીખ 31.03.2011 ની જરૂરિયાત "પ્રયોજકોએ TOR ની દરખાસ્ત,ફોરેસ્ટકલીયરન્સ સ્ટેજ-1 ની અરજી કર્યા પછી જ મૂકવી જોઈએ." આથી, આ દરખાસ્તનું પણ પાલન કરવામાં આવ્યું છે.TOR માટે અરજી કરવાના પહેલા ફોરેસ્ટકલીયરન્સ માટે અરજી કરવામાં આવેલ હતી.

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પ્રોજેકટ પ્રયોજકો દ્વારા કોઈપણ તબક્કે કાંઇપણ છુપાવવાનું નથી અને/અથવા એવી કોઈ ખોટી અને ગેરમાર્ગે દોરનારી માહિતી અથવા ડેટા રજૂ કરેલ નથી. જે અરજીના સ્ક્રિનિંગ(પૃથક્કરણ) અથવા સ્કોપિંગ(તપાસ) અથવા મૂલ્યાંકન અથવા નિર્ણય લેવા માટે અગત્યના હોય છે. EIA નોટિફિકેશન 2006 ની કલમ 8 (vi) નું પણ ઉલ્લંઘન કરેલ નથી.

આપના પત્ર ના મુદ્દા 1(d) વિષે અમે કોઈ ટિપ્પણી કરતા નથી.

2. PIL 17 of 2011નો હાઇકોર્ટ દ્વારા નિકાલ કરવામાં આવેલ છે તે ચુકાદો પુનરાવલોકનમાં છે. .

ધનેશ્વરી, એક મોસમી નદી સૂચિત સાઇટના પશ્ચિમ ભાગે વહે છે.નદીનો પ્રવાહ યથાવત રાખવામાં આવશે, તે પ્લાન્ટ લે આઉટ EIA રિપોર્ટના પેજ C2-3 પર દર્શાવવામાં આવેલ છે.EIA રિપોર્ટ (અનુસૂચિ –C 1-6)માં ગુગલમેપ આપવામાં આવેલ છે.

3. ગુજરાત રાજયમાં આવેલા પુરાતત્વીયસ્મારકોની સંપૂર્ણ યાદી http://asi.nic.in/asi_monu_alphalist_gujarat.asp.પર ઉપલબ્ધ છે. ઉપરાંત, ખોદકામની સંપૂર્ણ યાદીhttp://asi.nic.in/asi_excavations.asp.પર ઉપલબ્ધ છે. આજની તારીખમાં કોઈ નોટિફાઇડ પુરાતત્વીય સાઇટ સૂચિત પ્રોજેક્ટ સાઇટથી 10 કિલોમીટરની અંદરમાં આવેલ નથી.
4. કમિટી અને તેનો રિપોર્ટ APSEZ ને સંબંધિત છે. જે મુદ્દા દર્શાવ્યા છે, તે સૂચિત પ્રોજેક્ટની પ્રવૃત્તિને સંબંધિત નથી.તેથી અમે કોઈ ટિપ્પણી કરતા નથી.
5. APSEZએ ફોરેસ્ટ જમીનના ઔદ્યોગિક હેતુના ડાયવર્ઝન માટે અરજી કરેલ છે. ફોરેસ્ટના ડાયવર્ઝન ની કાર્યવાહી હાલ ચાલુ છે. લાગુ પડતાં ફોરેસ્ટના ડાયવર્ઝનના તમામ નિયમોનું પાલન કરવામાં આવશે. સ્થાપિત કાર્યવાહી પૂરી થતાં અને અંતે MoEF&CCદ્વારા મંજૂર કરતાં રાજ્ય સરકારે ફોરેસ્ટકલીયરન્સ માટે ભલામણ કરેલ છે.
6. મુદ્દા ઉઠાવ્યા છે તે APSEZ માટે છે અને સૂચિત પ્રોજેકટ પ્રવૃત્તિને સંબંધિત નથી, તેથી અમે કોઈ ટિપ્પણી કરતા નથી.
7. કોલ હેંડલિંગનો રિપોર્ટ અને તેની અસરો સૂચિત પ્રોજેકટ પ્રવૃત્તિ સાથે સુસંગત નથી. તેથી અમે કોઈ ટિપ્પણી કરતા નથી.
8. 2011 ની PIL 17 નો હાઇકોર્ટ દ્વારા નિકાલ કરવામાં આવેલો છે. ચુકાદો પુનરાવલોકનમા છે.
9. સંભવિત રોજગારીની વિગતો EIA રિપોર્ટના પ્રકરણ 2 માં દર્શાવવામાં આવેલ છે. આ પ્રોજેકટમાં લાયકાતના ધોરણે સ્થાનિક લોકોને નોકરીમાં પસંદગી આપવામાં આવશે. સ્થાનિક લોકોની નોકરી મેળવવાની કુશળતામાં વધારો થાય તે માટે સ્કિલ ડેવલપમેન્ટ સેન્ટર (કુશળતા વિકાસ કેન્દ્ર) સ્થાપવાની યોજના છે.

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10. સૂચિત સાઇટ CRZની બહાર આવેલી છે અને આથી CRZ નોટિફિકેશન અન્વયે મંજૂરી લેવાની જરૂર નથી.આ બાબત EIA રિપોર્ટની આકૃતિ 1.5 માં દર્શાવવામાં આવેલ છે. કુદરતી આપત્તિને ઓળખવા અને તેનો સામનો કરવા રિસ્ક એનાલિસિસ (જોખમ વિશ્લેષણ) અને ડિઝાસ્ટર મેનેજમેન્ટ (આપત્તિ વ્યવસ્થાપન) તૈયાર કરવામાં આવેલા છે, જે EIA રિપોર્ટમાં સામેલ છે.
11. પ્રોજેકટ માટે કોઈ અલગથી ડી સેલિનેશન પ્લાન્ટની દરખાસ્ત નથી. APSEZ પોતાના મંજૂર ડી સેલિનેશન પ્લાન્ટ ક્ષમતામાથી સૂચિત પ્રોજેક્ટને પાણી પૂરું પાડશે. આથી સૂચિત પ્રોજેક્ટને કારણે કોઈ વધારાની અસરો હશે નહીં.
12. અદાણી અને ટાટા પાવર પ્લાન્ટ સાથે સાથે APSEZ ના વેસ્ટ એન્ડ સાઉથ પોર્ટના રેફરન્સ EIA રિપોર્ટના ટેબલ 1.1 પ્રકરણ-1 માં દર્શાવેલા છે.
13. ટિપ્પણી જનરલ પ્રકારની હોવાથી અમે ટિપ્પણી કરતાં નથી.
14. પ્રસ્થાપિત કાર્યવાહી પ્રમાણે રાજ્ય સરકાર તરફથી ફોરેસ્ટ કલીયરન્સ માટેની ભલામણ તથા ત્યારબાદની MoEF&CCદ્વારા મંજૂરી આ બંને યુઝર એજન્સી દ્વારા સરકારશ્રી દ્વારા આપવામાં આવેલ દરેક શરતોનું પાલન કર્યા બાદ જ મળી શકે છે. અદાણી ફાઉન્ડેશન આસપાસના ગામડાઓમાં સસ્ટેનેબલ આજીવિકા માટે CSR પ્રોજેકટ દ્વારા કાર્ય કરી રહ્યું છે.
15. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે,સલ્ફ્યુરિક એસિડ આ પ્રોજેક્ટમાંથી બનતું વેચવાપાત્ર ઉત્પાદન છે. સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. આથી કોઈ નોંધપાત્ર પ્રતિકૂળ અસરોની સંભાવના નથી.
16. સૂચિત પ્રોજેકટથી કોઈ નદી બંધ થવાની સંભાવના નથી.
17. સૂચિત પ્રોજેકટ નવીનાળ થી કોટડી ખાડી પર જવામાં નડશે નહીં.
18. વનસ્પતિ અને પ્રાણીઓનો અભ્યાસ EIA ના ભાગરૂપે કરવામાં આવેલ છે અને વિગતો પ્રકરણ-3 માં અને મેનેજમેન્ટ પ્લાન પણ પ્રકરણ-4 પર દર્શાવવામાં આવેલ છે.

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અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,

અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)

અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-34

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Taluka- Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We are herewith responding para wise to the issues raised by you:

1. We submit that all requirements for obtaining the TOR from MoEFCC were fulfilled. After obtaining TOR, Environment Impact Assessment has been completed and all conditions of TOR has been complied with by project proponent for the purpose of public hearing.
   Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure 1, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC". The file status is also available online at MoEFCC Forest Clearance. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report.

   As the project is proposed by M/s Adani Enterprises Limited in APSEZ land, Forest Clearance has already been applied for this land by APSEZ (erstwhile Mundra SEZ Ltd.). The requirement of OM dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance...". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR.

   At no stage there is any concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application by the project proponent. There is no deviation from the Section 8 (vi) of EIA Notification 2006 also.

   We do not offer any comment related to point 1(d) of your letter.
2. The PIL 17 of 2011 has been disposed by the High Court. The judgment is under review.

Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Google Map is provided in EIA Report (Schedule –C 1-6).

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3. A complete list of archeological monuments in the state of Gujarat is available at http://asi.nic.in/asi_monu_alphalist_gujarat.asp. Further, a complete list of excavations is available at http://asi.nic.in/asi_excavations.asp. As on date, there is no Notified Archeological Site located within 10 km from the proposed project site.

4. The Committee and its report pertain to APSEZ. The points mentioned are not related to the proposed project activity therefore we do not offer any comment.

5. APSEZ has applied for diversion of forest land for industrial purpose. The forest diversion is under process. All the rules will be complied for forest diversion, as applicable. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.

6. The issues raised are for APSEZ and are not related to the proposed project activity therefore we do not offer any comment.

7. The Report on Coal Handling and its impacts are not relevant to the proposed project activity therefore we do not offer any comment.

8. The PIL 17 of 2011 has been disposed by the High Court. The judgment is under review.

9. Details on potential employment is mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.

10. The proposed site is outside CRZ and hence there is no requirement of Clearance under the CRZ Notification. The same is shown in Fig. 1.5 of EIA Report. Risk Analysis and Disaster Management Plan has been prepared to identify and address the natural disasters, which is covered in EIA Report.

11. There is no separate desalination plant proposed for the project. APSEZ will be supplying water for the proposed project from its approved desalination plant capacity. Therefore there will not be additional impact due to proposed project.

12. References of Adani and Tata Power Plants as well as west & south ports of APSEZ are mentioned in Table 1.1 of Chapter 1 of the EIA Report.

13. Comment being general in nature, we do not offer comment.

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14. Asestablished procedure, forest clearance is recommended by State Government and approved by MoEF&CC only after completion of all requirements and compliance by user agency. Adani foundation is working for Sustainable Livelihood in the surrounding villages through CSR projects.

15. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. Sulphuric Acid is a saleable product from this project. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Therefore no significant adverse impacts are envisaged.

16. No closure of river is envisaged in the proposed project.

17. Proposed project will not affect the access from Navinal to Kotdi Creek.

18. Flora and Fauna study has been conducted as part of the EIA and details are provided in the Chapter 3 and management plan is also provided in Chapter 4.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-35

Shri Vijay Gadhvi
Sri Harinagar- 1
Mandvi Naliya Road, Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,
We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control and environmental protection. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. The Copper Project is based on the import of Copper Concentrate, which is not available in our country in required quantity. Also, most of the finished products will be dispatched through sea route. These factors were considered as site selection criteria. The site is advantageous in terms of proximity to the port. With all the pollution control measures proposed, the environmental risks and impacts will be mitigated. The project is also based on zero liquid discharge. There are many such plants on coastal locations and have been operating without any significant impact on the coastal ecology. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. The entire process and conditions of forest clearance will be complied, once obtained.

2. The para has alleged Adani Group of violations that have not been substantiated. There have been such allegations and legal suits in the past which have been dismissed by the Hon'ble Courts. The points raised do not pertain to proposed project and therefore we do not offer any comments. However, project will be implemented in line with the permissions granted and by implementing environmental safeguards.

3. The proposed project is located partly in notified SEZ and partly in forest land applied for diversion. The Survey Numbers for notified SEZ have been incorporated in the Form-1 application and its details are: *APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), unsurveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL.* Same will also be included in the final EIA Report.

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4. APSEZ has given in principle approval to transfer/ allot the land in favour of AEL after obtaining due permissions. A copy of letter is provided in the Annexure-III of the EIA report.

5. The land details related to proposed project are provided in the Point No. 3 above.

6. Part of the proposed project land, 154.18 ha is within the Notified SEZ. A copy of notification is enclosed as Annexure- and same will be included in the final EIA Report.

7. Part of the proposed project land, 154.18 ha is within the Notified SEZ.

8. Proposed project includes notified SEZ area and the forest land. A copy of notified SEZ area is as per point no. 6 above. APSEZ has applied for forest land diversion and same is under progress. Details of land are provided in the chapter-2 of EIA the report.

9. We do not agree with your observation. AEL has not started any activity at the site and there is no encroachment on any land.

10. At the moment, there is no requirement of SEZ denotification for the proposed project area.

11. Alternative site analysis was carried out. The site selection criteria and the study of alternative sites is detailed in Chapter-5 of the EIA Report.

12. There is no proposal of reclamation in Forest Land. The proposal for diversion of forest land is under process. Other land under the proposed project is notified SEZ area.

13. The details of Forest Land are also shown in Form-I (Basic Information, Sl. Nos. 9, 12, 21 and 23).

14. Company has proposed 33% area for Green Belt. The 102.38 ha forest land, once diverted and allotted, will be part of the project area. The Green Belt will be developed in 33% of the total project area of 256.58 ha. There is no illegal encroachment of forest area.

15. As per the map on Page C3-16, the project site also includes part of the Siracha Reserve Forest. Correct map is provided in the EIA report.

16. The Forest Clearance is still under process. The details are available on the website of MoEF & CC (File No. 8-04/2016-FC).

17. The Forest Land diversion is under process and all the conditions of the forest clearance will be complied once granted.

18. The Forest Land diversion is under process and the requirements of Forest Rights Act, as applicable, will be complied with.

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19. SLP28788/2016 in the Supreme Court and WP (PIL) 12/2011 at Gujarat High Court are dismissed vide respective orders dated - and -. Therefore, there is no dispute.

20. In the matter of Sunita Narain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015.

21. Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Impact Assessment has been carried out covering 10 km area surrounding the project site and it includes water bodies (if any), local residents and villages. There is no proposal of closing any creeks.

22. Gujarat Coastal Zone Management Authority is the custodian of approved Coastal Zone Management Plan. However, authorized CRZ map superimposing project area prepared by authorized agency of MoEF&CC is provided in the Chapter-3 of the EIA report.

23. The CRZ Map enclosed is prepared by National Centre for Earth Science Studies and enclosed on Page C3-17 of EIA Report. More clear copy will be included in the final EIA report.

24. The proposed site is outside CRZ and the minimum distance from existing Mangrove in southern direction is more than 100 m.

25. The occupational structure of the people in the area is detailed on Page C3-65 of the EIA Report. The main workers account for 90.57% of the total workers. The Work Participation Rate is 56.36%. Fishing is one of the activities. Details on number of fishermen in the study area will be included in the final EIA report.

26. No fishermen will be impacted due to proposed project.

27. The details on pagadiya fisherfolk will be included in the final EIA Report.

28. Project will be developed over notified SEZ area and forest land applied for diversion. APSEZ has created dedicated approach road for fishermen of Navinal and Siracha. Fishermen access roads will not be closed due to proposed project.

29. There is no resettlement involved in the diversion of 102.38 ha of forest land. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.

30. Details on production quantity of copper slag and phosphogypsum is provided in the EIA report. Copper Slag can be used as a building material (Added in Concrete as well as in ready mix), Road Construction & shot blasting and Phosphogypsum is used for

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Cement manufacturing, gypsum board Manufacturing and fertilizer. Both the materials will be sold in domestic and overseas market.

31. There is no notification on Navinal Forest being notified as Biodiversity Area.

32. Carrying Capacity Studies are undertaken by Statutory Authorities. We are not aware of any Carrying Capacity Studies carried out for this area. EIA studies have been conducted for the study area as per TOR granted by MoEF&CC.

33. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for Air and Water and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

34. The Gujarati Summary was placed at all the Gram Panchayats within 10 km of the proposed site in addition to the 7 places- The District Collector, Bhuj, District Kutch, District Development Office, Bhuj, District Kutch, District Industry Centre, Bhuj, District Kutch, Taluka Development Office, Mundra, District Kutch, Taluka Development Office, Mandvi, District Kutch, The Chief Conservator of Forest, Ministry of Environment, Forests and Climate Change Government of India, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E-5, Arera Colony, Link Road -3, Ravishankar Nagar, Bhopal 462016 and Regional Office, Kutch (East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Admn Building, Sector 08, Gandhidham, Kutch.

35. This is outside the scope of the EIA Report for the proposed project.

36. Power Transmission Lines will be retained with some deviation.

37. 8 persons are proposed as a part of Environment Cell alone. The Environment Management is not only limited to these 8 persons, but it includes the operations carried out by various departments for the management of environment.

38. Adani Enterprises Limited will have its own Environment Management Team headed by an environmentalist, capable of handling all the environmental and pollution issues of the Copper Project. Other issues are outside the scope of the EIA Report for the proposed project.

39. The area under SLF is provided in the Pre-feasibility Report, which is a part of the TOR Application.

40. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are

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proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.

41. Our reply is same as point no. 40.

42. The question does not pertain to us, therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to the permissions granted.

43. Proposed project will have zero liquid discharge facility and no treated water will be sent to the sea.

44. There is no proposal of tie up with any CETP. AEL will have its own ETP for treatment of wastewater. Details are provided in the EIA report.

45. The Flow Diagram and the Capacities are provided in the EIA Report. Further planning will be carried out during detailed engineering.

46. EIA report includes details on demographic information about the study area. The Executive Summary of the EIA Report was prepared in local language and made available to all the panchayats within 10 km radius of the proposed site. The Executive Summary in local language was also made available at 5 Government Offices along with EIA Report. Adani foundation is working in the area of community health covering all the villages in the surrounding.

47. This is outside the scope of the EIA Report for the proposed project. However, local employment will be provided for proposed project based on eligibility and details are provided in the EIA report.

48. This is outside the scope of the EIA Report for the proposed project.

49. The EIA Report has been prepared as per the Terms of Reference issued by the Ministry of Environment, Forests and Climate Change.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

P.A Suryarao

(Prasad Suryarao)
Authorized Signatory.

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સંદર્ભ: AEL/Copper/Mundra/EC/PH/ D-A-35

શ્રી વિજય ગઢવી
શ્રી હરિનગર -1
મંદવીનાલીયા રોડ, માંડવી
જિલ્લો: કચ્છ ,ગુજરાત.

વિષય અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ અને પર્યાવરણીય રક્ષણ માટે નવીનતમ ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. પ્રોજેકટ કોપર કોન્સનટ્રેટની આયાત પર આધાર રાખે છે, જે આપણા દેશમાં જરૂરી જથ્થામાં ઉપલબ્ધ નથી.વળી, તૈયાર થયેલ ઘણા ઉત્પાદનો દરિયાઈ માર્ગે મોકલવામાં આવશે. આ પરિબળો સાઇટની પસંદગી માટે ધ્યાનમાં લેવામાં આવેલા.બંદરની નજીક હોવાથી આ સાઇટ ફાયદાકારક છે. તમામ સૂચવાયેલા પ્રદૂષણ નિયંત્રણ પગલાં લઈ, પર્યાવરણના જોખમ અને અસરોનું શમન કરવામાં આવશે. પ્રોજેકટ ઝીરો લિક્વિડ ડિસ્ચાર્જ(પ્રવાહી બહાર આવશે નહીં) પર આધારિત છે.દરિયા કિનારાના લોકેશનો પર આવા ઘણા પ્લાન્ટ આવેલા છે અને તેમના સંચાલનથી દરિયા કાંઠાની પરિસ્થિતી ઉપર કોઈ નોંધપાત્ર અસર થયેલ નથી.પ્રોજેકટ સાઇટનો એક ભાગ જંગલ જમીન છે, જેનો ઉપયોગ ત્યારેજ કરવામાં આવશે જ્યારે જંગલના માર્ગાંતરણની આખરી મંજૂરી મળી જશે. જંગલ મુક્તિ મંજૂર થતાં તેની તમામ પ્રક્રિયા અને શરતોનું પાલન કરવામાં આવશે.

2. આ પેરામાં અદાણી ગ્રુપે ઉલ્લંઘનો કરેલા છે તેવા આક્ષેપો કરવામાં આવેલા છે પણ તેનો કોઈ આધાર આપેલ નથી. ભૂતકાળમાં આવા આક્ષેપો અને કાનૂની દાવાઓ થયા હતા જે માનનીય કોર્ટો એ કાઢી

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નાખેલા છે. ઉપસ્થિત કરેલા મુદ્દા સૂચિત પ્રોજેક્ટને સંબંધિત નથી અને આથી અમે કોઈ ટિપ્પણી આપતા નથી. પરંતુ, પ્રોજેકટ મંજૂરી આપ્યા મુજબ જ અને પર્યાવરણીય સુરક્ષા ધ્યાનમાં રાખીને ચલાવવામાં આવશે. .

3. સૂચિત પ્રોજેક્ટ આંશિક નોટિફાઈડ SEZ માં અને આંશિક માર્ગાન્તર માટે લાગુ જંગલ જમીનમાં સ્થિત છે. નોટિફાઈડ SEZ માટે સર્વે નંબર્સ ફોર્મ-1 એપ્લિકેશનમાં સામેલ કરવામાં આવ્યા છે અને તેની વિગતો છે: *APSEZ* વિસ્તાર સીરાચા અને નેવાણી ગામોમાં: સિરાચા ગામ. 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141 / પી, 142 / પી, 143, 144/1, 144/2, 147 /પી, 295/1 ભાગ , 295/2 (જંગલ જમીન), બિનસર્વે જમીન, જૂની એસીએલ અને માર્ગાંતરિત મુંદ્રા જંગલ જમીનનો ભાગ. નેવીલ ગામ 223/પી, 224 /પી, 225/ પી અને જૂની એસીએલ જેનો અંતિમ ઇઆઇએ અહેવાલમાં પણ સામેલ કરવામાં આવશે.

4. APSEZ એ યોગ્ય પરવાનગીઓ પ્રાપ્ત કર્યા પછી એઇએલની તરફેણમાં જમીન તબદીલ કરવા/ ફાળવવા સૈધ્ધાંતિક મંજૂરી આપી છે. પત્રની એક નકલ ઇઆઇએ અહેવાલની અનુસૂચિ - 3 માં આપવામાં આવી છે.

5. સૂચિત પ્રોજેક્ટ સંબંધિત જમીનની વિગતો ઉપરના ક્રમાંક 3 માં આપવામાં આવેલી છે.

6. સૂચિત પ્રોજેક્ટની જમીનનો ભાગ, 154.18 હેકટર નોટિફાઈડ SEZ માં છે. જાહેરનામાંની એક નકલ અનુસૂચિ -? અને તેને અંતિમ ઇઆઇએ રિપોર્ટમાં શામેલ કરવામાં આવશે.

7. સૂચિત પ્રોજેક્ટની જમીનનો ભાગ, 154.18 હેકટર નોટિફાઈડ SEZ માં છે.

8. સૂચિત પ્રોજેક્ટમાં નોટિફાઈડ SEZ વિસ્તાર અને જંગલની જમીનનો સમાવેશ થાય છે. નોટિફાઈડ SEZ ની એક નકલ ઉપરના મુદ્દા નં. 6 મુજબ છે. APSEZ એ વન જમીનના માર્ગાન્તર માટે લાગુ પડે છે અને તે પ્રગતિ હેઠળ છે. ઇઆઇએ રિપોર્ટના પ્રકરણ -2 માં જમીનની વિગતો આપવામાં આવી છે.

9. અમે તમારા નિરીક્ષણ સાથે સંમત નથી. એઈએલે સાઇટ પર કોઈ પ્રવૃત્તિ શરૂ કરી નથી અને કોઈપણ જમીન પર કોઈ અતિક્રમણ કર્યું નથી.

10. હાલમાં, સૂચિત પ્રોજેક્ટ વિસ્તાર માટે SEZ ડીનોટીફીકેશનની કોઈ જરુરિયાત નથી.

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11. વૈકલ્પિક સ્થળ વિશ્લેષણ હાથ ધરવામાં આવ્યું હતું. સ્થળ પસંદગીના માપદંડ અને વૈકલ્પિક સ્થળનો અભ્યાસ EIA રિપોર્ટના પ્રકરણ -5 માં વિગતવાર આપેલ છે

12. વન જમીનમાં સુધારણાની કોઈ દરખાસ્ત નથી. જંગલની જમીનની માર્ગાંતરની દરખાસ્ત પ્રક્રિયા હેઠળ છે. સૂચિત પ્રોજેક્ટ હેઠળની અન્ય જમીન નોટિફાઈડ SEZ વિસ્તાર છે.

13. વનની જમીનની વિગત ફોર્મ -1 (મૂળભૂત માહિતી, ક્રમ નં 9, 12, 21 અને 23) માં પણ દર્શાવવામાં આવી છે.

14. કંપનીએ ગ્રીન બેલ્ટ માટે 33% વિસ્તારનો પ્રસ્તાવ મૂક્યો છે. 102.38 હેકટર જંગલની જમીન, એકવાર માર્ગાંતર અને ફાળવણી થયા પછી, તે પ્રોજેક્ટ વિસ્તારનો ભાગ હશે. 256.58 હેક્ટરના કુલ પ્રોજેક્ટ વિસ્તારના 33% માં ગ્રીન બેલ્ટ વિકસાવવામાં આવશે. જંગલ વિસ્તારમાં કોઈ ગેરકાયદેસર અતિક્રમણ કરવામાં આવ્યું નથી.

15. પૃષ્ઠ C3-16 ના નકશા મુજબ, પ્રોજેક્ટ સાઇટમાં સિરાચા રિઝર્વ ફોરેસ્ટનો ભાગ પણ શામેલ છે. યોગ્ય નકશો ઇઆઇએ અહેવાલમાં આપવામાં આવ્યો છે.

16. વન મંજૂરી હજી પણ કાર્યવાહી હેઠળ છે. આ વિગતો MoEF & CC (ફાઈલ નં. 8-04 / 2016-એફસી) ની વેબસાઇટ પર ઉપલબ્ધ છે.

17. જંગલ જમીન માર્ગાંતર કાર્યવાહી હેઠળ છે અને એકવાર મંજૂર થયા પછી, વન મંજૂરની તમામ શરતોનું પાલન કરવામાં આવશે.

18. જંગલ જમીન માર્ગાંતર કાર્યવાહી હેઠળ છે અને લાગુ થતી હોય તે પ્રમાણે જંગલ અધિકાર અધિનિયમની આવશ્યકતાઓનું પાલન કરવામાં આવશે.

19. તારીખ -અને -તારીખ સુપ્રીમ કોર્ટમાં SLP28788/2016 અને ગુજરાત હાઇકોર્ટમાં ડબલ્યુપી (પીઆઈએલ) 12/2011ને સંબંધિત ઓર્ડરોની થી રદ કરવામાં આવે છે. તેથી, કોઈ વિવાદ નથી.

20. સુનિતા નારાયણ કમિટીના અહેવાલના સંદર્ભમાં, APSEZ, 18 મી સપ્ટેમ્બર, 2015 ના તેમના અંતિમ હુકમ MoEF&CC.ના નિર્દેશો અનુસાર, પાલન કરે છે.

21. સૂચિત સાઇટના પશ્ચિમ ભાગમાં ધનેશ્વરી, મોસમી નદી વહે છે. ઇઆઇએ અહેવાલના પૃષ્ઠ C2-3 પરના પ્લાન્ટ લેઆઉટમાં દર્શાવ્યા મુજબ નદીના પ્રવાહને જાળવવામાં આવશે. પ્રોજેક્ટ સાઇટની આસપાસના

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10 કીમી વિસ્તારમાં અસર આકારણી આવરી લેવામાં આવી છે અને તે જળાશયો (જો કોઈ હોય તો), સ્થાનિક રહેવાસીઓ અને ગામોનો સમાવેશ કરે છે. કોઈપણ ખાડીઓ બંધ કરવાની કોઈ દરખાસ્ત નથી

22. ગુજરાત કોસ્ટલ ઝોન મેનેજમેન્ટ ઓથોરિટી માન્ય કોસ્ટલ ઝોન મેનેજમેન્ટ પ્લાનનો રખેવાળ છે. જોકે, MoEF&CC ની અધિકૃત એજન્સી દ્વારા તૈયાર કરાયેલ અધિકૃત સીઆરઝેડ નકશો સુપરિમબોઝિંગ પ્રોજેક્ટ વિસ્તારને ઇઆઇએ અહેવાલના પ્રકરણ -3 જણાવવામાં આવ્યો છે.

23. જોડેલ સીઆરઝેડ નકશો નેશનલ સેન્ટર ફોર અર્થ સાયન્સ સ્ટડીઝ દ્વારા તૈયાર કરવામાં આવેલ છે અને ઇઆઇએ રિપોર્ટના પૃષ્ઠ C3-17 પર જોડેલ છે. અંતિમ ઇઆઇએ અહેવાલમાં વધુ સ્પષ્ટ નકલ શામેલ કરવામાં આવશે.

24. સૂચિત સાઇટ સીઆરઝેડની બહાર છે અને દક્ષિણ દિશામાં પ્રવર્તમાન મેંગ્રોવથી લઘુત્તમ અંતર 100 મીટરથી વધુ છે.

25. આ વિસ્તારના લોકોનું વ્યવસાયિક માળખું ઇઆઇએ અહેવાલના પૃષ્ઠ C3-65 પર દર્શાવવામાં આવ્યું છે. મુખ્ય કામદારો કુલ કામદારોના 90.57 ટકા છે. કાર્ય ભાગીદારીનો દર 56.36 ટકા છે. માછીમારી પ્રવૃત્તિઓ પૈકીની એક છે. અભ્યાસ ક્ષેત્રમાં માછીમારોની સંખ્યા અંગેની વિગતોને અંતિમ ઇઆઇએ અહેવાલમાં સામેલ કરવામાં આવશે.

26. સૂચિત પ્રોજેક્ટને લીધે કોઈ માછીમારોને અસર થશે નહીં..

27. પેગડીયા માછીમારોની વિગતોનો અંતિમ ઈઆઇએ અહેવાલમાં સમાવેશ કરવામાં આવશે.

28. નોટિફાઈડ SEZ વિસ્તાર અને માર્ગાંતર માટે લાગુ કરવામા આવેલી જંગલની જમીન પર પ્રોજેક્ટ વિકસાવવામાં આવશે. APSEZ એ નવીનાળ અને સિરાચાના માછીમારો માટે સમર્પિત આવવા જવાનો માર્ગ બનાવ્યો છે. સૂચિત પ્રોજેક્ટને કારણે માછીમારોના એક્સેસ માર્ગો બંધ કરવામાં આવશે નહીં.

29. 102.38 હેક્ટર જંગલ જમીનના માર્ગાંતરણમાં કોઈ પુનર્વસન સંકળાયેલ નથી. વનસ્પતિ અને પ્રાણીઓના અભ્યાસ EIA ના ભાગરૂપે કરવામાં આવેલા છે અને EIA રિપોર્ટમાં મેનેજમેંટ પ્લાન આપવામાં આવેલો છે. એક વખત જંગલ મુક્તિ મળતાં, જંગલ મુક્તિની તમામ શરતોનું, જંગલ જમીનના માર્ગાંતરણની અસરોનું શમન કરવા માટે પાલન કરવામાં આવશે. તમામ કાર્યવાહી પૂરી થયા પછી અને MoEF&CCની મંજૂરી મળ્યા પછી જંગલ માર્ગાંતરણ માટે રાજ્ય સરકાર દ્વારા ભલામણ કરી શકાશે.

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30. કોપર સ્લેગ અને ફોસ્ફોજીપ્સમના ઉત્પાદનના જથ્થાની વિગતો EIA રિપોર્ટમાં આપવામાં આવેલી છે. કોપર સ્લેગ બિલ્ડીંગ મટિરિયલ તરીકે(કોંક્રીટમાં અને તૈયાર મિક્સમાં સાથે નાખવા), રોડ બાંધકામ અને અને શૉટ બ્લાસ્ટિંગમાં વપરાય છે અને ફોસ્ફોજીપ્સમ સિમેન્ટ ઉત્પાદન, જીપ્સમ બોર્ડ ઉત્પાદન અને ખાતરમાં વપરાય છે.બંને મટિરિયલ સ્થાનિક અને વિદેશી બજારોમાં વેચવામાં આવશે.

31. જૈવવિવિધતા ક્ષેત્ર તરીકે નવીનાળ ફોરેસ્ટ પર કોઈ જાહેરનામું સૂચિત કરવામાં આવ્યું નથી.

32. વૈધાનિક સત્તાવાળાઓ દ્વારા વહન ક્ષમતા અભ્યાસો હાથ ધરવામાં આવ્યા છે. આ વિસ્તાર માટે કોઈ પણ વહન ક્ષમતા અભ્યાસો હાથ ધરવામાં આવ્યા હોય તેની અમને જાણ નથી. MoEF&CC દ્વારા મંજૂર કરાયેલા TOR મુજબ અભ્યાસના વિસ્તાર માટે EIA અભ્યાસો હાથ ધરવામાં આવ્યા છે.

33. સંચિત અસર દર્શાવવા માટે સૂચિત કોપર પ્રોજેક્ટના કારણે અસરો બેઝલાઇન ડેટા પર લાદવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો હવા અને પાણી માટે નિર્ધારિત ધોરણોમાં જણાય છે અને તેથી તે સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો ઉપલબ્ધ છે.

34. 7 સ્થળો - જિલ્લા કલેકટર, ભુજ, જિલ્લો કચ્છ, જીલ્લા વિકાસ કચેરી, ભુજ, જિલ્લો કચ્છ, જિલ્લા ઉદ્યોગ કેન્દ્ર, ભુજ, જિલ્લો કચ્છ, તાલુકા વિકાસ કચેરી, મુંદ્રા, જિલ્લો કચ્છ, તાલુકા વિકાસ કચેરી, માંડવી, જિલ્લો કચ્છ, મુખ્ય વન સંરક્ષક, પર્યાવરણ, વન અને હવામાન પરિવર્તન મંત્રાલય, ભારત સરકાર, પ્રાદેશિક કચેરી (પશ્ચિમ ઝોન), કેન્દ્રીય પર્યાવરણ ભવન, ઇ -5, એરેરા કોલોની, લિંક રોડ -3, રવિશંકર નગર, ભોપાલ 462016 અને પ્રાદેશિક કચેરી, કચ્છ (પૂર્વ), ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ, રૂમ નં. 215-216, બીજો માળ, કંડલા પોર્ટ ટ્રસ્ટ, એડમીન બિલ્ડિંગ, સેકટર 08 , ગાંધીધામ, કચ્છ- ઉપરાંત સૂચિત સાઇટના 10 કિ.મી.ની અંદર તમામ ગ્રામ પંચાયતો ગુજરાતીમાં સારાંશ મૂકવામાં આવેલ છે.

35. આ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે.

36. પાવર ટ્રાન્સમિશન લાઇન્સ કેટલાક વિચલન સાથે જાળવી રાખવામાં આવશે.

37. માત્ર પર્યાવરણ સેલના એક ભાગ તરીકે 8 વ્યક્તિઓનો પ્રસ્તાવ છે. પર્યાવરણ વ્યવસ્થાપન આ 8 વ્યક્તિઓ સુધી મર્યાદિત નથી, પરંતુ પર્યાવરણ વ્યવસ્થાપન માટે વિવિધ વિભાગો દ્વારા હાથ ધરવામાં આવેલી કામગીરીનો તેમાં સમાવેશ થાય છે.

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38. અદાણી એન્ટરપ્રાઈઝીસ લિમિટેડ પાસે એન્જીનિયરિસ્ટની આગેવાની હેઠળની તેની પોતાની પર્યાવરણ વ્યવસ્થાપન ટીમ હશે, જે કોપર પ્રોજેક્ટના તમામ પર્યાવરણીય અને પ્રદૂષણના મુદ્દાઓનું સંચાલન કરવાની ક્ષમતા ધરાવે છે. અન્ય મુદ્દાઓ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે..

39. એસએલએફ હેઠળનો વિસ્તાર પ્રિ-ફીઝીબીલીટી અહેવાલમાં પૂરો પાડવામાં આવેલ છે, જે TOR એપ્લિકેશનનો એક ભાગ છે.

40. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાંટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે. સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની /પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે.

41. અમારો જવાબ મુદ્દા નં. 40 મુજબનો છે.

42. પ્રશ્ન અમને સંબંધિત નથી, તેથી અમે કોઈ ટિપ્પણી આપતા નથી.. ઇઆઇએ અહેવાલના પ્રકરણ -6 માં દર્શાવ્યા મુજબ અને મંજૂર કરેલ પરવાનગીઓ સાથે સુસંગત પર્યાવરણીય મોનીટરીંગ કરવામાં આવશે.

43. સૂચિત પ્રોજેક્ટમાં ઝીરો લીક્વીડ ડિસ્ચાર્જ સુવિધા હશે અને કોઈ સારવાર કરેલ પાણી સમુદ્રમાં મોકલવામાં આવશે નહીં

44. કોઈપણ સીઇટીપી સાથે જોડાણ કરવાની કોઈ દરખાસ્ત નથી. ગંદાપાણીના ઉપચાર માટે એઇએલની પોતાની ETP હશે. ઇઆઇએ અહેવાલમાં વિગતો આપવામાં આવી છે.

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45. ઇવાય અહેવાલમાં ફ્લો ડાયાગ્રામ અને ક્ષમતાઓ આપવામાં આવેલી છે. વિગતવાર એન્જિનિયરિંગ દરમિયાન વધુ આયોજન કરવામાં આવશે.

46. ઇઆઇએ અહેવાલમાં અભ્યાસના વિસ્તાર વિશે વસ્તી વિષયક માહિતીની વિગતો શામેલ છે. ઇઆઇએ અહેવાલના એક્ઝિક્યુટિવ સમરી સ્થાનિક ભાષામાં તૈયાર કરવામાં આવી હતી અને સૂચિત સાઇટના 10 કિલોમીટરના ત્રિજ્યામાં તમામ પંચાયતો પર ઉપલબ્ધ કરાવવામાં આવી હતી. ઇઆઇએ રિપોર્ટ સાથે એક્ઝિક્યુટિવ સમરી 5 સરકારી કચેરીઓ પર પણ સ્થાનિક ભાષામાં ઉપલબ્ધ કરવામાં આવી હતી. અદાણી ફાઉન્ડેશન આસપાસના તમામ ગામડાઓને આવરી લેતા સામુહિક આરોગ્ય ક્ષેત્રે કાર્ય કરી રહ્યું છે.

47. આ સૂચિત પ્રોજેક્ટ માટે EIA અહેવાલના કાર્યક્ષેત્રની બહાર છે. જો કે, પાત્રતાને આધારે સૂચિત પ્રોજેક્ટ માટે સ્થાનિક રોજગાર પૂરો પાડવામાં આવશે અને ઇઆઇએ અહેવાલમાં વિગતો પૂરી પાડવામાં આવી છે.

48. આ સૂચિત પ્રોજેક્ટ માટે EIA અહેવાલના કાર્યક્ષેત્રની બહાર છે.

49. પર્યાવરણ, વન અને આબોહવા પરિવર્તન મંત્રાલય દ્વારા આપવામાં આવેલા સંદર્ભની શરતો અનુસાર ઇઆઇએ અહેવાલ તૈયાર કરવામાં આવ્યો છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,

અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)

અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/ D-A-36

Shri Usman Gani H. Sherasiya
Secretary, National Fisherfolk Forum
Post- Kankot, Taluka- Wankaner
Dist- Morbi, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,
We acknowledge the receipt of your representation and have noted your concerns. We are herewith responding para wise to the issues raised by you:

1. The Copper Project is based on the import of Copper Concentrate, which is not available in our country in required quantity. Also, most of the finished products will be dispatched through sea route. These factors were considered as site selection criteria. The site is advantageous in terms of proximity to the port. With all the pollution control measures proposed, the environmental risks and impacts will be mitigated. The project is also based on zero liquid discharge. There are many such plants on coastal locations and have been operating without any significant impact on the coastal ecology. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. The entire process and conditions of forest clearance will be complied, once obtained.

2. The proposed project is located partly in notified SEZ and partly in forest land applied for diversion. The Survey Numbers for notified SEZ have been incorporated in the Form-1 application and its details are: *APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), unsurveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL.* Same will also be included in the final EIA Report.

3. APSEZ has given in principle approval to transfer/ allot the land in favour of AEL after obtaining due permissions. A copy of letter is provided in the Annexure-III of the EIA report.

4. The land details related to proposed project are provided in the Point No. 2 above.

5. Part of the proposed project land, 154.18 ha is within the Notified SEZ. A copy of notification is enclosed as Annexure- ? and same will be included in the final EIA Report.

6. Part of the proposed project land, 154.18 ha is within the Notified SEZ.

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7. Proposed project includes notified SEZ area and the forest land. A copy of notified SEZ area is as per point no. 6 above. APSEZ has applied for forest land diversion and same is under progress. Details of land are provided in the chapter-2 of EIA the report.

8. We do not agree with your observation. AEL has not started any activity at the site and there is no encroachment on any land.

9. At the moment, there is no requirement of SEZ denotification for the proposed project area.

10. Alternative site analysis was carried out. The site selection criteria and the study of alternative sites is detailed in Chapter-5 of the EIA Report.

11. There is no proposal of reclamation in Forest Land. The proposal for diversion of forest land is under process. Other land under the proposed project is notified SEZ area.

12. The details of Forest Land are also shown in Form-I (Basic Information, Sl. Nos. 9, 12, 21 and 23).

13. Company has proposed 33% area for Green Belt. The 102.38 ha forest land, once diverted and allotted, will be part of the project area. The Green Belt will be developed in 33% of the total project area of 256.58 ha. There is no illegal encroachment of forest area.

14. Forest land is part of proposed project area for which all necessary procedure and compliance will be made. Green Belt will be developed around the facilities as per desired norms.

15. As per the map on Page C3-16, the project site also includes part of the Siracha Reserve Forest. Correct map is provided in the EIA report.

16. The Forest Clearance is still under process. The details are available on the website of MoEF & CC (File No. 8-04/2016-FC).

17. Present list of directors of AEL is enclosed as Annexure- . Same will be included in the final EIA report.

18. SLP28788/2016 in the Supreme Court and WP (PIL) 12/2011 at Gujarat High Court are dismissed vide respective orders dated - and -. Therefore, there is no dispute.

19. In the matter of Sunita Narain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015.

20. Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Impact Assessment has been carried out covering 10 km area surrounding

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the project site and it includes water bodies (if any), local residents and villages. There is no proposal of closing any creeks.

21. Gujarat Coastal Zone Management Authority is the custodian of approved Coastal Zone Management Plan. However, authorized CRZ map superimposing project area prepared by authorized agency of MoEF&CC is provided in the Chapter-3 of the EIA report.

22. The CRZ Map enclosed is prepared by National Centre for Earth Science Studies and enclosed on Page C3-17 of EIA Report. More clear copy will be included in the final EIA report.

23. The proposed site is outside CRZ and the minimum distance from existing Mangrove in southern direction is more than 100 m.

24. The occupational structure of the people in the area is detailed on Page C3-65 of the EIA Report. The main workers account for 90.57% of the total workers. The Work Participation Rate is 56.36%. Fishing is one of the activities. Details on number of fishermen in the study area will be included in the final EIA report.

25. No fishermen will be impacted due to proposed project.

26. The details on pagadiya fisherfolk will be included in the final EIA Report.

27. Project will be developed over notified SEZ area and forest land applied for diversion. APSEZ has created dedicated approach road for fishermen of Navinal and Siracha. Fishermen access roads will not be closed due to proposed project.

28. There is no resettlement involved in the diversion of 102.38 ha of forest land. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.

29. Copper Concentrate will be the principal raw material, which has sulphur and mercury content of 34% and 50 ppm respectively. There is no known Uranium or Thorium content and its radiation in the raw material. Copper slag will contain Sulphur (0.5-1.5%) and mercury (BDL).

30. There are no CREP Guidelines for Copper Smelter & Refinery.

31. There are no CREP Guidelines for Copper Smelter & Refinery.

32. There are no CREP Guidelines for Copper Smelter & Refinery.

33. Details on production quantity of copper slag and phosphogypsum is provided in the EIA report. Copper Slag can be used as a building material (Added in Concrete as well

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as in ready mix), Road Construction & shot blasting and Phosphogypsum is used for Cement manufacturing, gypsum board Manufacturing and fertilizer. Both the materials will be sold in domestic and overseas market.

34. There are no CREP Guidelines for Copper Smelter & Refinery.

35. There is no notification on Navinal Forest being notified as Biodiversity Area.

36. Carrying Capacity Studies are undertaken by Statutory Authorities. We are not aware of any Carrying Capacity Studies carried out for this area. EIA studies have been conducted for the study area as per TOR granted by MoEF&CC.

37. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for Air and Water and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

38. The Gujarati Summary was placed at all the Gram Panchayats within 10 km of the proposed site in addition to the 7 places- The District Collector, Bhuj, District Kutch, District Development Office, Bhuj, District Kutch, District Industry Centre, Bhuj, District Kutch, Taluka Development Office, Mundra, District Kutch, Taluka Development Office, Mandvi, District Kutch, The Chief Conservator of Forest, Ministry of Environment, Forests and Climate Change Government of India, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E-5, Arera Colony, Link Road -3, Ravishankar Nagar, Bhopal 462016 and Regional Office, Kutch (East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Admn Building, Sector 08, Gandhidham, Kutch.

39. This is outside the scope of the EIA Report for the proposed project.

40. Power Transmission Lines will be retained with some deviation.

41. 8 persons are proposed as a part of Environment Cell alone. The Environment Management is not only limited to these 8 persons, but it includes the operations carried out by various departments for the management of environment.

42. Adani Enterprises Limited will have its own Environment Management Team headed by an environmentalist, capable of handling all the environmental and pollution issues of the Copper Project. Other issues are outside the scope of the EIA Report for the proposed project. The question does not pertain to proposed project and therefore we do not offer any comment.

43. The area under SLF is provided in the Pre-feasibility Report, which is a part of the TOR Application.

44. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the

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project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height, Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report. There will not be any impact on coral of Gulf of Kutch and Jamnagar due to proposed project activity.

45. The project is being designed with zero liquid discharge, there is no likelihood of ocean warming or acidification due to proposed project. There will not be any coral bleaching and marine acidification due to proposed project.
46. The project is estimated to emit 0.53 Million Tons of CO2 equivalent of GHG emission per year, which is insignificant in the context of Global Warming.
47. The total GHG emission is estimated at 0.53 Million Tons of CO2 equivalent per year. This information will be added as apart of final EIA Report.
48. We will be adopting advanced technologies which are having lesser footprint as compared to other existing conventional technologies in the market. However, alternative source of fuel will be explored to minimize the GHG emissions due to project activity.
49. The Gypsum produced will have around 20% moisture and same will be stored in the Gypsum storage area proposed over 28.34 ha through dry conveying method. Gypsum storage area will be constructed with HDPE liner to prevent any leaching. Gypsum will be sun-dried and sold to the potential customers. There will not be any discharge of water outside the project premises.
50. RO Rejects will be taken to Multi-Effect Evaporator. There will not be any discharge into the sea.
51. The question does not pertain to us, therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to the permissions granted.
52. Proposed project will have zero liquid discharge facility and no treated water will be sent to the sea.
53. The entire project will work on the principle of Zero Liquid Discharge. Details are provided in the EIA report.
54. The project will generate 6468 KLD of wastewater. Entire wastewater will be treated and reused within the plant. The details are provided in the EIA Report.
55. There is no proposal of tie up with any CETP. AEL will have its own ETP for treatment of wastewater. Details are provided in the EIA report.
56. The Flow Diagram and the Capacities are provided in the EIA Report. Further planning will be carried out during detailed engineering.

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57. The judgement passed by Honorable Supreme Court is in relation to the existing industry operating without preliminary treatment of waste water and therefore not applicable for the proposed project, however details of the ETP for the proposed project is provided in the EIA report.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

P.A. Suryarao

(Prasad Suryarao)
Authorized Signatory.

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રેફ: AEL/Copper/Mundra/EC/PH/ D-A-36

શ્રી ઉસ્માન ગની એચ. શેરસીયા
સેક્રેટરી, નેશનલ ફિશરફોક ફોરમ
પોસ્ટ- કાંકોટ, તાલુકા-વાંકાનેર
જિલ્લો:મોરબી, ગુજરાત

વિષય :અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,
અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ::

1. પ્રોજેકટ કોપર કોન્સનટ્રેટની આયાત પર આધાર રાખે છે, જે આપણા દેશમાં જરૂરી જથ્થામાં ઉપલબ્ધ નથી.વળી, તૈયાર થયેલ ઘણા ઉત્પાદનો દરિયાઈ માર્ગે મોકલવામાં આવશે. આ પરિબળો સાઇટની પસંદગી માટે ધ્યાનમાં લેવામાં આવેલા.બંદરની નજીક હોવાથી આ સાઇટ ફાયદાકારક છે. તમામ સૂચવાયેલા પ્રદૂષણ નિયંત્રણ પગલાં લઈ, પર્યાવરણના જોખમ અને અસરોનું શમન કરવામાં આવશે. પ્રોજેકટ ઝીરો લિક્વિડ ડિસ્ચાર્જ(પ્રવાહી બહાર આવશે નહીં) પર આધારિત છે.દરિયા કિનારાના લોકેશનો પર આવા ઘણા પ્લાન્ટ આવેલા છે અને તેમના સંચાલનથી દરિયા કાંઠાની પરિસ્થિતી ઉપર કોઈ નોંધપાત્ર અસર થયેલ નથી.પ્રોજેકટ સાઇટનો એક ભાગ જંગલ જમીન છે, જેનો ઉપયોગ ત્યારેજ કરવામાં આવશે જ્યારે જંગલના માર્ગાંતરણની આખરી મંજૂરી મળી જશે. જંગલ મુક્તિ મંજૂર થતાં તેની તમામ પ્રક્રિયા અને શરતોનું પાલન કરવામાં આવશે.

2. સૂચિત પ્રોજેક્ટ આંશિક નોટિફાઇડ SEZ માં અને આંશિક માર્ગાન્તર માટે લાગુ જંગલ જમીનમાં સ્થિત છે. નોટિફાઇડ SEZ માટે સર્વે નંબર્સ ફોર્મ-1 એપ્લિકેશનમાં સામેલ કરવામાં આવ્યા છે અને તેની વિગતો છે: *APSEZ* વિસ્તાર સીરાચા અને નેવાણી ગામોમાં: સિરાચા ગામ. 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141 / પી, 142 / પી, 143, 144/1, 144/2, 147 /પી, 295/1 ભાગ , 295/2 (જંગલ જમીન), બિનસર્વે જમીન, જૂની એસીએલ અને માર્ગાંતરિત મુંદ્રા જંગલ જમીનનો ભાગ. નેવીલ ગામ 223/પી, 224 /પી, 225/ પી અને જૂની એસીએલ જેનો અંતિમ ઇઆઇએ અહેવાલમાં પણ સામેલ કરવામાં આવશે.

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3. APSEZ એ યોગ્ય પરવાનગીઓ પ્રાપ્ત કર્યા પછી એઇએલની તરફેણમાં જમીન તબદીલ કરવા/ ફાળવવા સૈધ્ધાંતિક મંજૂરી આપી છે. પત્રની એક નકલ ઇઆઇએ અહેવાલની અનુસૂચિ - 3 માં આપવામાં આવી છે.

4. સૂચિત પ્રોજેક્ટ સંબંધિત જમીનની વિગતો ઉપરના ક્રમાંક 3 માં આપવામાં આવેલી છે.

5. સૂચિત પ્રોજેક્ટની જમીનનો ભાગ, 154.18 હેકટર નોટિફાઇડ SEZ માં છે. જાહેરનામાંની એક નકલ અનુસૂચિ -? અને તેને અંતિમ ઇઆઇએ રિપોર્ટમાં શામેલ કરવામાં આવશે.

6. સૂચિત પ્રોજેક્ટની જમીનનો ભાગ, 154.18 હેકટર નોટિફાઇડ SEZ માં છે.

7. સૂચિત પ્રોજેક્ટમાં નોટિફાઇડ SEZ વિસ્તાર અને જંગલની જમીનનો સમાવેશ થાય છે. નોટિફાઇડ SEZ ની એક નકલ ઉપરના મુદ્દા નં. 6 મુજબ છે. APSEZ એ વન જમીનના માર્ગાન્તર માટે લાગુ પડે છે અને તે પ્રગતિ હેઠળ છે. ઇઆઇએ રિપોર્ટના પ્રકરણ -2 માં જમીનની વિગતો આપવામાં આવી છે.

8. અમે તમારા નિરીક્ષણ સાથે સંમત નથી. એઈએલે સાઇટ પર કોઈ પ્રવૃત્તિ શરૂ કરી નથી અને કોઈપણ જમીન પર કોઈ અતિક્રમણ કર્યું નથી.

9. હાલમાં, સૂચિત પ્રોજેક્ટ વિસ્તાર માટે SEZ ડીનોટીફીકેશનની કોઈ જરુરિયાત નથી.

10. વૈકલ્પિક સ્થળ વિશ્લેષણ હાથ ધરવામાં આવ્યું હતું. સ્થળ પસંદગીના માપદંડ અને વૈકલ્પિક સ્થળનો અભ્યાસ EIA રિપોર્ટના પ્રકરણ -5 માં વિગતવાર આપેલ છે

11. વન જમીનમાં સુધારણાની કોઈ દરખાસ્ત નથી. જંગલની જમીનની માર્ગાંતરની દરખાસ્ત પ્રક્રિયા હેઠળ છે. સૂચિત પ્રોજેક્ટ હેઠળની અન્ય જમીન નોટિફાઇડ SEZ વિસ્તાર છે.

12. વનની જમીનની વિગત ફોર્મ -1 (મૂળભૂત માહિતી, ક્રમ નં 9, 12, 21 અને 23) માં પણ દર્શાવવામાં આવી છે.

13. કંપનીએ ગ્રીન બેલ્ટ માટે 33% વિસ્તારનો પ્રસ્તાવ મૂક્યો છે. 102.38 હેકટર જંગલની જમીન, એકવાર માર્ગાંતર અને ફાળવણી થયા પછી, તે પ્રોજેક્ટ વિસ્તારનો ભાગ હશે. 256.58 હેક્ટરના કુલ પ્રોજેક્ટ વિસ્તારના 33% માં ગ્રીન બેલ્ટ વિકસાવવામાં આવશે. જંગલ વિસ્તારમાં કોઈ ગેરકાયદેસર અતિક્રમણ કરવામાં આવ્યું નથી.

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14. વન જમીન સૂચિત પ્રોજેક્ટ વિસ્તારનો એક ભાગ છે જેના માટે તમામ જરૂરી પ્રક્રિયા અને પાલન કરવામાં આવશે. ઇચ્છિત નિયમો મુજબ સુવિધાઓની આસપાસ ગ્રીન બેલ્ટ વિકસાવવામાં આવશે.

15. પૃષ્ઠ C3-16 ના નકશા મુજબ, પ્રોજેક્ટ સાઇટમાં સિરાયા રિઝર્વ ફોરેસ્ટનો ભાગ પણ શામેલ છે. યોગ્ય નકશો ઇઆઇએ અહેવાલમાં આપવામાં આવ્યો છે.

16. વન મંજૂરી હજી પણ કાર્યવાહી હેઠળ છે. આ વિગતો MoEF & CC (ફાઈલ નં. 8-04 / 2016-એફસી) ની વેબસાઇટ પર ઉપલબ્ધ છે.

17. AEL ના ડિરેક્ટરોની વર્તમાન યાદી અનૂસૂચિ- xxx તરીકે જોડાયેલી છે. જેને અંતિમ ઇઆઇએ અહેવાલમાં શામેલ કરવામાં આવશે.

18. તારીખ -અને -તારીખ સુપ્રીમ કોર્ટમાં SLP28788/2016 અને ગુજરાત હાઇકોર્ટમાં ડબલ્યુપી (પીઆઈએલ) 12/2011ને સંબંધિત ઓર્ડરોની થી રદ કરવામાં આવે છે. તેથી, કોઈ વિવાદ નથી.

19. સુનિતા નારાયણ કમિટીના અહેવાલના સંદર્ભમાં, APSEZ, 18 મી સપ્ટેમ્બર, 2015 ના તેમના અંતિમ હુકમ MoEF&CC.ના નિર્દેશો અનુસાર, પાલન કરે છે.

20. સૂચિત સાઇટના પશ્ચિમ ભાગમાં ધનેશ્વરી, મોસમી નદી વહે છે. ઇઆઇએ અહેવાલના પૃષ્ઠ C2-3 પરના પ્લાન્ટ લેઆઉટમાં દર્શાવ્યા મુજબ નદીના પ્રવાહને જાળવવામાં આવશે. પ્રોજેક્ટ સાઇટની આસપાસના 10 કીમી વિસ્તારમાં અસર આકારણી આવરી લેવામાં આવી છે અને તે જળાશયો (જો કોઈ હોય તો), સ્થાનિક રહેવાસીઓ અને ગામોનો સમાવેશ કરે છે. કોઈપણ ખાડીઓ બંધ કરવાની કોઈ દરખાસ્ત નથી

21. ગુજરાત કોસ્ટલ ઝોન મેનેજમેન્ટ ઓથોરિટી માન્ય કોસ્ટલ ઝોન મેનેજમેન્ટ પ્લાનનો રખેવાળ છે. જોકે, MoEF&CC ની અધિકૃત એજન્સી દ્વારા તૈયાર કરાયેલ અધિકૃત સીઆરઝેડ નકશો સુપરિમબોઝિંગ પ્રોજેક્ટ વિસ્તારને ઇઆઇએ અહેવાલના પ્રકરણ -3 જણાવવામાં આવ્યો છે.

22. જોડેલ સીઆરઝેડ નકશો નેશનલ સેન્ટર ફોર અર્થ સાયન્સ સ્ટડીઝ દ્વારા તૈયાર કરવામાં આવેલ છે અને ઇઆઇએ રિપોર્ટના પૃષ્ઠ C3-17 પર જોડેલ છે. અંતિમ ઇઆઇએ અહેવાલમાં વધુ સ્પષ્ટ નકલ શામેલ કરવામાં આવશે.

23. સૂચિત સાઇટ સીઆરઝેડની બહાર છે અને દક્ષિણ દિશામાં પ્રવર્તમાન મેંગ્રોવથી લઘુત્તમ અંતર 100 મીટરથી વધુ છે.

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24. આ વિસ્તારના લોકોનું વ્યવસાયિક માળખું ઇઆઇએ અહેવાલના પૃષ્ઠ C3-65 પર દર્શાવવામાં આવ્યું છે. મુખ્ય કામદારો કુલ કામદારોના 90.57 ટકા છે. કાર્ય ભાગીદારીનો દર 56.36 ટકા છે. માછીમારી પ્રવૃત્તિઓ પૈકીની એક છે. અભ્યાસ ક્ષેત્રમાં માછીમારોની સંખ્યા અંગેની વિગતોને અંતિમ ઇઆઇએ અહેવાલમાં સામેલ કરવામાં આવશે.

25. સૂચિત પ્રોજેક્ટને લીધે કોઈ માછીમારોને અસર થશે નહીં..

26. પેગડીયા માછીમારોની વિગતોનો અંતિમ ઈઆઇએ અહેવાલમાં સમાવેશ કરવામાં આવશે.

27. નોટિફાઈડ SEZ વિસ્તાર અને માર્ગાંતર માટે લાગુ કરવામા આવેલી જંગલની જમીન પર પ્રોજેક્ટ વિકસાવવામાં આવશે. APSEZ એ નવીનાળ અને સિરાચાના માછીમારો માટે સમર્પિત આવવા જવાનો માર્ગ બનાવ્યો છે. સૂચિત પ્રોજેક્ટને કારણે માછીમારોના એક્સેસ માર્ગો બંધ કરવામાં આવશે નહીં.

28. 102.38 હેક્ટર જંગલ જમીનના માર્ગાંતરણમાં કોઈ પુનર્વસન સંકળાયેલ નથી. વનસ્પતિ અને પ્રાણીઓના અભ્યાસ EIA ના ભાગરૂપે કરવામાં આવેલા છે અને EIA રિપોર્ટમાં મેનેજમેંટ પ્લાન આપવામાં આવેલો છે. એક વખત જંગલ મુક્તિ મળતાં, જંગલ મુક્તિની તમામ શરતોનું, જંગલ જમીનના માર્ગાંતરણની અસરોનું શમન કરવા માટે પાલન કરવામાં આવશે. તમામ કાર્યવાહી પૂરી થયા પછી અને MoEF&CCની મંજૂરી મળ્યા પછી જંગલ માર્ગાંતરણ માટે રાજ્ય સરકાર દ્વારા ભલામણ કરી શકાશે.

29. કોપર કોન્સેન્ટરેટ મુખ્ય કાચો માલ હશે, જે અનુક્રમે 34% અને 50 પીપીએમની સલ્ફર અને મર્ક્યુરી સામગ્રી ધરાવે છે. કાચા માલમાં કોઈ જાણીતી યુરેનિયમ અથવા થોરીયમ સામગ્રી અને તેનું રેડીયેશન નથી. કોપર સ્લેગમાં તે જ સલ્ફર (0.5-1.5%) અને મર્ક્યુરી (બીડીએલ) હશે..

30. કોપર સ્મેલ્ટર અને રિફાઇનરી માટે કોઈ સીઆરપીપી માર્ગદર્શિકા નથી.

31. કોપર સ્મેલ્ટર અને રિફાઇનરી માટે કોઈ સીઆરપીપી માર્ગદર્શિકા નથી.

32. કોપર સ્મેલ્ટર અને રિફાઇનરી માટે કોઈ સીઆરપીપી માર્ગદર્શિકા નથી.

33. કોપર સ્લેગ અને ફોસ્ફોજીપ્સમના ઉત્પાદનના જથ્થાની વિગતો EIA રિપોર્ટમાં આપવામાં આવેલી છે. કોપર સ્લેગ બિલ્ડીંગ મટિરિયલ તરીકે(કોંક્રીટમાં અને તૈયાર મિક્સમાં સાથે નાખવા), રોડ બાંધકામ અને અને શૉટ બ્લાસ્ટિંગમાં વપરાય છે અને ફોસ્ફોજીપ્સમ સિમેન્ટ ઉત્પાદન, જીપ્સમ બોર્ડ ઉત્પાદન અને ખાતરમાં વપરાય છે.બંને મટિરિયલ સ્થાનિક અને વિદેશી બજારોમાં વેચવામાં આવશે.

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34. કોપર સ્મેલ્ટર અને રિફાઇનરી માટે કોઈ સીઆરપીપી માર્ગદર્શિકા નથી.

35. જૈવવિવિધતા ક્ષેત્ર તરીકે નવીનાળ ફોરેસ્ટ પર કોઈ જાહેરનામું સૂચિત કરવામાં આવ્યું નથી.

36. વૈધાનિક સત્તાવાળાઓ દ્વારા વહન ક્ષમતા અભ્યાસો હાથ ધરવામાં આવ્યા છે. આ વિસ્તાર માટે કોઈ પણ વહન ક્ષમતા અભ્યાસો હાથ ધરવામાં આવ્યા હોય તેની અમને જાણ નથી. MoEF&CC દ્વારા મંજૂર કરાયેલા TOR મુજબ અભ્યાસના વિસ્તાર માટે EIA અભ્યાસો હાથ ધરવામાં આવ્યા છે.

37. સંચિત અસર દર્શાવવા માટે સૂચિત કોપર પ્રોજેક્ટના કારણે અસરો બેઝલાઇન ડેટા પર લાદવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો હવા અને પાણી માટે નિર્ધારિત ધોરણોમાં જણાય છે અને તેથી તે સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો ઉપલબ્ધ છે.

38. 7 સ્થળો - જિલ્લા કલેકટર, ભુજ, જિલ્લો કચ્છ, જીલ્લા વિકાસ કચેરી, ભુજ, જિલ્લો કચ્છ, જિલ્લા ઉદ્યોગ કેન્દ્ર, ભુજ, જિલ્લો કચ્છ, તાલુકા વિકાસ કચેરી, મુંદ્રા, જિલ્લો કચ્છ, તાલુકા વિકાસ કચેરી, માંડવી, જિલ્લો કચ્છ, મુખ્ય વન સંરક્ષક, પર્યાવરણ, વન અને હવામાન પરિવર્તન મંત્રાલય, ભારત સરકાર, પ્રાદેશિક કચેરી (પશ્ચિમ ઝોન), કેન્દ્રીય પર્યાવરણ ભવન, ઇ -5, એરેરા કોલોની, લિંક રોડ -3, રવિશંકર નગર, ભોપાલ 462016 અને પ્રાદેશિક કચેરી, કચ્છ (પૂર્વ), ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ, રૂમ નં. 215-216, બીજો માળ, કંડલા પોર્ટ ટ્રસ્ટ, એડમીન બિલ્ડિંગ, સેકટર 08 , ગાંધીધામ, કચ્છ- ઉપરાંત સૂચિત સાઇટના 10 કિ.મી.ની અંદર તમામ ગ્રામ પંચાયતો ગુજરાતીમાં સારાંશ મૂકવામાં આવેલ છે.

39. આ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે.

40. પાવર ટ્રાન્સમિશન લાઇન્સ કેટલાક વિચલન સાથે જાળવી રાખવામાં આવશે.

41. માત્ર પર્યાવરણ સેલના એક ભાગ તરીકે 8 વ્યક્તિઓનો પ્રસ્તાવ છે. પર્યાવરણ વ્યવસ્થાપન આ 8 વ્યક્તિઓ સુધી મર્યાદિત નથી, પરંતુ પર્યાવરણ વ્યવસ્થાપન માટે વિવિધ વિભાગો દ્વારા હાથ ધરવામાં આવેલી કામગીરીનો તેમાં સમાવેશ થાય છે.

42. અદાણી એન્ટરપ્રાઈઝીસ લિમિટેડ પાસે એન્જીનિયરિસ્ટની આગેવાની હેઠળની તેની પોતાની પર્યાવરણ વ્યવસ્થાપન ટીમ હશે, જે કોપર પ્રોજેક્ટના તમામ પર્યાવરણીય અને પ્રદૂષણના મુદ્દાઓનું સંચાલન કરવાની ક્ષમતા ધરાવે છે. અન્ય મુદ્દાઓ સૂચિત પ્રોજેક્ટ માટે ઇઆઇઆઇ અહેવાલના કાર્યક્ષેત્રની બહાર છે.. .પ્રશ્ન સૂચિત પ્રોજેક્ટને સંબંધિત નથી, તેથી અમે કોઈ ટિપ્પણી આપતા નથી..

PAP

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43. એસએલએફ હેઠળનો વિસ્તાર પ્રિ-ફીઝીબીલીટી અહેવાલમાં પૂરો પાડવામાં આવેલ છે, જે TOR એપ્લિકેશનનો એક ભાગ છે.

44. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાંટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે. સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની /પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે.

45. આ પ્રોજેક્ટને ઝીરો લીક્વીડ ડિસ્ચાર્જ સાથે તૈયાર કરવામાં આવી રહ્યું છે, સૂચિત પ્રોજેક્ટને કારણે ઓસન વોર્મિંગ અથવા એસિડીકરણની કોઈ શક્યતા નથી. પ્રસ્તાવિત પ્રોજેક્ટને કારણે કોઈ કોરલ બ્લીચીંગ અને દરિયાઈ એસિડિફિકેશન રહેશે નહીં.

46. પ્રોજેક્ટ દર વર્ષે જીએચજી (GHG) ની 0.53 મિલિયન ટન CO2 સમકક્ષ ઉત્સર્જન હોવાનો અંદાજ છે, જે ગ્લોબલ વોર્મિંગના સંદર્ભમાં નજીવું છે.

47. કુલ જીએચજી દર વર્ષે 0.53 મિલિયન ટન CO2 સમકક્ષ ઉત્સર્જન હોવાનો અંદાજ છે. આ માહિતીને અંતિમ ઇઆઇએ અહેવાલના ભાગ રૂપે ઉમેરવામાં આવશે.

48. અમે બજારમાં હાલની પરંપરાગત તકનીકીઓની તુલનાએ ઓછા ફૂટપ્રિંટ ધરાવતી હોય તેવી અદ્યતન તકનીકીઓ અપનાવીશું. જો કે, પ્રોજેક્ટ પ્રવૃત્તિને કારણે જીએચજી ઉત્સર્જનને ઘટાડવા માટે બળતણનો વૈકલ્પિક સ્રોત શોધી કાઢવામાં આવશે.

49. જીપ્સમના ઉત્પાદનમાં લગભગ 20% ભેજ હોય છે અને તે સૂચિત 28.34 હેકટર જીપ્સમ સ્ટોરેજ એરિયામાં શુષ્ક વાહક પદ્ધતિ દ્વારા સંગ્રહિત કરવામાં આવશે. કોઈપણ લીશિંગ અટકાવવા માટે જીપ્સમ સ્ટોરેજ એરિયાનું HDPE લાઇનર વડે નિર્માણ કરવામાં આવશે. જીપ્સમ સૂર્યના તાપ વડે સૂકવી અને સંભવિત ગ્રાહકોને વેચવામાં આવશે. પ્રોજેક્ટની જગ્યા બહાર પાણીના કોઈપણ સ્રાવ થશે નહીં.

50. આર.ઓ. રીજેક્ટ્સને મલ્ટિ-ઈફેક્ટ ઈવેપોરેટરમાં લઈ જવામાં આવશે. દરિયામાં કોઈ નિકાલ થશે નહીં.

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51. પ્રશ્ન અમને સંબંધિત નથી, તેથી અમે કોઈ ટિપ્પણી આપતા નથી..પર્યાવરણીય મોનીટરીંગ ઇઆઇએ અહેવાલના પ્રકરણ -6 માં જણાવ્યા મુજબ અને મંજૂર કરેલ પરવાનગીઓ સાથે સુસંગત રહીને કરવામાં આવશે
52. સૂચિત પ્રોજેક્ટમાં ઝીરો લીક્વીડ ડિસ્ચાર્જ સુવિધા હશે અને કોઈ સારવાર કરેલ પાણી સમુદ્રમાં મોકલવામાં આવશે નહીં
53. સમગ્ર પ્રોજેક્ટ ઝીરો લિક્વિડ ડિસ્ચાર્જના સિદ્ધાંત પર કામ કરશે. ઇઆઇએ અહેવાલમાં વિગતો આપવામાં આવી છે.
54. આ પ્રોજેક્ટમાંથી 6468 KLD ગંદુ પાણી ઉત્પન્ન થશે. સંપૂર્ણ ગંદાપાણીનો પ્લાન્ટની અંદર પ્રક્રીયા કરી ફરીથી ઉપયોગ કરવામાં આવશે. વિગતો ઇઆઇએ અહેવાલમાં પૂરી પાડવામાં આવેલી છે
55. કોઈપણ સીઇટીપી સાથે જોડાણ કરવાની કોઈ દરખાસ્ત નથી. ગંદાપાણીના ઉપચાર માટે એઇએલની પોતાની ETP હશે. ઇઆઇએ અહેવાલમાં વિગતો આપવામાં આવી છે.
56. ઇવાય અહેવાલમાં ફ્લો ડાયાગ્રામ અને ક્ષમતાઓ આપવામાં આવેલી છે. વિગતવાર એન્જિનિયરિંગ દરમિયાન વધુ આયોજન કરવામાં આવશે.
57. માનનીય સુપ્રીમ કોર્ટ દ્વારા પસાર કરવામાં આવેલી ચુકાદો હાલના ઉદ્યોગ સાથે સંકળાયેલો છે અને તેથી તે લાગુ પડતો નથી, જો કે, સૂચિત પ્રોજેક્ટ માટે ઇ.ટી.પીની વિગતો ઇઆઇએ અહેવાલમાં આપવામાં આવી છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,

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P.A. Suryarao

(પ્રસાદ સૂર્યારાવ)

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સંદર્ભ: **AEL/Copper/Mundra/EC/PH/D-A-37**

વિજય ગઢવી
શ્રી હરીનગર-૧,
માંડવી નલીયા રોડ, માંડવી
જિલ્લોઃ- કચ્છ,ગુજરાત.

વિષયઃ-અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ માટે આધુનિક ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. 256.57 હેકટરના કુલ પ્રોજેક્ટ વિસ્તાર પૈકી, 154.18 હેક્ટર જમીન સૂચિત SEZ છે અને 102.38 હે ફોરેસ્ટની જમીન હેઠળ આવે છે. ઇઆઇએ અહેવાલમાં જોડેલ 15 એપ્રિલ 2016 ના APSEZ પત્ર મુજબ, APSEZએઇએલને પ્રોજેક્ટ માટે જમીન ફાળવવા માટે સૈધ્ધાંતિક રીતે સંમત છે. APSEZ (અગાઉની એમપીએસઇઝેડ લિમિટેડ) દ્વારા આ જમીન માટે અગાઉથી ફોરેસ્ટ ક્લીયરન્સ લાગુ કરવામાં આવ્યું છે. સ્ટેજ -1 વનની મંજૂરીને લાગુ કર્યા પછી, TOR માટે પ્રોજેક્ટ્સ પ્રયોજક દરખાસ્ત રજૂ કરી શકતા હોવાથી, આ જરૂરિયાતનું પણ પાલન કરવામાં આવ્યું છે. પ્રોજેક્ટ સાઇટનો એક ભાગ ફોરેસ્ટની જમીન છે, જેનો ઉપયોગ ફોરેસ્ટની જમીનના ડાયવર્ઝન માટે અંતિમ મંજૂરી મેળવ્યા પછી જ થશે. સ્થાપિત પ્રક્રિયાની પૂર્ણતા બાદ રાજ્ય સરકાર દ્વારા વનની મંજૂરીની ભલામણ કરવામાં આવે છે અને છેલ્લે MoEFCCદ્વારા મંજૂર કરવામાં આવે છે.
2. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે.

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સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની/પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને પણ મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે

3. ઇઆઇએરીપોર્ટનાપ્રકરણ 9 માંપર્યાવરણવ્યવસ્થાપનયોજના (ઇએમપી) માંજણાવ્યાપ્રમાણેપ્રોજેક્ટનેપર્યાવરણની સલામતી સાથેવિકસાવવામાંઆવશે. વિશ્વમાંઆવાઘણાપ્રોજેક્ટ્સ છે, જેમાં યુરોપ, અમેરિકા, એશિયાવગેરે વિકસિત દેશોનો સમાવેશ થાય છે. તમારા દ્વારા જે ભયનો ઉલ્લેખ થયો છે તે અમારી જાણમાં નથી. આ પ્લાન્ટ ચલાવવા માટે અમને વિશ્વાસ છે કે અમે પ્રદૂષણ ઘટાડવા અને પર્યાવરણનું રક્ષણ કરવા માટે તમામ સાવચેતીઓ રાખીશું. વસ્તીવિષયક વિગતો EIA અહેવાલના પ્રકરણ 3 માં આપવામાં આવી છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ મેળવવાની સુવિધા હશે. CPCB દ્વારા નિર્ધારિત ધોરણો મુજબ ઉત્સર્જન પ્રાપ્ત કરવા માટે પ્રદૂષણ નિયંત્રણના પગલાં અમલમાં મુકવામાં આવશે. પ્રોજેક્ટના વિકાસ પછી એમ્બિયન્ટ એર ક્વોલિટીને નિર્ધારિત ધોરણોની અંદર જોવા મળશે. લોકોની તંદુરસ્તી પર કોઈ નોંધપાત્ર પ્રતિકૂળ અસર નહીં થાય. EMP ઇઆઇએ અહેવાલના પ્રકરણ-9 માં આપવામાં આવ્યું છે.

4. દરવર્ષેકોપર પ્લાન્ટમાંથી આડ પેદાશ તરીકે અંદાજે 8 થી 10 લાખ ટન કોપર સ્લેગનું ઉત્પાદન થશે. બાંધકામ ઉદ્યોગ, રોડ નિર્માણ,શોટ-બ્લાસ્ટિંગ વગેરેમાં કોપર સ્લેગનો વ્યાપક ઉપયોગ થાય છે. કોપર સ્લેગને ફેરો-સેન્ડ અને આયર્ન-સિલિકેટતરીકે પણ ઓળખવામાં આવે છે, જે સિમેન્ટ કંપનીઓ દ્વારા ગ્રીન-સિમેન્ટનું ઉત્પાદન કરવા માટે કાચા માલ તરીકે ઉપયોગમાં લેવાય છે. સ્થાનિક તેમજ નિકાસ બજારોમાં સૂચિત પ્રોજેક્ટમાંથી પેદા થયેલા સ્લેગના વેચાણને વધારવા માટે પ્રયત્નો કરવામાં આવશે.

5. સૂચિત પ્રોજેક્ટ ASPEZના ક્ષાર રહિત સમુદ્રના પાણીના સ્ત્રોત પર આધારિત છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ કરવા માટેની સુવિધા હશે. ઇઆઇએ રિપોર્ટના પ્રકરણ-2 માં વિગતો આપવામાં આવી છે.

6. સિક્યુર્ડ લેન્ડ ફીલ(એસએલએફ) સૂચિત પ્રોજેક્ટ વિસ્તારની અંદર 30 એકર વિસ્તાર પર વિકસિત કરવાની દરખાસ્ત છે. ટ્રીટમેન્ટ, સંગ્રહ અને નિકાલની સુવિધા (ટીએસડીએફ) માટે CPCB માર્ગદર્શિકા

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મુજબ એસએલએફ નિર્માણ અને સંચાલન કરવામાં આવશે. એસએલએફ, તેની ક્ષમતા સુધી ભરાઈ ગયા પછી, ઉપરનો ભાગ ઢાંકી દેવામાં આવશે અને સોઈલ કવર ફેલાવવામાં આવશે અને પછી પ્લાન્ટેશન કરવામાં આવશે. પર્યાવરણીય પેરામીટરની દેખરેખ પણ હાથ ધરવામાં આવશે.

7. સૂચિત કોપર પ્રોજેક્ટના કારણે સૂચિત અસર દર્શાવવા માટે બેઝલાઇન ડેટા પરઉમેરવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો AAQ ના નિર્ધારિત ધોરણોની અંદર જણાય છે અને તેથી તેની સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ-4 માં વિગતો ઉપલબ્ધ છે.
8. સ્થાનિક લોકોને યોગ્યતા મુજબ રોજગારીમાં પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક લોકોની રોજગારીમાં સુધારો કરવા માટે કૌશલ્ય વિકાસ કાર્યક્રમ અમલમાં મૂકવામાં આવશે.
9. મર્ક્યુરી રીકવરી સુવિધા સૂચિત પ્રોજેક્ટનો એક ભાગ છે. મર્ક્યુરી પર્યાવરણમાં છોડવામાં આવશે નહીં. ઇઆઇએ રિપોર્ટના પ્રકરણ 2 માં વિગતો આપવામાં આવી છે.
10. પ્રક્રિયાના ભાગરૂપે સોનું અને ચાંદી જેવી કિંમતી ધાતુઓ પુનઃપ્રાપ્ત કરવામાં આવશે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબીલિટી હેઠળ વાર્ષિકરૂ 8.0 કરોડની જોગવાઇ કરવામાં આવી છે. શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, સ્થાયી આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ સંબંધિત ક્ષેત્રોમાં કરવામાં આવશે. તમારા દ્વારા ઉલ્લેખિત APSEZ સાથે સંકળાયેલો અને અમને જણાવ્યા મુજબનોદંડ પાછો ખેંચી લેવામાં આવ્યો છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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2012

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Ref: AEL/Copper/Mundra/EC/PH/D-A-37

Shri Vijay Gadhvi
Sri Harinagar- 1
MandviNaliya Road, Mandvi
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,
We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Out of 256.57 Ha of total project area, 154.18 Ha land is notified SEZ and 102.38 Ha fall under forest land. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report. Forest Clearance has already been applied for this land by APSEZ (erstwhile MPSEZ Ltd). As the project proponent can submit the proposal for TOR, after applying the Stage-I forestry clearance, this requirement has also been complied with. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.

2. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.

3. The project will be developed with all the environmental safeguards as detailed in Environment Management Plan (EMP) in Chapter 9 of EIA Report. There are many

PAA

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such projects in the world, including the developed countries in Europe, America, Asia, etc. The apprehension mentioned by you is not in our knowledge. We are confident of operating this plant with all the safeguards to mitigate the pollution and protect environment. Demographic details are provided in Chapter 3 of the EIA Report. Proposed project will have facility to achieve Zero Liquid Discharge. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Ambient Air Quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter 9 of the EIA report.

4. Copper slag, estimated 8 to 10 Lac Tonnes per year, will be produced from the copper plant as a by-product. Copper Slag is widely used in construction industry, road making, shot-blasting etc. Copper Slag is also known as Ferro-Sand and Iron-Silicate which is used by Cement companies as raw material to produce the green-cement. Efforts will be made to maximize the sale of the Slag generated from the proposed project in domestic as well as in export market.

5. The proposed project is based on desalinated sea water sourced from APSEZ. Proposed project will have facility to achieve Zero Liquid Discharge. Details are given in Chapter 2 of EIA Report.

6. Secured Land Fill (SLF) is proposed to be developed over the area of 30 Acres within the proposed project area. SLF will be constructed and operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and then plantation will be done. Monitoring of environmental parameters will also be carried out.

7. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for AAQ and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

8. Local people will be given preference in employment as per eligibility. Skill development programme will be implemented to improve the employability of local people.

9. Mercury recovery facility is part of the proposed project. Mercury will not be released in the environment. Details are given in Chapter 2 of EIA Report.

10. Precious metals like gold and silver will be recovered as part of the process. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. The

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2014

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penalty mentioned by you pertains to APSEZ and as informed to us same has been withdrawn.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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1804

Ref: AEL/Copper/Mundra/EC/PH/D-A-38

Shri PravinsinhBhurubha Chauhan
Village- Siracha, Taluka- Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,
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2016

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We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
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2018

સંદર્ભ: **AEL/Copper/Mundra/EC/PH/D-A-38**

શ્રી પ્રવિણસિંહ ભૂરૂભા ચૌહાણ
ગામઃ- સિરાચા
તાલુકોઃ- મુંદ્રા
જિલ્લોઃ- કચ્છ,ગુજરાત.

વિષયઃ-અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ માટે આધુનિક ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. 256.57 હેકટરના કુલ પ્રોજેક્ટ વિસ્તાર પૈકી, 154.18 હેક્ટર જમીન સૂચિત SEZ છે અને 102.38 હે ફોરેસ્ટની જમીન હેઠળ આવે છે. ઇઆઇએ અહેવાલમાં જોડેલ 15 એપ્રિલ 2016 ના APSEZ પત્ર મુજબ, APSEZએઇએલને પ્રોજેક્ટ માટે જમીન ફાળવવા માટે સૈધ્ધાંતિક રીતે સંમત છે. APSEZ (અગાઉની એમપીએસઇઝેડ લિમિટેડ) દ્વારા આ જમીન માટે અગાઉથી ફોરેસ્ટ ક્લીયરન્સ લાગુ કરવામાં આવ્યું છે. સ્ટેજ -1 વનની મંજૂરીને લાગુ કર્યા પછી, TOR માટે પ્રોજેક્ટ્સ પ્રયોજક દરખાસ્ત રજૂ કરી શકતા હોવાથી, આ જરૂરિયાતનું પણ પાલન કરવામાં આવ્યું છે. પ્રોજેક્ટ સાઇટનો એક ભાગ ફોરેસ્ટની જમીન છે, જેનો ઉપયોગ ફોરેસ્ટની જમીનના ડાયવર્ઝન માટે અંતિમ મંજૂરી મેળવ્યા પછી જ થશે. સ્થાપિત પ્રક્રિયાની પૂર્ણતા બાદ રાજ્ય સરકાર દ્વારા વનની મંજૂરીની ભલામણ કરવામાં આવે છે અને છેલ્લે MoEFCCદ્વારા મંજૂર કરવામાં આવે છે.
2. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે.

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સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની/પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને પણ મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે

3. ઇઆઇએરીપોર્ટનાપ્રકરણ 9 માંપર્યાવરણવ્યવસ્થાપનયોજના (ઇએમપી) માંજણાવ્યાપ્રમાણેપ્રોજેક્ટનેપર્યાવરણની સલામતી સાથેવિકસાવવામાંઆવશે. વિશ્વમાંઆવાઘણાપ્રોજેક્ટ્સ છે, જેમાં યુરોપ, અમેરિકા, એશિયાવગેરે વિકસિત દેશોનો સમાવેશ થાય છે. તમારા દ્વારા જે ભયનો ઉલ્લેખ થયો છે તે અમારી જાણમાં નથી. આ પ્લાન્ટ ચલાવવા માટે અમને વિશ્વાસ છે કે અમે પ્રદૂષણ ઘટાડવા અને પર્યાવરણનું રક્ષણ કરવા માટે તમામ સાવચેતીઓ રાખીશું. વસ્તીવિષયક વિગતો EIA અહેવાલના પ્રકરણ 3 માં આપવામાં આવી છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ મેળવવાની સુવિધા હશે. CPCB દ્વારા નિર્ધારિત ધોરણો મુજબ ઉત્સર્જન પ્રાપ્ત કરવા માટે પ્રદૂષણ નિયંત્રણના પગલાં અમલમાં મુકવામાં આવશે. પ્રોજેક્ટના વિકાસ પછી એમ્બિયન્ટ એર ક્વોલિટીને નિર્ધારિત ધોરણોની અંદર જોવા મળશે. લોકોની તંદુરસ્તી પર કોઈ નોંધપાત્ર પ્રતિકૂળ અસર નહીં થાય. EMP ઇઆઇએ અહેવાલના પ્રકરણ-9 માં આપવામાં આવ્યું છે.
4. દરવર્ષેકોપર પ્લાન્ટમાંથી આડ પેદાશ તરીકે અંદાજે 8 થી 10 લાખ ટન કોપર સ્લેગનું ઉત્પાદન થશે. બાંધકામ ઉદ્યોગ, રોડ નિર્માણ,શોટ-બ્લાસ્ટિંગ વગેરેમાં કોપર સ્લેગનો વ્યાપક ઉપયોગ થાય છે. કોપર સ્લેગને ફેરો-સેન્ડ અને આયર્ન-સિલિકેટતરીકે પણ ઓળખવામાં આવે છે, જે સિમેન્ટ કંપનીઓ દ્વારા ગ્રીન-સિમેન્ટનું ઉત્પાદન કરવા માટે કાચા માલ તરીકે ઉપયોગમાં લેવાય છે. સ્થાનિક તેમજ નિકાસ બજારોમાં સૂચિત પ્રોજેક્ટમાંથી પેદા થયેલા સ્લેગના વેચાણને વધારવા માટે પ્રયત્નો કરવામાં આવશે.
5. સૂચિત પ્રોજેક્ટ ASPEZના ક્ષાર રહિત સમુદ્રના પાણીના સ્ત્રોત પર આધારિત છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ કરવા માટેની સુવિધા હશે. ઇઆઇએ રિપોર્ટના પ્રકરણ-2 માં વિગતો આપવામાં આવી છે.
6. સિક્યુર્ડ લેન્ડ ફીલ(એસએલએફ) સૂચિત પ્રોજેક્ટ વિસ્તારની અંદર 30 એકર વિસ્તાર પર વિકસિત કરવાની દરખાસ્ત છે. ટ્રીટમેન્ટ, સંગ્રહ અને નિકાલની સુવિધા (ટીએસડીએફ) માટે CPCB માર્ગદર્શિકા

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2020

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મુજબ એસએલએફ નિર્માણ અને સંચાલન કરવામાં આવશે. એસએલએફ, તેની ક્ષમતા સુધી ભરાઈ ગયા પછી, ઉપરનો ભાગ ઢાંકી દેવામાં આવશે અને સોઈલ કવર ફેલાવવામાં આવશે અને પછી પ્લાન્ટેશન કરવામાં આવશે. પર્યાવરણીય પેરામીટરની દેખરેખ પણ હાથ ધરવામાં આવશે.

7. સૂચિત કોપર પ્રોજેક્ટના કારણે સૂચિત અસર દર્શાવવા માટે બેઝલાઇન ડેટા પરઉમેરવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો AAQ ના નિર્ધારિત ધોરણોની અંદર જણાય છે અને તેથી તેની સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ-4 માં વિગતો ઉપલબ્ધ છે.
8. સ્થાનિક લોકોને યોગ્યતા મુજબ રોજગારીમાં પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક લોકોની રોજગારીમાં સુધારો કરવા માટે કૌશલ્ય વિકાસ કાર્યક્રમ અમલમાં મૂકવામાં આવશે.
9. મર્ક્યુરી રીકવરી સુવિધા સૂચિત પ્રોજેક્ટનો એક ભાગ છે. મર્ક્યુરી પર્યાવરણમાં છોડવામાં આવશે નહીં. ઇઆઇએ રિપોર્ટના પ્રકરણ 2 માં વિગતો આપવામાં આવી છે.
10. પ્રક્રિયાના ભાગરૂપે સોનું અને ચાંદી જેવી કિંમતી ધાતુઓ પુનઃપ્રાપ્ત કરવામાં આવશે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબીલિટી હેઠળ વાર્ષિકરૂ 8.0 કરોડની જોગવાઇ કરવામાં આવી છે. શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, સ્થાયી આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ સંબંધિત ક્ષેત્રોમાં કરવામાં આવશે. તમારા દ્વારા ઉલ્લેખિત APSEZ સાથે સંકળાયેલો અને અમને જણાવ્યા મુજબનોદંડ પાછો ખેંચી લેવામાં આવ્યો છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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સંદર્ભ: **AEL/Copper/Mundra/EC/PH/D-A-39**

જાડેજા જયપાલસિંહ એલ.
ગામઃ-
તાલુકોઃ-
જિલ્લોઃ- કચ્છ,ગુજરાત.

વિષયઃ- અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ માટે આધુનિક ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. 256.57 હેકટરના કુલ પ્રોજેક્ટ વિસ્તાર પૈકી, 154.18 હેક્ટર જમીન સૂચિત SEZ છે અને 102.38 હે ફોરેસ્ટની જમીન હેઠળ આવે છે. ઇઆઇએ અહેવાલમાં જોડેલ 15 એપ્રિલ 2016 ના APSEZ પત્ર મુજબ, APSEZએઇએલને પ્રોજેક્ટ માટે જમીન ફાળવવા માટે સૈધ્ધાંતિક રીતે સંમત છે. APSEZ (અગાઉની એમપીએસઇઝેડ લિમિટેડ) દ્વારા આ જમીન માટે અગાઉથી ફોરેસ્ટ ક્લીયરન્સ લાગુ કરવામાં આવ્યું છે. સ્ટેજ -1 વનની મંજૂરીને લાગુ કર્યા પછી, TOR માટે પ્રોજેક્ટ્સ પ્રયોજક દરખાસ્ત રજૂ કરી શકતા હોવાથી, આ જરૂરિયાતનું પણ પાલન કરવામાં આવ્યું છે. પ્રોજેક્ટ સાઇટનો એક ભાગ ફોરેસ્ટની જમીન છે, જેનો ઉપયોગ ફોરેસ્ટની જમીનના ડાયવર્ઝન માટે અંતિમ મંજૂરી મેળવ્યા પછી જ થશે. સ્થાપિત પ્રક્રિયાની પૂર્ણતા બાદ રાજ્ય સરકાર દ્વારા વનની મંજૂરીની ભલામણ કરવામાં આવે છે અને છેલ્લે MoEFCCદ્વારા મંજૂર કરવામાં આવે છે.
2. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે.

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સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની/પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને પણ મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે

3. ઇઆઇએરીપોર્ટનાપ્રકરણ 9 માંપર્યાવરણવ્યવસ્થાપનયોજના (ઇએમપી) માંજણાવ્યાપ્રમાણેપ્રોજેક્ટનેપર્યાવરણની સલામતી સાથેવિકસાવવામાંઆવશે. વિશ્વમાંઆવાઘણાપ્રોજેક્ટ્સ છે, જેમાં યુરોપ, અમેરિકા, એશિયાવગેરે વિકસિત દેશોનો સમાવેશ થાય છે. તમારા દ્વારા જે ભયનો ઉલ્લેખ થયો છે તે અમારી જાણમાં નથી. આ પ્લાન્ટ ચલાવવા માટે અમને વિશ્વાસ છે કે અમે પ્રદૂષણ ઘટાડવા અને પર્યાવરણનું રક્ષણ કરવા માટે તમામ સાવચેતીઓ રાખીશું. વસ્તીવિષયક વિગતો EIA અહેવાલના પ્રકરણ 3 માં આપવામાં આવી છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ મેળવવાની સુવિધા હશે. CPCB દ્વારા નિર્ધારિત ધોરણો મુજબ ઉત્સર્જન પ્રાપ્ત કરવા માટે પ્રદૂષણ નિયંત્રણના પગલાં અમલમાં મુકવામાં આવશે. પ્રોજેક્ટના વિકાસ પછી એમ્બિયન્ટ એર ક્વોલિટીને નિર્ધારિત ધોરણોની અંદર જોવા મળશે. લોકોની તંદુરસ્તી પર કોઈ નોંધપાત્ર પ્રતિકૂળ અસર નહીં થાય. EMP ઇઆઇએ અહેવાલના પ્રકરણ-9 માં આપવામાં આવ્યું છે.

4. દરવર્ષેકોપર પ્લાન્ટમાંથી આડ પેદાશ તરીકે અંદાજે 8 થી 10 લાખ ટન કોપર સ્લેગનું ઉત્પાદન થશે. બાંધકામ ઉદ્યોગ, રોડ નિર્માણ,શોટ-બ્લાસ્ટિંગ વગેરેમાં કોપર સ્લેગનો વ્યાપક ઉપયોગ થાય છે. કોપર સ્લેગને ફેરો-સેન્ડ અને આયર્ન-સિલિકેટ તરીકે પણ ઓળખવામાં આવે છે, જે સિમેન્ટ કંપનીઓ દ્વારા ગ્રીન-સિમેન્ટનું ઉત્પાદન કરવા માટે કાચા માલ તરીકે ઉપયોગમાં લેવાય છે. સ્થાનિક તેમજ નિકાસ બજારોમાં સૂચિત પ્રોજેક્ટમાંથી પેદા થયેલા સ્લેગના વેચાણને વધારવા માટે પ્રયત્નો કરવામાં આવશે.

5. સૂચિત પ્રોજેક્ટ ASPEZ ના ક્ષાર રહિત સમુદ્રના પાણીના સ્ત્રોત પર આધારિત છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ કરવા માટેની સુવિધા હશે. ઇઆઇએ રિપોર્ટના પ્રકરણ-2 માં વિગતો આપવામાં આવી છે.

6. સિક્યુર્ડ લેન્ડ ફીલ (એસએલએફ) સૂચિત પ્રોજેક્ટ વિસ્તારની અંદર 30 એકર વિસ્તાર પર વિકસિત કરવાની દરખાસ્ત છે. ટ્રીટમેન્ટ, સંગ્રહ અને નિકાલની સુવિધા (ટીએસડીએફ) માટે CPCB માર્ગદર્શિકા

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મુજબ એસએલએફ નિર્માણ અને સંચાલન કરવામાં આવશે. એસએલએફ, તેની ક્ષમતા સુધી ભરાઈ ગયા પછી, ઉપરનો ભાગ ઢાંકી દેવામાં આવશે અને સોઈલ કવર ફેલાવવામાં આવશે અને પછી પ્લાન્ટેશન કરવામાં આવશે. પર્યાવરણીય પેરામીટરની દેખરેખ પણ હાથ ધરવામાં આવશે.

7. સૂચિત કોપર પ્રોજેક્ટના કારણે સૂચિત અસર દર્શાવવા માટે બેઝલાઇન ડેટા પર ઉમેરવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો AAQ ના નિર્ધારિત ધોરણોની અંદર જણાય છે અને તેથી તેની સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ-4 માં વિગતો ઉપલબ્ધ છે.
8. સ્થાનિક લોકોને યોગ્યતા મુજબ રોજગારીમાં પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક લોકોની રોજગારીમાં સુધારો કરવા માટે કૌશલ્ય વિકાસ કાર્યક્રમ અમલમાં મૂકવામાં આવશે.
9. મર્ક્યુરી રીકવરી સુવિધા સૂચિત પ્રોજેક્ટનો એક ભાગ છે. મર્ક્યુરી પર્યાવરણમાં છોડવામાં આવશે નહીં. ઇઆઇએ રિપોર્ટના પ્રકરણ 2 માં વિગતો આપવામાં આવી છે.
10. પ્રક્રિયાના ભાગરૂપે સોનું અને ચાંદી જેવી કિંમતી ધાતુઓ પુનઃપ્રાપ્ત કરવામાં આવશે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબીલિટી હેઠળ વાર્ષિક રૂ 8.0 કરોડની જોગવાઇ કરવામાં આવી છે. શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, સ્થાયી આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ સંબંધિત ક્ષેત્રોમાં કરવામાં આવશે. તમારા દ્વારા ઉલ્લેખિત APSEZ સાથે સંકળાયેલો અને અમને જણાવ્યા મુજબનો દંડ પાછો ખેંચી લેવામાં આવ્યો છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,

અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)

અધિકૃત સહીકર્તા .

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Shri JadejaJaipalsinh L
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,
We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Out of 256.57 Ha of total project area, 154.18 Ha land is notified SEZ and 102.38 Ha fall under forest land. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report. Forest Clearance has already been applied for this land by APSEZ (erstwhile MPSEZ Ltd). As the project proponent can submit the proposal for TOR, after applying the Stage-I forestry clearance, this requirement has also been complied with. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.

2. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.

3. The project will be developed with all the environmental safeguards as detailed in Environment Management Plan (EMP) in Chapter 9 of EIA Report. There are many such projects in the world, including the developed countries in Europe, America, Asia, etc. The apprehension mentioned by you is not in our knowledge. We are

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confident of operating this plant with all the safeguards to mitigate the pollution and protect environment. Demographic details are provided in Chapter 3 of the EIA Report. Proposed project will have facility to achieve Zero Liquid Discharge. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Ambient Air Quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter 9 of the EIA report.

4. Copper slag, estimated 8 to 10 Lac Tonnes per year, will be produced from the copper plant as a by-product. Copper Slag is widely used in construction industry, road making, shot-blasting etc. Copper Slag is also known as Ferro-Sand and Iron-Silicate which is used by Cement companies as raw material to produce the green-cement. Efforts will be made to maximize the sale of the Slag generated from the proposed project in domestic as well as in export market.

5. The proposed project is based on desalinated sea water sourced from APSEZ. Proposed project will have facility to achieve Zero Liquid Discharge. Details are given in Chapter 2 of EIA Report.

6. Secured Land Fill (SLF) is proposed to be developed over the area of 30 Acres within the proposed project area. SLF will be constructed and operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and then plantation will be done. Monitoring of environmental parameters will also be carried out.

7. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for AAQ and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

8. Local people will be given preference in employment as per eligibility. Skill development programme will be implemented to improve the employability of local people.

9. Mercury recovery facility is part of the proposed project. Mercury will not be released in the environment. Details are given in Chapter 2 of EIA Report.

10. Precious metals like gold and silver will be recovered as part of the process. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. The penalty mentioned by you pertains to APSEZ and as informed to us same has been withdrawn.

PAD

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We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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સંદર્ભ: AEL/Copper/Mundra/EC/PH/D-A-40

તુર્ક હુસેન ઈબ્રાહીમ નાથાની.
ગામઃ-ધ્રબ
તાલુકોઃ-
જિલ્લોઃ- કચ્છ,ગુજરાત.

વિષયઃ-અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ માટે આધુનિક ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. 256.57 હેકટરના કુલ પ્રોજેક્ટ વિસ્તાર પૈકી, 154.18 હેક્ટર જમીન સૂચિત SEZ છે અને 102.38 હે ફોરેસ્ટની જમીન હેઠળ આવે છે. ઇઆઇએ અહેવાલમાં જોડેલ 15 એપ્રિલ 2016 ના APSEZ પત્ર મુજબ, APSEZએઇએલને પ્રોજેક્ટ માટે જમીન ફાળવવા માટે સૈધ્ધાંતિક રીતે સંમત છે. APSEZ (અગાઉની એમપીએસઇઝેડ લિમિટેડ) દ્વારા આ જમીન માટે અગાઉથી ફોરેસ્ટ ક્લીયરન્સ લાગુ કરવામાં આવ્યું છે. સ્ટેજ -1 વનની મંજૂરીને લાગુ કર્યા પછી, TOR માટે પ્રોજેક્ટ્સ પ્રયોજક દરખાસ્ત રજૂ કરી શકતા હોવાથી, આ જરૂરિયાતનું પણ પાલન કરવામાં આવ્યું છે. પ્રોજેક્ટ સાઇટનો એક ભાગ ફોરેસ્ટની જમીન છે, જેનો ઉપયોગ ફોરેસ્ટની જમીનના ડાયવર્ઝન માટે અંતિમ મંજૂરી મેળવ્યા

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પછી જ થશે. સ્થાપિત પ્રક્રિયાની પૂર્ણતા બાદ રાજ્ય સરકાર દ્વારા વનની મંજૂરીની ભલામણ કરવામાં આવે છે અને છેલ્લે MoEFCCદ્વારા મંજૂર કરવામાં આવે છે.

2. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે. સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની/પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને પણ મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે

3. ઇઆઇએરીપોર્ટનાપ્રકરણ 9 માંપર્યાવરણવ્યવસ્થાપનયોજના (ઇએમપી) માંજણાવ્યાપ્રમાણેપ્રોજેક્ટનેપર્યાવરણની સલામતી સાથેવિકસાવવામાંઆવશે. વિશ્વમાંઆવાઘણાપ્રોજેક્ટ્સ છે, જેમાં યુરોપ, અમેરિકા, એશિયાવગેરે વિકસિત દેશોનો સમાવેશ થાય છે. તમારા દ્વારા જે ભયનો ઉલ્લેખ થયો છે તે અમારી જાણમાં નથી. આ પ્લાન્ટ ચલાવવા માટે અમને વિશ્વાસ છે કે અમે પ્રદૂષણ ઘટાડવા અને પર્યાવરણનું રક્ષણ કરવા માટે તમામ સાવચેતીઓ રાખીશું. વસ્તીવિષયક વિગતો EIA અહેવાલના પ્રકરણ 3 માં આપવામાં આવી છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ મેળવવાની સુવિધા હશે. CPCB દ્વારા નિર્ધારિત ધોરણો મુજબ ઉત્સર્જન પ્રાપ્ત કરવા માટે પ્રદૂષણ નિયંત્રણના પગલાં અમલમાં મુકવામાં આવશે. પ્રોજેક્ટના વિકાસ પછી એમ્બિયન્ટ એર ક્વોલિટીને નિર્ધારિત ધોરણોની અંદર જોવા મળશે. લોકોની તંદુરસ્તી પર કોઈ નોંધપાત્ર પ્રતિકૂળ અસર નહીં થાય. EMP ઇઆઇએ અહેવાલના પ્રકરણ-9 માં આપવામાં આવ્યું છે.

4. દરવર્ષેકોપર પ્લાન્ટમાંથી આડ પેદાશ તરીકે અંદાજે 8 થી 10 લાખ ટન કોપર સ્લેગનું ઉત્પાદન થશે. બાંધકામ ઉદ્યોગ, રોડ નિર્માણ,શોટ-બ્લાસ્ટિંગ વગેરેમાં કોપર સ્લેગનો વ્યાપક ઉપયોગ થાય છે. કોપર સ્લેગને ફેરો-સેન્ડ અને આયર્ન-સિલિકેટતરીકે પણ ઓળખવામાં આવે છે, જે સિમેન્ટ કંપનીઓ દ્વારા

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ગ્રીન-સિમેન્ટનું ઉત્પાદન કરવા માટે કાચા માલ તરીકે ઉપયોગમાં લેવાય છે. સ્થાનિક તેમજ નિકાસ બજારોમાં સૂચિત પ્રોજેક્ટમાંથી પેદા થયેલા સ્લેગના વેચાણને વધારવા માટે પ્રયત્નો કરવામાં આવશે.

5. સૂચિત પ્રોજેક્ટ ASPEZના ક્ષાર રહિત સમુદ્રના પાણીના સ્ત્રોત પર આધારિત છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ કરવા માટેની સુવિધા હશે. ઇઆઇએ રિપોર્ટના પ્રકરણ-2 માં વિગતો આપવામાં આવી છે.
6. સિક્યુર્ડ લેન્ડ ફીલ(એસએલએફ) સૂચિત પ્રોજેક્ટ વિસ્તારની અંદર 30 એકર વિસ્તાર પર વિકસિત કરવાની દરખાસ્ત છે. ટ્રીટમેન્ટ, સંગ્રહ અને નિકાલની સુવિધા (ટીએસડીએફ) માટે CPCB માર્ગદર્શિકા મુજબ એસએલએફ નિર્માણ અને સંચાલન કરવામાં આવશે. એસએલએફ, તેની ક્ષમતા સુધી ભરાઈ ગયા પછી, ઉપરનો ભાગ ઢાંકી દેવામાં આવશે અને સોઈલ કવર ફેલાવવામાં આવશે અને પછી પ્લાન્ટેશન કરવામાં આવશે. પર્યાવરણીય પેરામીટરની દેખરેખ પણ હાથ ધરવામાં આવશે.
7. સૂચિત કોપર પ્રોજેક્ટના કારણે સૂચિત અસર દર્શાવવા માટે બેઝલાઇન ડેટા પરઉમેરવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો AAQ ના નિર્ધારિત ધોરણોની અંદર જણાય છે અને તેથી તેની સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ-4 માં વિગતો ઉપલબ્ધ છે.
8. સ્થાનિક લોકોને યોગ્યતા મુજબ રોજગારીમાં પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક લોકોની રોજગારીમાં સુધારો કરવા માટે કૌશલ્ય વિકાસ કાર્યક્રમ અમલમાં મૂકવામાં આવશે.
9. મર્ક્યુરી રીકવરી સુવિધા સૂચિત પ્રોજેક્ટનો એક ભાગ છે. મર્ક્યુરી પર્યાવરણમાં છોડવામાં આવશે નહીં. ઇઆઇએ રિપોર્ટના પ્રકરણ 2 માં વિગતો આપવામાં આવી છે.
10. પ્રક્રિયાના ભાગરૂપે સોનું અને ચાંદી જેવી કિંમતી ધાતુઓ પુનઃપ્રાપ્ત કરવામાં આવશે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબીલિટી હેઠળ વાર્ષિકરૂ 8.0 કરોડની જોગવાઇ કરવામાં આવી છે. શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, સ્થાયી આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ સંબંધિત ક્ષેત્રોમાં કરવામાં આવશે. તમારા દ્વારા ઉલ્લેખિત APSEZ સાથે સંકળાયેલો અને અમને જણાવ્યા મુજબનોદંડ પાછો ખેંચી લેવામાં આવ્યો છે.

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અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-40

Shri Turk Hussain Ibrahim Nathani
Village- Dhruv, Taluka- Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Out of 256.57 Haof total project area, 154.18 Ha land is notified SEZ and 102.38 Ha fall under forest land. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report. Forest Clearance has already been applied for this land by APSEZ (erstwhile MPSEZ Ltd). As the project proponent can submit the proposal for TOR, after applying the Stage-I forestry clearance, this requirement has also been complied with. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.
2. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.
3. The project will be developed with all the environmental safeguards as detailed in Environment Management Plan (EMP) in Chapter 9 of EIA Report. There are many such projects in the world, including the developed countries in Europe, America, Asia, etc. The apprehension mentioned by you is not in our knowledge. We are confident of operating this plant with all the safeguards to mitigate the pollution and protect environment. Demographic details are provided in Chapter 3 of the EIA

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Report. Proposed project will have facility to achieve Zero Liquid Discharge. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Ambient Air Quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter 9 of the EIA report.

4. Copper slag, estimated 8 to 10 Lac Tonnes per year, will be produced from the copper plant as a by-product. Copper Slag is widely used in construction industry, road making, shot-blasting etc. Copper Slag is also known as Ferro-Sand and Iron-Silicate which is used by Cement companies as raw material to produce the green-cement. Efforts will be made to maximize the sale of the Slag generated from the proposed project in domestic as well as in export market.
5. The proposed project is based on desalinated sea water sourced from APSEZ. Proposed project will have facility to achieve Zero Liquid Discharge. Details are given in Chapter 2 of EIA Report.
6. Secured Land Fill (SLF) is proposed to be developed over the area of 30 Acres within the proposed project area. SLF will be constructed and operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and then plantation will be done. Monitoring of environmental parameters will also be carried out.
7. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for AAQ and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.
8. Local people will be given preference in employment as per eligibility. Skill development programme will be implemented to improve the employability of local people.
9. Mercury recovery facility is part of the proposed project. Mercury will not be released in the environment. Details are given in Chapter 2 of EIA Report.
10. Precious metals like gold and silver will be recovered as part of the process. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. The penalty mentioned by you pertains to APSEZ and as informed to us same has been withdrawn.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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સંદર્ભ: AEL/Copper/Mundra/EC/PH/D-A-41

તુર્ક મોહમ્મદ અબ્દુલ કાદર જમાદાર.
ગામઃ-ધ્રબ
તાલુકોઃ-
જિલ્લોઃ- કચ્છ,ગુજરાત.

વિષયઃ- અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ માટે આધુનિક ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. 256.57 હેકટરના કુલ પ્રોજેક્ટ વિસ્તાર પૈકી, 154.18 હેક્ટર જમીન સૂચિત SEZ છે અને 102.38 હે ફોરેસ્ટની જમીન હેઠળ આવે છે. ઇઆઇએ અહેવાલમાં જોડેલ 15 એપ્રિલ 2016 ના APSEZ પત્ર મુજબ, APSEZએઇએલને પ્રોજેક્ટ માટે જમીન ફાળવવા માટે સૈધ્ધાંતિક રીતે સંમત છે. APSEZ (અગાઉની એમપીએસઇઝેડ લિમિટેડ) દ્વારા આ જમીન માટે અગાઉથી ફોરેસ્ટ ક્લીયરન્સ લાગુ કરવામાં આવ્યું છે. સ્ટેજ -1 વનની મંજૂરીને લાગુ કર્યા પછી, TOR માટે પ્રોજેક્ટ્સ પ્રયોજક દરખાસ્ત રજૂ કરી શકતા હોવાથી, આ જરૂરિયાતનું પણ પાલન કરવામાં આવ્યું છે. પ્રોજેક્ટ સાઇટનો એક ભાગ ફોરેસ્ટની જમીન છે, જેનો ઉપયોગ ફોરેસ્ટની જમીનના ડાયવર્ઝન માટે અંતિમ મંજૂરી મેળવ્યા પછી જ થશે. સ્થાપિત પ્રક્રિયાની પૂર્ણતા બાદ રાજ્ય સરકાર દ્વારા વનની મંજૂરીની ભલામણ કરવામાં આવે છે અને છેલ્લે MoEFCCદ્વારા મંજૂર કરવામાં આવે છે.
2. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે.

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સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની/પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને પણ મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે

3. ઇઆઇએરીપોર્ટનાપ્રકરણ 9 માંપર્યાવરણવ્યવસ્થાપનયોજના (ઇએમપી) માંજણાવ્યાપ્રમાણેપ્રોજેક્ટનેપર્યાવરણની સલામતી સાથેવિકસાવવામાંઆવશે. વિશ્વમાંઆવાઘણાપ્રોજેક્ટ્સ છે, જેમાં યુરોપ, અમેરિકા, એશિયાવગેરે વિકસિત દેશોનો સમાવેશ થાય છે. તમારા દ્વારા જે ભયનો ઉલ્લેખ થયો છે તે અમારી જાણમાં નથી. આ પ્લાન્ટ ચલાવવા માટે અમને વિશ્વાસ છે કે અમે પ્રદૂષણ ઘટાડવા અને પર્યાવરણનું રક્ષણ કરવા માટે તમામ સાવચેતીઓ રાખીશું. વસ્તીવિષયક વિગતો EIA અહેવાલના પ્રકરણ 3 માં આપવામાં આવી છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ મેળવવાની સુવિધા હશે. CPCB દ્વારા નિર્ધારિત ધોરણો મુજબ ઉત્સર્જન પ્રાપ્ત કરવા માટે પ્રદૂષણ નિયંત્રણના પગલાં અમલમાં મુકવામાં આવશે. પ્રોજેક્ટના વિકાસ પછી એમ્બિયન્ટ એર ક્વોલિટીને નિર્ધારિત ધોરણોની અંદર જોવા મળશે. લોકોની તંદુરસ્તી પર કોઈ નોંધપાત્ર પ્રતિકૂળ અસર નહીં થાય. EMP ઇઆઇએ અહેવાલના પ્રકરણ-9 માં આપવામાં આવ્યું છે.

4. દરવર્ષેકોપર પ્લાન્ટમાંથી આડ પેદાશ તરીકે અંદાજે 8 થી 10 લાખ ટન કોપર સ્લેગનું ઉત્પાદન થશે. બાંધકામ ઉદ્યોગ, રોડ નિર્માણ,શોટ-બ્લાસ્ટિંગ વગેરેમાં કોપર સ્લેગનો વ્યાપક ઉપયોગ થાય છે. કોપર સ્લેગને ફેરો-સેન્ડ અને આયર્ન-સિલિકેટ તરીકે પણ ઓળખવામાં આવે છે, જે સિમેન્ટ કંપનીઓ દ્વારા ગ્રીન-સિમેન્ટનું ઉત્પાદન કરવા માટે કાચા માલ તરીકે ઉપયોગમાં લેવાય છે. સ્થાનિક તેમજ નિકાસ બજારોમાં સૂચિત પ્રોજેક્ટમાંથી પેદા થયેલા સ્લેગના વેચાણને વધારવા માટે પ્રયત્નો કરવામાં આવશે.

5. સૂચિત પ્રોજેક્ટ ASPEZ ના ક્ષાર રહિત સમુદ્રના પાણીના સ્ત્રોત પર આધારિત છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ કરવા માટેની સુવિધા હશે. ઇઆઇએ રિપોર્ટના પ્રકરણ-2 માં વિગતો આપવામાં આવી છે.

6. સિક્યુર્ડ લેન્ડ ફીલ (એસએલએફ) સૂચિત પ્રોજેક્ટ વિસ્તારની અંદર 30 એકર વિસ્તાર પર વિકસિત કરવાની દરખાસ્ત છે. ટ્રીટમેન્ટ, સંગ્રહ અને નિકાલની સુવિધા (ટીએસડીએફ) માટે CPCB માર્ગદર્શિકા

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મુજબ એસએેલએેફ નિર્માણ અને સંચાલન કરવામાં આવશે. એસએેલએેફ, તેની ક્ષમતા સુધી ભરાઈ ગયા પછી, ઉપરનો ભાગ ઢાંકી દેવામાં આવશે અને સોઈલ કવર ફેલાવવામાં આવશે અને પછી પ્લાન્ટેશન કરવામાં આવશે. પર્યાવરણીય પેરામીટરની દેખરેખ પણ હાથ ધરવામાં આવશે.

7. સૂચિત કોપર પ્રોજેક્ટના કારણે સૂચિત અસર દર્શાવવા માટે બેઝલાઇન ડેટા પર ઉમેરવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો AAQ ના નિર્ધારિત ધોરણોની અંદર જણાય છે અને તેથી તેની સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ-4 માં વિગતો ઉપલબ્ધ છે.
8. સ્થાનિક લોકોને યોગ્યતા મુજબ રોજગારીમાં પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક લોકોની રોજગારીમાં સુધારો કરવા માટે કૌશલ્ય વિકાસ કાર્યક્રમ અમલમાં મૂકવામાં આવશે.
9. મર્ક્યુરી રીકવરી સુવિધા સૂચિત પ્રોજેક્ટનો એક ભાગ છે. મર્ક્યુરી પર્યાવરણમાં છોડવામાં આવશે નહીં. ઇઆઇએ રિપોર્ટના પ્રકરણ 2 માં વિગતો આપવામાં આવી છે.
10. પ્રક્રિયાના ભાગરૂપે સોનું અને ચાંદી જેવી કિંમતી ધાતુઓ પુનઃપ્રાપ્ત કરવામાં આવશે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબીલિટી હેઠળ વાર્ષિક રૂ 8.0 કરોડની જોગવાઇ કરવામાં આવી છે. શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, સ્થાયી આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ સંબંધિત ક્ષેત્રોમાં કરવામાં આવશે. તમારા દ્વારા ઉલ્લેખિત APSEZ સાથે સંકળાયેલો અને અમને જણાવ્યા મુજબનો દંડ પાછો ખેંચી લેવામાં આવ્યો છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-41

Shri Turk Mohammad Hanif Abdul Kadar Jamadar
Village Dhruv,
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,
We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Out of 256.57 Haof total project area, 154.18 Ha land is notified SEZ and 102.38 Ha fall under forest land. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report. Forest Clearance has already been applied for this land by APSEZ (erstwhile MPSEZ Ltd). As the project proponent can submit the proposal for TOR, after applying the Stage-I forestry clearance, this requirement has also been complied with. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.

2. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report

3. The project will be developed with all the environmental safeguards as detailed in Environment Management Plan (EMP) in Chapter 9 of EIA Report. There are many

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such projects in the world, including the developed countries in Europe, America, Asia, etc. The apprehension mentioned by you is not in our knowledge. We are confident of operating this plant with all the safeguards to mitigate the pollution and protect environment. Demographic details are provided in Chapter 3 of the EIA Report. Proposed project will have facility to achieve Zero Liquid Discharge. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Ambient Air Quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter 9 of the EIA report.

4. Copper slag, estimated 8 to 10 Lac Tonnes per year, will be produced from the copper plant as a by-product. Copper Slag is widely used in construction industry, road making, shot-blasting etc. Copper Slag is also known as Ferro-Sand and Iron-Silicate which is used by Cement companies as raw material to produce the green-cement. Efforts will be made to maximize the sale of the Slag generated from the proposed project in domestic as well as in export market.

5. The proposed project is based on desalinated sea water sourced from APSEZ. Proposed project will have facility to achieve Zero Liquid Discharge. Details are given in Chapter 2 of EIA Report.

6. Secured Land Fill (SLF) is proposed to be developed over the area of 30 Acres within the proposed project area. SLF will be constructed and operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and then plantation will be done. Monitoring of environmental parameters will also be carried out.

7. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for AAQ and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

8. Local people will be given preference in employment as per eligibility. Skill development programme will be implemented to improve the employability of local people.

9. Mercury recovery facility is part of the proposed project. Mercury will not be released in the environment. Details are given in Chapter 2 of EIA Report.

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10. Precious metals like gold and silver will be recovered as part of the process. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. The penalty mentioned by you pertains to APSEZ and as informed to us same has been withdrawn.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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સંદર્ભ: AEL/Copper/Mundra/EC/PH/D-A-42

તુર્ક ઈસ્માઈલ રશીદ જમાદાર.
ગામઃ-ધ્રબ
તાલુકોઃ-મુંદરા
જિલ્લોઃ- કચ્છ,ગુજરાત.

વિષયઃ- અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ માટે આધુનિક ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. 256.57 હેકટરના કુલ પ્રોજેક્ટ વિસ્તાર પૈકી, 154.18 હેક્ટર જમીન સૂચિત SEZ છે અને 102.38 હે ફોરેસ્ટની જમીન હેઠળ આવે છે. ઇઆઇએ અહેવાલમાં જોડેલ 15 એપ્રિલ 2016 ના APSEZ પત્ર મુજબ, APSEZએઇએલને પ્રોજેક્ટ માટે જમીન ફાળવવા માટે સૈધ્ધાંતિક રીતે સંમત છે. APSEZ (અગાઉની એમપીએસઇઝેડ લિમિટેડ) દ્વારા આ જમીન માટે અગાઉથી ફોરેસ્ટ ક્લીયરન્સ લાગુ કરવામાં આવ્યું છે. સ્ટેજ -1 વનની મંજૂરીને લાગુ કર્યા પછી, TOR માટે પ્રોજેક્ટ્સ પ્રયોજક દરખાસ્ત રજૂ કરી શકતા હોવાથી, આ જરૂરિયાતનું પણ પાલન કરવામાં આવ્યું છે. પ્રોજેક્ટ સાઇટનો એક ભાગ ફોરેસ્ટની જમીન છે, જેનો ઉપયોગ ફોરેસ્ટની જમીનના ડાયવર્ઝન માટે અંતિમ મંજૂરી મેળવ્યા પછી જ થશે. સ્થાપિત પ્રક્રિયાની પૂર્ણતા બાદ રાજ્ય સરકાર દ્વારા વનની મંજૂરીની ભલામણ કરવામાં આવે છે અને છેલ્લે MoEFCCદ્વારા મંજૂર કરવામાં આવે છે.
2. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે.

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સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની/પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ જમીનના સ્તરના કેન્દ્રીકરણનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને પણ મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત જમીનના સ્તરનું કેન્દ્રીકરણ પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે

3. ઇઆઇએરીપોર્ટનાપ્રકરણ 9 માંપર્યાવરણવ્યવસ્થાપનયોજના (ઇએમપી) માંજણાવ્યાપ્રમાણેપ્રોજેક્ટનેપર્યાવરણની સલામતી સાથેવિકસાવવામાંઆવશે. વિશ્વમાંઆવાઘણાપ્રોજેક્ટ્સ છે, જેમાં યુરોપ, અમેરિકા, એશિયાવગેરે વિકસિત દેશોનો સમાવેશ થાય છે. તમારા દ્વારા જે ભયનો ઉલ્લેખ થયો છે તે અમારી જાણમાં નથી. આ પ્લાન્ટ ચલાવવા માટે અમને વિશ્વાસ છે કે અમે પ્રદૂષણ ઘટાડવા અને પર્યાવરણનું રક્ષણ કરવા માટે તમામ સાવચેતીઓ રાખીશું. વસ્તીવિષયક વિગતો EIA અહેવાલના પ્રકરણ 3 માં આપવામાં આવી છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ મેળવવાની સુવિધા હશે. CPCB દ્વારા નિર્ધારિત ધોરણો મુજબ ઉત્સર્જન પ્રાપ્ત કરવા માટે પ્રદૂષણ નિયંત્રણના પગલાં અમલમાં મુકવામાં આવશે. પ્રોજેક્ટના વિકાસ પછી એમ્બિયન્ટ એર ક્વોલિટીને નિર્ધારિત ધોરણોની અંદર જોવા મળશે. લોકોની તંદુરસ્તી પર કોઈ નોંધપાત્ર પ્રતિકૂળ અસર નહીં થાય. EMP ઇઆઇએ અહેવાલના પ્રકરણ-9 માં આપવામાં આવ્યું છે.

4. દરવર્ષેકોપર પ્લાન્ટમાંથી આડ પેદાશ તરીકે અંદાજે 8 થી 10 લાખ ટન કોપર સ્લેગનું ઉત્પાદન થશે. બાંધકામ ઉદ્યોગ, રોડ નિર્માણ,શોટ-બ્લાસ્ટિંગ વગેરેમાં કોપર સ્લેગનો વ્યાપક ઉપયોગ થાય છે. કોપર સ્લેગને ફેરો-સેન્ડ અને આયર્ન-સિલિકેટ તરીકે પણ ઓળખવામાં આવે છે, જે સિમેન્ટ કંપનીઓ દ્વારા ગ્રીન-સિમેન્ટનું ઉત્પાદન કરવા માટે કાચા માલ તરીકે ઉપયોગમાં લેવાય છે. સ્થાનિક તેમજ નિકાસ બજારોમાં સૂચિત પ્રોજેક્ટમાંથી પેદા થયેલા સ્લેગના વેચાણને વધારવા માટે પ્રયત્નો કરવામાં આવશે.

5. સૂચિત પ્રોજેક્ટ ASPEZ ના ક્ષાર રહિત સમુદ્રના પાણીના સ્ત્રોત પર આધારિત છે. સૂચિત પ્રોજેક્ટમાં ઝીરો લિક્વિડ ડિસ્ચાર્જ કરવા માટેની સુવિધા હશે. ઇઆઇએ રિપોર્ટના પ્રકરણ-2 માં વિગતો આપવામાં આવી છે.

6. સિક્યુર્ડ લેન્ડ ફીલ (એસએલએફ) સૂચિત પ્રોજેક્ટ વિસ્તારની અંદર 30 એકર વિસ્તાર પર વિકસિત કરવાની દરખાસ્ત છે. ટ્રીટમેન્ટ, સંગ્રહ અને નિકાલની સુવિધા (ટીએસડીએફ) માટે CPCB માર્ગદર્શિકા

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મુજબ એસએલએફ નિર્માણ અને સંચાલન કરવામાં આવશે. એસએલએફ, તેની ક્ષમતા સુધી ભરાઈ ગયા પછી, ઉપરનો ભાગ ઢાંકી દેવામાં આવશે અને સોઈલ કવર ફેલાવવામાં આવશે અને પછી પ્લાન્ટેશન કરવામાં આવશે. પર્યાવરણીય પેરામીટરની દેખરેખ પણ હાથ ધરવામાં આવશે.

7. સૂચિત કોપર પ્રોજેક્ટના કારણે સૂચિત અસર દર્શાવવા માટે બેઝલાઇન ડેટા પર ઉમેરવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો AAQ ના નિર્ધારિત ધોરણોની અંદર જણાય છે અને તેથી તેની સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ-4 માં વિગતો ઉપલબ્ધ છે.
8. સ્થાનિક લોકોને યોગ્યતા મુજબ રોજગારીમાં પ્રાધાન્ય આપવામાં આવશે. સ્થાનિક લોકોની રોજગારીમાં સુધારો કરવા માટે કૌશલ્ય વિકાસ કાર્યક્રમ અમલમાં મૂકવામાં આવશે.
9. મર્ક્યુરી રીકવરી સુવિધા સૂચિત પ્રોજેક્ટનો એક ભાગ છે. મર્ક્યુરી પર્યાવરણમાં છોડવામાં આવશે નહીં. ઇઆઇએ રિપોર્ટના પ્રકરણ 2 માં વિગતો આપવામાં આવી છે.
10. પ્રક્રિયાના ભાગરૂપે સોનું અને ચાંદી જેવી કિંમતી ધાતુઓ પુનઃપ્રાપ્ત કરવામાં આવશે. સ્થાનિક સમુદાયના વિકાસ માટે કોર્પોરેટ સોશિયલ રિસ્પોન્સિબીલિટી હેઠળ વાર્ષિક રૂ 8.0 કરોડની જોગવાઇ કરવામાં આવી છે. શિક્ષણ, આરોગ્ય અને સ્વચ્છતા, સ્થાયી આજીવિકા અને ગ્રામીણ આંતરમાળખાકીય સુવિધાઓ સંબંધિત ક્ષેત્રોમાં કરવામાં આવશે. તમારા દ્વારા ઉલ્લેખિત APSEZ સાથે સંકળાયેલો અને અમને જણાવ્યા મુજબનો દંડ પાછો ખેંચી લેવામાં આવ્યો છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
અધિકૃત સહીકર્તા .

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Ref: AEL/Copper/Mundra/EC/PH/D-A-42

To,
Shri Turk Ismail Abdul Rashid Jamadar
Village- Dhruv, Taluka- Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. Out of 256.57 Haof total project area, 154.18 Ha land is notified SEZ and 102.38 Ha fall under forest land. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report. Forest Clearance has already been applied for this land by APSEZ (erstwhile MPSEZ Ltd). As the project proponent can submit the proposal for TOR, after applying the Stage-I forestry clearance, this requirement has also been complied with. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.

2. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report

3. The project will be developed with all the environmental safeguards as detailed in Environment Management Plan (EMP) in Chapter 9 of EIA Report. There are many such projects in the world, including the developed countries in Europe, America,

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Asia, etc. The apprehension mentioned by you is not in our knowledge. We are confident of operating this plant with all the safeguards to mitigate the pollution and protect environment. Demographic details are provided in Chapter 3 of the EIA Report. Proposed project will have facility to achieve Zero Liquid Discharge. Pollution control measures will be implemented to achieve emissions as per the prescribed standards by CPCB. Ambient Air Quality is found to be within the prescribed standards after development of the project. There will not be any significant adverse impact on the health of the people. EMP is provided in Chapter 9 of the EIA report.

4. Copper slag, estimated 8 to 10 Lac Tonnes per year, will be produced from the copper plant as a by-product. Copper Slag is widely used in construction industry, road making, shot-blasting etc. Copper Slag is also known as Ferro-Sand and Iron-Silicate which is used by Cement companies as raw material to produce the green-cement. Efforts will be made to maximize the sale of the Slag generated from the proposed project in domestic as well as in export market.

5. The proposed project is based on desalinated sea water sourced from APSEZ. Proposed project will have facility to achieve Zero Liquid Discharge. Details are given in Chapter 2 of EIA Report.

6. Secured Land Fill (SLF) is proposed to be developed over the area of 30 Acres within the proposed project area. SLF will be constructed and operated as per the CPCB guideline for Treatment, Storage & Disposal Facility (TSDF). The SLF, once filled to its capacity will be capped on top and soil cover will be spread and then plantation will be done. Monitoring of environmental parameters will also be carried out.

7. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for AAQ and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

8. Local people will be given preference in employment as per eligibility. Skill development programme will be implemented to improve the employability of local people.

9. Mercury recovery facility is part of the proposed project. Mercury will not be released in the environment. Details are given in Chapter 2 of EIA Report.

10. Precious metals like gold and silver will be recovered as part of the process. For development of the local community a budget of Rs. 8.0 Crores per year has been provided under Corporate Social Responsibility. The areas of intervention will be education, health & sanitation, sustainable livelihood and rural infrastructure. The penalty mentioned by you pertains to APSEZ and as informed to us same has been withdrawn.

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We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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સંદર્ભ: **AEL/Copper/Mundra/EC/PH/D-A-43**

શ્રી જાડેજા ગજેન્દ્રસિંહ ભીમાજી,
સરપંચ,નવીનાલ
ગામ:-નવીનાલ,
તાલુકો:- મુંદ્રા
જિલ્લો:- કચ્છ,ગુજરાત.

વિષય:-અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ.

માનનીય સાહેબ,,

આપના દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓના પેરાવાઇઝ જવાબ અમો અત્રે આપી રહ્યા છીએ.

1. અમારી રજૂઆત છે કે MoEFCCપાસેથી TOR મેળવવાની તમામ જરૂરિયાત સંતોષવામાં આવી હતી.TOR મેળવ્યા પછી, એન્વાયરમેન્ટ ઇમ્પેક્ટ એસેસ્સમેંટ (પર્યાવરણ અસર મૂલ્યાંકન) પૂર્ણ કરવામાં આવેલ છે અને TOR ની તમામ શરતોનો પ્રોજેક્ટના પ્રયોજકો દ્વારા લોકસુનાવણીના ઉદ્દેશ માટે અમલ કરવામાં આવેલ છે.
   ફોરેસ્ટ જમીનના દરજ્જા અંગે, આ TOR માટેના ફોર્મ-1 માં અને ઉપરાંત TOR કોમ્પલાયન્સ (EIA રિપોર્ટના એનેક્ષર 1, પેજ A1-14) માંસ્પષ્ટપણે જાહેર કરવામાં આવેલ છે કે "ફોરેસ્ટ જમીન 253 એકર પણ સામેલ છે જે ઔદ્યોગિક હેતુ માટે તબદીલ કરવામાં આવશે.રાજ્ય સરકારે ફોરેસ્ટકલીયરન્સ માટે ભલામણ કરેલી છે અને તે હવે કેન્દ્ર સરકાર સમક્ષ ફાઇલ નંબર-04/2016-FCથી છે" ફાઇલનું સ્ટેટસ પણ ઓનલાઇનMoEFCCપરવન્યમંજૂરી અર્થેઉપલબ્ધ છે. APSEZ ના પત્ર તારીખ 15 એપ્રિલ 2016 થી APSEZ એ સૈદ્ધાંતિક રીતે AEL ના પ્રોજેકટ માટે જમીન ફાળવવાનું કબુલ કરેલ છે, જે EIA રિપોર્ટમાં સામેલ છે.
   મેસર્સ અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ દ્વારા પ્રોજેકટ APSEZની જમીનમાં દરખાસ્ત કરવામાં આવેલ હોવાથી આ જમીન ફોરેસ્ટકલીયરન્સ માટે APSEZ(ભુતપૂર્વ મુંદ્રા એસઇઝેડ લિમિટેડ) દ્વારા જ અરજી કરી દેવામાં આવેલ હતી.તારીખ 31.03.2011 ની જરૂરિયાત "પ્રયોજકોએ TOR ની દરખાસ્ત,ફોરેસ્ટકલીયરન્સ સ્ટેજ-1 ની અરજી કર્યા પછી જમૂકવી જોઈએ." આથી, આ દરખાસ્તનું પણ

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પાલન કરવામાં આવ્યું છે.TOR માટે અરજી કરવાના પહેલા ફોરેસ્ટકલીયરન્સ માટે અરજી કરવામાં આવેલ હતી.

પ્રોજેકટ પ્રયોજકો દ્વારા કોઈપણ તબક્કે કાંઇપણ છુપાવવાનું નથી અને/અથવા એવી કોઈ ખોટી અને ગેરમાર્ગે દોરનારી માહિતી અથવા ડેટા રજૂ કરેલ નથી.જે અરજીના સ્ક્રિનિંગ(પૃથક્કરણ) અથવા સ્કોપિંગ(તપાસ) અથવા મૂલ્યાંકન અથવા નિર્ણય લેવા માટે અગત્યના હોય છે. EIA નોટિફિકેશન 2006 ની કલમ 8 (vi)નું પણ ઉલ્લંઘન કરેલ નથી.

આપના પત્ર ના મુદ્દા 1(d) વિષે અમે કોઈ ટિપ્પણી કરતા નથી.

2. PIL 17 of 2011નો હાઇકોર્ટ દ્વારા નિકાલ કરવામાં આવેલ છે તે ચુકાદો પુનરાવલોકનમાં છે. .

ધનેશ્વરી, એક મોસમી નદી સૂચિત સાઇટના પશ્ચિમ ભાગે વહે છે.નદીનો પ્રવાહ યથાવત રાખવામાં આવશે, તે પ્લાન્ટ લે આઉટ EIA રિપોર્ટના પેજ C2-3 પર દર્શાવવામાં આવેલ છે.EIA રિપોર્ટ (અનુસૂચિ –C 1-6)માં ગુગલમેપ આપવામાં આવેલ છે.

3. ગુજરાત રાજયમાં આવેલા પુરાતત્વીયસ્મારકોની સંપૂર્ણ યાદી http://asi.nic.in/asi_monu_alphalist_gujarat.asp.પર ઉપલબ્ધ છે. ઉપરાંત, ખોદકામની સંપૂર્ણ યાદીhttp://asi.nic.in/asi_excavations.asp.પર ઉપલબ્ધ છે. આજની તારીખમાં કોઈ નોટિફાઇડ પુરાતત્વીય સાઇટ સૂચિત પ્રોજેક્ટ સાઇટથી 10 કિલોમીટરની અંદરમાં આવેલ નથી.
4. કમિટી અને તેનો રિપોર્ટ APSEZ ને સંબંધિત છે. જે મુદ્દા દર્શાવ્યા છે, તે સૂચિત પ્રોજેક્ટની પ્રવૃત્તિને સંબંધિત નથી.તેથી અમે કોઈ ટિપ્પણી કરતા નથી.
5. આ મુદ્દો એપીએલ ના સંબંધિત છે,તે સૂચિત પ્રોજેક્ટની પ્રવૃત્તિને સંબંધિત નથી.તેથી અમે કોઈ ટિપ્પણી કરતા નથી.
6. APSEZએ ફોરેસ્ટ જમીનના ઔદ્યોગિક હેતુના ડાયવર્ઝનમાટે અરજી કરેલ છે.ફોરેસ્ટના ડાયવર્ઝનની કાર્યવાહી હાલ ચાલુ છે. લાગુ પડતાં ફોરેસ્ટના ડાયવર્ઝનના તમામ નિયમોનું પાલન કરવામાં આવશે. સ્થાપિત કાર્યવાહી પૂરી થતાં અને અંતેMoEF&CCદ્વારા મંજૂર કરતાં રાજ્ય સરકારે ફોરેસ્ટકલીયરન્સ માટે ભલામણ કરેલ છે.
7. મુદ્દા ઉઠાવ્યા છે તે APSEZ માટે છે અને સૂચિત પ્રોજેકટ પ્રવૃત્તિને સંબંધિત નથી,તેથી અમે કોઈ ટિપ્પણી કરતા નથી.
8. કોલ હેંડલિંગનો રિપોર્ટ અને તેની અસરો સૂચિત પ્રોજેકટ પ્રવૃત્તિ સાથે સુસંગત નથી. તેથી અમે કોઈ ટિપ્પણી કરતા નથી.
9. 2011 ની PIL 17 નો હાઇકોર્ટ દ્વારા નિકાલ કરવામાં આવેલો છે. ચુકાદો પુનરાવલોકનમા છે.

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10. સંભવિત રોજગારીની વિગતો EIA રિપોર્ટના પ્રકરણ 2 માં દર્શાવવામાં આવેલ છે. આ પ્રોજેકટમાં લાયકાતના ધોરણે સ્થાનિક લોકોને નોકરીમાં પસંદગી આપવામાં આવશે. સ્થાનિક લોકોની નોકરી મેળવવાની કુશળતામાં વધારો થાય તે માટે સ્કિલ ડેવલપમેન્ટ સેન્ટર (કુશળતા વિકાસ કેન્દ્ર) સ્થાપવાની યોજના છે.
11. સૂચિત સાઇટ CRZની બહાર આવેલી છે અને આથી CRZ નોટિફિકેશન અન્વયે મંજૂરી લેવાની જરૂર નથી.આ બાબત EIA રિપોર્ટની આકૃતિ 1.5 માં દર્શાવવામાં આવેલ છે. કુદરતી આપત્તિને ઓળખવા અને તેનો સામનો કરવા રિસ્ક એનાલિસિસ (જોખમ વિશ્લેષણ) અને ડિઝાસ્ટર મેનેજમેન્ટ (આપત્તિ વ્યવસ્થાપન) તૈયાર કરવામાં આવેલા છે, જે EIA રિપોર્ટમાં સામેલ છે.
12. પ્રોજેકટ માટે કોઈ અલગથી ડી સેલિનેશન પ્લાન્ટની દરખાસ્ત નથી. APSEZ પોતાના મંજૂર ડી સેલિનેશન પ્લાન્ટ ક્ષમતામાથી સૂચિત પ્રોજેક્ટને પાણી પૂરું પાડશે. આથી સૂચિત પ્રોજેક્ટને કારણે કોઈ વધારાની અસરો હશે નહીં.
13. અદાણી અને ટાટા પાવર પ્લાન્ટ સાથે સાથે APSEZ ના વેસ્ટ એન્ડ સાઉથ પોર્ટના રેફરન્સ EIA રિપોર્ટના ટેબલ 1.1 પ્રકરણ-1 માં દર્શાવેલા છે.
14. ટિપ્પણી જનરલ પ્રકારની હોવાથી અમે ટિપ્પણી કરતાં નથી.
15. પ્રસ્થાપિત કાર્યવાહી પ્રમાણે રાજ્ય સરકારતરફથી ફોરેસ્ટ કલીયરન્સ માટેની ભલામણ તથા ત્યારબાદની MoEF&CCદ્વારા મંજૂરી આ બંને યુઝર એજન્સી દ્વારા સરકારશ્રી દ્વારા આપવામાં આવેલ દરેક શરતોનું પાલન કર્યા બાદ જ મળી શકે છે. અદાણી ફાઉન્ડેશન આસપાસના ગામડાઓમાં સસ્ટેનેબલ આજીવિકા માટે CSR પ્રોજેકટ દ્વારા કાર્ય કરી રહયું છે.
16. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે,સલ્ફ્યુરિક એસિડ આ પ્રોજેક્ટમાંથી બનતું વેચવાપાત્ર ઉત્પાદન છે. સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB)ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. આથી કોઈ નોંધપાત્ર પ્રતિકૂળ અસરોની સંભાવના નથી.
17. સૂચિત પ્રોજેકટથી કોઈ નદી બંધ થવાની સંભાવના નથી.
18. સૂચિત પ્રોજેકટ નવીનાળ થી કોટડી ખાડી પર જવામાં નડશે નહીં.
19. વનસ્પતિ અને પ્રાણીઓનો અભ્યાસ EIA ના ભાગરૂપે કરવામાં આવેલ છે અને વિગતો પ્રકરણ-3 માં અને મેનેજમેન્ટ પ્લાન પણ પ્રકરણ-4 પર દર્શાવવામાં આવેલ છે.

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અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,

અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)

અધિકૃત સહીકર્તા.

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Ref: AEL/Copper/Mundra/EC/PH/D-A-43

Shri Jadeja Gajendra sinh Bhimaji
Sarpanch, Navinal
Village- Navinal, Taluka- Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,

We are herewith responding para wise to the issues raised by you:

1. We submit that all requirements for obtaining the TOR from MoEFCC were fulfilled. After obtaining TOR, Environment Impact Assessment has been completed and all conditions of TOR has been complied with by project proponent for the purpose of public hearing.
   Regarding the Status of Forest Land, this is clearly disclosed in Form-1 for TOR and further in TOR compliance (Annexure 1, page AI-14 of EIA report) that "Forest land of 253 Acres is also involved which will be converted for industrial use. State Government has recommended for the forest clearance and it is now at Central government through File No. 8-04/2016-FC". The file status is also available online at MoEFCC Forest Clearance. APSEZ has in principally agreed to allot the land for the project to AEL, as per APSEZ letter dated 15th April 2016 which is enclosed in EIA report.

   As the project is proposed by M/s Adani Enterprises Limited in APSEZ land, Forest Clearance has already been applied for this land by APSEZ (erstwhile Mundra SEZ Ltd.). The requirement of OM dated 31.03.2011 is "the proponent should submit the proposal for TOR, only after applying the Stage-I forestry clearance...". Hence, this requirement has also been complied as the Forest Clearance was applied much before applying for TOR.

   At no stage there is any concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application by the project proponent. There is no deviation from the Section 8 (vi) of EIA Notification 2006 also.

   We do not offer any comment related to point 1(d) of your letter.

2. The PIL 17 of 2011 has been disposed by the High Court. The judgment is under review.

   Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Google Map is provided in EIA Report (Schedule –C 1-6).

PAD

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3. A complete list of archeological monuments in the state of Gujarat is available at http://asi.nic.in/asi_monu_alphalist_gujarat.asp. Further, a complete list of excavations is available at http://asi.nic.in/asi_excavations.asp. As on date, there is no Notified Archeological Site located within 10 km from the proposed project site.
4. The Committee and its report pertain to APSEZ. The points mentioned are not related to the proposed project activity therefore we do not offer any comment.
5. The issues raised are for APL and are not related to the proposed project activity therefore we do not offer any comment.
6. APSEZ has applied for diversion of forest land for industrial purpose. The forest diversion is under process. All the rules will be complied for forest diversion, as applicable. Forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC.
7. The issues raised are for APSEZ and are not related to the proposed project activity therefore we do not offer any comment.
8. The Report on Coal Handling and its impacts are not relevant to the proposed project activity therefore we do not offer any comment.
9. The PIL 17 of 2011 has been disposed by the High Court. The judgment is under review.
10. Details on potential employment is mentioned in Chapter 2 of EIA Report. Preference will be given to local people for employment in this project based on eligibility. There is a plan to set up a Skill Development Centre to improve the employability of local youth.
11. The proposed site is outside CRZ and hence there is no requirement of Clearance under the CRZ Notification. The same is shown in Fig. 1.5 of EIA Report. Risk Analysis and Disaster Management Plan has been prepared to identify and address the natural disasters, which is covered in EIA Report.
12. There is no separate desalination plant proposed for the project. APSEZ will be supplying water for the proposed project from its approved desalination plant capacity. Therefore there will not be additional impact due to proposed project.
13. References of Adani and Tata Power Plants as well as west & south ports of APSEZ are mentioned in Table 1.1 of Chapter 1 of the EIA Report.
14. Comment being general in nature, we do not offer comment.
15. As a procedure, forest clearance is recommended by State Government after completion of established process and finally approved by MoEF&CC. Adani foundation is working for Sustainable Livelihood in the surrounding villages through CSR projects.
16. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. Sulphuric Acid is a saleable product from this project. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Therefore no significant adverse impacts are envisaged.
17. No closure of river is envisaged in the proposed project.

PAA

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18. Proposed project will not affect the access from Navinal to Kotdi Creek.
19. Flora and Fauna study has been conducted as part of the EIA and details are provided in the Chapter 3 and management plan is also provided in Chapter 4.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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સંદર્ભ: **AEL/Copper/Mundra/EC/PH/D-A-44**

શ્રી પ્રવિણસિંહ ભૂરૂભા ચૌહાણ
ગામઃ- સિરાચા
તાલુકોઃ- મુંદ્રા
જિલ્લોઃ- કચ્છ,ગુજરાત.

વિષયઃ- અદાણી એન્ટરપ્રાઈસિસ લિમિટેડ(AEL)ના કોપર રિફાઇનરી પ્રોજેકટ અંગેની લોકસુનાવણીમાંની આપની રજુઆતનો જવાબ.

માનનીય સાહેબ,,

અમે તમારી રજૂઆતની પ્રાપ્તિને સ્વીકારીએ છીએ અને તમારી ચિંતાઓની નોંધ લીધી છે. અમે તમને ખાતરી આપીએ છીએ કે પ્રોજેક્ટની કામગીરી શરૂ થતાં પહેલાં બધા પર્યાવરણીય સાવચેતીઓની વ્યવસ્થા કરવામાં આવશે. અમે પ્રદૂષણ નિયંત્રણ માટે આધુનિક ટેકનોલોજી પણ અપનાવીશું. આ પ્રોજેક્ટને ઝીરો લિક્વિડ ડિસ્ચાર્જ સાથે અમલમાં મૂકવામાં આવશે. પર્યાવરણીય અસર આકારણી હાથ ધરવામાં આવી છે અને તમામ પર્યાવરણીય પરિમાણો કાનૂની મર્યાદાની અંદર હશે. અમે તમારા દ્વારા ઉઠાવવામાં આવેલા મુદ્દાઓનો આ મુજબ જવાબ આપીએ છીએ:

1. કોપર પ્રોજેકટ તે આયાત કરેલ કોપર કોન્સનટ્રેટ પર આધાર રાખે છે, જે આપણા દેશમાં જરૂરી જથ્થામાં ઉપલબ્ધ નથી.વળી, તૈયાર થયેલ ઘણા ઉત્પાદનો દરિયાઈ માર્ગે મોકલવામાં આવશે. આ પરિબળો સાઇટની પસંદગી માટે ધ્યાનમાં લેવામાં આવેલા.બંદરની નજીક હોવાથી આ સાઇટ ફાયદાકારક છે. તમામ સૂચવાયેલા પ્રદૂષણ નિયંત્રણ પગલાં લઈ, પર્યાવરણના જોખમ અને અસરોનું શમન કરવામાં આવશે. પ્રોજેકટ ઝીરો લિક્વિડ ડિસ્ચાર્જપર આધારિત છે.દરિયા કિનારાના લોકેશનો પર આવા ઘણા પ્લાન્ટ આવેલા છે અને તેમના સંચાલનથી દરિયા કાંઠાની પરિસ્થિતી ઉપર કોઈ નોંધપાત્ર અસર થયેલ નથી.પ્રોજેકટ સાઇટનો એક ભાગ ફોરેસ્ટ જમીન છે, જેનો ઉપયોગ ત્યારેજ કરવામાં આવશે જ્યારે ફોરેસ્ટના ડાયવર્ઝનની આખરી મંજૂરી મળી જશે. ફોરેસ્ટકલીયરન્સ મંજૂર થતાં તેની તમામ પ્રક્રિયા અને શરતોનું પાલન કરવામાં આવશે.
2. આ પેરામાં અદાણી ગ્રુપે ઉલ્લંઘનો કરેલા છે તેવા આક્ષેપો કરવામાં આવેલા છે પણ તેનો કોઈ આધાર આપેલ નથી. ભૂતકાળમાં આવા આક્ષેપો અને કાનૂની દાવાઓ થયા હતા જે માનનીય કોર્ટો એ રદ કરેલા છે. ઉપસ્થિત કરેલા મુદ્દા સૂચિત પ્રોજેક્ટને સંબંધિત નથી અને આથી અમે કોઈ ટિપ્પણી આપતા

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નથી. જરૂરી પરમીશનમળ્યા બાદ પર્યાવરણીય સંરક્ષણ માટેના પગલા લઈને જ પ્રોજેકટ કાર્યરત કરવામાં આવશે.

3. સૂચિત પ્રોજેક્ટ આંશિકનોટિફાઈડSEZમાં અને આંશિક ફોરેસ્ટ જમીનમાં ડાયવર્ઝન માટે એપ્લાઈડ કરેલ છે. નોટિફાઈડ SEZમાટે સર્વે નંબર્સ ફોર્મ-1 એપ્લિકેશનમાં સામેલ કરવામાં આવ્યા છે અને તેની વિગતો:APSEZ વિસ્તાર સીરાચા અને નવીનાળ ગામોમાં: સિરાચા ગામ. 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/પી, 142/પી, 143, 144/1, 144/2, 147/પી, 295/1 ભાગ , 295/2 (ફોરેસ્ટ જમીન), બિનસર્વે જમીન, જૂની એસીએલ અને માર્ગાંતરિત મુંદ્રા ફોરેસ્ટ જમીનનો ભાગ. નવીનાળ ગામ 223/પી, 224 /પી, 225/પી અને જૂની એસીએલ જેનો અંતિમ ઇઆઇએ અહેવાલમાં પણ સામેલ કરવામાં આવશે.
4. APSEZ એ યોગ્ય પરવાનગીઓ પ્રાપ્ત કર્યા પછી એઇએલની તરફેણમાં જમીન તબદીલ કરવા/ ફાળવવા સૈધ્ધાંતિક મંજૂરી આપી છે. પત્રની એક નકલ ઇઆઇએ અહેવાલની અનુસૂચિ - 3 માં આપવામાં આવી છે.
5. સૂચિત પ્રોજેક્ટ સંબંધિત જમીનની વિગતો ઉપરના ક્રમાંક 3 માં આપવામાં આવેલી છે.
6. સૂચિત પ્રોજેક્ટની જમીનનો ભાગ, 154.18 હેકટર નોટિફાઈડ SEZમાં છે. જાહેરનામાંની એક નકલ અંતિમ ઇઆઇએ રિપોર્ટમાં સામેલ કરવામાં આવશે.
7. સૂચિત પ્રોજેક્ટની જમીનનો ભાગ, 154.18 હેકટર નોટિફાઈડ SEZમાં છે.
8. સૂચિત પ્રોજેક્ટમાં નોટિફાઈડ SEZ વિસ્તાર અને ફોરેસ્ટની જમીનનો સમાવેશ થાય છે. નોટિફાઈડ SEZની એક નકલ ઉપરના મુદ્દા નં. 6 મુજબ છે. APSEZ એફોરેસ્ટ જમીનના ડાયવર્ઝન માટે અરજી કરેલ છે અને તે પ્રોસેસમાં છે. ઇઆઇએ રિપોર્ટના પ્રકરણ -2 માં જમીનની વિગતો આપવામાં આવી છે.
9. અમે તમારા ઓબ્ઝર્વેશન સાથે સંમત નથી. એઈએલે સાઇટ પર કોઈ પ્રવૃત્તિ શરૂ કરી નથી અને કોઈપણ જમીન પર કોઈ અતિક્રમણ કર્યું નથી.
10. હાલમાં, સૂચિત પ્રોજેક્ટ વિસ્તાર માટે SEZ ડીનોટીફીકેશનની કોઈ જરુરિયાત નથી.
11. વૈકલ્પિક સ્થળ વિશ્લેષણ હાથ ધરવામાં આવ્યું હતું. સ્થળ પસંદગીના માપદંડ અને વૈકલ્પિક સ્થળનો અભ્યાસ EIA રિપોર્ટના પ્રકરણ-5 માં વિગતવાર આપેલ છે
12. ફોરેસ્ટ જમીનમાં સુધારણાની કોઈ દરખાસ્ત નથી. ફોરેસ્ટની જમીનની ડાયવર્ઝનની દરખાસ્ત પ્રોસેસમાં છે. સૂચિત પ્રોજેક્ટ હેઠળની અન્ય જમીન નોટિફાઈડ SEZ વિસ્તાર છે.
13. ફોરેસ્ટની જમીનની વિગત ફોર્મ -1 (મૂળભૂત માહિતી, ક્રમ નં 9, 12, 21 અને 23) માં પણ દર્શાવવામાં આવી છે.
14. કંપનીએ ગ્રીન બેલ્ટ માટે 33% વિસ્તારનો પ્રસ્તાવ મૂક્યો છે. 102.38 હેકટર ફોરેસ્ટની જમીન, એકવાર ડાયવર્ઝન અને ફાળવણી થયા પછી, તે પ્રોજેક્ટ વિસ્તારનો ભાગ હશે. 256.58 હેક્ટરના કુલ પ્રોજેક્ટ

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વિસ્તારના 33% માં ગ્રીન બેલ્ટ વિકસાવવામાં આવશે. ફોરેસ્ટ વિસ્તારમાં કોઈ ગેરકાયદેસર અતિક્રમણ કરવામાં આવ્યું નથી.

15. પૃષ્ઠ C3-16 ના નકશા મુજબ, પ્રોજેક્ટ સાઇટમાં સિરાચા રિઝર્વ ફોરેસ્ટનો ભાગ પણ સામેલ છે. યોગ્ય નકશો ઇઆઇએ અહેવાલમાં આપવામાં આવ્યો છે.
16. વન મંજૂરી હજી પણ કાર્યવાહી હેઠળ છે. આ વિગતો MoEF& CC (ફાઈલ નં. 8-04 / 2016-એફસી) ની વેબસાઇટ પર ઉપલબ્ધ છે.
17. ફોરેસ્ટ જમીન ડાયવર્ઝન કાર્યવાહી હેઠળ છે અને એકવાર મંજૂર થયા પછી, વન મંજૂરની તમામ શરતોનું પાલન કરવામાં આવશે.
18. ફોરેસ્ટ જમીન ડાયવર્ઝન કાર્યવાહી હેઠળ છે અને લાગુ થતી હોય તે પ્રમાણે ફોરેસ્ટ અધિકાર અધિનિયમની આવશ્યકતાઓનું પાલન કરવામાં આવશે.
19. તારીખ –અને - સુપ્રીમ કોર્ટમાં SLP28788/2016 અને ગુજરાત હાઇકોર્ટમાં ડબલ્યુપી (પીઆઈએલ) 12/2011ને સંબંધિત ઓર્ડરોથી રદ કરવામાં આવે છે. તેથી, કોઈ વિવાદ નથી.
20. સુનિતા નારાયણ કમિટીના અહેવાલના સંદર્ભમાં, APSEZ, 18 મી સપ્ટેમ્બર, 2015 ના તેમના અંતિમ હુકમ MoEF&CCના નિર્દેશો અનુસાર, પાલન કરે છે.
21. સૂચિત સાઇટના પશ્ચિમ ભાગમાં ધનેશ્વરી, મોસમી નદી વહે છે. ઇઆઇએ અહેવાલના પૃષ્ઠ C2-3 પરના પ્લાન્ટ લેઆઉટમાં દર્શાવ્યા મુજબ નદીના પ્રવાહને જાળવવામાં આવશે. પ્રોજેક્ટ સાઇટની આસપાસના 10 કીમી વિસ્તારમાં ઈમ્પેક્ટ એસેસમેન્ટ આવરી લેવામાં આવી છે અને તે જળાશયો (જો કોઈ હોય તો), સ્થાનિક રહેવાસીઓ અને ગામોનો સમાવેશ કરે છે. કોઈપણ ખાડીઓ બંધ કરવાની કોઈ દરખાસ્ત નથી.
22. ગુજરાત કોસ્ટલ ઝોન મેનેજમેન્ટ ઓથોરિટી માન્ય કોસ્ટલ ઝોન મેનેજમેન્ટ પ્લાનનો કસ્ટોડીયન છે. જોકે,MoEF&CC ની અધિકૃત એજન્સી દ્વારા તૈયાર કરાયેલ અધિકૃત સીઆરઝેડ નકશો સુપરઈમ્પોઝીંગ પ્રોજેક્ટ વિસ્તારને ઇઆઇએ અહેવાલના પ્રકરણ -3 જણાવવામાં આવ્યો છે.
23. જોડેલ સીઆરઝેડ નકશો નેશનલ સેન્ટર ફોર અર્થ સાયન્સ સ્ટડીઝ દ્વારા તૈયાર કરવામાં આવેલ છે અને ઇઆઇએ રિપોર્ટના પૃષ્ઠ C3-17 પર જોડેલ છે. અંતિમ ઇઆઇએ અહેવાલમાં વધુ સ્પષ્ટ નકલ સામેલ કરવામાં આવશે.
24. સૂચિત સાઇટ સીઆરઝેડની બહાર છે અને દક્ષિણ દિશામાં પ્રવર્તમાન મેંગ્રોવથી લઘુત્તમ અંતર 100 મીટરથી વધુ છે.
25. આ વિસ્તારના લોકોનું વ્યવસાયિક માળખું ઇઆઇએ અહેવાલના પૃષ્ઠ C3-65 પર દર્શાવવામાં આવ્યું છે. મુખ્ય કામદારો કુલ કામદારોના 90.57 ટકા છે. કાર્ય ભાગીદારીનો દર 56.36 ટકા છે. માછીમારી

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પ્રવૃત્તિઓ પૈકીની એક છે. અભ્યાસ ક્ષેત્રમાં માછીમારોની સંખ્યા અંગેની વિગતોને અંતિમ ઇઆઇએ અહેવાલમાં સામેલ કરવામાં આવશે.

26. સૂચિત પ્રોજેક્ટને લીધે કોઈ માછીમારોને અસર થશે નહીં..
27. પગાડીયા માછીમારોની વિગતોનો અંતિમ ઈઆઇએ અહેવાલમાં સમાવેશ કરવામાં આવશે.
28. નોટિફાઈડ SEZ વિસ્તાર અને ડાયવર્ઝન માટે લાગુ કરવામાં આવેલી ફોરેસ્ટની જમીન પર પ્રોજેક્ટ વિકસાવવામાં આવશે. APSEZ એ નવીનાડ અને સિરાચાના માછીમારો માટે સમર્પિત આવવા જવાનો માર્ગ બનાવ્યો છે. સૂચિત પ્રોજેક્ટને કારણે માછીમારોના જવાના માર્ગો બંધ કરવામાં આવશે નહીં.
29. 102.38 હેક્ટર ફોરેસ્ટ જમીનના ડાયવર્ઝનમાં કોઈ પુનર્વસન સંકળાયેલ નથી. વનસ્પતિ અને પ્રાણીઓના અભ્યાસ EIA ના ભાગરૂપે કરવામાં આવેલા છે અને EIA રિપોર્ટમાં મેનેજમેન્ટ પ્લાન આપવામાં આવેલો છે. એક વખત ફોરેસ્ટકલીયરન્સ મળતાં,ફોરેસ્ટકલીયરન્સની તમામ શરતોનું,ફોરેસ્ટ જમીનના ડાયવર્ઝનની અસરોનું શમન કરવા માટે પાલન કરવામાં આવશે. તમામ કાર્યવાહી પૂરી થયા પછી અને MoEF&CCની મંજૂરી મળ્યા પછી ફોરેસ્ટડાયવર્ઝન માટે રાજ્ય સરકાર દ્વારા ભલામણ કરી શકાશે.
30. કોપર સ્લેગ અને ફોસ્ફોજીપ્સમના ઉત્પાદનના જથ્થાની વિગતો EIA રિપોર્ટમાં આપવામાં આવેલી છે. કોપર સ્લેગ બિલ્ડીંગ મટિરિયલ તરીકે(કોંક્રીટમાં અને તૈયાર મિક્સમાં સાથે નાખવા), રોડ બાંધકામ અને અને શૉટ બ્લાસ્ટિંગમાં વપરાય છે અને ફોસ્ફોજીપ્સમ સિમેન્ટ ઉત્પાદન, જીપ્સમ બોર્ડ ઉત્પાદન અને ખાતરમાં વપરાય છે.બંને મટિરિયલ સ્થાનિક અને વિદેશી બજારોમાં વેચવામાં આવશે.
31. જૈવવિવિધતા ક્ષેત્ર તરીકે નવીનાળ ફોરેસ્ટ પર કોઈ નોટીફીકેશન સૂચિત કરવામાં આવ્યું નથી.
32. કાયદાકીય સત્તાવાળાઓ દ્વારા વહન ક્ષમતા અભ્યાસો હાથ ધરવામાં આવ્યા છે. આ વિસ્તાર માટે કોઈ પણ વહન ક્ષમતા અભ્યાસો હાથ ધરવામાં આવ્યા હોય તેની અમને જાણ નથી. MoEF&CC દ્વારા મંજૂર કરાયેલા TOR મુજબ અભ્યાસના વિસ્તાર માટે EIA અભ્યાસો હાથ ધરવામાં આવ્યા છે.
33. સૂચિત કોપર પ્રોજેક્ટના કારણે સૂચિત અસર દર્શાવવા માટે બેઝલાઇન ડેટા પર ઉમેરવામાં આવી છે. પ્રોજેક્ટના સંચાલન પછીની પૂર્વાનુમાનિત અસરો હવા અને પાણી માટે નિર્ધારિત ધોરણોમાં જણાય છે અને તેથી તે સ્વાસ્થ્ય, કૃષિ અને પશુપાલન પર કોઈ નોંધપાત્ર અસર થવાની સંભાવના નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો ઉપલબ્ધ છે.
34. સૂચિત સાઇટના 10 કિ.મી.ની વિસ્તારના તમામ ગ્રામ પંચાયતો ગુજરાતીમાં સારાંશ મૂકવામાં આવેલ છે. ઉપરાંત 7 સ્થળો - જિલ્લા કલેકટર,ભુજ,જિલ્લો કચ્છ, જીલ્લા વિકાસ કચેરી, ભુજ,જિલ્લો કચ્છ, જિલ્લા ઉદ્યોગ કેન્દ્ર, ભુજ,જિલ્લો કચ્છ, તાલુકા વિકાસ કચેરી, મુંદ્રા, જિલ્લો કચ્છ, તાલુકા વિકાસ કચેરી, માંડવી, જિલ્લો કચ્છ, મુખ્ય વન સંરક્ષક, પર્યાવરણ, વન અને હવામાન પરિવર્તન મંત્રાલય, ભારત સરકાર, પ્રાદેશિક કચેરી (પશ્ચિમ ઝોન), કેન્દ્રીય પર્યાવરણ ભવન, ઇ -5, એરેરા કોલોની, લિંક રોડ -3,

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રવિશંકર નગર, ભોપાલ 462016 અને પ્રાદેશિક કચેરી, કચ્છ (પૂર્વ), ગુજરાત પ્રદૂષણ નિયંત્રણ બોર્ડ, રૂમ નં. 215-216,બીજો માળ, કંડલા પોર્ટ ટ્રસ્ટ, એડમીન બિલ્ડિંગ, સેકટર 08, ગાંધીધામ, કચ્છ.

35. આ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે.
36. પાવર ટ્રાન્સમિશન લાઇન્સ કેટલાક ફેરફાર સાથે જાળવી રાખવામાં આવશે.
37. માત્ર પર્યાવરણ વિભાગના 8 વ્યક્તિઓનો પ્રસ્તાવ છે. પર્યાવરણ વ્યવસ્થાપન આ 8 વ્યક્તિઓ સુધી મર્યાદિત નથી, પરંતુ પર્યાવરણ વ્યવસ્થાપન માટે વિવિધ વિભાગો દ્વારા હાથ ધરવામાં આવેલી કામગીરીનો તેમાં સમાવેશ થાય છે.
38. અદાણી એન્ટરપ્રાઈઝીસ લિમિટેડ પાસે તેની પોતાની પર્યાવરણ વ્યવસ્થાપન ટીમ હશે, જેની આગેવાની પર્યાવરણવાદી હેઠળ હશે,જે કોપર પ્રોજેક્ટના તમામ પર્યાવરણીય અને પ્રદૂષણના મુદ્દાઓનું સંચાલન કરવાની ક્ષમતા ધરાવશે. અન્ય મુદ્દાઓ સૂચિત પ્રોજેક્ટ માટે ઇઆઇએ અહેવાલના કાર્યક્ષેત્રની બહાર છે.
39. એસએલએફ હેઠળનો વિસ્તાર પ્રિ-ફીઝીબીલીટી અહેવાલમાં પૂરો પાડવામાં આવેલ છે, જે TOR એપ્લિકેશનનો એક ભાગ છે.
40. પ્રક્રિયા દરમ્યાન ઉત્પન્ન થયેલો SO2 ગેસ, સલ્ફ્યુરિક એસિડના પ્લાન્ટ માટે ઈન્પુટ કાચો માલ છે અને પ્રોજેકટ એરિયાની અંદરજ સંબંધિત પ્લાન્ટમાં સલ્ફ્યુરિક એસિડમાં રૂપાંતરિત કરવામાં આવશે. સલ્ફ્યુરિક એસિડ પ્લાન્ટના શેષ વાયુઓ ટેલ ગેસ સ્ક્રબ્બિંગ પછી, કેન્દ્રિય પ્રદૂષણ નિયંત્રણ બોર્ડ (CPCB) ના નિયત ધોરણોને અનુસરી ચીમનીમાથી છોડવામાં આવશે. 46 ચિમની /પ્રોસેસ વેન્ટમાંથી, 4 ચીમનીને 100 મીટર (300 ફુટ) ઊંચાઈ સાથે પ્રસ્તાવિત કરવામાં આવી છે. અસર મૂલ્યાંકન હાથ ધરવામાં આવ્યું છે અને પ્રોજેક્ટ કાર્યરત થયા બાદ ગ્રાઉન્ડલેવલ કોન્સનસ્ટ્રેશનનું મૂલ્યાંકન કરવા માટે બેઝલાઈન ડેટા પર વૃદ્ધિની અસરોને મૂકવામાં આવી છે. પ્રોજેક્ટની કામગીરી પછીની પૂર્વાનુમાનિત ગ્રાઉન્ડ લેવલ કોન્સનસ્ટ્રેશન પણ નેશનલ એમ્બિયન્ટ એર ક્વોલિટી સ્ટાન્ડર્ડની અંદર હશે અને તેથી તેની આસપાસની ઇકોસિસ્ટમ પર કોઈપણ લાંબા ગાળાની અસરો થવાની અપેક્ષા નથી. ઇઆઇએ રિપોર્ટના પ્રકરણ 4 માં વિગતો આપવામાં આવી છે.
41. અમારો જવાબ મુદ્દા નં. 40મુજબનો છે.
42. પ્રશ્ન અમને સંબંધિત નથી, તેથી અમે કોઈ ટિપ્પણી આપતા નથી..
43. સૂચિત પ્રોજેક્ટમાં ઝીરો લીક્વીડ ડિસ્ચાર્જ સુવિધા હશે અને કોઈ ટ્રીટેડ પાણી સમુદ્રમાં મોકલવામાં આવશે નહીં.
44. કોઈપણ સીઇટીપી સાથે જોડાણ કરવાની કોઈ દરખાસ્ત નથી. ગંદાપાણીના ટ્રીટમેન્ટ માટે એઇએલની પોતાની ETP હશે. ઇઆઇએ અહેવાલમાં વિગતો આપવામાં આવી છે.

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45. ઈઆઈએ અહેવાલમાં ફ્લો ડાયાગ્રામ અને ક્ષમતાઓ આપવામાં આવેલી છે. પ્રોજેકટના એન્જિનિયરિંગ દરમિયાન વધુ આયોજન કરવામાં આવશે.
46. ઇઆઇએ અહેવાલમાં અભ્યાસના વિસ્તાર વિશે વસ્તી વિષયક માહિતીની વિગતો સામેલ છે. ઇઆઇએ અહેવાલના એક્ઝિક્યુટિવ સમરી સ્થાનિક ભાષામાં તૈયાર કરવામાં આવી હતી અને સૂચિત સાઇટના 10 કિલોમીટરના ત્રિજ્યામાં તમામ પંચાયતો પર ઉપલબ્ધ કરાવવામાં આવી હતી. ઇઆઇએ રિપોર્ટ સાથે એક્ઝિક્યુટિવ સમરી 7 સરકારી કચેરીઓ પર પણ સ્થાનિક ભાષામાં ઉપલબ્ધ કરવામાં આવી હતી. અદાણી ફાઉન્ડેશન આસપાસના તમામ ગામડાઓને આવરી લેતા સામુહિક આરોગ્ય ક્ષેત્રે કાર્ય કરી રહ્યું છે.
47. આ સૂચિત પ્રોજેક્ટ માટે EIA અહેવાલના કાર્યક્ષેત્રની બહાર છે. જો કે, પાત્રતાને આધારે સૂચિત પ્રોજેક્ટ માટે સ્થાનિક રોજગાર પૂરો પાડવામાં આવશે અને ઇઆઇએ અહેવાલમાં વિગતો પૂરી પાડવામાં આવી છે.
48. આ સૂચિત પ્રોજેક્ટ માટે EIA અહેવાલના કાર્યક્ષેત્રની બહાર છે.
49. પર્યાવરણ, વન અને આબોહવા પરિવર્તન મંત્રાલય દ્વારા આપવામાં આવેલા સંદર્ભની શરતો અનુસાર ઇઆઇએ અહેવાલ તૈયાર કરવામાં આવ્યો છે.

અમે ખાત્રી આપીએ છીએ કે પ્રોજેક્ટના સ્થાપન અને સંચાલનમાં તમામ પર્યાવરણીય સુરક્ષા પ્રદાન કરવામાં આવશે.

આપનો આભાર,
અદાણી એન્ટરપ્રાઇઝિસ લિમિટેડ વતી,

(પ્રસાદ સૂર્યારાવ)
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Taluka- Mundra
Dist- Kutchh, Gujarat.

Subject: **Response to your representation in Public Hearing for Copper Refinery Project of Adani Enterprises Limited (AEL).**

Dear Sir,
We acknowledge the receipt of your representation and have noted your concerns. We assure you that all the environmental safeguards will be put into place before operation of the project. We will also be adopting the latest technology for pollution control. The project will be implemented with Zero Liquid Discharge. The Environmental Impact Assessment has been carried out and all the environmental parameters will be within the statutory limits. We are herewith responding para wise to the issues raised by you:

1. The Copper Project is based on the import of Copper Concentrate, which is not available in our country in required quantity. Also, most of the finished products will be dispatched through sea route. These factors were considered as site selection criteria. The site is advantageous in terms of proximity to the port. With all the pollution control measures proposed, the environmental risks and impacts will be mitigated. The project is also based on zero liquid discharge. There are many such plants on coastal locations and have been operating without any significant impact on the coastal ecology. Part of the project site is forest land, which will be used only after obtaining final approval for diversion of forest land. The entire process and conditions of forest clearance will be complied, once obtained.

2. The para has alleged Adani Group of violations that have not been substantiated. There have been such allegations and legal suits in the past which have been dismissed by the Hon'ble Courts. The points raised do not pertain to proposed project and therefore we do not offer any comments. However, project will be implemented in line with the permissions granted and by implementing environmental safeguards.

3. The proposed project is located partly in notified SEZ and partly in forest land applied for diversion. The Survey Numbers for notified SEZ have been incorporated in the Form-1 application and its details are: *APSEZ area in Siracha and Navinal villages. Siracha village 125/1, 125/2, 126, 129, 135, 137, 138/1, 140, 141/P, 142/P, 143, 144/1, 144/2, 147/P, 295/1 part, 295/2 (forest land), unsurveyed land, old ACL and diverted Mundra forest land part. Navinal Village 223/P, 224/P, 225/P and old ACL.* Same will also be included in the final EIA Report.

PAD

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adani

4. APSEZ has given in principle approval to transfer/ allot the land in favour of AEL after obtaining due permissions. A copy of letter is provided in the Annexure-III of the EIA report.

5. The land details related to proposed project are provided in the Point No. 3 above.

6. Part of the proposed project land, 154.18 ha is within the Notified SEZ. A copy of notification will be included in the final EIA Report.

7. Part of the proposed project land, 154.18 ha is within the Notified SEZ.

8. Proposed project includes notified SEZ area and the forest land. A copy of notified SEZ area is as per point no. 6 above. APSEZ has applied for forest land diversion and same is under progress. Details of land are provided in the chapter-2 of EIA the report.

9. We do not agree with your observation. AEL has not started any activity at the site and there is no encroachment on any land.

10. At the moment, there is no requirement of SEZ denotification for the proposed project area.

11. Alternative site analysis was carried out. The site selection criteria and the study of alternative sites is detailed in Chapter-5 of the EIA Report.

12. There is no proposal of reclamation in Forest Land. The proposal for diversion of forest land is under process. Other land under the proposed project is notified SEZ area.

13. The details of Forest Land are also shown in Form-I (Basic Information, Sl. Nos. 9, 12, 21 and 23).

14. Company has proposed 33% area for Green Belt. The 102.38 ha forest land, once diverted and allotted, will be part of the project area. The Green Belt will be developed in 33% of the total project area of 256.58 ha. There is no illegal encroachment of forest area.

15. As per the map on Page C3-16, the project site also includes part of the Siracha Reserve Forest. Correct map is provided in the EIA report.

16. The Forest Clearance is still under process. The details are available on the website of MoEF& CC (File No. 8-04/2016-FC).

17. The Forest Land diversion is under process and all the conditions of the forest clearance will be complied once granted.

18. The Forest Land diversion is under process and the requirements of Forest Rights Act, as applicable, will be complied with.

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19. SLP28788/2016 in the Supreme Court and WP (PIL) 12/2011 at Gujarat High Court are dismissed vide respective orders dated - and -. Therefore, there is no dispute.

20. In the matter of SunitaNarain committee report, APSEZ is complying as per directions of MoEF&CC vide their final order dated 18th Sep, 2015.

21. Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the Plant Layout on Page C2-3 of EIA Report. Impact Assessment has been carried out covering 10 km area surrounding the project site and it includes water bodies (if any), local residents and villages. There is no proposal of closing any creeks.

22. Gujarat Coastal Zone Management Authority is the custodian of approved Coastal Zone Management Plan. However, authorized CRZ map superimposing project area prepared by authorized agency of MoEF&CC is provided in the Chapter-3 of the EIA report.

23. The CRZ Map enclosed is prepared by National Centre for Earth Science Studies and enclosed on Page C3-17 of EIA Report. More clear copy will be included in the final EIA report.

24. The proposed site is outside CRZ and the minimum distance from existing Mangrove in southern direction is more than 100 m.

25. The occupational structure of the people in the area is detailed on Page C3-65 of the EIA Report. The main workers account for 90.57% of the total workers. The Work Participation Rate is 56.36%. Fishing is one of the activities.Details on number of fishermen in the study area will be included in the final EIA report.

26. No fishermen will be impacted due to proposed project.

27. The details on pagadiya fisher folk will be included in the final EIA Report.

28. Project will be developed over notified SEZ area and forest land applied for diversion. APSEZ has created dedicated approach road for fishermen of Navinal and Siracha. Fishermen access roads will not be closed due to proposed project.

29. There is no resettlement involved in the diversion of 102.38 ha of forest land. Flora and fauna study has been conducted as a part of EIA and management plan is also provided in the EIA report. All the conditions of Forest Clearance, once obtained, will be complied to mitigate the impact due to diversion of the forest land. The forest diversion can be recommended by the State Government after completing all the procedures and granted by MoEF&CC.

30. Details on production quantity of copper slag and phosphogypsum is provided in the EIA report. Copper Slag can be used as a building material (Added in Concrete as well as in ready mix), Road Construction & shot blasting and Phosphogypsum is used for

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Cement manufacturing, gypsum board Manufacturing andfertilizer. Both the materials will be sold in domestic and overseas market.

31. There is no notification on Navinal Forest being notified as Biodiversity Area.

32. Carrying Capacity Studies are undertaken by Statutory Authorities. We are not aware of any Carrying Capacity Studies carried out for this area. EIA studies have been conducted for the study area as per TOR granted by MoEF&CC.

33. The impacts due to proposed Copper project have been superimposed on the baseline data to show the cumulative impacts. The predicted impacts after operation of the project are found to be within the prescribed standards for Air and Water and hence not expected to have any significant impact on health, agriculture and animal husbandry. Details are available in Chapter 4 of the EIA Report.

34. The Gujarati Summary was placed at all the Gram Panchayats within 10 km of the proposed site in addition to the 7 places- The District Collector, Bhuj, District Kutch, District Development Office, Bhuj, District Kutch, District Industry Centre, Bhuj, District Kutch, Taluka Development Office, Mundra, District Kutch, Taluka Development Office, Mandvi, District Kutch, The Chief Conservator of Forest, Ministry of Environment, Forests and Climate Change Government of India, Regional Office (West Zone), KendriyaParyavaranBhavan, E-5, Arera Colony, Link Road -3, Ravishankar Nagar, Bhopal 462016 and Regional Office, Kutch (East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Admn Building, Sector 08, Gandhidham, Kutch.

35. This is outside the scope of the EIA Report for the proposed project.

36. Power Transmission Lines will be retained with some deviation.

37. 8 persons are proposed as a part of Environment Cell alone. The Environment Management is not only limited to these 8 persons, but it includes the operations carried out by various departments for the management of environment.

38. Adani Enterprises Limited will have its own Environment Management Team headed by an environmentalist, capable of handling all the environmental and pollution issues of the Copper Project. Other issues are outside the scope of the EIA Report for the proposed project.

39. The area under SLF is provided in the Pre-feasibility Report, which is a part of the TOR Application.

40. The SO2 gases produced during the process is an input raw material for Sulphuric Acid Plant and will be converted to Sulphuric Acid in the respective plant within the project area. The residual gases from the Sulphuric Acid Plant will be released through Chimney after tail-gas scrubbing, meeting the prescribed norms of Central Pollution Control Board (CPCB). Out of 46 Chimneys/Process Vents, 4 Chimneys are

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proposed with 100 meter (300 feet) height. Impact Assessment has been carried out and the incremental impacts have been superimposed on the baseline data to assess the ground level concentrations after the project is operational. The predicted ground level concentration after the operation of the project will also be within the National Ambient Air Quality Standards and thus not expected to have any long term impact on the surrounding ecosystem. Details are provided in Chapter 4 of the EIA Report.

41. Our reply is same as point no. 40.

42. The question does not pertain to us, therefore we do not offer any comment. Environmental monitoring will be carried out as mentioned in the chapter-6 of the EIA report and in line to the permissions granted.

43. Proposed project will have zero liquid discharge facility and no treated water will be sent to the sea.

44. There is no proposal of tie up with any CETP. AEL will have its own ETP for treatment of wastewater. Details are provided in the EIA report.

45. The Flow Diagram and the Capacities are provided in the EIA Report.Further planning will be carried out during detailed engineering.

46. EIA report includes details on demographic information about the study area. The Executive Summary of the EIA Report was prepared in local language and made available to all the panchayats within 10 km radius of the proposed site. The Executive Summary in local language was also made available at 5 Government Offices along with EIA Report. Adani foundation is working in the area of community health covering all the villages in the surrounding.

47. This is outside the scope of the EIA Report for the proposed project. However, local employment will be provided for proposed project based on eligibility and details will be provided in the final EIA report.

48. This is outside the scope of the EIA Report for the proposed project.

49. The EIA Report has been prepared as per the Terms of Reference issued by the Ministry of Environment, Forests and Climate Change.

We assure you that all the environmental safeguards will be provided during implementation and operation of the project.

Thanking you,
For Adani Enterprises Ltd,

(Prasad Suryarao)
Authorized Signatory

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Annexure E

SUNDAY TIMES OF INDIA, AHMEDABAD
MARCH 26, 2017

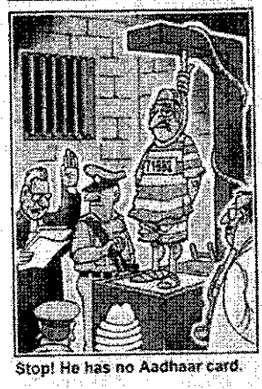
Linking over 1br
Aadhaar may cos

TIMES NEWS NETWORK

New Delhi: Over one billion mobile phone numbers will have to be linked their owners' Aadhaar account in the next one year, which telecom companies say may cost as much as Rs 2,500 crore.

"We have been asked by the telecom ministry to start the process of linking mobile numbers/subscribers with their aadhar account. Mobile companies will start the process soon," Rajan Mathews, director-general of Cellular Operators Association of India (COAI), told

JUST LIKE THAT AJIT NINAN



Stop! He has no Aadhaar card.

Ahead of GST launc
rejigs indirect tax

TIMES NEWS NETWORK

New Delhi: As it prepares to launch the Goods and Services Tax (GST) by July 1, the finance ministry on Saturday approved the re-organisation of the indirect tax wing renaming the Central Board of Excise and Customs (CBEC) as the Central Board of Indirect Taxes and Customs (CBIC).

The decision will be sent for legislative approval.

The existing formations of central excise and service tax under the CBEC have been re-organised to implement and enforce the provisions of the proposed GST.

The changes were approved by finance minister



The Central Board of Excise and Customs (CBEC) was renamed as the Central Board of Indirect Taxes and Customs (CBIC). FM Arun Jaitley approved the changes

Arun Jaitley.

The proposed CBIC is ex-
pected to supervise the work
of all its field formations and
directorates and assist the
government in policy-ma-
king linked to GST and will

After 51 years, BSF gets woman combat officer

Gwalior: Tanushree Pareek on Saturday became the first woman combat officer to be commissioned in the 51-year history of the BSF, the country's largest border guarding force.

Pareek (25) also led the passing out parade of 67 trainee officers that was reviewed by Union home minister Rajnath Singh at the Border Security Force camp at Tekanpur near here.

DR. RAM MA
VIE
Ph
Ref.No.4887 Dr. RMLIMS
Dr. Ram Manohar Lohia Ins
Lucknow announces admissi
Application is invited from eli

Name of course	
M.Sc Nuclear Medicine	Candidate minimum in physics in Life sci recognize
Duration:2 Years (4 Semesters)	
Total No. of seats	06* (03 G *Reserva

Note: Detailed description.
application form can be filled

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Bajaj ends alliance with Kawasaki

Satyanarayan.Iyer
@timesgroup.com

Pune: Bajaj Auto on Saturday said it will end its 8-year-old 'sales and services' partnership with Japanese automaker Kawasaki in India from April 1, 2017.

The company did not specify the reason for terminating the partnership, but said "the two have mutually and amicably decided to separate in India." It appears though, from the sales figures, that Kawasaki was not able to sell enough units in the country.

Kawasaki motorcycles in India were sold through the KTM dealerships (earlier Probiking network). Bajaj entered into a partnership with KTM to sell the latter's motorcycles in the country.

KTM has over 300 dealerships in the country. However, it is not clear through how many of these dealerships, Kawasaki sells it's units. Bajaj Auto said that it intends to focus more on the KTM brand, which, it said, has seen a compounded growth rate of 48% since 2012. Kawasaki paid a share of its profit to Bajaj Auto to use its dealerships. "Profit numbers are confidential," Amit Nandi, president, Probiking said.

"The Probiking network has sold about 6,500 Kawasaki motorcycles in India since 2009, whereas it sold over 1,00,000 KTM motorcycles since 2012," said Nandi.

Gujarat Pollution Control Board
Paryavaran Bhavan, Sector 10 A, Gandhinagar 382 010
Tel: 079-23232152 Fax: 079-23222784, www.gpcb.gov.in

PUBLIC NOTICE

It is hereby informed that as per the Ministry of Environment, Forests & Climate Change, Government of India, New Delhi vide its Notification no. S.O. 1533 dated September 14, 2006, Public Hearing of **M/s. Adani Enterprises Limited, for Proposed Greenfield Copper Refinery Plant-1 MTPA, At Adani Port Special Economic Zone Land in Village(S) Siracha and Navinal, Taluka: Mundra, District: Kutch,** covered under **Category "A"** as mentioned in their request application.

All local affected persons of the project are requested to remain present in the public hearing or send their response in writing to Member Secretary, Gujarat Pollution Control Board before the hearing date.

Other concerned persons having a plausible stake in the environment aspects of the project or activity can submit their responses to Member Secretary, GPCB in writing before the hearing date.

It may be noted that, draft Environmental Impact Assessment report and the Executive Summary of Environment Impact Assessment Report of the project has been sent to the following authorities or offices to make it available for inspection to the public during normal office hours, till the Public Hearing is over.

1. The District Collector Office, **Kutch**
2. District Development Office, **Kutch**
3. District Industry Centre, **Kutch**
4. Taluka Development Office, **Ta. Mundra, Gandhidham, Dist. Kutch.**
5. Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forests & Climate Change, GoI, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E- 5, Arera Colony, Link Road 3, Ravisankar Nagar, Bhopal 462 016
6. **Regional Office, (Kutch-East), Gujarat Pollution Control Board, Room No. 215-216, Second Floor, Kandla Port Trust, Administrative Building, Sector 08, Gandhidham, Kutch - 370 201.**

The District Magistrate / District Collector / Deputy Commissioner or his / her representative not below the rank of an Additional District Magistrate shall supervise and preside over the entire public hearing process.

The Public Hearing is scheduled to be held on **29/04/2017 at 11:00 hrs, at Community Premises (Samajvadi) Centre, Opposite Tunda Primary School, Village: Tunda, Ta: Mundra, District: Kutch, Gujarat.**

Place: Gandhinagar
Date : 24.03.2017

K. C. Mistry
Member Secretary

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અજાર-	૭	૨૯	૧
ભચાઉ	૨	૧૦	૦
રાપર	૬	૪૬	૦
અબડાસા	૫	૮	૨

પેટા ચૂંટણી

તાલુકો	સરપંચ	સભ્ય	બિનહરીફ
રાપર	૨	૦	૦
નખત્રાણા	૩	૨	૧

ચૂંટણી માટે સરપંચની સ્પર્ધામાં પાંચ સરપંચ અને બે સભ્ય રહ્યા છે. જિલ્લા ચૂંટણી અધિકારી કચેરીના હેવાલ

સાત સભ્યો જગ



પ્રવીણકુમાર અરજણ
કોમલ રવજી માધાણ
સ્પેક્ષાએ રાજીખુશી
મધ્યે હિન્દુ શાસ્ત્રોક્ત
તા. ૨૬-૩-૨૦૧૭ના

જાહેર રહિયો

શ્રી અખિલ કચ્છ તુરી-બારોટ સમાજ

આથી સર્વેને જાણ કરવામાં આવે છે કે તા. ૨૧/૩/૨૦૧૭ના રોજ 'કચ્છમિત્ર' દૈનિક સમાચારપત્રમાં પ્રસિદ્ધ થયેલ પાના નં. ૧૩ ઉપર જે સમાજના કહેવાતા ટ્રસ્ટના સમાચાર પ્રસિદ્ધ થયેલ તે અત્યંત ખોટા અને ઉપજાવી કાઢેલી હકીકતોવાળા છે. સમાજ દ્વારા કોઈ ટ્રસ્ટ હોલના તબક્કે બનાવવામાં આવેલ નથી અને સમાજે કોઈપણ આવા મંડળ કે ટ્રસ્ટની સ્થાપના કરેલ નથી કે કરવાની રજા-પરવાનગી આપેલ નથી. પરંતુ અમુક લોકો આપસમાં મેળાવીપણું (સગાવાદ) કરીને સમાજના ભાગલા કરાવવા માટે આવી પ્રવૃત્તિઓ કરી રહેલ છે. સમાજે તેમની વિરુદ્ધ સખ્ત કાર્યવાહી કરવાનું નક્કી કરેલ છે અને તમામ લોકોને આથી જાણ કરવામાં આવે છે કે આવી ખોટી હકીકતોવાળા સમાચારથી ગેરમાર્ગે દોરાવું નહીં અને સમાજની એકતા અને અખંડિતતા જળવાઈ રહે તે માટે સમાજની રજા-પરવાનગી કે સહમતી વિના આવી કોઈ કામગીરીમાં ભાગ ન લેવા સમાજના પ્રમુખશ્રી દ્વારા અનુરોધ કરવામાં આવે છે.

પ્રમુખશ્રી, શ્રી અખિલ કચ્છ તુરી-બારોટ સમાજ

PGVCL - માધાપર પે. વિ.

આથી માધાપર પે.વિ. PGVCL હેઠળ આવતા વીજગ્રાહકોને જણાવવાનું કે તા. ૨૬ (રવિવાર) તથા તા. ૨૯ (બુધવાર)ની રજાઓમાં કચેરી વીજબિલના કલેકશન માટે નિયત સમય મુજબ ચાલુ રહેશે. તેથી ડિસકનેકશનથી બચવા માટે બાકી વીજબિલ તાત્કાલિક ભરી જવા. જે ગ્રાહકોને નિયત સમય પસાર થઈ ગયો હોવા છતાં વીજબિલ મળેલ ના હોય તેમણે ઓફિસ સમય દરમ્યાન ઓફિસનો સંપર્ક કરી વીજબિલના નાણાં ભરપાઈ કરવા જણાવવામાં આવે છે.

નાયબ ઈજનેર, માધાપર પે. વિ.

EXCLUSIVE RESI
♦ સમગ્ર શૌરા EE
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♦ JEE તથા
Fees વગ
♦ રાજકોટના
♦ અત્યંત સ્વ
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ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ

પર્યાવરણ ભવન, સેક્ટર ૧૦ અ, ગાંધીનગર ૩૮૨ ૦૧૦
ટેલી: ૦૭૯-૨૩૨૩૨૧૫૨, ફેક્સ: ૦૭૯-૨૩૨૨૨૯૮૪, www.gpcb.gov.in

જાહેર સૂચના

ભારત સરકારના પર્યાવરણ, વન અને જળ વાયુ પરીવર્તન મંત્રાલય, નવી દિલ્હીના જાહેરનામા ક્રમાંક: એસ.ઓ. ૧૫૩૩ તારીખ ૧૪.૦૯.૨૦૦૬ અન્વયે જણાવવાનું કે, **મેસર્સ. અદાણી એન્ટરપ્રાઇઝ લિમીટેડ, અદાણી પોર્ટ સ્પેશીયલ ઇકોનોમીક ઝોનની જમીન ખાતે, ગામઃ સિરાચા અને નવીનાળા, તા. મુન્દ્રા, જિલ્લો. કચ્છ દ્વારા ગ્રીનફિલ્ડ કોપર રીફાઇનરી પ્લાન્ટ-૧ મેટીપીએના ઉત્પાદન માટેની સુચિત** પરીયોજના (પ્રોજેક્ટ) **કેટેગરી 'એ'**, અંતર્ગત તેઓની અરજી અનુસંધાને પર્યાવરણીય લોકસુનાવણી આયોજીત કરવામાં આવે છે.

લોકસુનાવણીની પ્રકીયાના ભાગરૂપે લાગતાવળગતા સ્થાનિક અસરગ્રસ્ત લોકોનું ધ્યાન દોરીને સદર લોકસુનાવણી દરમિયાન હાજર રહેવા અથવા તેઓની ટીકા-ટિપ્પણી લેખિતમાં પર્યાવરણ સુનાવણીની તારીખ પહેલા સભ્ય સચિવશ્રી, ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડને મોકલવા વિનંતી છે.

રસ ધરાવતી અન્ય વ્યક્તિઓને પણ તેઓની ટીકા-ટિપ્પણી પર્યાવરણ સુનાવણીની તારીખ પહેલા લેખિતમાં સભ્ય સચિવશ્રી ગુ.પ્ર.નિ.બોર્ડને મોકલી આપવા વિનંતી છે.

અંગ્રે ઉલ્લેખનીય છે કે, પ્રોજેક્ટના ઇ્યાઇએ-(એન્વિરોન્મેન્ટ ઇમ્પેક્ટ એસ્સેસમેન્ટ) અહેવાલના મુસદ્દાની પ્રત તથા એન્વિરોન્મેન્ટ ઇમ્પેક્ટ એસ્સેસમેન્ટનો સંક્ષિપ્ત અહેવાલની પ્રતને નીચે દર્શાવેલ ઑથોરિટી / કાર્યાલયો ખાતે કામકાજના દિવસો દરમિયાન લોકસુનાવણીના દિન સુધી નિહાળી શકાશે.

૧. જિલ્લા કલેક્ટરશ્રીની કચેરી, **કચ્છ**

૨. જિલ્લા વિકાસ અધિકારીની કચેરી, **કચ્છ**

૩. જિલ્લા ઉદ્યોગ કેન્દ્ર, **કચ્છ**

૪. તાલુકા વિકાસ અધિકારીની કચેરી, **તા. મુન્દ્રા, જી. કચ્છ**

૫. અધિક અગ્ર મુખ્ય વન સંરક્ષકશ્રી (સી), પર્યાવરણ, વન અને જળ પરિવર્તન મંત્રાલય, ભારત સરકારની પ્રાદેશિક કચેરી (પશ્ચિમ ઝોન), કેન્દ્રીય પર્યાવરણ ભવન, ઇ-૫, અરેરા કોલોની, લીન્ક રોડ-૩, રવીશંકર નગર, ભોપાલ - ૪૬૨૦૧૬.

૬. **માદેશિક કચેરી, કચ્છ (પૂર્વ) ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, રૂમ નંબરઃ ૨૧૫-૨૧૬, બીજો માળ, કંડલા પોર્ટ ટ્રસ્ટ, વહીવટી બિલ્ડીંગ, સેક્ટર ૦૮, ગાંધીધામ, કચ્છ - ૩૭૦ ૨૦૧.**

જિલ્લા કલેક્ટર / જિલ્લા મેજિસ્ટ્રેટ / ડેપ્યુટી કમિશ્નર અથવા તેઓના / તેણીના પ્રતિનિધિ, કે જેનો હોદ્દો અધિક જિલ્લા મેજિસ્ટ્રેટથી ઊતરતી કક્ષાનો ન હોય, તેવી વ્યક્તિ સદર લોકસુનાવણીની કામગીરીનું દેખરેખ અને સંચાલન કરશે.

લોકસુનાવણીની **તારીખ ૨૯/૦૪/૨૦૧૭નાં રોજ ૧૧.૦૦ કલાકે, કોમ્યુનીટી પ્રીમાઇસીસ (સમાજવાડી) સેક્ટર, ટુન્ડા પ્રાથમિક શાળાની સામે, ગામઃ ટુન્ડા, તા. મુન્દ્રા, જિલ્લો. કચ્છ, ગુજરાત** ખાતે યોજવામાં આવેલ છે.

સ્થળઃ ગાંધીનગર
તા. ૨૪-૦૩-૨૦૧૭

કે. સી. મિશ્રી
સભ્ય સચિવ

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ક્રમ	ગામનું નામ. તાલુકા તથા જિલ્લો.	ટપાલ મળવાની પહોંચ. ટપાલ લેનાર નું નામ	તારીખ અને સમય	સહી અને સિક્કો
૫.	ગામ: ટુન્ડા અને વાંઢ (જૂથ ગ્રામ પંચાયત) તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	[illegible] ...ટુન્ડા/..ગ્રામ પંચાયત તા.મુંદરા (કચ્છ)
૬.	ગામ: શિરાચા તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	તલાટી સહમંત્રી શિરાચા ગ્રામપંચાયત તા. મુંદરા - કચ્છ
૭.	ગામ:નવીનાળ તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	તલાટી સહમંત્રી, નવી નાળ ગ્રામ પંચાયત મુંદરા - કચ્છ
૮.	ગામ: મોટા કાંડાગરા તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	મોટા કાંડાગરા ગ્રામપંચાયત તા.મુંદરા (કચ્છ)
૯.	ગામ: મોટી ખાખર તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	[illegible]
૧૦.	ગામ: મોટા ભુજપુર તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	સરપંચશ્રી, ભદ્રેશ્વર ગ્રામ પંચાયત તા. મુન્દ્રા જી. કચ્છ
૧૧.	ગામ:જરપરા તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	[illegible]
૧૨.	ગામ: દેસલપર તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	[illegible]
૧૩.	ગામ: બોરાણા તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	[illegible]
૧૪.	ગામ: ધ્રબ તા. મુન્દ્રા જિ. કચ્છ	[illegible]	[illegible]	[illegible] એ. કે. ગુપ્તા
૧૧.	ગામ: ત્રગડી તા. માંડવી જિ. કચ્છ	[illegible]	[illegible]	[illegible]
૧૨	ગામ: નાના ભાડીયા તા. માંડવી જિ. કચ્છ	[illegible]	[illegible]	[illegible]
૧૩	ગામ: મોટા ભાડીયા તા. માંડવી જિ. કચ્છ	[illegible]	[illegible]	[illegible]
૧૪.	ગામ: નાની ખાખર તા. માંડવી જિ. કચ્છ	[illegible]	[illegible]	[illegible]

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ગુજરાત પ્રદુષણ નિંયત્રણ બોર્ડ,

પ્રાદેશિક કચેરી - કચ્છ (પૂર્વ)
રૂમ નં. ૨૧૫-૨૧૬, બીજો માળ, કંડલા પોર્ટ ટ્રસ્ટ વહીવટી કચેરી,
ગાંધીધામ - કચ્છ - ૩૭૦૨૦૧, ફોન નં : ૦૨૮૩૬-૨૩૦૮૨૮

પત્ર નં.: ગુ.પ્ર.નિ.બો/ પ્રા.ક. કચ્છ (પૂર્વ)ટી-૧(૮)/ 257. તા. 27-03-2017

પ્રતિ,

તલાટી કમ મંત્રી શ્રી,

_____ ગ્રામ પંચાયત કચેરી

ગામ : _____ તા: _____

જિલ્લો : કચ્છ. (સામેલ લીસ્ટ મુજબ)

વિષય: મેસર્સ અદાણી એન્ટરપ્રાઈઝ લીમીટેડ ની લોક સુનાવણી બાબતે જાહેર સુચના તથા ગુજરાતી સારાંશની નકલ મોકલવા બાબત.

શ્રીમાન,

ઉપરોકત વિષય પરત્વે જણાવવાનું કે મેસર્સ મેસર્સ અદાણી એન્ટરપ્રાઈઝ લીમીટેડ, ગામ:સિરાચા,તા.મુન્દ્રા, જી.કચ્છ ના સુચીત પ્લાન્ટ માટેની પરીયોજના અન્વયે લોક સુનાવણી નીચેના સ્થળે, તારીખે અને સમયે રાખવામાં આવેલ છે. જેની જાહેર સુચના તથા ગુજરાતી સારાંશની નકલ ગ્રામ્યજનોની જાણ સારૂ બહોળી પ્રસિદ્ધિ અર્થે આ સાથે બીડાણ કરેલ છે, જે આપના નોટીસ બોર્ડ પર લગાવી સર્વે ગ્રામ્યજનોના ધ્યાને લાવવા વિનંતી છે.

તારીખ અને સમય: ૨૯-૦૪-૨૦૧૭ સવારે ૧૧૦૦ કલાકે

સ્થળ: કમ્યુનીટી પ્રીમાઈસીસ સેન્ટર (સમાજવાડી), ટુન્ડા પ્રાથમિક શાળા ની સામે, ગામ.ટુન્ડા
તા. મુંદ્રા , જી. કચ્છ, ગુજરાત

આભાર સહ,

આપનો વિશ્વાસુ,

બીડાણ: જાહેર સુચના તથા ગુજરાતી સારાંશની નકલ.

(કે. બી. ચૌધરી)
પ્રાદેશિક અધિકારી

નકલ રવાના :

૧.સભ્ય સચિવશ્રી, ગુ.પ્ર.નિ.બોર્ડ,ગાંધીનગર (ખાસ ધ્યાને : શ્રી આર.વી.પટેલ, વ.પ.ઈ).....આપની જાણ સારૂ.

૨. મેસર્સ અદાણી એન્ટરપ્રાઈઝ લીમીટેડ, ગામ:સિરાચા,તા.મુન્દ્રા, જી.કચ્છ

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ,
પ્રાદેશિક કચેરી - કચ્છ (પૂર્વ)
રૂમ નં. ૨૧૫-૨૧૬-૨૧૭, કંડલા પોર્ટ ટ્રસ્ટ વહીવટી કચેરી,
સેક્ટર -૦૮, ગાંધીધામ - ૩૭૦૨૦૧, ફોન - ૦૨૮૩૬-૨૩૦૮૨૮

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No: GPCB/ RO Kutch (East) / T-1(8)/ 256 Date:- 27-03-2017

To,

1. The District Collector, Collector Office, Bhuj, Kutch
2. The District Development Officer, Bhuj, Kutch.
3. The General Manager, District Industry Centre, Bhuj, Kutch.
4. The Taluka Development Officer, Mundra, Taluka Mundra, Kutch.
5. The Taluka Development Officer, Mandvi, Taluka Mandvi, Kutch.
6. The Chief Conservator of Forests, Ministry of Environment, Forest and Climate Change, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E-5, Arera Colony, Link Road -3, Ravishankar Colony, Bhopal - 462016, Madhya Pradesh.

Sub: Request to display documents as annexed for the Environmental Public Hearing of M/s. Adani Enterprises Limited, at Adani Port Special Economic Zone Land in Village (S) Siracha and Navinal, Taluka: Mundra, District: Kutch for setting up of proposed plant.

Ref: 1. Ministry of Environment, Forest and Climate Change, Government of India Notification No. SO (1533) dated 14-09-2006 and SO (948) dated 12-06-2007 and subsequent amendment thereof.
2. GPCB/PH/2016-17/Kutch (East)-08/405291 dated 27-02-2017
3. GPCB/PH/2016-17/Kutch (East)-08/ 757 dated 24-03-2017

Sir,

In connection with the subject mentioned above, the Environmental Public Hearing is scheduled to be held on 29-04-2017 at 1100 hrs at Community Premises Centre (Samajvadi), Opp- Tunda Prathmilk Shala, Vill. Tunda, Ta. Mundra, Di. Kutch, Gujarat. Please find enclosed herewith following documents for the schedules Environmental Public Hearing.

- ✓ Draft Environmental Impact Assessment Report
- ✓ Executive summary of the project in English and Gujarati language
- ✓ Soft copy of Draft Environmental Impact Assessment Report and Executive summary of the project in English and Gujarati language.

You are kindly requested to display the above said documents for inspection to the public during normal office hours, till the public hearing is over and widely publicize it within your respective jurisdictions by requesting the interested persons to send their comments.

Thanking y

SP BHUJ STG <370001>
EG941873740IN
Counter No:1,OP-Code:USER1
To:ADDNL CHIEF CON FORE,KPBHAVAN WEST REG
RAVI SHANKAR NAGAR, PIN:462016
From:ADANI POWER LTD , BODAKDEV AHD
Wt:1658grams,
Amt:173.00 (LFee:Rs.0.00), 27/03/2017 16:56
Taxes:Rs.23.00<<Track on www.indiapost.gov.in
भारतीय डाक

Yours faithfully,
(K.B.Chaudhari)
ial Officer (Kutch – East)
GPCB

Encl: As ab

Copy submitted
The Member Secretary, GPCB, Gandhinagar.....(Kind Attention: Shri R.V.Patel, SEE, GPCB, Gandhinagar)..... for favour of information.

2069

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ,
પ્રાદેશિક કચેરી - કચ્છ (પૂર્વ)
રૂમ નં. ૨૧૫-૨૧૬-૨૧૭, કંડલા પોર્ટ ટ્રસ્ટ વહીવટી કચેરી,
સેક્ટર -૦૮, ગાંધીધામ - ૩૭૦૨૦૧, ફોન - ૦૨૮૩૬-૨૩૦૮૨૮

1858

NO: GPCB/ RO Kutch (East) / T-1(8)/ 256 Date: 27-03-2017

To,

1. The District Collector, Collector Office, Bhuj, Kutch
2. The District Development Officer, Bhuj, Kutch.
3. The General Manager, District Industry Centre, Bhuj, Kutch.
4. The Taluka Development Officer, Mundra, Taluka Mundra, Kutch.
5. The Taluka Development Officer, Mandvi, Taluka Mandvi, Kutch.
6. The Chief Conservator of Forests, Ministry of Environment, Forest and Climate Change, Regional Office (West Zone), Kendriya Paryavaran Bhavan, E-5, Arera Colony, Link Road -3, Ravishankar Colony, Bhopal – 462016, Madhya Pradesh.

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2. GPCB/PH/2016-17/Kutch (East)-08/405291 dated 27-02-2017
3. GPCB/PH/2016-17/Kutch (East)-08/ 757 dated 24-03-2017

In connection with the subject mentioned above, the Environmental Public Hearing is scheduled to be held on 29-04-2017 at 1100 hrs at Community Premises Centre (Samajvadi), Opp- Tunda Prathmilk Shala, Vill. Tunda, Ta. Mundra, Di. Kutch, Gujarat. Please find enclosed herewith following documents for the schedules Environmental Public Hearing.

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- ✓ Executive summary of the project in English and Gujarati language
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Thanking you,

Yours faithfully,

(K.B.Chaudhari)
Regional Officer (Kutch - East)
GPCB

Received
S. elam.
28/3/2017.

Encl: As above.

Copy submitted to:
The Member Secretary, GPCB, Gandhinagar.....(Kind Attention: Shri R.V.Patel, SEE, GPCB, Gandhinagar)..... for favour of information.

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ,
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2070

NO: GPCB/ RO Kutch (East) / T-1(8)/ 256 Date:- 27-03-2017

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પ્રાદેશિક કચેરી - કચ્છ (પૂર્વ)
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1860

Ref: GPCB/ RO Kutch (East) / T-1(8)/ 256 Date:- 27-03-2017

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Regional Officer (Kutch – East)
GPCB

Encl: As above.

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7

2072

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NO: GPCB/ RO Kutch (East) / T-1(8)/ 256 Date:- 27-03-2017

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અધિક કારકુન
જીલ્લા પંચાયત, કચ્છ-ભુજ

Yours faithfully,
(K.B.Chaudhari)
Regional Officer (Kutch - East)
GPCB

Encl: As above.

Copy submitted to:
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2073

1862

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NO: GPCB/ RO Kutch (East) / T-1(8)/ 256 Date: 27-03-2017

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Thanking you,

27/3/17
INWARD CLERK
RECEIVED BRANCH
COLLECTOR OFFICE
BHUJ - KUTCH

Yours faithfully,
(K.B.Chaudhari)
Regional Officer (Kutch – East)
GPCB

Encl: As above.

Copy submitted to:
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ANNEXURE R4

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

EAC OBSERVATION REPLYS

Sponsor :

adani™

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

Prepared by :

Vimta
Driven by Quality, Inspired by Science.

Vimta Labs Limited
142, IDA, Phase-II, Cherlapally
Hyderabad–500 051, Telangana State
env@vimta.com, www.vimta.com
(NABL Accredited and ISO 17025 Certified Laboratory,
Recognized by MoEF&CC, New Delhi)

JUNE, 2019

TABLE OF CONTENTS

Sr. No.	Committee Observations	Page Nos.
1	According to the EIA report, the land requirement for the project is 256.58 Ha. Out of 256.58 Ha, 154.19 Ha is APSEZ area and 102.39 Ha is a Forest land. The land use conversion plan of 154.19 Ha for industrial purpose has not been obtained from the Competent Authority concerned. Further, PP has obtained stage I forest land diversion approval for 1576.81 ha in the name of M/s. Adani Ports and SEZ Limited. The factual agreement between M/s. Adani Enterprises Limited and M/s. Adani Ports and SEZ Limited for the utilization of 102.39 Ha is a Forest land is not clear.	1
2	CRZ map inter-alia including demarcation of HTL/LTL/CRZ land classification along with super imposition of plant site through competent agencies has not been submitted.	45
3	Source of copper ore concentrate, characteristics, mode of transportation from source to plant site, confirmed ore linkage document has not been submitted.	46
4	Water consumption of 10 LTPA Copper smelter is 32790 KLD whereas the water requirement for existing 4.5 LTPA copper smelter unit is only 10,000 KLD. Hence, water requirement for the proposed plant has to be reworked out.	65
5	According to the EIA records, Dhaneshwari river is passing through the project site and the mangrove reserve forest is existing within the project site. Quantification of these mangroves and conservation measures for mangroves and the river stream has not been submitted.	69
6	Storage arrangements made for the raw materials are found to be not adequate. Open storage of raw materials such as coal, limestone etc., shall be avoided.	158
7	Sulfur balance of the copper smelter unit has not been submitted.	161
8	Copper slag disposal site co-ordinates, concrete mode of utilization, maximum time frame envisaged for the storage at the disposal yard i.e., one month (or) 15 days has not been submitted.	162
9	Phospo-gypsum disposal site co-ordinates, concrete mode of utilization, maximum time frame envisaged for the storage at the disposal yard i.e., one month (or) 15 days has not been submitted.	184
10	Lining details for Phospo-gypsum disposal yard, leachate collection system envisaged and details of piezo-well installation has not been made available.	190
11	Secured land fill site co-ordinates, lining details, leachate collection system envisaged and details of piezo-well installation has not been made available.	205
12	Baseline health status of the people living in the study area of the project site has not been collected.	223
13	Details regarding disposal of arsenic bearing sludge has not been submitted.	268
14	Mercury in ambient air has not been monitored.	271
15	Conservation plan prepared for the Schedule-I species is not meeting the requirement of the conservation of the species that are identified. Therefore, the plan shall be revised considering the requirements of the conservation of the species identified and shall be approved by the competent authority concerned.	276
16	Collection of runoff water from the raw material storage area, slag and gypsum storage yard and its treatment has not been submitted.	277
17	Study on installation of rain water harvesting structure based on annual rain fall pattern and details regarding amount of water to be conserved has not made available.	279
18	Impact on hydro geology regime of the project site has not submitted.	280

19	Occupational health assessment envisaged for the employees and workers has not been submitted.	340
20	As per the Public hearing proceedings, it is noted that there are strong oppositions from the stake holders against the installation of copper smelter unit. Consolidated list of point- wise issues raised and response provided along with action plan for implementation has not been submitted.	398
21	The Chapter-5 consists of only listing of alternative technologies. The committee opined that the PP shall select out of alternative technologies available, based on the selection of the technology, the impact prediction shall be made and mitigation measures shall be proposed.	440
22	Quantitative representation of mitigation measures was not presented.	448
23	Revised water balance shall be submitted.	451
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25	Management of white shall be spelled out	463
26	Material balance shall be revised.	465
27	The involvement of geological expert shall be provided.	471
28	The compliance of specific conditions of the environmental clearance of the SEZ shall be provided.	472
29	The reply to TOR point No. (4) is not proper.	918
30	The data retrieved from the LULC studies shall be utilized for the prediction of impacts and mitigation measures.	922
31	The Air Quality modeling studies shall be re-worked out including the mercury and keeping the mixing height in view.	924
32	The Environmental Policy of the Organization is not meeting the requirements given in ToR Point No. 9(i), 9(ii), 9(iii), 9(iv).	939
33	The CER shall be calculated on the slab rates as per the Office memorandum issued on 1st May, 2018.	944

2077

Summary of Responses to ADS by MoEF&CC

The pointwise responses/ replies for all Additional Details Sought (ADS) in the EAC (Industry-1) meeting held at Ministry of Environment, Forest & Climate Change dated 10-11th January 2019 is provided hereunder along with the applicable supporting documents and annexures.

After additional studies in-line with the ADS, total cost of Environmental Management Plan (EMP) has been revised from Rs. 1,044.40 Crore to Rs. 1,048.43 Crore.

Sr. No.	Description of Item	Capital Cost (Rs. in Crores)	Revised Capital Cost (Rs. in Crores)	Recurring Cost (Rs. in Crores)
1	Air pollution control system	639	639	2.5
2	Water pollution control system	360	360	1.5
3	Environmental management system: • Solid waste management system • Greenbelt development and others • Post project monitoring • Gas collection hood and energy conservation	45	45	1
4	Wildlife conservation and Mangrove Conservation Plan	0.40	4.43	0.53
Total		**1,044.40**	**1,048.43**	**5.53**

The CER budget has also been revised from Rs. 40 Crore to Rs.58 Crore. The budget allocations under CER has been derived from the issues raised during the PH, findings of Social Impact Assessment and Office Memorandum (OM) dated 1st May 2018.

EAC OBSERVATION NO.-1

2078

EAC OBSERVATION:

According to the EIA report, the land requirement for the project is 256.58 ha. Out of 256.58 ha, 154.19 ha is APSEZ area and 102.39 ha is a Forest land. The land use conversion plan of 154.19 ha for industrial purpose has not been obtained from the Competent Authority concerned. Further, PP has obtained stage I forest land diversion approval for 1576.81 ha in the name of M/s. Adani Ports and SEZ Limited. The factual agreement between M/s. Adani Enterprises Limited and M/s. Adani Ports and SEZ Limited (APSEZ) for the utilization of 102.39 Ha in a Forest land is not clear.

REPLY:

Total project area for the proposed Copper Refinery is 256.58 ha. APSEZ is in possession of 154.19 ha land and is already notified as SEZ via Gazette Notification of Ministry of Commerce and Industry dated 21st September 2016 and the same is attached as **Annexure-1(a)**.

The balance land of 102.39 ha for proposed Copper Refinery Project is part of Forest Clearance (FC) proposal no- F.No.: 8-04/2016-FC for diversion of 1576.81 ha of forest land applied by M/s APSEZ. This FC proposal has been accorded stage-1 "In-principle" approval vide letter dated 16th November 2018, under Section-2 of the Forest (Conservation) Act, 1980 in favour of APSEZL for the development of Special Economic Zone (SEZ) and Industrial Park. Forest Clearance (FC) Stage-I, letter dated: 16th November 2019 is attached as **Annexure-1(b).**

The FAC committee recommended Forest land diversion for the proposed land use of 1576.81 ha which includes 125 ha land for the proposed Copper project during the meeting dated 25th January 2018. Minutes of the Meeting is attached as an **Annexure-1(c).**

There is factual agreement through a MoU **(Annexure-1(d))** dated 14th March 2019 between APSEZ and AEL which reads as " APSEZ will make available to AEL 256.58 ha of land on long term lease basis. Out of the total requirement of 256.58 ha land, currently APSEZ is in possession of 154.19 ha of land which can be readily made available for the project. The balance land of 102.39 ha is under forest diversion process and will be handed over to the project once APSEZ receives the possession of the land." The complete details of land parcels is available as part of the MoU.

रजिस्ट्री सं० डी० एल०-33004/99

REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY
भाग II—खण्ड 3—उप-खण्ड (ii)
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PUBLISHED BY AUTHORITY

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No. 2315] NEW DELHI, THURSDAY, SEPTEMBER 22, 2016/BHADRA 31, 1938

वाणिज्य एवं उद्योग मंत्रालय

(वाणिज्य विभाग)

अधिसूचना

नई दिल्ली, 21 सितम्बर, 2016

का.आ. 3029(अ).—यत:, केन्द्र सरकार ने भारत सरकार, वाणिज्य एवं उद्योग मंत्रालय (वाणिज्य विभाग) की निम्नलिखित अधिसूचनाओं के तहत गुजरात राज्य के मुंद्रा में विशेष आर्थिक जोन मै. मुंद्रा पोर्ट एण्ड स्पेशल इकोनोमिक जोन लिमिटेड के नाम में अधिसूचित/अनधिसूचित किए थे, अर्थात्:-

(1) सं. का.आ. 1365 (अ) दिनांक 27 मई, 2009;

(2) सं. का.आ. 583 (अ) दिनांक 26 मार्च, 2012;

(3) सं. का.आ. 1443 (अ) दिनांक 31 मई, 2013;

(4) सं. का.आ. 3379 (अ) दिनांक 11 दिसंबर, 2015;

और यत:, दिनांक 27 मार्च, 2012 के अनुमोदन पत्र सं. एफ.1/15/2011-एसईजेड के अनुसार उल्लिखित एसईजेड के नाम को मै. मुंद्रा पोर्ट एण्ड स्पेशल इकोनोमिक जोन लिमिटेड से बदल कर मै. अदानी पोर्ट्स एंड स्पेशल इकोनोमिक जोन लिमिटेड कर दिया था;

और यत: केन्द्र सरकार ने पूर्ववर्ती पैराग्राफ में उल्लिखित तथा इस अधिसूचना के साथ संलग्न का.आ. सं. 1365 (अ) दिनांक 27 मई, 2009; का.आ. सं. 583 (अ) दिनांक 26 मार्च, 2012; का.आ. सं. 1443 (अ) दिनांक 31 मई, 2013; का.आ. सं 3379 (अ) दिनांक 11 दिसंबर, 2015; द्वारा अधिसूचित समस्त विशेष आर्थिक जोनों को प्रशासनिक सुविधा के लिए और विकासकर्ताओं के अधिकारों, दायित्वों और वित्तीय लाभों को प्रभावित किए बिना समेकित करने का निर्णय लिया है;

अत: अब विशेष आर्थिक जोन नियम, 2006 के नियम 8 के साथ पठित विशेष आर्थिक जोन अधिनियम, 2005 (2005 का 28) (जिसे एतद्पश्चात उक्त अधिनियम कहा गया है) की धारा 4 की उप-धारा (1) के द्वितीय परन्तुक द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और प्रथम पैराग्राफ में उल्लिखित अधिसूचना सं. का.आ. 1365 (अ) दिनांक 27 मई, 2009; का.आ.सं. 583 (अ) दिनांक 26 मार्च, 2012; सं. का.आ. 1443 (अ) दिनांक 31 मई, 2013; का.आ.सं. 3379 (अ) दिनांक 11 दिसंबर, 2015 के अधिक्रमण में, ऐसे अधिक्रमण से पूर्व किए गए कार्यों या किए जाने के लिए विलोपित कार्यों को छोड कर, केन्द्र सरकार इस बात से संतुष्ट होने के बाद उक्त अधिनियम की धारा 3 की उपधारा (8) के अंतर्गत अपेक्षाएं और अन्य संबंधित अपेक्षाएं पूरी हो गई हैं, एतद्वारा प्रथम पैराग्राफ में उल्लिखित अधिसूचनाओं में वर्णित विशेष आर्थिक जोनों के समेकित करती है और निम्नलिखित क्षेत्र को विशेष आर्थिक जोन के रूप में पुन: अधिसूचित करती है जिसमें निम्नलिखित तालिका में उल्लिखित सर्वेक्षण संख्या तथा क्षेत्र शामिल हैं, अर्थात:-

तालिका

अ (बहु उत्पाद)				
क्र. सं	गाँव/क्षेत्र का नाम	तालुका	सर्वेक्षण सं./विवरण	क्षेत्र हैक्ट. में
1	धुब्र	मुद्रां	उत्तर: नवीनल क्रीक दक्षिण : जी एम बी-जी ए पी एल भूमि पूर्व: जी एम बी-जी ए पी एल भूमि पश्चिम: 175 एकड़ भूमि	121-40-43
2.	धुब्र	मुद्रां	उत्तर : जी एम बी – जी ए पी एल भूमि एवं जी ए पी एल रोड दक्षिण :जी एम बी – जी ए पी एल भूमि पूर्व: 300 एकड़ भूमि पश्चिम: 325 एकड भूमि	70-81-92
3	धुब्र	मुद्रां	उत्तर :जी एम बी – जी ए पी एल भूमि एवं जी ए पी एल रोड. दक्षिण :जी एम बी – जी ए पी एल भूमि पूर्व: जी ए पी एल रोड एवं 175 एकड़ भूमि पश्चिम: जी एम बी - जी ए पी एल भूमि	131-52-13
4	नवीनल द्वीप भूमि	मुद्रां	उत्तर : नवीनल क्रीक एवं जी एम बी-जी ए पी एल भूमि दक्षिण : कच्छ की खाडी. पूर्व : जी ए पी एल रोड. एवं 325 एकड़ एसीएल भूमि पश्चिम : क्रीक एवं वन क्षेत्र	406-29-97
			उत्तर : वन भूमि	

5	नवीनल द्वीप भूमि	मुद्रां	दक्षिण : नवीनल क्रीक पूर्व : जी ए पी एल रोड. पश्चिम: वन भूमि	80-93-62
6	मुद्रां एवं पुरानी भारत नमक एवं रसायन लि. की भूमि	मुद्रां	उत्तर: ध्रूव ग्राम की क्र.स. 169 का ट्रेवर्स लैंड और मुद्रां ग्राम की क्रं.स. 141 का ट्रेवर्स लैंड दक्षिण: बोचा क्रीक एवं पुराना मुद्रां पतन पूर्व: पुराना मुद्रां पोर्ट रोड. पश्चिम: नवीनल क्रीक एवं जी ए पी एल रोड	320-75-02
7	ध्रुव्र	मुद्रां	169	150-54-13
8	मुद्रां	मुद्रां	141 पार्ट, 141 पार्ट	71-44-64
9	बरोई	मुद्रां	207, 207 पार्ट	39-87-12
10	गोवरसामा	मुद्रां	27, 28/2, 28/3, 28/4, 28/5, 28/6, 28/7, 33/1, 33/2, 33/3, 33/4, 33/5, 34/2, 34/3, 34/4, 34/5, 34/6, 34/7, 34/8, 34/9 पार्ट, 34/9 पार्ट, 34/10, 34/11, 52/8, 52 पार्ट, 28/1, 52 पार्ट, 52 पार्ट (पुराना)	43-75-61
11	शेकादिया	मुद्रां	81/1, 81/2,120/1	04-04-68
12	लूनी	मुद्रां	162, 163 पार्ट, 165/1, 165/2, 166, 167 पार्ट, 168, 169 पार्ट, 177/2, 235 पार्ट, 237/1, 237/2, 258, 238, 239/1 पार्ट, 243 पार्ट, 244, 245/2, 245/1, 246 पार्ट, 247 पार्ट, 248 पार्ट, 254/2 पार्ट, 256/1 पार्ट, 257, 259, 262, 263, 264, 265, 266, 267/1, 267/2, 274/2, 277 पार्ट, 278/1, 278/2, 279 पार्ट, 280, 281, 282, 342 पार्ट, 342 पार्ट, 236, 468 पार्ट, 468 पार्ट, 468 पार्ट	183-68-47

13	वडाला	मुद्रां	120 पार्ट, 177/1, 177/2, 178, 179 पार्ट, 180/1, 180/2, 180/3, 181, 184, 185 पार्ट, 185 पार्ट, 186 पार्ट, 187, 188/1, 189/1, 189/2, 190/1, 190/2, 191, 192, 193, 195 पार्ट, 196/1, 196/2, 197/1, 197/2, 197/3, 197/4, 198, 199 पार्ट, 200, 243/2, 244/2, 245/1पार्ट, 245/1 पार्ट, 245/2, 251/2 पार्ट, 254, 255/1, 255/2 पार्ट, 256 पार्ट, 257, 258/1, 259,260/1, 260/2, 261/1, 261/2, 262, 263/1 पार्ट, 264/1, 264/2, 264/3, 404, 405, 406/1 पार्ट, 406/2 पार्ट, 406/3, 406/4, 423/2, 424, 425/1, 425/2,	138-02-66
			425/3 पार्ट, 431 पार्ट, 432/1 पार्ट, 432/2, 432/3, 433, 434, 435 पार्ट, 446 पार्ट, 447, 448, 449/1, 449/2, 450 पार्ट, 465 पार्ट, 467 पार्ट, 468 पार्ट, 469 पार्ट, 470 पार्ट, 478 पार्ट, 526/1, 527 पार्ट, 528/1, 528/2, 529 पार्ट, 530, 533, 534 पार्ट, 376, 466 पार्ट, 472, 202, 466 पार्ट	
14	पावादियारा	मुद्रां	10/1 पार्ट, 11, 12/3, 12/4, 12/5, 12/6, 13/1, 13/2, 13/3, 14/1 पार्ट, 15, 16 पार्ट, 30, 32/1 पार्ट, 39 पार्ट, 41, 42/1, 42/2, 43/1, 43/2, 44 पार्ट, 17 पार्ट, 29, 31/1, 31/2	26-22-33
15	भरूडिया	मुद्रां	168 पार्ट, 173/1, 173/2, 174 पार्ट, 176, 177 पार्ट, 210, 211 पार्ट, 212, 214, 217 पार्ट, 217 पार्ट, 178 पार्ट	27-01-25

16	भद्रेश्वरा	मुद्रां	54 पार्ट, 55 पार्ट, 57, 60, 153/1, 154/2, 63/1 पार्ट, 63/2 पार्ट, 82/1, 82/3, 84/1, 85/1 पार्ट, 85/2, 86/1, 89 पार्ट, 90, 96 पार्ट, 97 पार्ट, 98 पार्ट, 99, 102/1 पार्ट, 125/1, 151/2, 130/1, 131/1, 132/2, 132/3, 133, 134/2, 137/2 पार्ट, 137/3, 138, 139, 140, 152/1, 152/2, 153/2, 153/3, 153/4, 157/1, 157/3, 86/2, 88, 95, 100, 134/1(137/3), 137/1, 84/2, 130/3, 143/4, 144, 145, असर्वेक्षित भूमि of 25 एकड.	119-23-93
17	बीतावलाडिया (अतमनो वास)	अंजार	255 पार्ट, 260/1, 263, 264 पार्ट, 284/1 पार्ट, 284/2, 285 पार्ट, 289 पार्ट, 290, 291 पार्ट, 292/1, 292/2, 293/1 पार्ट, 294 पार्ट, 297/1 पार्ट, 295 पार्ट, 298/1, 298/2, 302 पार्ट, 304 पार्ट, 299 पार्ट, 300 पार्ट, 301, 306/1 पार्ट, 308 पार्ट, 309 पार्ट, 309 पार्ट, 312 पार्ट, 292/3, 345, 347, 334, 342, 346	61-24-85
18	बीतावलाडिया (उगमनोवास)	अंजार	5/1 पार्ट, 6 पार्ट, 8 पार्ट, 9 पार्ट, 9 पार्ट, 10 पार्ट, 11/1 पार्ट, 11/2 पार्ट, 11/3, 18/1 पार्ट, 18/2 पार्ट, 18/3, 19, 21, 22/2 पार्ट, 22/3, 22/4, 22/5, 23 पार्ट, 55 पार्ट, 184/1 पार्ट, 184/2 पार्ट, 186 पार्ट, 187/1 पार्ट, 220, 221 पार्ट, 222, 223 पार्ट, 224 पार्ट, 225 पार्ट, 225 पार्ट, 338, 401पार्ट, 401 पार्ट, 7, 43, 220, 405 पार्ट, 20,	61-60-25

			असर्वेक्षित भूमि of 10 एकड	
19	कुम्भरिया	अंजार	101 पार्ट, 102, 103, 104, 105 पार्ट, 112 पार्ट, 113, 114 पार्ट, 115, 116, 117, 118, 119, 120 पार्ट, 266 पार्ट, 123, 147, 148 पार्ट, 149 पार्ट, 157, 158, 159/1 पार्ट, 159/2 पार्ट, 160 पार्ट, 161 पार्ट, 162 पार्ट, 163 पार्ट, 164 पार्ट, 169 पार्ट, 171, 172, 174 पार्ट, 251 पार्ट, 252 पार्ट, 253 पार्ट, 254, 255, 256, 257, 258, 259 पार्ट, 265 पार्ट, 267 पार्ट, 270 पार्ट, 268, 269, 271, 274 पार्ट, 275 पार्ट, 276 पार्ट, 152, 111, 136	67-70-31
20	देवलिया	अंजार	4, 8/1, 9, 10, 11/1, 11/2, 45 पार्ट, 46 पार्ट, 47, 48, 49/1, 49/2, 335 पार्ट, 335 पार्ट, 338/1, 338/2, 338/3 पार्ट, 340 पार्ट, 341 पार्ट, 342/1, 342/2, 348/2 पार्ट, 384/2, 342/3, 343, 344, 346, 347, 348/1 पार्ट, 349, 350, 351, 352 पार्ट, 353 पार्ट, 354 पार्ट, 355, 356, 357, 358/1, 358/2, 358/3, 359, 360, 361, 362, 363, 364, 365, 367 पार्ट, 369/2 पार्ट, 369/3, 370 पार्ट, 384/4 पार्ट, 387 पार्ट, 395/1 पार्ट, 397 पार्ट, 398, 399, 400, 403, 404 पार्ट, 405 पार्ट, 489 पार्ट, 401, 489 पार्ट	169-42-98
21	शिनोई	अंजार	514	3-37-91
			717/1 पार्ट, 717/2 पार्ट, 718 पार्ट, 723, 724, 725 पार्ट, 728,	

22	अंजार-एसआईएम	अंजार	734 पार्ट, 735 पार्ट, 736, 737 पार्ट, 738 पार्ट, 761, 762 पार्ट, 867, 868/1 पार्ट, 868/2, 869 पार्ट, 870 पार्ट, 872 पार्ट, 873 पार्ट, 874/1 पार्ट, 875/1, 875/2, 875/3, 875/4 पार्ट, 984 पार्ट, 722/4, 727, 866, 984 पार्ट, 1026, 1058, 1005 पार्ट, 1024 पार्ट, 1025, 1026, 1027, 1010, 1005 पार्ट, 1024 पार्ट	89-14-11
23	मेघपार-कुंभर्डी	अंजार	43 पार्ट, 51/2, 52 पार्ट, 57/1 पार्ट, 63 पार्ट, 68 पार्ट, 69/1 पार्ट, 69/2 पार्ट, 70/1 पार्ट, 70/3 पार्ट, 122/2, 124/1 पार्ट, 124/2 पार्ट, 124/3 पार्ट, 124/4, 140/1 पार्ट, 140/2, 141 पार्ट, 142/4, 163 पार्ट	18-67-60
24	मुद्रां पत्तन (जी ए पी एल) पत्तन सीमा	-	निम्नलिखित वर्तमान अधिसूचनाओं के अनुसार: (i) सीमाशुल्क आयुक्त का कार्यालय, गुजरात, अहमदाबाद द्वारा जारी दिनांक 23.09.1999 की सं.17/99-सी.सी (ii) पत्तन एवं यातायात विभाग, गुजरात सरकार द्वारा जी दिनांक 11.12.2008 की सं. पी/टी/2008/69/डब्ल्यू के एस/432007/जी/ 488/जी एच/1 (iii) सीमाशुल्क आयुक्त (नि.) का कार्यालय, जामनगर द्वारा जारी दिनांक 7 मार्च, 2003 की सं. 03/2003 (iv) सीमाशुल्क आयुक्त (नि.) का कार्यालय, जामनगर द्वारा जारी दिनांक 20 मई, 2003 की सं. 03/2003	
25	मुद्रां	मुद्रां	141 पाइकी	251-43-08
26	मुद्रां	मुद्रां	141 पाइकी	74-61-45
27	धुब्र	मुद्रां	169 पार्ट	105-01-93
28	धुब्र	मुद्रां	169 पार्ट	16-18-80

29	धुब्र	मुद्रां	169/पी1/पी1/पी3	14-16-41
30	धुब्र	मुद्रां	असर्वेक्षित भूमि	28-93-61
31	जारपारा	मुद्रां	689/7	41-92-69
32	जारपारा	मुद्रां	689/29	48-42-72
33	जारपारा	मुद्रां	689/30	24-31-16
34	जारपारा	मुद्रां	689/36	63-70-79
35	जारपारा	मुद्रां	689/47	21-04-38
36	जारपारा	मुद्रां	689/48	74-46-25
37	जारपारा	मुद्रां	689/49	70-51-68
38	जारपारा	मुद्रां	689/50	41-65-27
39	जारपारा	मुद्रां	689/52	16-19-08
40	जारपारा	मुद्रां	असर्वेक्षित भूमि	269-03-89
41	जारपारा	मुद्रां	689/पी92/पी2/पी2	87-20-05
42	नवीनल	मुद्रां	55/1	1-22-42
43	नवीनल	मुद्रां	56/2	0-23-27
44	नवीनल	मुद्रां	64/1	0-98-14
45	नवीनल	मुद्रां	102/1	2-30-67
46	नवीनल	मुद्रां	102/2	1-11-29
47	नवीनल	मुद्रां	110/3	0-84-98
48	नवीनल	मुद्रां	115/3	1-02-18
49	नवीनल	मुद्रां	130	3-24-76
50	नवीनल	मुद्रां	223/पार्ट	134-29-94
51	नवीनल	मुद्रां	असर्वेक्षित भूमि	58-22-79
52	नवीनल	मुद्रां	224 & 225 पार्ट	93-48-29
53	सिरचा	मुद्रां	120	2-12-46
54	सिरचा	मुद्रां	121/1	1-16-35
55	सिरचा	मुद्रां	121/3	1-04-21
56	सिरचा	मुद्रां	121/4	1-95-26
57	सिरचा	मुद्रां	125/1	1-74-02
58	सिरचा	मुद्रां	131	2-54-95

59	सिरचा	मुद्रां	295 पार्ट	103-67-08
60	सिरचा	मुद्रां	124	1-86-16
61	सिरचा	मुद्रां	125/2	1-60-86
62	सिरचा	मुद्रां	126	2-22-58
63	सिरचा	मुद्रां	129	5-62-52
64	सिरचा	मुद्रां	135	2-60-01
65	सिरचा	मुद्रां	137	1-63-90
66	सिरचा	मुद्रां	138/1	3-65-23
67	सिरचा	मुद्रां	140	4-24-92
68	सिरचा	मुद्रां	141	2-24-60
69	सिरचा	मुद्रां	142	2-68-11
70	सिरचा	मुद्रां	143	4-14-81
71	सिरचा	मुद्रां	144/1	3-83-44
72	सिरचा	मुद्रां	144/2	1-39-62
73	सिरचा	मुद्रां	147	2-92-39
74	सिरचा	मुद्रां	असर्वेक्षित भूमि	64-72-85
75	सिरचा	मुद्रां	295/पी6/पी3	73-35-18
76	टुंडा	मुद्रां	180/पी	77-52-50
77	टुंडा	मुद्रां	असर्वेक्षित भूमि	506-94-82
78	मुद्रां	मुद्रां	141 पाइकी	607-05-00
79	मुद्रां	मुद्रां	141 पाइकी	84-17-55
80	मुद्रां	मुद्रां	जी एम बी/जी ए पी एल भूमि (ओल्ड भारत साल्ट लैंड)	382-95-00
81	टुंडा	मुद्रां	180 पाइकी	231-60-98
82	सिरचा	मुद्रां	295/1 पाइकी	62-27-12
83	बरोई	मुद्रां	238 पी	20-23-50
84	बरोई	मुद्रां	207 पी	21-70-16
85	गोवरसमा	मुद्रां	52 पी	189-25-95
86	गोवरसमा	मुद्रां	53 पी	27-01-51
	कुल योग अ			**6456.3349** हेक्टेयर
ब (एफ टी डब्लू जेड)				
87	धुब्र	-	169/36	168.41

	कुल योग ब	**168.41** हेक्टेयर

स (नया बहुउत्पाद)			
88	मुद्रां वन	असर्वेक्षित भूमि	1228.00.00
89	मुद्रां वन	असर्वेक्षित भूमि	227.00.00
90	मुद्रां वन	असर्वेक्षित भूमि	385.00.00
	सिरचा	असर्वेक्षित भूमि	1.59.37
	नवीनल	असर्वेक्षित भूमि	6.99.95
91	जारपारा	असर्वेक्षित भूमि	2.86.92
	जारपारा	689/पी92/पी2	5.07.11
		कुल योग स	**1856.53.35**
	कुल योग (अ+ब+स)		**8481.2784** हेक्टेयर

[फा. सं. एफ. 1/12/2016-एसईजेड]

आलोक वर्धन चतुर्वेदी, अपर सचिव

MINISTRY OF COMMERCE AND INDUSTRY

(Department of Commerce)

NOTIFICATION

New Delhi, the 21st September, 2016

S.O. 3029(E).—WHEREAS, the Central Government had notified/de-notified the Special Economic Zone named M/s. Mundra Port and Special Economic Zone Limited at Mundra in the State of Gujarat under the following notifications of the Government of India in the Ministry of Commerce and Industry (Ministry of Commerce), namely:-

(1) S.O. number 1365 (E) dated 27th May, 2009;

(2) S.O. number 583 (E) dated 26th March, 2012;

(3) S.O. number 1443 (E) dated 31st May, 2013;

(4) S.O. number 3379 (E) dated 11th December, 2015;

AND, WHEREAS, the name of the SEZ was changed from M/s. Mundra Port and Special Economic Zone Limited (MPSEZL) to M/s. Adani Ports and Special Economic Zone Limited vide approval letter No. F.1/15/2011-SEZ dated 27th March, 2012;

AND, WHEREAS, the Central Government has decided to consolidate all the Special Economic Zones notified vide S.O. number 1365 (E) dated 27th May, 2009; S.O. number 583 (E) dated 26th March, 2012; S.O. number 1443 (E) dated 31st May, 2013; S.O. number 3379 (E) dated 11th December, 2015 referred in preceding paragraph for administrative convenience and without affecting rights obligations and fiscal benefits of the Developer(s);

NOW, THEREFORE, the Central Government, in exercise of the powers conferred by second proviso to sub-section (1) of section 4 of the Special Economic Zones Act, 2005 (28 of 2005) (hereinafter referred to as the said Act, read with rule 8 of the Special Economic Zones Rules, 2006, and in supersession of the notification number S.O. number 1365 (E) dated 27th May, 2009; S.O. number 583 (E) dated 26th March, 2012; S.O. number 1443 (E) dated 31st May, 2013; S.O. number 3379 (E) dated 11th December, 2015, referred to the first paragraph, except as respects things done or omitted to be done for such supersession, the Central Government on being satisfied that the requirements under sub-section (8) of section 3 of the said Act and other related requirements are fulfilled, hereby consolidates the Special Economic Zones mentioned in the notifications referred to the first paragraph, and re-notifies following areas comprising following survey numbers given in the table below as a Special Economic Zone, namely:

TABLE

A (Multi Product)				
Sl. No.	**Name of Village/Area**	**Taluka**	**Survey No./Details**	**Area in Hectares**
1.	Dhrub	Mundra	North: Navinal Creek South : GMB-GAPL land East: GMB-GAPL land West: 175 acre Land	121-40-43
2.	Dhrub	Mundra	North : GMB – GAPL Land and GAPL Road South :GMB – GAPL Land	70-81-92
			East: 300 Acre Land West: 325 Acre Land	
3.	Dhrub	Mundra	North :GMB – GAPL Land and GAPL Road South :GMB – GAPL Land East: GAPL Road and 175 Acre Land West: GMB - GAPL Land	131-52-13
4.	Navinal Island Land	Mundra	North : Navinal Creek and GMB-GAPL land South : Gulf of Kutch East : GAPL road and 325 acres ACL land West : Creek and Forest Area	406-29-97
5.	Navinal Island Land	Mundra	North : Forest Land South : Navinal Creek East : GAPL Road West : Forest Land	80-93-62
6.	Mundra and Old Bharat Salt and Chemical Ltd. Land	Mundra	North: Traverse Land S.No. 169 of Village – Dhrub and Traverse land S. No. 141 of Village – Mundra South: Bocha Creek & Old Mundra Port East: Old Mundra Port Road West: Navinal Creek and GAPL Road	320-75-02
7.	Dhrub	Mundra	169	150-54-13
8.	Mundra	Mundra	141 part, 141 Part	71-44-64
9.	Baroi	Mundra	207, 207 Part	39-87-12
10.	Govarsama	Mundra	27, 28/2, 28/3, 28/4, 28/5,	43-75-61

			28/6, 28/7, 33/1, 33/2, 33/3, 33/4, 33/5, 34/2, 34/3, 34/4, 34/5, 34/6, 34/7, 34/8, 34/9 Part, 34/9 Part, 34/10, 34/11, 52/8, 52 Part, 28/1, 52 Part, 52 Part (old)	
11.	Shekhadiya	Mundra	81/1, 81/2, 120/1	04-04-68
12.	Luni	Mundra	162, 163 Part, 165/1, 165/2, 166, 167 Part, 168, 169 Part, 177/2, 235 Part, 237/1, 237/2, 258, 238, 239/1 Part, 243 Part, 244, 245/2, 245/1, 246 Part, 247 Part, 248 Part, 254/2 Part, 256/1 Part, 257, 259, 262, 263, 264, 265, 266, 267/1, 267/2, 274/2, 277 Part, 278/1, 278/2, 279 Part, 280, 281, 282, 342 Part, 342 Part, 236, 468 Part, 468 Part, 468 Part	183-68-47
13.	Vadala	Mundra	120 Part, 177/1, 177/2, 178, 179 Part, 180/1, 180/2, 180/3, 181, 184, 185 Part, 185 Part, 186 Part, 187, 188/1, 189/1, 189/2, 190/1, 190/2, 191, 192, 193, 195 Part, 196/1, 196/2, 197/1, 197/2, 197/3, 197/4, 198, 199 Part, 200, 243/2, 244/2, 245/1 Part, 245/1 Part, 245/2, 251/2 Part, 254, 255/1, 255/2 Part, 256 Part, 257, 258/1, 259, 260/1, 260/2, 261/1, 261/2, 262, 263/1 Part, 264/1, 264/2, 264/3, 404, 405, 406/1 Part, 406/2 Part, 406/3, 406/4,	138-02-66
			423/2, 424, 425/1, 425/2, 425/3 Part, 431 Part, 432/1 Part, 432/2, 432/3, 433, 434, 435 Part, 446 Part, 447, 448, 449/1, 449/2, 450 Part, 465 Part, 467 Part, 468 Part, 469 Part, 470 Part, 478 Part, 526/1, 527 Part, 528/1, 528/2, 529 Part, 530, 533, 534 Part, 376, 466 Part, 472, 202, 466 Part	
14.	Pavadiyara	Mundra	10/1 Part, 11, 12/3, 12/4, 12/5, 12/6, 13/1, 13/2, 13/3, 14/1 Part, 15, 16 Part, 30, 32/1 Part, 39 Part, 41, 42/1, 42/2, 43/1, 43/2, 44 Part, 17 Part, 29, 31/1, 31/2	26-22-33
15.	Bharudia	Mundra	168 Part, 173/1, 173/2, 174 Part, 176, 177 Part, 210, 211	27-01-25

			Part, 212, 214, 217 Part, 217 Part, 178 Part	
16.	Bhadreshwar	Mundra	54 Part, 55 Part, 57, 60, 153/1, 154/2, 63/1 Part, 63/2 Part, 82/1, 82/3, 84/1, 85/1 Part, 85/2, 86/1, 89 Part, 90, 96 Part, 97 Part, 98 Part, 99, 102/1 Part, 125/1, 151/2, 130/1, 131/1, 132/2,132/3,133,134/2, 137/2 Part, 137/3, 138, 139, 140,152/1,152/2,153/2, 153/3, 153/4, 157/1, 157/3, 86/2, 88, 95, 100, 134/1(137/3), 137/1, 84/2, 130/3, 143/4, 144, 145, Unsurveyed Land of 25 acres	119-23-93
17.	Bitawaladia (Athamnowas)	Anjar	255 Part, 260/1, 263, 264 Part, 284/1 Part, 284/2, 285 Part, 289	61-24-85
			Part, 290, 291 Part, 292/1, 292/2, 293/1 Part, 294 Part, 297/1 Part, 295 Part, 298/1, 298/2, 302 Part, 304 Part, 299 Part, 300 Part, 301, 306/1 Part, 308 Part, 309 Part, 309 Part, 312 Part, 292/3, 345, 347, 334, 342, 346	
18.	Bitawaladia (Ugamanowa)	Anjar	5/1 Part, 6 Part, 8 Part, 9 Part, 9 Part, 10 Part, 11/1 Part, 11/2 Part, 11/3, 18/1 Part, 18/2 Part, 18/3, 19, 21, 22/2 Part, 22/3, 22/4, 22/5, 23 Part, 55 Part, 184/1 Part, 184/2 Part, 186 Part, 187/1 Part, 220, 221 Part, 222, 223 Part, 224 Part, 225 Part, 225 Part, 338, 401 Part, 401Part, 7, 43, 220, 405 Part, 20, Unsurveyed land of 10 acres	61-60-25
19.	Kumbharia	Anjar	101 Part, 102, 103, 104, 105 Part, 112 Part, 113, 114 Part, 115, 116, 117, 118, 119, 120 Part, 266 Part, 123, 147, 148 Part, 149 Part, 157, 158, 159/1 Part, 159/2 Part, 160 Part, 161 Part, 162 Part, 163 Part, 164 Part, 169 Part, 171, 172, 174 Part, 251 Part, 252 Part, 253 Part, 254, 255, 256, 257, 258, 259 Part, 265 Part, 267 Part, 270 Part, 268, 269, 271, 274 Part, 275 Part, 276 Part, 152, 111, 136	67-70-31
20.	Devalia	Anjar	4, 8/1, 9, 10, 11/1, 11/2, 45 Part, 46 Part, 47, 48, 49/1, 49/2, 335 Part, 335 Part, 338/1,	169-42-98

			338/2, 338/3 Part, 340 Part, 341 Part, 342/1, 342/2, 348/2 Part, 384/2, 342/3, 343, 344, 346, 347, 348/1 Part, 349, 350, 351, 352 Part, 353 Part, 354 Part, 355, 356, 357, 358/1, 358/2, 358/3, 359, 360, 361, 362, 363, 364, 365, 367 Part, 369/2 Part, 369/3, 370 Part, 384/4 Part, 387 Part, 395/1 Part, 397 Part, 398, 399, 400, 403, 404 Part, 405 Part, 489 Part, 401, 489 Part	
21.	Shynoi	Anjar	514	3-37-91
22.	Anjar SIM	Anjar	717/1 Part, 717/2 Part, 718 Part, 723, 724, 725 Part, 728, 734 Part, 735 Part, 736, 737 Part, 738 Part, 761, 762 Part, 867, 868/1 Part, 868/2, 869 Part, 870 Part, 872 Part, 873 Part, 874/1 Part, 875/1, 875/2, 875/3, 875/4 Part, 984 Part, 722/4, 727, 866, 984 Part, 1026, 1058, 1005 Part, 1024 Part, 1025, 1026, 1027, 1010, 1005 Part, 1024 Part	89-14-11
23.	Meghpar – Kumbhardi	Anjar	43 Part, 51/2, 52 Part, 57/1 Part, 63 Part, 68 Part, 69/1 Part, 69/2 Part, 70/1 Part, 70/3 Part, 122/2, 124/1 Part, 124/2 Part, 124/3 Part, 124/4, 140/1 Part, 140/2, 141 Part, 142/4, 163 Part	18-67-60
24.	Mundra Port (GAPL) Port Limits	-	As per following existing notifications: (i) No. 17/99-CC dated 23- 09-1999 issued by the Office of the Commissioner of Customs, Gujarat, Ahmedabad (v) No. PT/2008/69/WKS/432007/ G/488/ GH/1 dated 11- 12-2008 issued by Ports and Transport Department, Government of Gujarat. (vi) No. 03/2003 dated 7th March 2003 issued by the Office of the Commissioner of Customs (Prev.), Jamnagar. (vii) No. 09/2003 dated 20th May 2003 issued by the Office of the Commissioner of Customs (Prev.), Jamnagar.	--
25.	Mundra	Mundra	141 Paiki	251-43-08
26.	Mundra	Mundra	141 Paiki	74-61-45
27.	Dhrub	Mundra	169 Part	105-01-93

28.	Dhrub	Mundra	169 Part	16-18-80
29.	Dhrub	Mundra	169/P51/P1/P3	14-16-41
30.	Dhrub	Mundra	Unsurveyed Land	28-93-61
31.	Zarpara	Mundra	689/7	41-92-69
32.	Zarpara	Mundra	689/29	48-42-72
33.	Zarpara	Mundra	689/30	24-31-16
34.	Zarpara	Mundra	689/36	63-70-79
35.	Zarpara	Mundra	689/47	21-04-38
36.	Zarpara	Mundra	689/48	74-46-25
37.	Zarpara	Mundra	689/49	70-51-68
38.	Zarpara	Mundra	689/50	41-65-27
39.	Zarpara	Mundra	689/52	16-19-08
40.	Zarpara	Mundra	Unsurveyed Land	269-03-89
41.	Zarpara	Mundra	689/P92/P2/P2	87-20-05
42.	Navinal	Mundra	55/1	1-22-42
43.	Navinal	Mundra	56/2	0-23-27
44.	Navinal	Mundra	64/1	0-98-14
45.	Navinal	Mundra	102/1	2-30-67
46.	Navinal	Mundra	102/2	1-11-29
47.	Navinal	Mundra	110/3	0-84-98
48.	Navinal	Mundra	115/3	1-02-18
49.	Navinal	Mundra	130	3-24-76
50.	Navinal	Mundra	223/part	134-29-94
51.	Navinal	Mundra	Unsurveyed Land	58-22-79
52.	Navinal	Mundra	224 & 225 Part	93-48-29
53.	Siracha	Mundra	120	2-12-46
54.	Siracha	Mundra	121/1	1-16-35
55.	Siracha	Mundra	121/3	1-04-21
56.	Siracha	Mundra	121/4	1-95-26
57.	Siracha	Mundra	125/1	1-74-02
58.	Siracha	Mundra	131	2-54-95
59.	Siracha	Mundra	295 Part	103-67-08
60.	Siracha	Mundra	124	1-86-16
61.	Siracha	Mundra	125/2	1-60-86
62.	Siracha	Mundra	126	2-22-58
63.	Siracha	Mundra	129	5-62-52
64.	Siracha	Mundra	135	2-60-01
65.	Siracha	Mundra	137	1-63-90
66.	Siracha	Mundra	138/1	3-65-23
67.	Siracha	Mundra	140	4-24-92
68.	Siracha	Mundra	141	2-24-60
69.	Siracha	Mundra	142	2-68-11
70.	Siracha	Mundra	143	4-14-81
71.	Siracha	Mundra	144/1	3-83-44
72.	Siracha	Mundra	144/2	1-39-62
73.	Siracha	Mundra	147	2-92-39

74.	Siracha	Mundra	Unsurveyed Land	64-72-85
75.	Siracha	Mundra	295/P6/P3	73-35-18
76.	Tunda	Mundra	180/P	77-52-50
77.	Tunda	Mundra	Unsurveyed Land	506-94-82
78.	Mundra	Mundra	141 Paiki	607-05-00
79.	Mundra	Mundra	141 Paiki	84-17-55
80.	Mundra	Mundra	GMB/GAPL Land (Old Bharat Salt Land)	382-95-00
81.	Tunda	Mundra	180 Paiki	231-60-98
82.	Siracha	Mundra	295/1 Paiki	62-27-12
83.	Baroi	Mundra	238 P	20-23-50
84.	Baroi	Mundra	207 P	21-70-16
85.	Govarsama	Mundra	52 P	189-25-95
86.	Govarsama	Mundra	53 P	27-01-51
	Total of A			**6456.3349 Ha**

B (FTWZ)				
87.	Dhrub	-	169/36	168.41
	Total of B			**168.41 ha**

C (New Multi Product)			
88.	Mundra Forest	Unsurveyed Land	1228.00.00
89.	Mundra Forest	Unsurveyed Land	227.00.00
90.	Mundra Forest	Unsurveyed Land	385.00.00
	Siracha	Unsurveyed Land	1.59.37
	Navinal	Unsurveyed Land	6.99.95
91.	Zarpara	Unsurveyed Land	2.86.92
	Zarpara	689/P92/P2	5.07.11
		Total of C	**1856.53.35**
	Total area of (A+B+C)		**8481.2784**

[F. No. F.1/12/2016-SEZ]

ALOK VARDHAN CHATURVEDI, Addl. Secy.

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HARINDRA KUMAR Digitally signed by HARINDRA KUMAR Date: 2016.09.23 11:48:01 +05'30'

F. No. 8-04/2016-FC
Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)
****

Indira Paryavaran Bhawan
Aliganj, Jorbagh Road
New Delhi – 110 003
Dated: 16th November, 2018

To,

The Principal Secretary (Forests),
Department of Forests & Environment,
Government of Gujarat,
Gandhi Nagar.

Sub: Diversion of 1576.81 ha Reserved Forest Land in favour of Adani Ports and Special Economic Zone Ltd. (APSEZL) for the development of Special Economic Zone (SEZ) and Industrial Park at Village – Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Tehsil Mundra, under Forest Division and District Kutch, Gujarat (Online Proposal No. FP/GJ/IND/17613/2004):- Reg.

Sir,

I am directed to refer to the APCCF (Land Management) and Nodal Officer, (FCA), Govt. of Gujarat letter No. FCA-1014/10-11/14/S.F-66/F dated 21.01.2016 for seeking prior approval of Central Government under Section-2 of the Forest (Conservation) Act, 1980. The proposal has been examined by the Forest Advisory Committee (FAC) constituted by the Central Government under Section-3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government of Gujarat and on the basis of the recommendations of the Forest Advisory Committee (FAC), the Central Government hereby agrees to accord *"In-principle"* approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 1576.81 ha Reserved Forest Land in favour of Adani Ports and Special Economic Zone Ltd. (APSEZL) for the development of Special Economic Zone (SEZ) and Industrial Park at Village – Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Tehsil Mundra, under Forest Division and District Kutch, Gujarat, subject to the following conditions:-

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) *The entire forest area being diverted, should not be cleared off the vegetation in one go after diversion. The UA may clear vegetation for the purpose of basic/essential infrastructure to be developed in the SEZ. Thereafter, as and when a specific project / industry is to come up in the SEZ, the corresponding area shall be marked on the ground and cleared off vegetation. Till then the remaining areas shall be maintained as green cover. It shall be ensured that the lease agreement is made within six months of such clearing. A detailed land use for the marked area, on which clearing of vegetation is proposed shall be submitted to the Regional Office of MoEF&CC before start of work on the area, for information. The Regional Office of MoEF&CC shall ensure that the user agency carries out the work which is in conformity with the broad land use submitted by it. It shall be ensured that minimum number of trees are cleared. The user agency shall explore the possibility of trees of 10 cm dia at breast height and above, proposed for felling/clearing are translocated to suitable location within or outside the SEZ in consultation with State Forest department;*

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(iii) Felling of tress on the forest land being diverted shall be reduced to the bare minimum and the trees should be felled under strict supervision of the State Forest Department;

(iv) *The diverted forest land shall not be proposed to be utilized for Golf Course, Beach Resort, Park or Residential purposes, or any other activity prohibited by FCA 1980, FC Rules and/or guidelines made there under*

(v) *The diverted forest land shall not be used for the construction/expansion of any private Aerodrome. The forest land may be considered, in future on merits, in case of commercial Airport is developed with the approval of DGCA.*

(vi) *The detailed existing land use with maps of all forest land 2008.41 ha (1840ha + 168.41 ha) for which the approval was granted vide letter dated 30.09.2009 and details of complete land use including forest land for the existing private Aerodrome and power plants within the SEZ may be provided for information;*

(vii) *Forest areas proposed within of Mundra survey no. 141/P, Baroi survey no. 207/P, Goversama survey no. 52/P, Luni survey no. 468/P and Bhadreswar survey no. 733/P are having sea front. 100mt shelter belt/green belt in above villages be included in the Master plan of the SEZ, excluding stretches where use of water front is inevitable;*

(viii) *All the conditions as recommended by the Chief Wildlife Warden shall be complied with the User Agency;*

(ix) *The State Government shall clarify whether any non-forest land situated in and around the SEZ but not forming part of the SEZ at present, can be acquired by/allotted to the APSEZ before Stage-II approval;*

(x) *If 683 ha land of GMB or any other non-forest land is allotted for this SEZ, then the equivalent forest land shall be reduced from the forest land diverted/being diverted for the SEZ;*

(xi) *The State Government and the UA shall make effort to include 122 ha of non-forest land in village Jarapara in the SEZ. Accordingly, it is recommended that 122 ha of forest land in Bhadreswar Block shall be maintained as green belt at the cost of UA;*

(xii) *State government will provide details of lease period, terms and conditions on which the forest land is proposed to be diverted in favour of the Use Agency;*

(xiii) *All other conditions imposed in the approval granted for diversion of 2008.41 ha (1840ha + 168.41 ha) forest land on 30.09.2009 shall be complied;*

(xiv) *Only site-specific activities, permissible under the Rules and guidelines framed under the FC Act, shall be taken up in the forest land to be diverted;*

(xv) *The recommendation of the FAC is subject to the condition that in case of conflicts, the provisions of FC Act, 1980, shall prevail over those of SEZ Act 2005;*

(xvi) *All other conditions/recommendations made by FAC on this proposal in its meeting on 25.01.2018, not in conflict with the recommendation of FAC on 20.09.2018 shall remain unchanged.*

(xvii) *The User agency shall identify suitable land for Compensatory Afforestation over double the forest area being diverted. The land shall be mutated in the name of State Forest Department before the Stage-II approval;*

(xviii) *The User Agency shall deposit in the designated account the estimated amount towards compensatory afforestation to be carrying out by the State Forest Department;*

(xix) The Compensatory Afforestation shall be done over double non-forest land (NFL) i.e *3154 ha* to the forest area proposed to be diverted, as per the recommendation of Government of Gujarat, vide its GR No. FCA-1013/11-10/SF-24/F, dt 12.06.2015. The Compensatory Afforestation shall be done within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved plan in consultation with the State Forest Department at the cost of the User Agency. CA at rate of 1000 saplings per hectares shall be planted over *3154.00* ha.

(31,54,000 plants). If this is not possible to plant these many seedlings in the identified NFL, the balance seedlings will be planted in degraded forest land as per the prescriptions of the Working Plan at the cost of the User agency. In such case CA cost will be revised and duly approved by competent authority and will be deposited online in the Adhoc-CAMPA account of the state concerned;

(xx) The User agency shall identify and mutate in the name of State Forest Department of Government of Gujarat, 3154 ha of suitable non-forest land for CA adjacent to notified Forest for raising Compensatory Afforestation (CA) shall be notified as reserved Forest under Section-4 or Protected Forest under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act. The Nodal officer must report compliance within a period of 6 month from the date of grant of final approval and send a copy of the notification declaring the non-forest land under Section 4 or Section 29 of the Indian Forest Act, 1927, or under the relevant section of the local Forest Act as the case may be, to this Ministry for information and record;

(xxi) The State Government shall submit a certificate, that site for CA is suitable and free from all encroachments and other encumbrances, under the signature not below the rank of Nodal Officer (FCA) in the State Government;

(xxii) The land identified for the purpose of CA shall be clearly depicted on a Survey of India toposheet of 1:50,000 scale;

(xxiii) *The Compensatory Afforestation land shall be surveyed at the cost of User Agency and the User Agency shall erect pillars and barbed wire fencing or trench under the consultation of CCF, Kutch Circle;*

(xxiv) The User Agency shall deposit the cost of raising and maintaining the compensatory afforestation at the current wage rate in the account of Adhoc-CAMPA of the state concerned through online e-portal only. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years;

(xxv) The User Agency shall provide additionally 25% of the CA cost towards Soil and Moisture Conservation measures in the proposed CA area as per site requirement and the said amount shall be deposit in the account of Adhoc-CAMPA of the state concerned through online e-portal only;

(xxvi) The User Agency shall deposit, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC dated 05.02.2009. The requisite funds shall be deposited in the account of Adhoc-CAMPA of the state concerned through online e-portal only;

(xxvii) At the time of payment on the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(xxviii) The user agency should ensure that the compensatory levies (CA cost, NPV etc.) are deposited through challan generated online on web portal and deposited in appropriate bank online only. Amount deposited through other modes will not be accepted as compliance of Stage-I clearance;

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(xxix) The forest clearance will be for a period co-terminus with the lease period specified in the lease agreement. The State Government will submit the lease agreement documents specified in the lease agreement;

(xxx) The User agency shall obtain the Environment Clearance as per the provisions of the Environment (Protection) Act, 1986, if required;

(xxxi) *Complete compliance of CRZ regulations shall be ensured;*

(xxxii) Layout plan of the proposal shall not be changed without the prior approval of the Central Government;

(xxxiii) The User Agency will abide by the applicable recommendations of the State Government including State Forest/Wildlife Departments;

(xxxiv) State Government shall complete settlement of rights, in terms of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in its letter No. 11-9/1998-FC (pt.) dated 03.08.2009 read with 05.07.2013 in support thereof;

(xxxv) The user agency shall provide alternate fuels (LPG) to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(xxxvi) Boundary of the forest land proposed to be diverted shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing, distance from pillar to pillar and GPS co-ordinates;

(xxxvii) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

(xxxviii) The user agency shall submit the annual self-compliance report in respect of the above conditions to the State Government, concerned Regional Office and this Ministry by the end of March of every year regularly; and

(xxxix) The user agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations, Guidelines, relevant Hon'ble Court Order (s) and National Green Tribunal (NGT) Order(s), if any, pertaining to this project for the time being in force, as applicable to the project.

3. After receipt of the report on compliance to the conditions stipulated in the paragraph-2 above, from the State Government of Gujarat, Final/Stage-II approval for diversion of the proposed forest land under Section-2 of the Forest (Conservation) Act, 1980 will be issued by this Ministry. Diversion of the proposed forest land to the user agency shall not be effected by the State Government of Gujarat, till Final/Stage-II approval is issued by this Ministry.

Yours faithfully,

16/11/2098

(Shrawan Kumar Verma)
Dy. Inspector General of Forests (FC)

Copy to:-

1. The PCCF, Govt. of Gujarat, Gandhinagar.
2. The Addl. PCCF (Central), Regional Office (Western Zone), Bhopal.

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3. The Nodal Officer FCA, 1980, Forest Department O/o PCCF, Govt. of Gujarat, Gandhinagar.
4. User Agency.
5. Monitoring Cell, FC Division, MoEF & CC, New Delhi, for uploading.
6. Guard File.

16/11/2018

(Shrawan Kumar Verma)
Dy. Inspector General of Forests (FC)

ANNEXURE-1(c)

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d) 25% of CA cost will be deposited extra by the user agency for soil and moisture conservation (SMC) activities on the CA land.
e) Complete compliance of FRA will be done and certificate on prescribed form will be submitted along with the compliance report.

Agenda No. 3

F. No. 8-04/2016-FC

Sub: Diversion of 1576.81 ha of Reserved forest land for the development of Special Economic Zone and Industrial Park at Village - Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Ta. Mundra, Dist. Kutch in favour of Adnai Group, Mundra Port and Special Economic Zone Ltd., Ahmedabad.

The above stated agenda item was considered by FAC on 25.1.18 and details available on file were also considered and the FAC observed as follows

1. The present proposal is for diversion of **1576.81 ha** of reserved forest for non-forestry purpose for the development of port based multipurpose SEZ by Adani Ports and Special Economic Zone Limited (APSEZL) in Mundra coast in Kutch district of Gujarat.

2. Adani Ports and Special Economic Zone Limited (APSEZ) is a private multi-port operator. The company was earlier known as Mundra Port & Special Economic Zone Ltd (MPSEZ) and it changed its name to "Adani Ports and Special Economic Zone Limited (APSEZL)" on January 6, 2012.

3. **Adani Ports and Special Economic Zone Limited (APSEZL):** In 1994, the Gujarat Maritime Board (GMB) approved setting up a captive jetty at the Port of Mundra. The Adani group initiated its activities in Mundra in 1994-95. In 1998, a joint sector company, the Gujarat Adani Port Ltd. (GAPL), was incorporated. In 2001, the Port of Mundra signed a concession agreement with GMB for development, operation, and maintenance of the port at Mundra.
4. According to the State Government, the Ministry of Commerce and Industry, Government of India granted in principle permission for total 10000 ha of Mudra Special Economic Zone (MSEZ) in 2001 under State Government's Exim Policy 2000. Under SEZ Act 2005 a Special Economic Zone (SEZ) at Mundra was notified in 2006. The Mundra Special Economic Zone was merged with GAPL of Adani Group. The combined company was renamed 'Mundra Port and Special Economic Zone Limited (MPSEZL)' under Adani Group.

5. **Forest Clearances granted to MPSEZL:**

   a. On 26th June 1998 the proposal for 2400 ha of Forest land for M/s Adani Chemicals was submitted by the State Government which was rejected by Forest Advisory

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Committee (FAC) on the ground that the area contains 19.42 lakh mangrove trees. On 17th July 2002, FAC asked for a fresh proposal to be submitted due to high impacts of the project and its location in an ecologically fragile region. On 26th September 2002 FAC recommends 1840 ha of forest land out of the revised proposal for 1850 ha. 10 ha of interspersed mangrove forests was kept out. However, the proposal was granted in principle approval on 13th May 2004 by MoEF to M/s Adani Chemicals for diversion of **168.41 ha** of forest land in only one consolidated patch in survey area number 169/36 for salt washery and desalination plant for diversion of **1840 ha** of forestland for high purity salt works. The EC was also granted to Adani Chemicals Limited for the establishment of high purity salt works, involving an area of **2946.22 ha**, of this **1850 ha** is forestland, for which the in-principle forest clearance was granted in May 2004. The Forest Clearance (FC) and EC letters specify that 10 ha of interspersed mangrove forest, which was deleted from the proposed area shall be transferred back to the state government and maintained at the project cost.

b. On 23rd June 2004 MoEF granted approval for change of user agency from M/s Adani Chemicals Ltd to M/s Mundra SEZ Ltd. However on 5th September 2007, the MPSEZ Ltd requested the MoEF to amend the 'In principle approval' to include phasing out of payments for the diversions of the forest land and changing the name to Mundra Port and SEZ Ltd (MPSEZL); and also for change of land use in Master Plan also in favour of MPSEZ Ltd.

c. However on 27th March 2008 FAC rejected the change of land use to carry out activities related to the Master Plan of the MPSEZL which was against purposes (high purity salt works and salt washery) for which the forest land was earlier diverted. The FAC noted, *"the proposed land use completely changes the scope and purpose of the original diversion accorded....the state government may be advised to submit the proposal afresh."*

d. The application for fresh forest clearance for 1840 ha came up before the Forest Advisory Committee (FAC) of the MoEF in March 2008. Thereafter on 17th April 2008, the FAC considers and recommended the proposal following a representation by MPSEZL dated 3rd April 2008. This came under the scanner of CEC. On 16th July 2008 Central Empowered Committee reported on the FAC reconsideration decision to divert 1840 ha + 168.41 ha of forest land. The report concludes, *"the CEC is of the view that the recommendations of the FAC in the present case may not be accepted and the present request by the user agency for the diversion of forest land in a phased manner as part of the expansion of the Mundra Port and SEZ Limited may be rejected."* On 3rd October 2008 Supreme Court's order in the TN Godavarman case, *"as Regards the proposed land use, the State Government may furnish a fresh proposal to the FAC within a reasonable time."*

e. A fresh application was made by MPSEZL and was granted in-principle approval for forest land of 2008.41 ha (1840 ha + 168.41 ha) on 27.2.2009. The final approval was granted by MoEF on 30.09.2009 with specific and standard conditions.

f. The proposed land use for **diversion of 1840 ha** of forest land as recommended by the State Government was as under:

S. No.	Description of Items	Area (Ha)
1.	Port incl. Jetties, Basine, harbour, barge Berths, Tug Berths and their Immediate back-up Areas for Cargo handling area, Crane movement area, circulation areas etc.	386.40
2.	Container Freight Stations (CFS) including closed areas, Open Container Storage areas,	257.60
3.	Godowns & Closed Storage Areas for Bulk & Liquid Cargos including Rail sidings etc.	349.60
4.	Open Stock Yards & Open Hard Stands incl. rail sidings etc. for coal, Iron Ore, Steel, Cement, FIM, Pipes etc.	423.20
5.	Transport & Utiliti Corridor including Railway Lines, Roads, Drains, water Pipelines, Oil & Gas Pipelines, Sewage Pipelines, Sea-Water Intake Channel, Outlet Channel/Pipelines, Transmission Lines, Conveyors, Telecom / Data Transmission Lines, Buildings etc.	368.00
6.	Green Belt, etc.	55.20
	Total	**1840.00**

And the proposed land use for **diversion of 168.41 ha** of forest land as recommended by the State Government was as under:

S. No.	Description of Items	Area (Ha)
1.	Container Freight Stations (CFS) including Closed areas, Open Storage areas, Circulation areas etc.	21.89
2.	Light / Medium Industries	106.10
3.	CBD / Offices, Roads, Drains, Water Pipelines, Oil & Gas Pipelines, Sewage Pipelines, electricity Lines, Telecom / Data Transmission Lines, other Buildings etc.	25.56

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4.	Green Belt Development	14.85
	Total	**168.41**

6. The final approval was granted by MoEF on 30.09.2009 with specific and standard conditions..

7. **Details of notified Adani Port Special Economic Zone**: According to the project authority, the project involves development of SEZ of the 10000 ha of SEZ, the plot area, **8481.2784 ha** is notified in different point of time. On May 27, 2009, the Ministry of Commerce and Industry re-notified and consolidated the SEZ area of **6472.8684 ha**. After forest clearance, the Ministry of Commerce and Industry de-notified **1840 ha** of Mundra SEZ on 25th November 2009. The details of SEZ notification is as under:

Notification of SEZ	Area Notified as SEZ (ha)
March 4, 2006, GPCB issued a site clearance certificate to Mundra SEZ Limited for airstrip development at survey No. 52/53 of Village Goersana in Mundra.	
June 23, 2006, Ministry of Commerce and Industry notified multi product SEZ under GAPL of 2406.7592 ha in Mundra and Anjar*talukas*.	2406.759
September 6, 2006, Ministry of Commerce and Industry transferred the notified multi product SEZ under GAPL of 2406.7592 ha in Mundra and Anjar*talukas* to M/s Mundra Port and Special Economic Zone Limited.	
May 10, 2007, Ministry of Commerce and Industry notified power SEZ under Adani Power Private Limited of 293.881 ha in Tunda and Siracha villages.	293.881
July 3, 2007, Ministry of Commerce and Industry notified an additional area of 251.4308 ha was notified as part of the SEZ.	251.4308
June 23, 2006, Ministry of Commerce and Industry notified an additional area of 74.6145 ha as part of the multi product SEZ under MPSEZL.	74.6145
May 2, 2008, Ministry of Commerce and Industry notified an additional area of 1074.1755 ha under the multi product SEZ in favor of MPSEZL.	1074.1755
August 11, 2008, Ministry of Commerce and Industry notified an additional area of 2113.7962 ha under the multi product SEZ in favor of MPSEZL.	2113.7962
Total	6214.657

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May 27, 2009, Ministry of Commerce and Industry re-notified and consolidated the SEZ area of 6472.8684 ha.	**6472.8684**

8. The APSEZL again proposed in 2010 to develop another 3510.06 ha including 1840 ha already diverted and another 1670 ha of government land including 864.1299 ha of forest land. APSEZL however approached the Forest Department vide ref no APSEZL/APCCF (land)/F-01/2013-14 dated 10th June 2013 for the entire 1576.81 ha Reserved forest.

9. The State Government of Gujarat vide their letter No. FCA-1014/10-11/14/S.F-66/F dated 21.01.2016 had submitted the proposal for additional **1576.81 ha** of all remaining forest land to consolidate all land holding in the proposed APSEZ which was submitted for diversion in 2005. The proposal was considered earlier in the FAC meeting dated 20.07.2017 also. The details of forest land is as under:

Village	**Survey No.**	**Hect.**
Siracha	295/paiki	125.00
Siracha	295/paiki-2	269.10
Navinal	223/paiki	89.52
Dhurb Mundra	169/paiki 141/paiki-2	81.59 46.66
Baroi	207/paiki	136.43
Goarsama	52/paiki	112.06
Luni	468/paiki-2	516.45
Bhadreshwar	733/paiki	200.00
		1576.81

10. The application was submitted by Mundra Special Economic Zone Limited (MSEZL) in old application form in March 2005 for Mundra Special Economic Zone (MSEZ) for following purposes:

"MSEZ is proposed to be set up with self-contained facilities like Ind. Park Complex, Distribution Center, Commercial Complexes, Housing Complexes, Utilities like Water Supply, Drainage, Roads, Lighting, Social Infrastructure like schools, colleges, hospitals, townships, open air theatre, amusement park, etc. and provision for Air-field, helipad, railway station, roads (SH& NH), etc. over a total area of about 10,000 hectares.

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This 10,000 hectares land is required to be in contiguous blocks as far as possible in the area identified which includes Govt. Waste Land, Forest Land, Private Land, etc.

The development will be as per the detailed project report. The class SEZs set up at JEBEL ALI-FTZ Dubai and SHENZEN PORT – HONGKONG."

11. Justification for the diversion of forest land was given as under:

"As per the policy of the Government India, SEZs are intended to be developed as self-contained township for industrial and commercial with required infrastructure for industrial/commercial activities like water supply, sewerage, adequate power supply, effluent treatment facilities, rail, road, port and airport connectivity for easy movement of cargo and service personnel and world class township having composite social infrastructure like schools, colleges, banks, hospitals, post offices, super markets, amusement parks and gardens, recreation centers and cinema halls and hotels and restaurants and world class commercial complexes for housing the offices of international trading and industrial organizations for setting up their activities in the Special Economic Zone.

In the case of Mundra SEZ, after eliminating the existing populated areas, contiguous land available are Government was land and forest land without useful vegetation and private uncultivable land. Moreover, the land in question is located in the vicinity of Mundra Port and railway line. The forest land proposed for diversion is within the overall boundary of the Mundra SEZ project. There is significant vegetation on the proposed forest land and the particular lands cannot be avoided for making contiguous land blocks. Moreover, the sea facing forest lands offer ideal scope for development of various SEZ activities without really sacrificing any forest.

For all the above said development contiguous blocks of lands are required to facilitate proper area planning.

Moreover, SEZ project is supposed to be in vicinity of sea port for providing easy movement of bulk cargoes. For the industries located in SEZ, re-export facilities will be excellent and will have benefits of some special privileges. The SEZ industries will generate huge employment for the country and benefits of value addition accrue to the nation while the benefits of duty exemption are availed by entrepreneurs locating their industrial units in SEZ."

12. The proposal was recommended by the DFO on 24.03.2005and the Chief Conservator of Forests Kuchchh Circle recommended the proposal on 15.05.2010 to the Nodal officer FCA Gujarat with the following observation:

    1. The user agency has already diverted the reserved forest of 2008.41 ha for the same cause, so this proposed area can be developed as forests only within SEZ. Therefore, there is no need for any diversion of forest land for the same cause.

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2. If this proposal is considered for the diversion than the forest of Siracha of an area of 394.10 may be excluded because of the unique prominent *Acacia nilotica* forest in the district.
3. The area is coastal area so at least 100 mt belt toward sea may be developed as green shelter belt only.
4. For proposed compensatory afforestation land, the Murachvan area is adjoining to forest area and favourable to wildlife. But the remaining two areas Junachay and Amara are not adjoining to any forest areas. Also, they are only grazing areas for local peoples. So, as CF, undersigned does not recommend to accept these areas as compensatory lands.
5. Therefore, these proposed Junachay and Amara areas may kindly be replaced with either at Nanamodungar having dominant indigenous trees cover, Keerodungar having Caracal site and breeding site for migratory birds or land in Abdasa taluka, having GIB habitat.

13. The Nodal Officer FCA recommended the proposal on 16.08.2010 to the with following recommendations:

The user agency has submitted proposal for diversion of 1576.81 ha of forest land for the purpose of developing SEZ. However, it is recommended for 1552.81 ha area, subject to following conditions:

1. There exist rights of local people as per forest settlement reports in the area. These rights may either be continued as such or the user agency should provide alternative at their cost.
2. As Siracha RF supports good patches of Deshi Babool (*Acacia nilotica*) and small wildlife, these patches, totaling to 269.25 ha area will be conserved *in situ* as Green Belt by the user agency.
3. User agency shall provide right of way of not less than 8 mts width within Dhrub RF area for the proposed diversion of 24 ha which has been excluded from the proposal of the user agency.
4. The non-forest land to Compensatory Afforestation shall be transferred to the Department duly demarcated and surveyed by DILR and after barbed wire fencing or trench mound fencing shall be provided by the user agency as decided by CCF, Kachchh.
5. User agency will develop green shelter belt of not less than 100 mts. width all along the adjoining coastal land of the proposed area under diversion.
6. Permission of the competent authority shall be obtained by the user agency for developing the area as SEZ.
7. It user agency fails to develop the area with 5 years from the date of the formal approval, the remaining area shall be reverted back to the Forest Department without payment of any refund or compensation of any kind.

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14. The State Government has recommended the proposal on 21.01.2016 subject to the following conditions:

"Diversion of **1576.81** ha of forest land of Reserved forest land for development of Special Economic Zone and Industrial Park at village-Siracha, Navinal, Dhurab, Mundra, Borai, Gorasama, Luni, Bhadreshwar, Taluka. Mundra, Distt., Kutch in favour of Adani Group Mundra Port and Special Economic Zone Ltd, Ahmedabad" this proposal is recommended subject to the following conditions:

1	The user agency shall make necessary arrangements for right of the way for the local people from the diverted land. Plan of such arrangement with the consent of local people shall be submitted before the formal approval to this proposal.
2	All the conditions as recommended by the Chief Wildlife Warden shall be complied with the User Agency. (A copy is enclosed in this proposal)
3	The User Agency shall develop and maintain a green belt at Siracha Village for *in situ* conservation of Indian Birds and Wolfs, hence 100 ha. area of Siracha village may be excluded from the diversion. Exact location of 100 ha. from the total demanded land of Siracha village can be decided at the time of formal approval.
4	If 122 ha. of Village – Zarpapa- 683 ha., of GMB or any other revenue land is allotted for this SEZ then equivalent land from land shall be reduced from the demanded forest land for this SEZ.
5	The Compensatory Afforestation land shall be surveyed at the cost of User Agency and erect pillars and barbed wire fencing or trench under the consultation of CCF, Kutch Circle.
6	The user agency shall develop the 100 mts shelter belt at adjoining sea side.
7	Approval of Developing SEZ shall be obtained by the User Agency from concerned authority.
8	The diverted shall be utilized for the purpose of the SEZ within 5(five) years from the date of the formal approval. If the user agency fails to do so, the unutilized forest land shall be recovered by the Forest Department.
9	The User Agency shall obtain Environment Clearance, CRZ Clearance before the commencement of the work.
10	The Compensatory Afforestation land shall be handed over to the State Forest Department without any liability and encroachment before the formal approval to this proposal.

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11	All the conditions of the formal approval of 2008.41 ha forest land shall be diverted shall be complied with before the formal approval of this proposal
	(a) 3770 ha non-forest land of Kutch district shall be transferred to the state Forest Department before the formal approval to this proposal for the Ghorad Sanctuary.
	(b) Compensatory Afforestation for the approval of 2008.41 ha of forest land shall be transferred to the State Forest Department before the formal approval to this proposal.
	(c) The User agency shall pay the cost of fencing in Compensatory Afforestation land to the State Forest Department before the formal approval to this proposal.
	(d) The user agency shall pay the difference amount of 5.35 Crores for the firewood estimation from 2008.41 ha forest land before the formal approval to this proposal.
	(e) Any other conditions of the formal approval of the 2008.41 ha diverted forest land before the formal approval of this proposal.
12	Diverted forest land shall not be utilized for Golf Course, Bench Resort, Park or Residential purposes or any other activity prohibited by FCA 1980 and/or guidelines there under.
13	The user agency shall comply the additional conditions of processing fee, Registration fee, Additional Compensatory Afforestation Land, Amount for Additional Compensatory Afforestation Land and additional Compensatory Afforestation Land and additional amount as per Government of Gujarat's GR No. FCA-1013/11-10/SF-24/F Dated 12.06.2015
14	The user agency shall comply the provisions of Forest Right Act, 2006 before the formal approval of this proposal.
15	Recommendations of the Nodal Officer is submitted by its letter no. JMN/29B/A/806/2015-16 dated 28.12.2015 (A copy is enclosed in this proposal)

15. The said proposal was considered earlier also by the FAC in its meeting held on 20.07.2017 and based on the facts made available on the date of FAC meeting, the following information were sought from the State Government:

(i) Detailed land use plan has not been submitted and therefore the State government shall provide detailed land use of the whole area including forest and non-forest land.

(ii) State government will analyse and examine the land use plan and submit a proposal for diversion of forest land for non- forestry purpose for only those land use which are permissible under the guideline of FCA 1980.

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	those land uses which are permissible under the guideline of FCA, 1980.	
	The details of proposed land use are as follows:	
	Proposed land use	Area in ha.
	Power Plant 1000 MW X 3	59.9
		209.2
	Copper Smelter Plant – 1 MT capacity	125
	Coal to Polygeneration – 10 MT capacity	89.52
	CFS & warehousing	81.59
	Engineering Cluster	5.21
	Mix Industrial cluster viz engineering ware house etc and social Infrastructure as per FCA 1980 guidelines viz schools, hospitals/ dispensary, community halls, cooperatives, etc.	41.45
	CFS & warehousing	51.46
	Commercial Airport with MRO, Storage yards, fuel tankers, terminals etc.	84.98
		112.06
	Engineering Cluster with Water front for manufacturing and assembly of Crane, Boilers, project cargo, port operation equipment, etc and Liquid storage tanks farm.	516.44
		200
	Total	1576.81
iii.	In this regard, the State Govt. reported that compliance of all conditions put forward in final Approval given by the Govt. of India.	
	In principal approval has been granted by Govt. of India vide letter No. 8-2/1999-FC (PT) dated 27.02.2009 for land admeasuring 1840 ha and 168.41 ha to Adani Ports and SEZ Ltd for development of port based Special Economic Zone. Compliance of conditions laid down in In-principle approval granted by the Govt. of India.	
	For the condition No. 8 of in principle approval no. 8-2/1999-FC (PT) dated 27.02.2009, 3752.30 ha land is transferred in the name of Forests & Environment Department out of 3700.00 ha land of which was possessed by GEDA.	
	For the Conditions No. 17, 18 & 19 of Memorandum No. FCA-1009(10-14) SF-18-K dated 17.11.2009, the user agency has given the Bank Guarantee of **Rs.77300000.00.** User agency has provided detailed compliance of all conditions put forward in Final Approval given by the Govt. of India	
iv.	In this regard, the State Govt. reported that at one point of time in 2009, **the then Conservator of Forest, Kutch has directed to exclude an area of 394 ha in Village Siracha, stating that 100 ha patch possess good vegetation and presence of wild animals.** The State Govt. accordingly recommended final proposal with deduction of 100 ha land out of this 394 h	

(iii)MOEF&CC had accorded prior approval under section 2(ii) of FC Act, in favour of M/s Mundra Port, for diversion of reserved forest area of 57.75 ha, for laying of Railway line vide letter No. 8-163/97FC, MoEF, New Delhi, dated 24.07.2004, and 1840.00 ha. & 168.41 ha. for development of port based SEZ vide No. 8-2/1999-FC(Pt), dated 27.02.2009. It has been fulfilled/complied by the user agency. The State Government shall submit complete compliance of all stipulations of past approvals under section 2(ii) of FCA, 1980.

(iv) Site inspection was carried out by the regional office for **1476.81 ha** whereas state government has now recommended the proposal for total **1576.81 ha**, which include 100 ha of *Acacia nilotica* patch , with condition that the same may be diverted by allowing user agency to pay five times of NPV of forest area. This patch is a part of 394 ha of forest of Sircha village which CF Kutch had recommended to be excluded. **Regional office may inspect the area again and give specific comments on exclusion/inclusion of 100 ha or 394 ha into the proposal.**

(v) State Government may kindly give justification for notifying the forest area as part of SEZ (special economic Zone) without seeking prior permission under the provision of Forest conservation act 1980.

(vi) It is reported that the part of non- forest area is being utilized as SEZ and now the proposal is for the balance patches of forest area which are required to be included in SEZ to make the total area as 10000 ha. From the review of the map and justification of the state it is learnt that it is statutory requirement of custom department that for processing zone of SEZ it should be located on contiguous pieces of land and that there should be over all contiguity in the various components of SEZ. State Government had further justified that there is no option than to opt for the diversion of forest land to be included in the SEZ. The State Government may be asked why this matter was not brought to the notice of FAC earlier.

(vii)State Government shall give very specific recommendation regarding suitability of Compensatory afforestation land.

(viii) State Government shall submit complete compliance of FRA.

16. Accordingly, the State Govt. and Regional office, Bhopal was requested vide the Ministry's letter dated 24.08.2017 to furnish the information as sought by FAC in its meeting held on 20.07.2017 The State Government vide their letter no. FCA-1014/10-11/14/S.F-66/F dated 01.12.2017 has submitted their compliance report as under:

S. No.	Reply of State Govt.
i. & ii	In this regard, the State Govt. reported that the user agency has submitted details pocket wise land use plan as per the FCA, 1980 guideline and is attached in their reply as Annexure-A (pg. 803/c), as submitted to CCF, Kutch & Nodal Officer. Detailed land use plan is in accordance with their project needs and project components. User agency has provided detailed land use plan and has given confirmation that diverted forest area for only

	Zone (SEZ) to User Agency in 2001 under State Govt.'s Exim Policy 2000.
	That the forest land, is required to complete the SEZ land requirement for establishing SEZ has been mentioned in the original proposal and has been provided in various comments, offered by user agency and this office.
	Thus, as of now total 8464 ha of area, acquired in piece meal through Private land, Direct Govt. allotted land and Govt. land allotment through Gujarat Maritime Board has been declared as SEZ area.
	As informed by user agency, they will approach Ministry of Commerce and Industry, Govt. of India to declare this area as SEZ area only after the area is diverted to User Agency.
vi.	**In this regard, the State Govt. reported that the** proposal of User Agency for area under consideration is adjoining to already declare as SEZ of 8464 ha land. There is no other land except Forest Land. Hence, User agency has proposed for diversion of Forest Land.
	Ministry of Commerce and Industries, Govt. of India has granted In-principle permission for establishing SEZ in total 10000 ha of Special Economic Zone (SEZ) to User Agency in 2001 under State Government's Exim Policy, 2000.
	That the land is required to complete the SEZ land requirement for establishing SEZ has been mentioned in the original proposal and has been provided in various comments, offered by user agency and his office.
	It is statutory requirement of customs department that for processing zone of SEZ, it should be located on contiguous pieces of land and that there should be over all contiguity in the various components of SEZ. This aspect has been submitted by the State Government earlier, in its project justification and other clarifications provided.
vii.	The State Govt. stated that the detailed scheme for Compensatory Afforestation and land suitability was already prepared in Sept-2008 while processing the proposal. But, as per the opinion of then Conservator of Forests, Kutch that Non-forest Land of Junachy and Amara area offered as CA land by User Agency is not adjacent to existing forest land and therefore not suitable for afforestation.
	However, as per the latest resolution of State Government dated 15.05.2017 whenever the Non-forest land being offered as Compensatory Afforestation land is not possible to be contiguous to existing forest land and if the area of diversion is 100 ha or more area the CA land should not be less than a patch of 25 ha. Considering this guideline the CA offered land at Junachy and Amara was found suitable.
	State Government vide its GR dated 15.05.2017 has provided guidelines for suitability of private land for compensatory land. Considering this

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	in Jan. 2016.
	However, User agency requested State Govt. for the re-survey of the Siracha land stating that the Wild life report is quite old i.e. of 2009 and at present no wildlife and exotic vegetation is available in that area. The survey was carried out by CCF, Kutch office and founded that there was negligible movement of wildlife as per report and Acacia Nilotica is present only in one corner of the land parcel. Further, the area of 100 ha of Siracha is in close proximity to existing power plant and as represented by user agency this Forest land of Siracha is necessary for their expansion of Power Plant, due to integration with existing power plant. **User agency has also represented and agreed to pay 5 times NPV in line with FCA provision of addressing the situation of diversion of Wild life protected area.** User agency feels that there is no other alternative for 100 ha land and for that DCF Kutch East has recommended not to exclude 100 ha land.
	But, as per reference of Minutes of Meeting of Forest Advisory Committee held on 20.07.2017, APCCF, Regional Office, Bhopal has conducted the site inspection once again on 26.09.2017 to decide for 100 ha Siracha forest land. Previously, it was done on 06.05.2016. So now this aspect pertains to Regional Office Bhopal and its further report on latest site inspection report.
v.	**In this regard, the State Govt. reported that Ministry of Commerce and Industry, Govt of India has granted in principle permission for total 10000 ha of Special Economic Zone (SEZ) to User Agency in 2001 under State Govt's Exim Policy 2000.** In the meantime, user agency has acquired 6456 ha land in piece meal through private land, direct allotted Govt land and Govt land allotment through Gujarat Maritime Board. **As and when user agency got the possession of land, it was further notified as SEZ Area after getting approval from Ministry of Commerce and Industry, GoI.** Further, the area of 1840 ha and 168 ha forest land has been diverted to APSEZL by Forest Department in Nov-2009 has also been notified for SEZ area in April-2015 and March-2012 respectively.
	Thus, as of now total 8464 ha of area has been declared as SEZ Area.
	The area declared as SEZ area earlier is adjacent to various pockets of this 1576 ha forest land, which is proposed for diversion by User Agency. The area of 1576 ha as proposed for allotment by User Agency has not been declared as SEZ Area as it is not in their possession. As informed by user agency, they will approach Ministry of Commerce and Industry, Government of India to declare this area as SEZ area only after the area is diverted to User Agency.
	Ministry of Commerce and Industry, Govt. of India has granted in principle permission for establishing SEZ in total 10,000 ha of Special Economic

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	guideline, the CA offered land at Junachy and Amara was found suitable.
	Suitability Certificates along with scheme of Compensatory Afforestation and land suitability for land area of 503.01 ha of Village Murachban, Taluka. Lakhpat, 283.80 ha of Village Junachy, Taluka.Lakhpat and 790 ha of Village Amara, Taluka.Nakhatrana have been provided by DCF accordingly.
	However, User Agency has given undertaking if forest department is not ready to accept proposed CA land as mentioned above, it will be changed and new CA areas will be provided before the issuance of final approval.
viii.	The State Govt. stated that an Undertaking has been given by the User Agency that all formalities as per the Guidelines of Forest Rights Rules-2006 of Government of India will be completed before final approval. So, undertaking of User Agency may be provided.

17. After the FAC meeting on 20.07.2017, theMinistry vide it's letter dated 24-08-2017 requested the Regional Office, Bhopal to **inspect the area again** and give specific recommendations on the exclusion / inclusion of 100 hectares or 394 hectares of forest area in the proposal.The Regional office inspected the project area on 26.09.2017 with the specific and the only objective of evaluating the recommendation of the State Government of Gujarat to include 100 ha of 394.10 ha of Siracha village into the project. SIR was done along with Shri U.D. Singh, APCCF (Land), GOG, Shri P.S. Randhava, CCF, Kutch and the senior officers from the User Agency. Based on the field observations during inspection, the discussions held at the time of inspection with User Agency officers as well as officers of State Forest Department, Regional office recommended the proposal for consideration of diversion of 394.10 hectares of forest area of Siracha village for the following reasons:

a) The forest land of Siracha village is adjoining the existing power plant of the User Agency. During field inspection the User Agency representatives informed that the forest land of Siracha village is required for the expansion of the existing power plant which was initially developed keeping in view the future expansion. Therefore, for the expansion of existing power plant, the User Agency has no option for alternative site and its requirement are integral for implementation, operation and expansion of future component.

b) The Siracha forest land is an isolated patch of forest measuring 394.10 (Map prepared by BISAG). *Though, it is good forest, however, since it is surrounded from all sides by habitation and various kinds of infrastructure it does not, therefore, possess high conservation value. During inspection, regional office found no major signs of wild life.* The last Inspection Report of Regional Office, Bhopal dated 06.05.2016 also under paragraph 19 mentions that during site visit, no significant wild life was seen. With the

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full development of SEZ, its conservation value would be further undermined. It the CA area is developed contiguous to an existing large forest area with good potential for conservation the loss on account of 394.10 ha of forest area would be adequately compensated.

c) Generation of power is one of the key requirements for the development of the country. The 3000 MW proposed to be generated, as informed by the User Agency, through the said expansion of adjoining power plant near Siracha, in regional office's well-considered opinion, would be far less detrimental to the overall environment as compared to another standalone thermal power plant established elsewhere to produce same amount of power. The main reason for this is that such a standalone power plant in the hinterland would be supplied huge quantity of required coal transported through railway or road whereas the proposed expanded thermal power plant would be fed coal by a conveyor system (as informed by User Agency during inspection) from Mundraport to the power plant. Secondly the expansion would use the existing sea water facility for cooling and consumptive purpose thus avoiding use of huge quantity of fresh water if the new plant were to come up elsewhere. Thirdly, the expansion would use the existing infrastructure facilities for evacuation of power.

d) The State Government has recommended payment of five times the NPV for the 100 hectares of forest area coming under diversion for non-forest use for the project.
In other words the APCCF (C), Regional Office has recommended the diversion of 394.10 ha of good forest, citing reason that it will have no future conservation value, for future expansion of TTP by APSEZL albeit at 5 times the NPV.

18. Form the documents examined by the FAC in meeting dated 25.01.2018 it is learnt that the Mundra special economic zone is proposed to set up with self-contained facilities like Industrial park complex, distribution centre, commercial complexes, Housing complexes , utilities like water supply, drainage, roads ,lighting, social infrastructure like school, colleges, hospitals , townships, open air theatre, recreation centre, cinema hall, amusement park etc and provision for air field, helipad ,railway station, roads(SH &N.H) etc over total area. The User Agency has now agreed to change the land use of forest land as informed by State Govt. vide its letter dated 01-12-2017 and the proposed changed land use of forest land is now indicated under para 16 above.
FAC deliberated on the fact that establishment of port based SEZ is necessary for the development of the country. On analysis through DSS it is observed that most of the forest area and revenue areas are under non forestry use and some patches of forest areas are available inside SEZ. In view of the clarification submitted by the State Government vide letter dated 01-12-2017 FAC recommends the grant of In Principle Approval for the diversion of **1552.81 ha** (1576.81-24 ha) of forest land subject to general standard and following specific conditions.

i The Nodal officer, FCA had recommended in 2010 that though the user agency has submitted proposal for diversion of 1576.81 ha of forest land for the purpose of developing SEZ only 1552.81 ha area may be diverted excluding 24 ha in Dhrub RF, subject to specific conditions.. It was recommended that the user agency shall provide

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right of way of not less than 8 mts width for 24 ha which has been excluded from the proposal of the user agency. The details of settlement of rights shall be provided.

ii The diverted forest land measuring 1552.81ha shall be maintained as green area within the APSEZ and the diversion for non-forestry purpose will be considered only on case to case basis by the ministry for the purpose required for SEZ.

iii Diverted forest land shall not be proposed to be utilized for Golf Course, Beach Resort. Park or Residential purposes, or any other activity prohibited by FCA 1980 and/or guidelines there under

iv From the DSS analysis it is observed that Aerodrome already exists in the zone. The diverted forest land will not be proposed for the construction of private Aerodrome as demanded by the use agency. The forest land may be considered, in future on merits, in case of commercial Airport is developed with the approval of DGCA.

v The detailed existing land use with maps of all forest land 2008.41 ha (1840ha + 168.41 ha) for which the approval was granted vide 30.09.2009 and details of complete land use including forest land for the existing private Aerodrome and power plants within the SEZ may be provided.

vi 100 meter wide green shelter belt along the sea coast except in the waterfront area shall be included in the Master Plan of APSEZ.

vii Complete compliance of CRZ regulations shall be ensured.

viii All the conditions as recommended by the Chief Wildlife Warden shall be complied with the User Agency.

ix The Compensatory Afforestation land shall be surveyed at the cost of User Agency and erect pillars and barbed wire fencing or trench under the consultation of CCF, Kutch Circle.

x Compensatory afforestation shall be raised over identified non forest land equivalent to the diverted forest land diverted and at least 1000 plants per hectare (1552.81 hectares x 1000 = 1552810 plants) shall be planted with provision for ten years on subsequent maintenance.

xi 25% of revised CA cost will be deposited extra by the user agency for soil and moisture conservation (SMC) activities on the CA land.

xii Complete compliance of Forest Right Act 2006 to be done for the 1576.81 ha of forest land by the State Government.

xiii To provide protection to the existing wildlife a patch of natural forest in Luni to Harmiramora village shall be kept as green belt without carrying out any activities in that area as recommended by the CCF Kutch Circle vide letter dated 15.5.2014 to PCCF Wildlife Gujarat. The recommendation of the Chief wildlife warden Gujarat sent vide No WLP/663/32/B/1778-79/2014 dated 30.5.2014 must be complied.

xiv The State Government will inform about the status of the land measuring 122 ha in village Jarapara and 683 ha of land belonging to GMB has been transferred to APSEZL. This area need to be deducted from the proposed forest land diversion as recommended by the State Government.

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xv State government will provide the terms and conditions on which the forest is proposed to be transferred on lease to the use agency The detail of lease period, terms, conditions and consideration, if any, may be provided.

xvi All other conditions imposed in the approval granted for diversion of 2008.41 ha (1840ha + 168.41 ha) forest land on 30.09.2009 shall be complied.

Agenda No. 4

F. No. 8-115/2000-FC

Sub: Diversion of 19.52 ha of forest land for raising the height of Barvi Dam for submergence and rehabilitation in District Thane of Maharashtra.

The above stated agenda Item was considered by FAC on 25.1.18 and observed as follows:

1. The State Govt. of Maharashtra vide their letter no. FLD-1215/CR-292-F-10 dated 15.09.2015 has submitted a proposal for diversion of 19.52 ha of forest land for raising the height of Barvi Dam for submergence and rehabilitation in District Thane of Maharashtra to Regional Office, Nagpur.
2. This is a dam being constructed since 1968 to meet the demand of water for industrial and drinking purposes. MoEF&CC vide its letter no. 8-115/2000-FC dated 19.12.2005 had accorded approval for diversion of 513.66 ha of forest land. The proposed height of the dam at the time of approval was 62.05 meter. It is reported that this projects was envisaged to be constructed in three stages. In second stage the height was raised up to 65.05 m and in third stage the height is proposed to be raised up to 72.06 m.
3. The proposal for additional area of 19.52 ha was submitted to REC Nagpur.
4. The stated proposal was considered by the REC in its meeting held on 25.01.2015. The Addl. PCCF & Nodal Officer (FCA), Government of Maharashtra and representative of the user agency were also present in the said Regional Empowered Committee (REC) meeting. After detailed examination of the proposal and interaction with the Nodal officer (FCA) and representatives of the User Agency, the REC observed as under:
   i. The Committee noted that project envisages raising the height of Barvi Dam in Thane District in the State of Maharashtra to meet the increased demand of water for industrial and drinking purposes. Project was already completed and in the 3rd stages out of which two stages area already completed and in the **3rd Stage of the project, height of dam is proposed to be increased by 7.01 meters i.e. from RL 65.05 meters to 72.06 meters to augment the storage capacity of the reservoir to meet the increased demand of water in the region.**
   ii. The Committee also noted that Government of India vide its letter no. 8-115/2000-FC dated 19.12.2005 had accorded approval for diversion of 513.66 ha of forest land. However, while submitting the initial proposal for diversion of 513.66 ha of

ANNEXURE-1(d)

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BT 167816

નંબર : ૧૧૧૩૧૫ રૂ.૧૦૦/-
તારીખ : 13/3/2019
નામ : કાંદાવાડી પોર્ટસ ઝોન સ્પેશીયલ ઈકોનોમીક ઝોન લી.વતી મયુરભાઈ
સરનામું : કોલાગ્રામ, મુન્દ્રા, કચ્છ, અમદાવાદ
શાહ શેફાલીબેન કલ્પેશકુમાર
લા.નં. એસ.બી./૩૮૦-૩૮૧/૧૯૯૮
એ/૨, ભાગ્યલક્ષ્મી એપાર્ટમેન્ટ, નવા શિખિ ફ્લેટ સામે,
મ્યુ. ગાર્ડન પાસે, વાસણા, અમદાવાદ-૭ના સહીં
સહી... S.K.Shah

MEMORANDUM OF UNDERSTANDING (MOU)

THIS MOU is entered on this 14th day of March, 2019 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART,**

and Adani Port & SEZ Ltd, a Company registered under the Company's Act 2013 and having its registered office at 1st Floor, Infrastructure House, Nr. Adani House, Navrangpura, Ahmedabad (hereinafter referred to as **"APSEZ"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL & APSEZ may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.

ADANI ENTERPRISES LTD. AHMEDABAD

WHEREAS

AEL is setting up an integrated copper smelting & refinery complex at Mundra, Gujarat (hereinafter referred to as "**Plant**") with an annual production capacity of 10, 00,000 TPA.

Since, APSEZ is already having the land, power & water availability in the proposed area, AEL would like to utilize these resources for its Plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

APSEZ will make available to AEL 256.58 hectares of land on long term lease basis. Out of the total requirement of 256.58 hectares of land, currently APSEZ is in possession of 154.19 hectares of land which can be readily made available for the project. The balance 102.39 hectares of land is under forest diversion process and will be handed over to the project once APSEZ receives the possession of the land. The complete details of the land is placed at Annexure-I of this MOU.

APSEZ will make available to AEL 300 MW of power & 32,800 m3/day of desalinated water for the Plant operations.

The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1. The effective date shall be the date of this MOU.
2. This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

SETTLEMENT OF DISPUTES

1. In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to respective senior management of each Party, who in turn will work out an amicable settlement.

OTHER CONDITIONS:

1. Any amendment to this MoU in order to be valid shall be in writing.
2. This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED * ADANI PORTS

ADANI ENTERPRISES LTD. AHMEDABAD

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Validity:

This MoU shall remain valid until execution of the Definitive Agreements to this effect.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYARAO

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature: _____

Name: Ravi Tapasi

For APSEZ

Signed and delivered by the

Signature: _____

Name: Jai Kharanya

Witness:

Signature: _____

Name: Anil Nair

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Annexure-I

Land Details for the Copper Project

Sl.no	Land Details with Survey nos.	Area in Ha
1	APSEZ Land Village : Siracha, Navinal & Mundra forest, Survey nos. : 223/p, 224/p, 225/p, 295/1p, 125/1, 125/2, 126,129,135,137,138/1, 140, 141/p, 142/p, 143, 144/1, 144/2,147/p, Un surveyed p,	154.19 Ha
2	APSEZ Applied FOREST Land (Diversion under process) Village: Siracha Survey nos. : 295/2p,	102.39 Ha
	Total	**256.58 Ha**

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.

ADANI ENTERPRISES LTD. AHMEDABAD

EAC OBSERVATION NO.-2

2.11.19

EAC OBSERVATION:

CRZ map inter-alia including demarcation of HTL/LTL/CRZ land classification along with super imposition of plant site through competent agencies has not been submitted.

REPLY:

The map of proposed project is superimposed on CRZ map of the area prepared in 2011 by Centre of Earth Science Studies (CESS), Thiruvantapuram, an institute recognized by Ministry of Environment and Forest & Climate Change, Government of India. The proposed project site is outside the CRZ. This map is in Figure-1.5 of EIA and also attached herewith.

Further, National Centre for Sustainable Coastal Management (NCSCM), Chennai which is a nodal agency for CRZ mapping and preparation of CZMP for Gujarat has been engaged for the superimposition of the proposed Copper Refinery plant layout on authenticated CRZ map of district Kutch.

NCSCM has communicated that superimposition of the proposed project Copper Refinery plant layout on CRZ Map would be done after approval of CZMP map of Kutch District as the CZMP of district Kutch is under approval process by Govt of Gujarat.

EAC OBSERVATION:

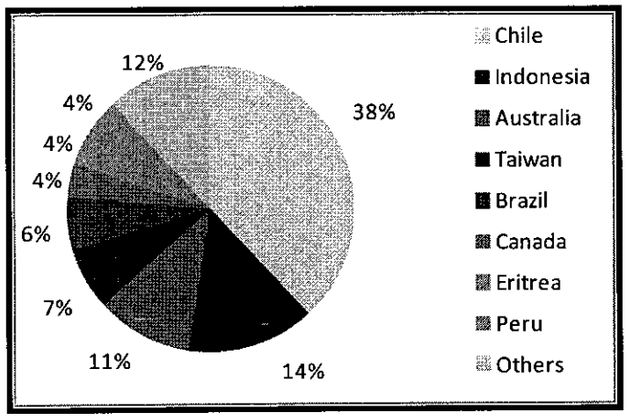
Source of copper ore concentrate, characteristics, mode of transportation from source to plant site, confirmed ore linkage document has not been submitted.

REPLY:

Copper Concentrate for the proposed project will be sourced from the following countries:

- Latin American Countries such as Chile, Peru, Brazil
- ASEAN Countries such as Indonesia, Philippines
- Australia
- Africa
- Canada
- USA

Copper Concentrate is basic raw material for the Copper Smelter. Latin American countries are the major supplier of the raw material. Copper Concentrate for the proposed project will be sourced through various mines across the globe. There is adequate reserves for the Copper are available and hence sourcing of the Copper Concentrate will not be constraint. Please find below the chart showing the receipt of the Copper Concentrate from different countries for copper smelters available in India.



World copper mine production is growing around 3% per annum and is 20 Million Tons in 2017. 42% of production is coming through Latin American countries and 17% from Asia. Europe and North America contributes 13% each. Chilli, Peru, Australia, Indonesia are some of the major countries exporting copper concentrate. China, Japan, Korea, Germany and India are the major importers of copper concentrate. A detailed Copper Concentrate Market Report prepared from International Copper Study Group (ICSG) is being presented in **annexure- 3(a).**

For long term ore (Copper Concentrate) linkage various supplier have been approached and comfort letters from various suppliers have been attached in **annexure- 3(b).**

EAC OBSERVATION NO.-3

The typical copper concentrate analysis is shown below; 2121

Species	Unit	Sourcing Range	Smelting Input Range
Cu	Wt%	18 - 54	24 - 28
Fe	Wt%	16 - 36	24 - 29
S	Wt%	22 - 36	30 - 34
SiO_2	Wt%	1 - 19	< 10
CaO	Wt%	0.2 – 3.0	< 1.0
MgO	Wt%	0.1 – 2.3	< 1.0
Al_2O_3	Wt%	0.2 – 4.2	< 2
Zn	Wt%	0.1 – 5.0	< 3
Pb	Wt%	0.1 – 3.0	< 1.5
Fe_3O_4	Wt%	0.1 – 9.0	< 1.5
H_2O	Wt%	6 - 10	< 8
As	g/t	500 - 15000	< 2500
Se	g/t	5 - 500	< 300
Bi	g/t	50 - 570	< 200
Sb	g/t	20 - 2000	< 150
Ni	g/t	10 - 2500	< 350
Te	g/t	5 - 300	< 100
Cd	g/t	2 - 270	< 20
Cr	g/t	2 - 400	< 45
Cl	g/t	20 - 1500	< 400
F	g/t	20 - 2000	< 1500
Hg	g/t	1 - 100	< 40

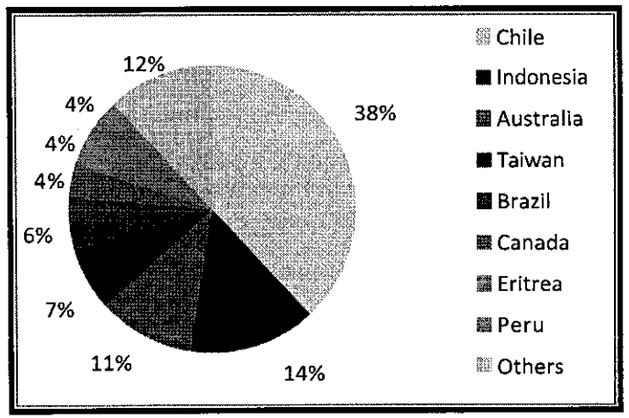
Copper Concentrate will be unloaded from the vessel and transported to intermediate facility at port storage by closed conveyor system. The storage facility at the port and plant will be a closed and paved with concrete. All the transfer points will be fitted with dust extraction/ suppression system to handle dust.

Copper Concentrate will be transported from port to plant by closed conveyor system or by closed trucks. Dust extraction/ suppression system to handle dust will be provided at the truck unloading point.

Copper concentrate storage facility will be provided and paved with concrete. Detail drawing of the storage facility is attached in **Annexure-6.**

Copper Concentrate Market Outlook

Copper Concentrate is basic raw material for the Copper Smelter. Latin American countries are the major supplier of the raw material. Copper Concentrate for the proposed project will be sourced through various mines across the globe. There is adequate reserves for the Copper are available and hence sourcing of the Copper Concentrate will not be constraint. Please find below the chart showing the receipt of the Copper Concentrate from different countries in India.



Below are the some of the extract information from International Copper Study Group – World Copper Fact book 2018.

1. Long term Availability of Copper
2. World Mine Production
3. Mine Production By Region
4. Top Copper Concentrate Producing Countries
5. Top 20 Mines by Capacity
6. International Trade Flow for Copper Concentrate.

The World Copper Factbook 2018

Copper Resources and Long-Term Availability of Copper

Copper Reserves and Resources

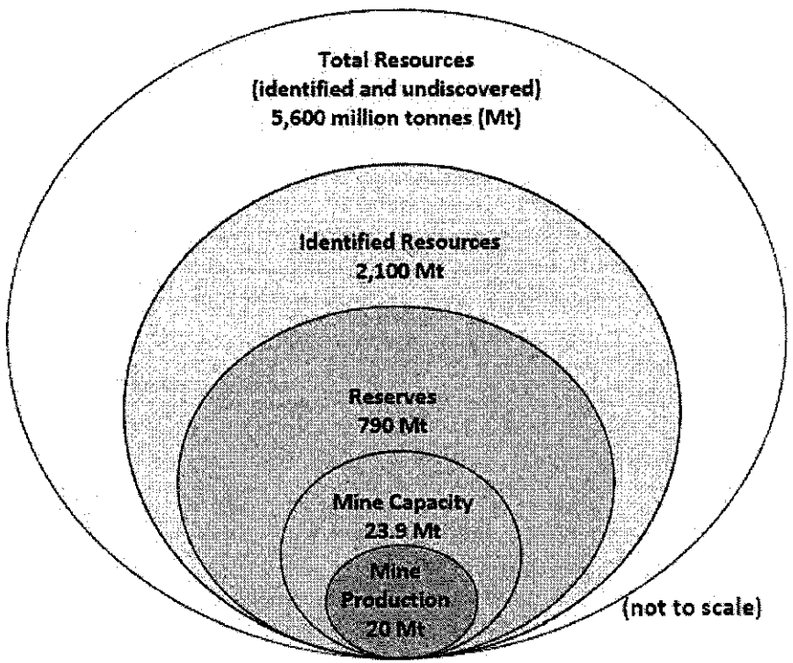
Typically, the future availability of minerals is based on the concept of reserves and resources. Reserves are deposits that have been discovered, evaluated and assessed to be economically profitable to mine. Resources are far bigger and include reserves, discovered deposits that are potentially profitable, and undiscovered deposits that are predicted based on preliminary geological surveys (see definitions below).

According to the United States Geological Survey (USGS), copper reserves currently amount to around 790 million tonnes (Mt) and identified and undiscovered copper resources are estimated to be around 2,100 Mt and 3,500 Mt, respectively. The latter does not take into account the vast amounts of copper found in deep sea nodules and land-based and submarine massive sulphides. Current and future exploration opportunities will lead to increases in both reserves and known resources.

Definitions (http://minerals.usgs.gov/minerals/pubs/mcs/2014/mcsapp2014.pdf)
Resource: A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible.
Identified Resources: Resources whose location, grade, quality, and quantity are known or estimated from specific geologic evidence. Identified resources include economic, marginally economic, and sub-economic components.
Undiscovered Resources: Resources, the existence of which are only postulated, comprising deposits that are separate from identified resources. Undiscovered resources may be postulated in deposits of such grade and physical location as to render them economic, marginally economic, or sub-economic.
Reserves: That part of the reserve base (part of an identified resource that meets specified minimum physical and chemical criteria related to current mining and production practices, including those for grade, quality, thickness, and depth) which could be economically extracted or produced at the time of determination. The term reserves need not signify that extraction facilities are in place and operative.

2017 World Copper Reserves & Mine Production [1/]

(undiscovered resources not including deep sea nodules and land-based and submarine massive sulfides - contained copper)



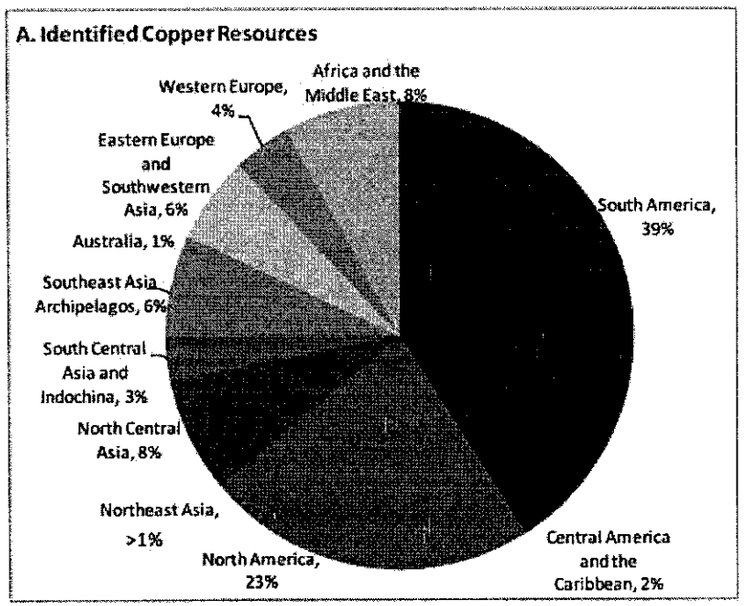
1/ Source: USGS (resources/reserves data) and ICSG (capacity/production data)

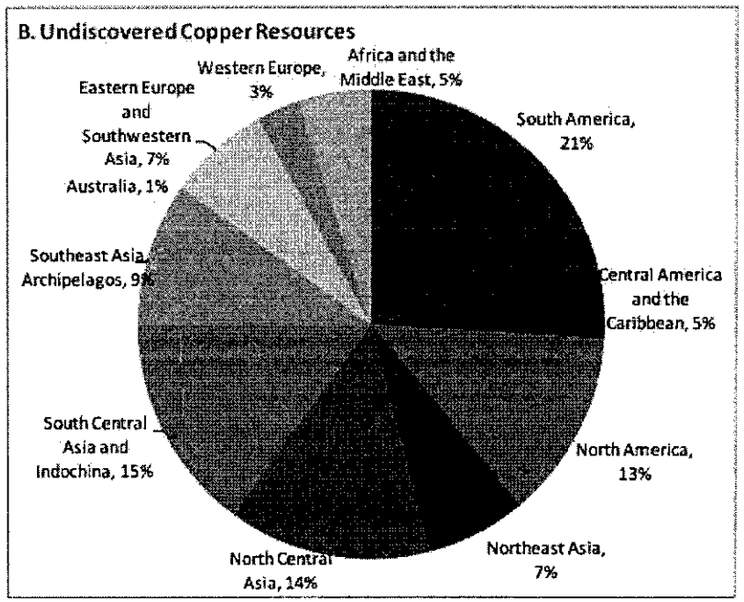
International Copper Study Group

Concentrate imports per origin
The World Copper Factbook 2018

Global Distribution of Identified and Undiscovered Copper Resources in Porphyry and Sediment-hosted Stratabound Copper Deposits [1/]

In 2013 the U.S. Geological Survey (USGS) completed a geology-based, cooperative international assessment of copper resources of the world [2/]. The USGS assessed undiscovered copper in two deposit types that account for about 80% of the world's copper supply. Porphyry copper deposits account for about 60% of the world's copper. In porphyry copper deposits, copper ore minerals are disseminated in igneous intrusions. Sediment-hosted stratabound copper deposits, in which copper is concentrated in layers in sedimentary rocks, account for about 20% of the world's identified copper. The mean undiscovered totals for porphyry and sediment-hosted deposits are 3,100 and 400 Mt respectively, resulting in a global total of 3,500 Mt of copper. With identified copper resources currently estimated at 2,100 Mt, total copper resources (undiscovered + identified) are estimated at 5,600 Mt.





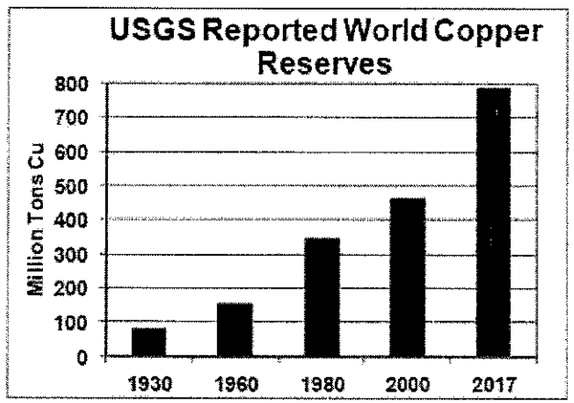
1/ Undiscovered Copper Resources - A Global Assessment, April 2014, Presentation at ICSG meeting, Lisbon, by Mrs *Jane M. Hammarstrom (USGS Global Mineral Resource Assessment Team)*
2/ Supporting studies, including documentation of the assessment methodology and descriptions of individual tracts, are available on the USGS Mineral Resources Program Web site, at *http://minerals.usgs.gov/global/.*

International Copper Study Group

Are We Going to Run Out of Copper[1]?

It is highly improbable. Since 1950, based on the then current rate of demand, there has always been, on average, 40 years of reserves, and significantly greater amounts of known resources (USGS data). In addition, recycling, innovation and mining exploration continue to contribute to the long-term availability of copper.

Despite increased demand for copper produced from ore in recent years, increases in reserves have grown, and there is more identified copper available to the world than at any other time in history.



In the period 2007-2017, 192 million tonnes of copper have been mined. In that same period however, reserves have grown by 300 million tonnes. This reflects additional exploration, technological advances and the evolving economics of mining.

Technology has a key role to play in addressing many of the challenges faced by new copper production. Known and as yet unknown innovations will ensure new mine production continues to provide vital copper supplies.

In addition copper recycling plays an important role in copper availability since today's primary copper is tomorrow's recycled material. Unlike other commodities such as energy or food, copper is not "consumed". Copper is one of the few raw materials which can be recycled repeatedly without any loss of performance, and key stakeholders such as policy-makers, scrap collectors, copper producers and recyclers must all focus on ensuring that yesterday's metal is recycled and re-used.

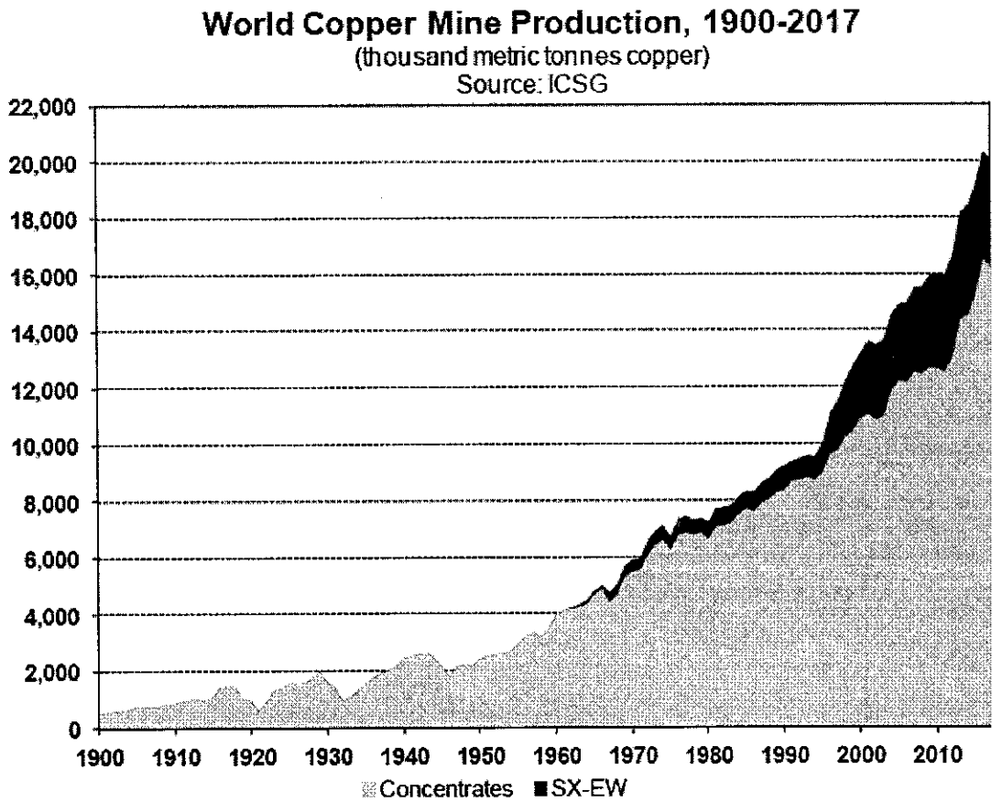
While this will ensure a progressive move towards a more sustainable economy, the loop cannot be completely closed for two reasons. Firstly, demand will continue to increase due to population growth, product innovation and economic development. Secondly in most applications, copper stays in use for decades.

Consequently, meeting future metals demand will continue to require a combination of primary raw materials, coming from mines, as well as recycled materials, while innovative policies and technology should continue to contribute to improvements in recycling performance and resource efficiency.

Based on the latest knowledge on geological availability and continuous industry innovation there are good reasons to believe that copper will continue to be a vital and positive contributor to society well into the future.

1/ Based on the International Copper Association briefing note on copper's long-term availability. See http://copperalliance.org/about-copper/long-term-availability/

Copper Mine Production

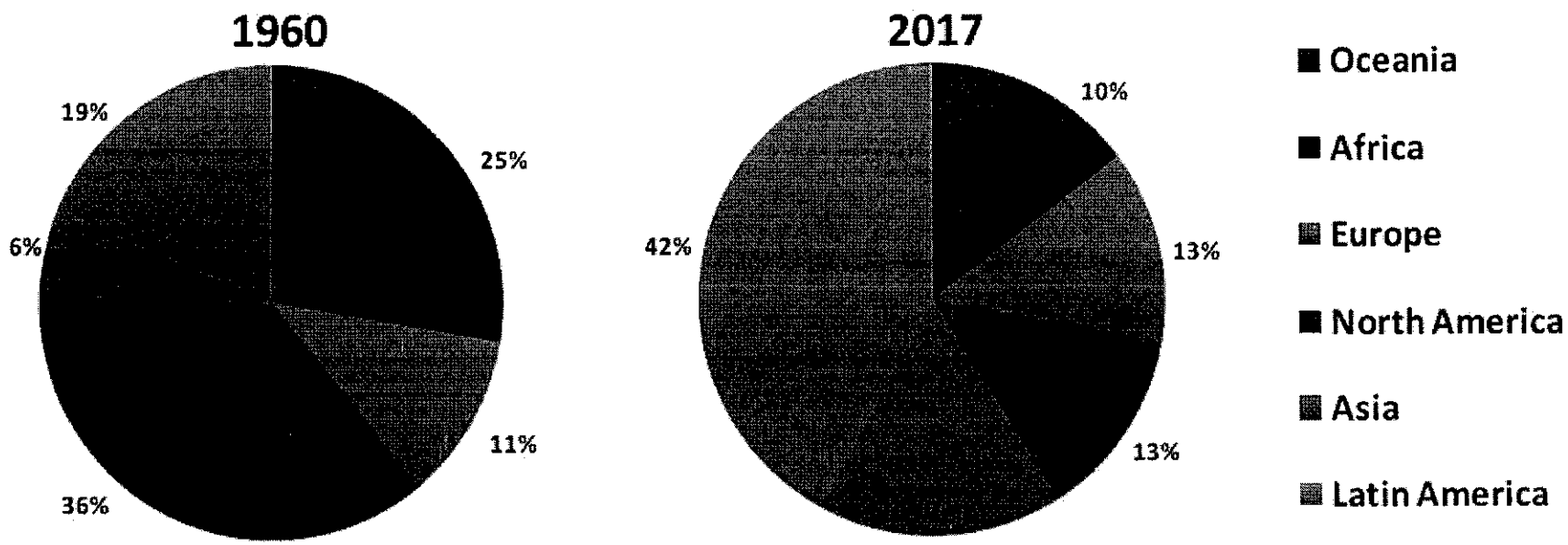


Since 1900, when world production was less than 500 thousand tonnes copper, world copper mine production has grown by 3.2% per annum to 20 million tonnes in 2017. SX-EW production, virtually non-existent before the 1960s, stood at 3.7 million tonnes in 2017.

Copper Mine Production by Region, 1960 versus 2017

Thousand metric tonnes copper

Source: ICSG

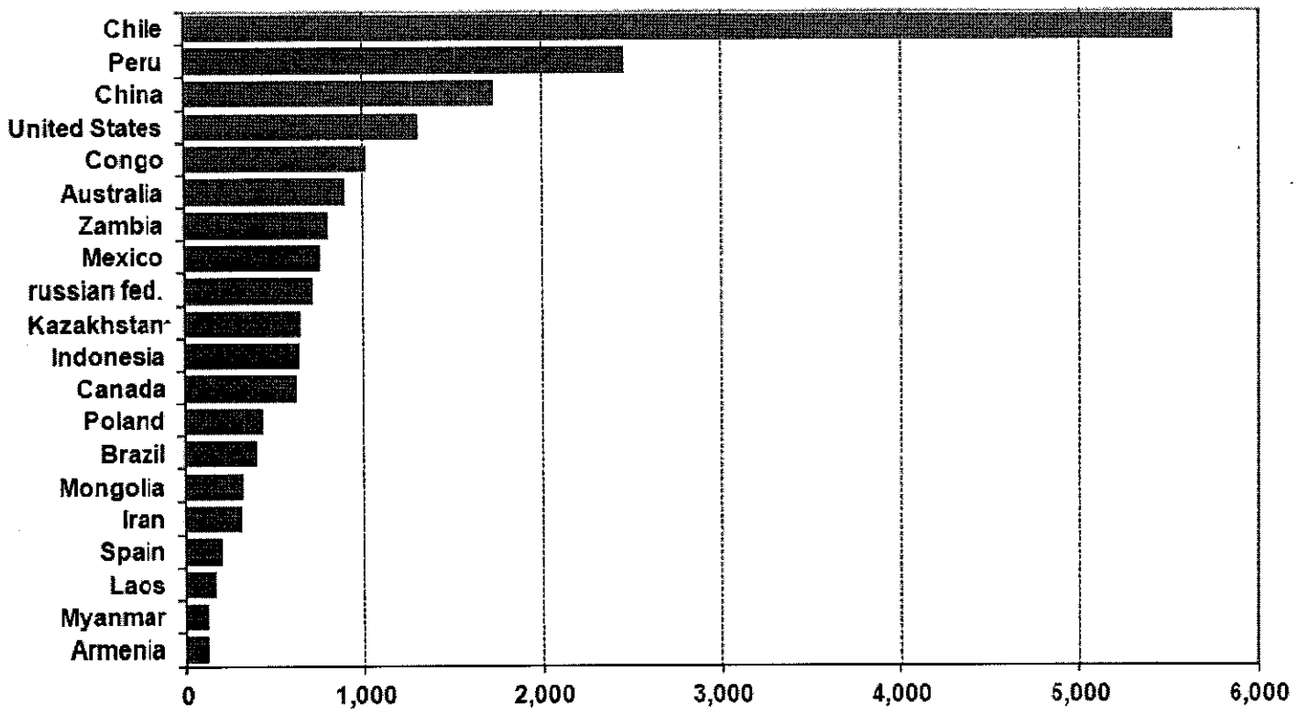


From less than 750,000 tonnes copper in 1960, copper mine production in Latin America has increased to 8.4 million tonnes in 2017, representing 42% of the global total. Asia has also exhibited significant growth. The region's share of global production has increased from just 6% to 17% over the respective period. Conversely, North America's share declined from 36% to 13%.

ANNEXURE-3(a)

Copper Mine Production by Country: Top 20 Countries in 2017

(Thousand metric tonnes)
Source: ICSG

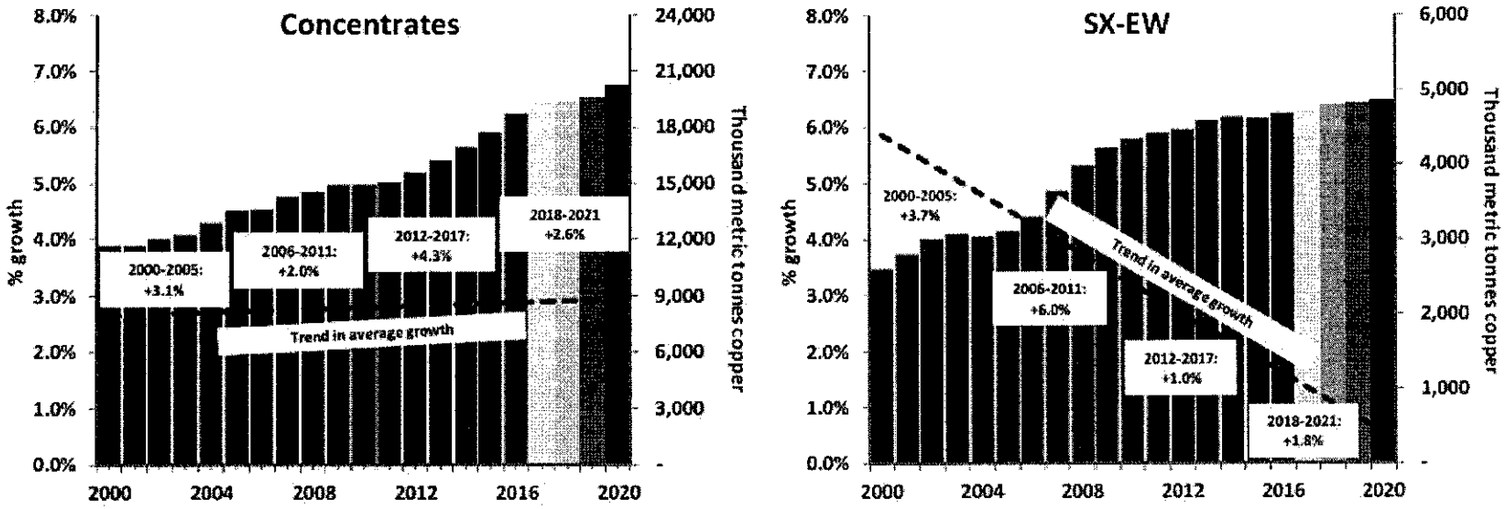


Chile accounted for over a quarter of world copper mine production in 2017 with mine output of 5.5 million tonnes copper. Peru, which has seen a sharp increase in output since 2015, accounted for 12% of world mine production.

The World Copper Factbook 2018

Trends in Copper Mining Capacity, 2000-2021

Thousand metric tonnes (Bars) and Annual percentage change (Line)
Source: ICSG Directory of Copper Mines and Plants – H1 2018 Edition



Copper mining capacity is estimated to reach 25.9 million tonnes copper in 2021, with 20% being SX-EW production. This will be 8% higher than global capacity of 23.9 million tonnes copper recorded in 2017. Growth in copper mine capacity is expected to average 2.4% per year going forward as new capacity is added at existing and some new operations. The ratio between production and capacity is called the capacity utilization rate. The world mine capacity utilization rate was around 84% in 2017.

Note: Capacity data reflects production capabilities not necessarily production forecasts

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ANNEXURE-3(a)

The World Copper Factbook 2018

Top 20 Copper Mines by Capacity (basis 2018)

Thousand metric tonnes copper

Source: ICSG Directory of Copper Mines and Plants – H1 2018 Edition

Rank	Mine	Country	Owner(s)	Source	Capacity
1	Escondida	Chile	BHP Billiton (57.5%), Rio Tinto Corp. (30%), Japan Escondida (12.5%)	Concs & SX-EW	1,370
2	Grasberg	Indonesia	P.T. Freeport Indonesia Co. (PT-FI), Rio Tinto	Concentrates	700
3	Morenci	United States	Freeport-McMoRan Inc 72%, 28% affiliates of Sumitomo Corporation	Concs & SX-EW	520
4	Buenavista del Cobre (former Cananea)	Mexico	Grupo Mexico	Concs & SX-EW	510
5	Collahuasi	Chile	Anglo American (44%), Glencore plc (44%), Mitsui (8.4%), JX Holdings (3.6%)	Concs & SX-EW	504
6	Cerro Verde II (Sulphide)	Peru	Freeport-McMoRan Copper & Gold Inc. 54%, Compañia de Minas Buenaventura 19.58%, Sumitomo 21%	Concentrates	500
7	Polar Division (Norilsk/ Talnakh Mills)	Russia	Norilsk Nickel	Concentrates	450
7	Antamina	Peru	BHP Billiton (33.75%), Teck (22.5%), Glencore plc (33.75%), Mitsubishi Corp. (10%)	Concentrates	450
9	Las Bambas	Peru	MMG (62.5%), Guoxin International Investment Corporation Limited (22.5%), CITIC Metal Co., Ltd. (15%)	Concentrates	430
10	El Teniente	Chile	Codelco	Concs & SX-EW	422
11	Los Bronces	Chile	Anglo American 50.1%, Mitsubishi Corp. 20.4%, Codelco 20%, Mitsui 9.5%	Concs & SX-EW	405
12	Los Pelambres	Chile	Antofagasta Plc (60%), Nippon Mining (25%), Mitsubishi Materials (15%)	Concentrates	370
13	Kansanshi	Zambia	First Quantum Minerals Ltd (80%), ZCCM (20%)	Concs & SX-EW	340
14	Chuquicamata	Chile	Codelco	Concs & SX-EW	330
15	Kamoto	Congo	Katanga Mining Ltd (86.33% Glencore plc) 75%, Gecamines 25%	SX-EW	300
16	Radomiro Tomic	Chile	Codelco	Concs & SX-EW	290
17	Bingham Canyon	United States	Kennecott	Concentrates	280
18	Sentinel	Zambia	First Quantum Minerals Ltd	Concentrates	250
18	Toromocho	Peru	Chinalco	Concentrates	250
20	Olympic Dam	Australia	BHP Billiton	Concs & SX-EW	225

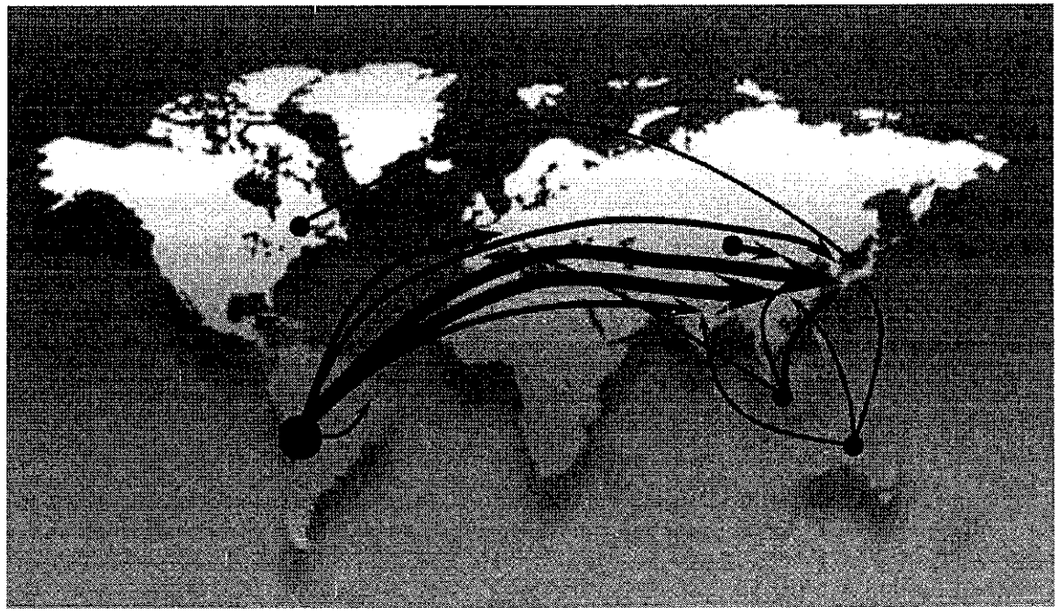
Note: Capacity data reflects production capabilities not necessarily production forecasts

International Copper Study Group

Major International Trade Flows of Copper Ores and Concentrates[1]

Major **Exporters** of Copper Ores and Concentrates, 2017

1. Chile
2. Peru
3. Australia
4. Spain
5. Mexico
6. Mongolia
7. Canada
8. Brazil
9. Indonesia
10. Kazakhstan



Major **Importers** of Copper Ores and Concentrates, 2017

1. China
2. Japan
3. Spain
4. Korean Rep.
5. India
6. Germany
7. Bulgaria
8. Philippines
9. Russian Fed.
10. Brazil

Image courtesy of the Copper Development Association.

[1]Figure is intended to illustrate trade flows but not actual trade routes. Detailed trade matrices are available in ICSG Statistical Yearbook.

ANNEXURE-3(a)

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Copper Concentrate Characteristics

Species	Unit	Sourcing Range	Smelting Input Range
Cu	Wt%	18 - 54	24 - 28
Fe	Wt%	16 - 36	24 - 29
S	Wt%	22 - 36	30 - 34
SiO_2	Wt%	1 - 19	< 10
CaO	Wt%	0.2 – 3.0	< 1.0
MgO	Wt%	0.1 – 2.3	< 1.0
Al_2O_3	Wt%	0.2 – 4.2	< 2
Zn	Wt%	0.1 – 5.0	< 3
Pb	Wt%	0.1 – 3.0	< 1.5
Fe_3O_4	Wt%	0.1 – 9.0	< 1.5
H_2O	Wt%	6 - 10	< 8

Species	Unit	Sourcing Range	Smelting Input Range
As	g/t	500 - 15000	< 2500
Se	g/t	5 - 500	< 300
Bi	g/t	50 - 570	< 200
Sb	g/t	20 - 2000	< 150
Ni	g/t	10 - 2500	< 350
Te	g/t	5 - 300	< 100
Cd	g/t	2 - 270	< 20
Cr	g/t	2 - 400	< 45
Cl	g/t	20 - 1500	< 400
F	g/t	20 - 2000	< 1500
Hg	g/t	1 - 100	< 40

1924

ANNEXURE-3(a)

Concentrate Source:

Copper Concentrate will be sourced from the following countries:

- Latin American Countries such as Chile, Peru, Brazil
- ASEAN Countries such as Indonesia, Philippines
- Australia
- Africa
- Canada
- USA

RtM

Mitsubishi Corporation RtM International Pte. Ltd.
3 Temasek Avenue #32-01, Centennial Tower,
Singapore 039190
Co.Reg.No. 201230103M
ABN 22 609 587 715
www.mitsubishicorprtm.com/global

February 11.2019

Mr. Prasad A. Suryarao
Adani Enterprises Ltd.
7th Floor B Wing. Sambhaav House.
Judges Bungalow Road.
Bodakdev. Ahmedabad – 380 015;
Gujarat. India

Dear Mr. Rao / Mr. Prasanna.

Expression of Interest for Supply of Copper Concentrate

This refers to various discussions we have had over last one year.

We are happy to note that the project is now well into the final phase of getting approvals.

As you are aware. we are a part of Mitsubishi Group which has investments in copper mines like Escondida. Los Pelambres. Antamina. Quelleveco etc in Latin America. The Group also owns Triland Metals Ltd – a prominent member of London Metals Exchange.

We are currently trading approximately 600K dmt copper concentrate worldwide and with Quelleveco offtake commencing from early 2022 onwards. the book size will increase to well over 1 million dmt. We have access to some of the cleanest copper concentrate qualities available.

As assured during our meetings. Mitsubishi Corporation RtM International Pte Ltd (RtMI) shall be more than pleased to supply mutually agreed quantity of copper concentrate to the proposed Adani Copper smelter.

Looking forward to discuss in greater detail once all the approvals are in the place.

Kindly keep us posted on the progress. Thanks

Best regards.

Y.K. Sharma
Mitsubishi Corporation
RtM International Pte Ltd.

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TRANSAMINE
TRADING SA

Date : Feb 01 , 2019

M/s Adani Enterprises
Ahmedabad

Kind Attention : Mr Prasad Surya Rao

Dear Sir

This is with reference to our various discussions on the subject of Copper concentrates supplies to your proposed Copper Smelter project at Mundra.As you are aware Transamine Trading SA, trades 1.2 to 1.5 million MT of copper concentrates annually, sourcing the same across the globe from as far and wide as Chile, Peru, Mexico, US, Canada, DRC, Indonesia, Papua New Guinea, Australia etc. It has got well established relationship with all the major mines like Escondida, Grasberg, Los Pelambras, Chiquicamata, Andina, Collahuasi, Sierra Gorda, Jabel Sayid etc. It expects to maintain the volume for the coming years at the present level, which makes it one amongst the top four Copper concentrates trader in the world today.

Kindly note Transamine Trading S.A, Geneva has advised that they will be extremely keen into entering into an agreement for long term supply of Copper concentrates under frame mechanism covering multiple years, as we have discussed so far . The said agreement can be sealed and signed off, once the proposed project gets necessary Environment Clearance to establish from the relevant regulatory authorities. Therefore , please do advise us once you have received the mentioned approval – so that we can progress on the agreement.

We look forward to hearing from you soon

Thanks and Regards
Somnath Ghosh
On behalf o Transamine Trading S.A.

CH - 6 Cours de Rive, 1204 Geneva, Switzerland - Tel: +41 22 776 60 60, Fax: +41 22 776 60 19

TRAFIGURA

TRAFIGURA INDIA PRIVATE LIMITED

11th February 2019

To,

Adani Enterprises Ltd.- Copper Business
Adani Corporate House, Shantigram,
Nr. Vaishnodevi Circle, SG Highway,
Ahmedabad – 380058, Gujarat, India

Sub: Supply of Copper Concentrate for Adani Copper Project

Kind Attention: Mr. Prasad A. Suryarao

This is with reference to the update on the progress of your Copper project at Mundra, Gujarat.

As you are aware, Trafigura is one of the largest copper concentrate suppliers in the world and have association with multiple miners and Smelters all across the world. We are delighted to reconfirm building a long term relationship with Adani for this project. We confirm our interest to be a Concentrate supplier to your Project – depending on the time frame for the project commissioning, commercial and other related terms. The said supply would be made on a regular basis from our pool of resources available. We also assure you that the quality parameters will be shared with you on a periodical basis & based on the mutual agreement, the requisite quantity shall be supplied to your project.

At last we want to reassure you that we would be definitely be interested to enter into the MoU/Definitive agreement for this project concentrate requirement offtake subject and as confirmed by you after necessary statutory approvals and other formalities which we understand are still going on including but not limiting to EC. The detailed terms & conditions will also be incorporated in the agreement based on our mutual discussion at that point of time.

Wishing you the best for your approval process, we look forward for your feedback on the progress.

Yours faithfully,

For Trafigura India Pvt. Ltd.

Amol Mehra

TRAFIGURA INDIA PRIVATE LIMITED
REGISTERED OFFICE: D-64, DEFENCE COLONY, NEW DELHI-110024, DELHI INDIA
CORPORATE OFFICE: UNIT NO. 1101, ONE BKC, PLOT NO. C - 66, G BLOCK, BANDRA KURLA COMPLEX, BANDRA (EAST), MUMBAI, MAHARASHTRA – 400 051, INDIA
WWW.TRAFIGURA.COM - EMAIL: MUMBAI@TRAFIGURA.COM
PH: +91 22 42268550 FAX: +91 22 42268599
REGISTERED NUMBER: U51909DL2009FTC234813

2137

MITSUI & CO.,LTD.
1-3, Marunouchi 1-chome,
Chiyoda-ku, Tokyo, 100-8631, Japan
Tel: +81-3-3285-3398

MITSUI&CO.

Date. 17th, May 2019
In reply please Address to
Base Metals div.

To: Adani Enterprise Ltd – Copper Business, Ahmedabad.
Dear Mr. Prasad Suryarao,

We are delighted to receive an update on the progress of your copper project at Mundra.
It is our honor that we may have a chance to establish a long-term relationship with Adani who will be a biggest copper producer in India after the completion of the smelter construction work.

As you might be aware, we are one of the major copper concentrate supplier in the world who handle approximately 1 million DMT per year of the copper concentrates.

Our major sources of supply are; Collahuasi copper mine, Los Bronces copper mine and Caserones copper mine of which we have shares, and also, we have long-term supply contracts with the global major suppliers including Codelco and BHP, as well as off-take contracts with the middle sized copper mines in Asia Pacific region.

On top of the copper concentrates, we are capable to supply the secondary copper raw materials including copper anodes and copper blisters which may be consumed at your smelter facility.

Please be advised that we are ready to discuss our business opportunity including Memorandum of Understanding arrangement for our future raw material business once necessary licenses including the environment approval have been granted by the authorities.

We do hope your operating permission to be obtained soon, looking forward to discussing our business possibility near future and waiting any further good news from yours with this regard.
Hope this is line with our earlier discussion also.

Yours faithfully,

Tatsuhiro Torikai
General Manager
Raw Material Marketing Dept.
Base Metals Div.

EAC OBSERVATION:

Water consumption of 10 LTPA Copper smelter is 32790 KLD whereas the water requirement for existing 4.5 LTPA copper smelter unit is only 10,000 KLD. Hence, water requirement for the proposed plant has to be reworked out.

REPLY:

The water consumption for the proposed copper plant has been prepared based on the information submitted by various technology licensers.

Water consumption is largely due to evaporation losses in the cooling tower of Copper Smelter and Sulphuric Acid Plant, evaporation losses during the copper slag granulation. To identify the area to rework for the water consumption reduction, a benchmarking exercise was carried out.

Water Consumption is largely depends on:

1. Type of Cooling System (Air Cooling/ Water Cooling/ Sea water or River based once through system) adopted.
2. Operating conditions (Temperature of the Incoming water and Circulation Rate) prevailing.
3. Type of Copper Slag Handling System (Granulation or Ladle Cooling)
4. Air Cooling and Ladle Cooling needs large area.

Proposed project will have water consumption ~ 8.7 m3/T of Copper in case of water cooling system (6.5 m3/ T of Copper in case of air cooling system) compared to Vedanta's water consumption of ~ 6.9 m3/T of Copper (average of last 5 years)*.

Specific Water Consumption (m3/T of Product)

Name of the plant	Unit	Proposed	Vedanta, India**
Copper Smelter	m^3/T of Copper	2.42	2.40
Copper Refinery	m^3/T of Copper	0.52	0.66
Sulphuric Acid	m^3/T of Copper	5.44	2.98
CCR	m^3/T of Copper	0.32	0.24
Total Copper		**8.70**	**6.28**
Phosphoric Acid	m^3/T of Phosphoric Acid	4.25	4.33

Source: Sustainability Report

****Source: National Award for Excellence in water management – 2008***

Difference between Proposed and Vedanta:

1. Sulphuric Acid Cooling Tower system: Water Cooled CT Vs Water Cooled CT+ Radiator Type air Cooler.
2. Sulphuric Acid to Copper ratio (This ratio depends on sulphur to copper ratio in copper concentrate): **3.00** vs **2.70**

EAC OBSERVATION NO.-4

2139

Type of Cooling Towers

Due to non-availability of adequate water, referred plant uses mix of Water Cooled Cooling Tower and Radiator Type air Cooler system for Sulphuric Acid cooling which saves approximately 0.7 m3 per ton of sulphuric acid. This has reduced water consumption by ~0.7 m3/ T of Sulphuric Acid (~2.2 m3/T of Copper). Proposed project will be using water cooling system due to availability of the water from desalination plant and it also helps Proposed project to reduce **carbon footprint by 45%.** Detailed note is attached (**Annexure-4**) for the ready reference.

MUNDRA COPPER SMELTER – 1.0 MTPA

COMPARISON OF WET COOLING TOWER AND RADIATOR TYPE AIR COOLER

- **Preamble**

Sulphuric acid plant requires circulating water for meeting cooling requirement of various auxiliaries. Heat from various auxiliaries is gained by circulating water which is rejected to the atmosphere through cooling tower.

The heat can be rejected from the circulating cooling water either through wet cooling tower or dry cooling tower (i.e., radiator type air cooler, which is water to air cooler).

Wet cooling towers (or open circuit cooling towers) operate on the principle of evaporative cooling. The cooling water from the plant is pumped to a height of about 10 m and distributed over the cooling tower fill, cascading down the fill to the well at the bottom. In this type of cooling tower, some water is lost due to evaporation and drift which is about 2% of circulation rate. Also, in order to keep the dissolved solids in water under control, blowdown is taken from the water. To make-up for this loss (~2.5%), water needs to be continuously added into the system.

Radiator type Air Coolers (or Dry cooling towers) work on the principle of convection and conduction to dissipate heat from process fluid to the air stream created by the fans mounted on it. Dry coolers are closed loop systems which eliminate any kind of water loss and thus eliminating the continuous requirement of make-up water.

A comparative study is done with respect to the wet and dry cooling towers for the sulphuric acid plant for Mundra Copper Complex and same is presented below in this note.

1 Technical Comparison

Technical comparison of different parameters between Wet Cooling Tower and Radiator type Air Coolers are presented in the table below considering the circulating water requirement for a 1500 KTPA (100% H_2SO_4) of sulphuric acid plant for each phase.

S.No.	Description	Unit	Wet Cooling Tower	Radiator type Cooler
1	Heat Load	kW	172138	172138
2	Hot Water Inlet Temp	deg. C	42	80
3	Cold Water Outlet Temp	deg. C	32	65
4	Water Quality	-	Desalinated Water	Passivated DM
5	Total Circulating Water	m^3/hr	14804	9869
6	Temperature Range	deg. C	10	15
7	Cycles of Concentration, C		4	0
8	CT evaporation loss, E	m^3/hr	227	0
9	Total CT evaporation loss per day	m^3/day	5436	0
10	CT drift loss @ 0.01% (D) of total CW flow	m^3/hr	1	0
11	Total CT drift loss per day	m^3/day	36	0
12	CT blow down (B) B = (E / C-1) -D, where C = Cycles of Concentration,	m^3/hr	74	0
13	Total CT blow down per day	m^3/day	1776	0

ANNEXURE-4

2140

MUNDRA COPPER SMELTER – 1.0 MTPA

COMPARISON OF WET COOLING TOWER AND RADIATOR TYPE AIR COOLER

S.No.	Description	Unit	Wet Cooling Tower	Radiator type Cooler
14	CT make-up total (M) M = E* (C /(C-1))	m^3/hr	302	0
15	Total CT make up water required per day for each phase (1500 KTPA SAP)	m^3/day	7248	0
16	**Total CT make up water required per day for both phase (3000 KTPA SAP)**	**m^3/day**	**14496**	**0**
17	Power Consumption to produce desal water	kW	1359	0
18	Power Consumption Fans	kW	539	4370
19	Power Consumption for CW Pumps	kW	2069	1379
20	Total Power Consumption for each phase (1500 KTPA SAP)	kW	3966	5749
21	Total Power Consumption for both phase (3000 KTPA SAP)	**kW**	**7933**	**11498**
22	Footprint each phase (1500 KTPA SAP)	m2	935	4186
23	**Footprint each phase (1500 KTPA SAP)**	**acre**	**0.231**	**1.034**
24	**Footprint both phase (3000 KTPA SAP)**	**acre**	**0.462**	**2.069**
25	**CO2 Emission each phase (1500 KTPA SAP)**	**kg**	**1123**	**1627**
26	**CO2 Emission both phase (3000 KTPA SAP)**	**kg**	**2245**	**3255**

1.1 Circulating Water Quality

For Wet cooling tower, desalinated water will be used as circulating water in the circuit.

For radiator type cooler, the circulation system is a closed one, therefore passivated DM water shall be used with provision for intermittent make-up.

1.2 Water Consumption

As per above table, make-up water requirement for wet cooling towers of both phases is approx. 14496 m3/hr to account for blowdown, evaporation and drift losses.

In radiator type air coolers, the water circulates in closed loop, hence make-up water requirement is not there (negligible, as only leakages have to be topped-up).

1.3 Power Consumption

In both the systems, fans and pumps consume power. However, in case of wet cooling tower, additional power will be consumed for generating make-up water.
As indicated in table above, total power consumed by radiator type coolers is 45% higher than wet cooling tower.

MUNDRA COPPER SMELTER – 1.0 MTPA
COMPARISON OF WET COOLING TOWER AND RADIATOR TYPE AIR COOLER

1.4 Footprint Area

Footprint area required for radiator type cooler will be approx. five (5) times that of wet cooling towers for same flow of circulating water.

1.5 Carbon Emissions

As per above table, there is significant difference in carbon emission (45% higher) for radiator type cooler compared to wet cooling tower.
(Note: Based on Greenhouse gas reporting: conversion factors from Department for Business, Energy and Industrial Strategy, Govt of UK. The conversion factor is 0.28307 kg CO2 for each kWh produced.)

1.6 Material of Construction

FRP can be used for cooling tower casing and PP/ PVC materials can be used in wet cooling tower for fills & drift eliminators.

Radiator type cooler casing/ structure shall be carbon steel with epoxy painting and finned tubes shall be of Stainless steel.

2 Conclusion

Wet cooling tower is recommended due to the following as detailed above:
1) Lower power consumption 45%
2) Lower carbon footprint by 45%
3) Lower land requirement by 77%
4) No need of DM water
5) Reliable performance as no issues of fouling being an open system

***

EAC OBSERVATION NO.-5

2143

EAC OBSERVATION:

According to the EIA records, Dhaneshwari River is passing through the project site and the mangrove reserve forest is existing within the project site. Quantification of these mangroves and conservation measures for mangroves and the river stream has not been submitted.

REPLY:

As mentioned in EIA report, Dhaneshwari River is passing through the project site however, no mangrove reserve forest is existing within the project site. The mangroves are present at Kotdi creek which is ~200 m from the project site in the southern side. There will be bridges across the two land parcels for accessing. Flow of the water from the river will not be disturbed. No activity will be carried out in Dhaneshwari river bed. A 50 m wide greenbelt has been proposed along the side of Dhaneshwari River within the project site.

Wildlife Conservation Plan & Mangrove Conservation Plan study for Proposed Greenfield Copper Refinery Project has been conducted by Dr. Bharat Jethva, NABET Accredited FAE Cat-I, Ecology & Biodiversity of M/s. Bhagwati Enviro Care Pvt. Ltd.

A study carried out by National Centre for Sustainable Coastal Management (NCSCM), Chennai in year 2018, the total mangrove cover in Kotdi-I and Kotdi-II creeks was about 410 ha, out of which dense mangroves occurred to the extent of only 50 ha (12%), followed by sparse mangroves, distributed in 189 ha. The scattered mangrove covered an area of 171 ha. A study by Thivakaran and Sawale (2016) reported 47 species of macrofauna in the Mundra mangrove eco-system. Total 12 species of gastropods, 14 species of crustaceans, 9 species of bivalves, 8 species of polychaetes and 4 species belonged to the category "others". Increasing spread of mangrove area and high species richness of macrofauna suggests healthy and dynamic condition of mangrove ecosystem in this area.

Study suggests that mangrove plantation shall be carried out by Kutch East Forest Division as the area is under their jurisdiction and the staff has vast experience in mangrove plantation and management. A financial outlay of Rs. 250 Lakhs has been proposed by AEL for mangrove plantation and monitoring. The mangrove conservation report is enclosed as **Annexure-5**.

adani

Dated 25 March 2019

To,

Divisional Forest Officer (Kutch – East)
Kutch, Gujarat

Sub- Submission of Wildlife and Mangrove Conservation Plan for approval please.

Dear Sir,

M/s. Adani Enterprises Limited (AEL) has proposed to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in Siracha and Navinal village within Adani Port Special Economic Zone (APSEZ), taluka Mundra, district Kutch, Gujarat.

As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category-A of project activity 3(a) for prior Environmental Clearance (EC) from Ministry of Environment, Forest & Climate Change (MoEF&CC). Hence, Terms of Reference (TORs) for the preparation of EIA has been obtained from the MoEFCC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016 (attached).

Total area earmarked for the project is 256.58 ha (634 acres), out of which 154.19 ha (381 acres) of land is already industrial land in APSEZ and 102.39 ha (253 acres) land is part of the total 1576.81 Ha forest land for which Stage-1 Forest Clearance has been granted by the MoEF&CC vide letter F.No 8-04/2016-FC dated 16th Nov 2018 (attached) in favor of APSEZ.

Condition number No. 5(v) of the TOR reads that "Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area is to be prepared".

Study has been carried out through NABET accredited Field Area Expert, Cat-I (Ecology and Biodiversity). Wildlife Conservation Plan has been prepared based on primary data and fresh field surveys. Besides, the Mangrove Conservation Plan has also been incorporated in the present study.

Attached, please find the 3 copies of Conservation Plan for your comments and forwarding to Chief Wild Life Warden (CWLW) the state for approval please.

Thanking you,
Sincerely,

P.A.Suryarao

(Prasad Suryarao)
Authorized Signatory

CC: Chief Wild Life Warden (CWLW), Forest Department, Government of Gujarat, Gandhinagar

Adani Enterprises Ltd
Adani House
Shantigram, S G Highway
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Regd. Office: Adani House, Nr Mithakhali Six Roads, Navrangpura, Ahmedabad 380 009, India

25/3/2019
રવાનગી કારકુન
નાયબ વન સંરક્ષકશ્રીની કચેરી
પૂર્વ વન વિભાગ, હોસ્પિટલ રોડ,
ભુજ - કચ્છ. ૩૭૦૦૦૧.

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F. No. J-11011/113/2016-IA-II.(I)
Government of India
Ministry of Environment & Forests
(IA-II Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi-110 003.
Email: sharath.kr@gov.in

Dated: 24th March , 2017

To
M/s Adani Enterprises Limited,
Sambhaav House,
Judges Bungalow Road, Bodakdev,
Ahmedabad, Gujarat -380015.

CORRIGENDUM

Sub: Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat – regarding corrigendum to ToR

Ref: AEL/Copper/Mundra/MoEFCC/Env/Amd/Feb2017/out-1 dated 21.02.2017

This has reference this Ministrys letter of even No. J-11011/113/2016-IA.II(I) dated 21.06.2016 prescribing ToRs for the above mentioned proposal for preparation of EIA/EMP report under the provisions of Environment Impact Assessment Notification, 2006 as amended.

2. The Ministry of Environment, Forest and Climate Change has examined the request. In partial modification of this Ministry's letter of even no. dated 21.06.2016, the following changes are incorporated in the ToR letter.

For	Read as
Greenfield Copper Refinery Plant (10 MTPA) project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat	Greenfield Copper Refinery Plant **(1.0 MTPA)** project of M/s Adani Enterprises Limited located at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat

3.0 All other conditions of the above referred Terms of Reference letter shall remain unchanged

This issues with the approval of competent authority.

24/3/17

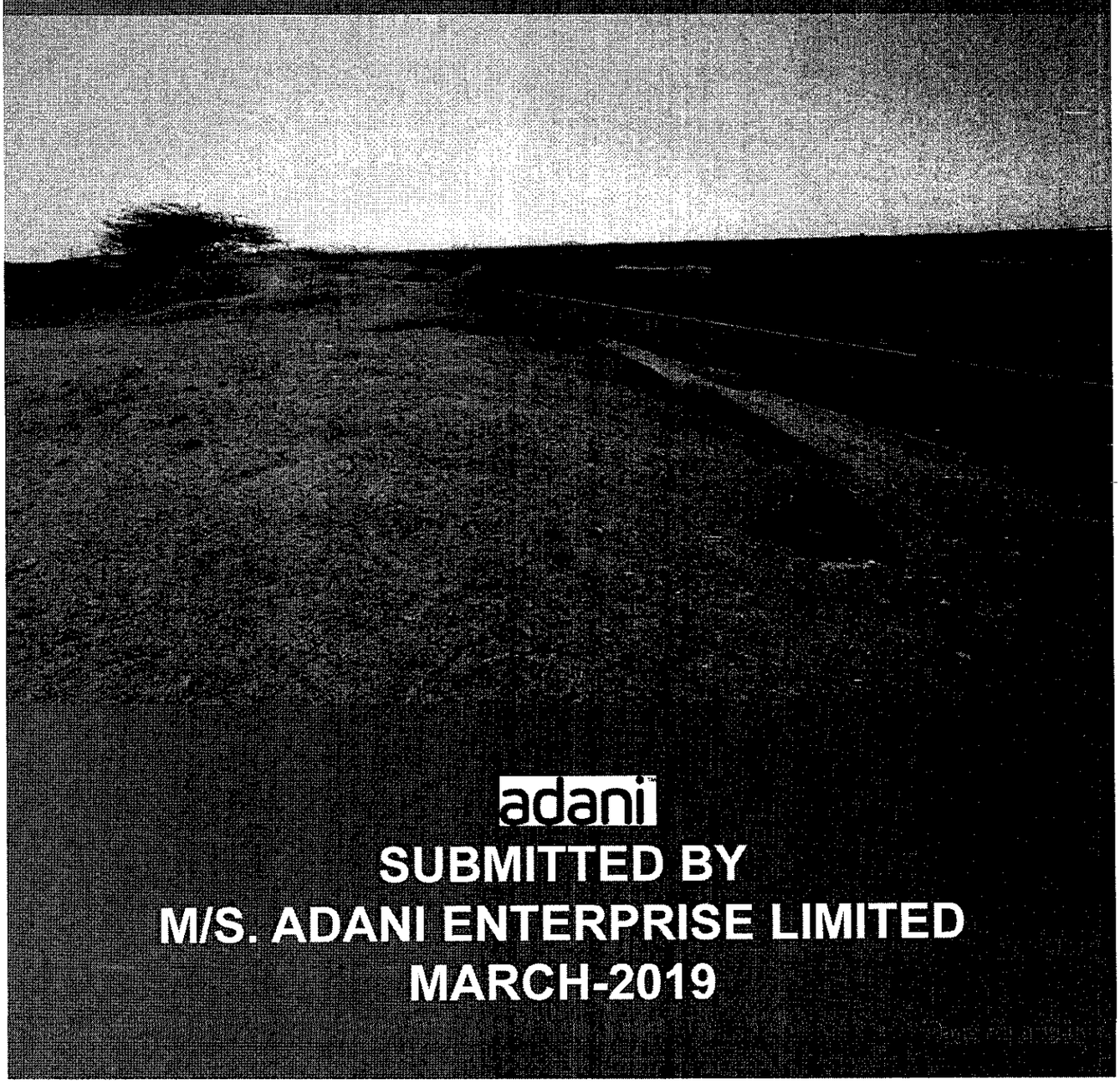
(Sharath Kumar Pallerla)
Scientist 'F'

Copy to:-

1. The Secretary, Department of Environment, Government of Gujrat.
2. The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (WZ), E-5, Kendriya Paryavaran Bhawan, E-5 Arera Colony, Link Road-3, Ravishankar Nagar, Bhopal – 462016.

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Wildlife Conservation Plan & Mangrove Conservation Plan for Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone in Siracha and Navinal Villages of Taluka Mundra, District Kutch, Gujarat



adani

SUBMITTED BY

M/S. ADANI ENTERPRISE LIMITED

MARCH-2019

2147

Wildlife Conservation Plan & Mangrove Conservation Plan for Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone in Siracha and Navinal Villages of Taluka Mundra, District Kutch, Gujarat

Submitted by

M/s. Adani Enterprise Limited

Study by
Dr. Bharat Jethva
NABET Accredited FAE
Cat-I, Ecology & Biodiversity
Bhagwati Enviro Care Pvt. Ltd.
March-2019

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CERTIFICATE

This report "Wildlife Conservation Plan and Mangrove Conservation Plan for Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone in Siracha and Navinal Villages of Taluka Mundra, District Kutch, Gujarat" has been prepared by us based on extensive field visits and data collected, review of published literature, information and maps furnished by M/s Adani Enterprise Limited, and data available in public domain. The study was restricted to project area and its 10 km periphery from the project area.

Dr. Bharat Jethva
NABET Accredited FAE
Cat-I, Ecology & Biodiversity
Bhagwati Enviro Care Pvt. Ltd.
Ahmedabad

10th March 2019
Ahmedabad

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1. INTRODUCTION

1.1. Background

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha (634 acres) of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology, which will be located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, Taluka Mundra, district Kutch, Gujarat.

As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. The application No: IA/GJ/IND/53004/2016 for prior EC (Form-1 and Pre Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April 2016 and same was reviewed by the Expert Appraisal Committee (Industry-I) the meeting held on 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. TOR has been issued by MoEF&CC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016. EIA for the project has been conducted by the NABET accredited consultant and submitted to MoEF&CC for Environmental Clearance in 2018.

As a part of approved ToR No. 5(v) 'Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area is to be prepared'. Present study is carried out towards preparation of above mentioned plan based on primary data and fresh field surveys. Besides, as on voluntary basis, the Mangrove Conservation Plan has also been

incorporated in this report. Therefore, the present study is carried out to fulfil requirement of the ToR issued to AEL. The present study is a detailed account of flora, fauna, mangrove and wildlife habitats present in 10 km radius of the proposed project area based on literature survey and primary data collection. Additionally 10-15 km radius area was also studied to check if there is any environmental sensitivity present based on the secondary information and published literature.

1.2. Legal Framework

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha (634 acres) of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology, which will be located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, Taluka Mundra, district Kutch, Gujarat.

The proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. The application No: IA/GJ/IND/53004/2016 for prior EC (Form-1 and Pre Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April 2016 and same was reviewed by the Expert Appraisal Committee (Industry-I) the meeting held on 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. TOR has been issued by MoEF&CC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016. The present study is to fulfil the requirements of studies mentioned under ToR No. 5(v) issued to AEL.

1.3. Scope of Work

Scope of work for this study is in line with the ToR No. 5(v) issued to AEL which include preparation of Wildlife Conservation Plan. AEL also intends to submit Mangrove conservation plan as part of this report. The preparation of the wildlife and mangrove consecration plan required the study of habitat types and quality, species, diversity, rarity, fragmentation, ecological linkage, age, abundance, etc. in case of schedule fauna, conservation measures should be proposed, And a detailed study to assess the wildlife habitats, their migration route, etc. and measures to mitigate impacts of the proposed activities.

The present study has carried out identification of ecologically sensitive receptors (species, habitats& eco-systems) based on field investigations and literature survey along with their mitigation with conservation action plan. The study was carried out in core area (project site) and in buffer area i.e. 10.0km periphery from the project site. The study was carried out systematically and scientifically using primary and secondary data in order to bring out factual information on the ecological conditions of the project site and its surroundings.

The study involved assessment of general habitat type, vegetation pattern, preparation of inventory flora and fauna of terrestrial ecosystem in 10 km radius from the boundary of proposed project site. Biological assessment of the site was done to identify whether there are any Rare, Endemic or Threatened (RET) species of flora or fauna in the core area as well its buffer zone and to identify whether there are any ecologically sensitive area within buffer zone that is likely to be impacted. The study also designed to suggest suitable mitigation measures if necessary for conservation of important species and their habitats etc.

1.4. Objectives of the Study

The major aim of the present study is to avoid any impact of proposed project activity on important natural habitats or species in the study area. Therefore, the study is carried out with following objectives.

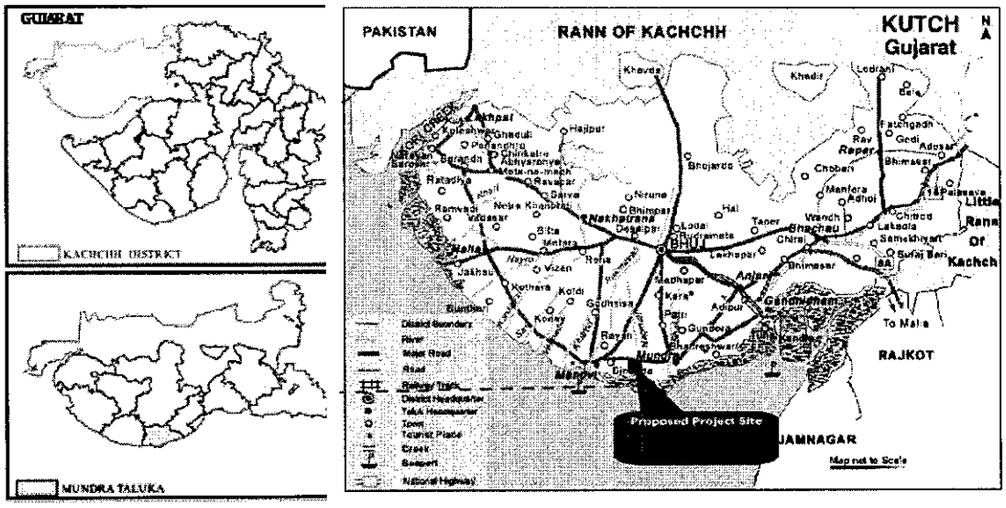
- To evaluate the ecological status of the study area with respect to important flora, fauna and ecologically sensitive habitats etc.
- Assessment of any impacts of the project activities on ecologically sensitive habitats and species.
- Recommend mitigation measures in the form of wildlife conservation plan with an in-built monitoring mechanism and schedule of implementation along with financial budget.

2. STUDY AREA

2.1. Project Location

The proposed project site is located in villages Siracha and Navinal at APSEZ Taluka Mundra, district Kutch in the state of Gujarat (Map-2.1).

Map- 2.1: Proposed project location in Siracha village of Kutch district in Gujarat.



2.2. Study Area:

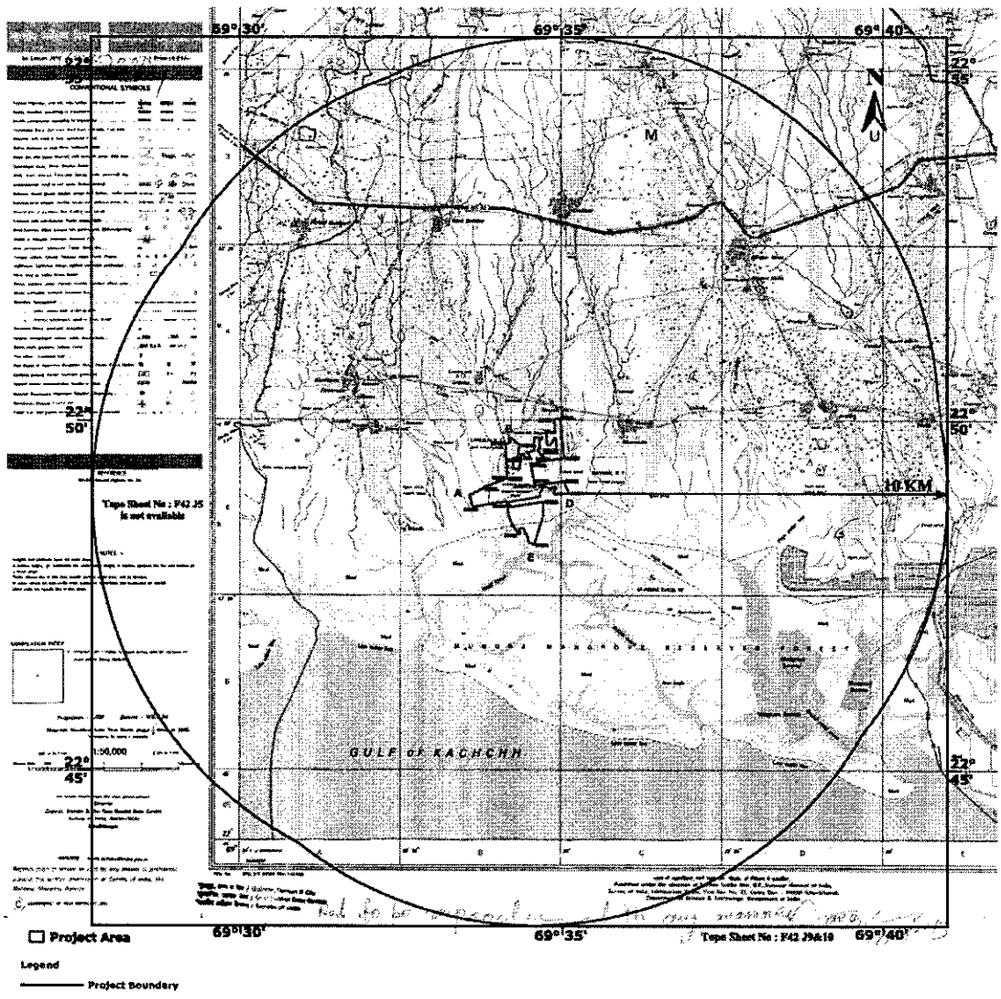
For the convenience of the study and the user agencies, the study area was divided in two major parts i.e. 1) Core area/project area and 2) Buffer area i.e. 10.0 km periphery of the project boundary (Map-2.2, Map-2.3).

2.2.1. Core Area:

Core area is proposed project area of Greenfield Copper Refinery plant at Mundra (Map-2.2) The total area earmarked for the proposed project is 256.58 ha (634 acres), in which 154.19 ha (381 acres) of land belongs to APSEZ area and 102.39 ha (253 acres) of land belongs to forest area for promoting industrial development. The Gulf of Kutch sea coast is located at 3.9 km south from the proposed project site. The area is located 5.0 km south of National Highway NH- 8A and 0.3 km from State Highway SH-6. No

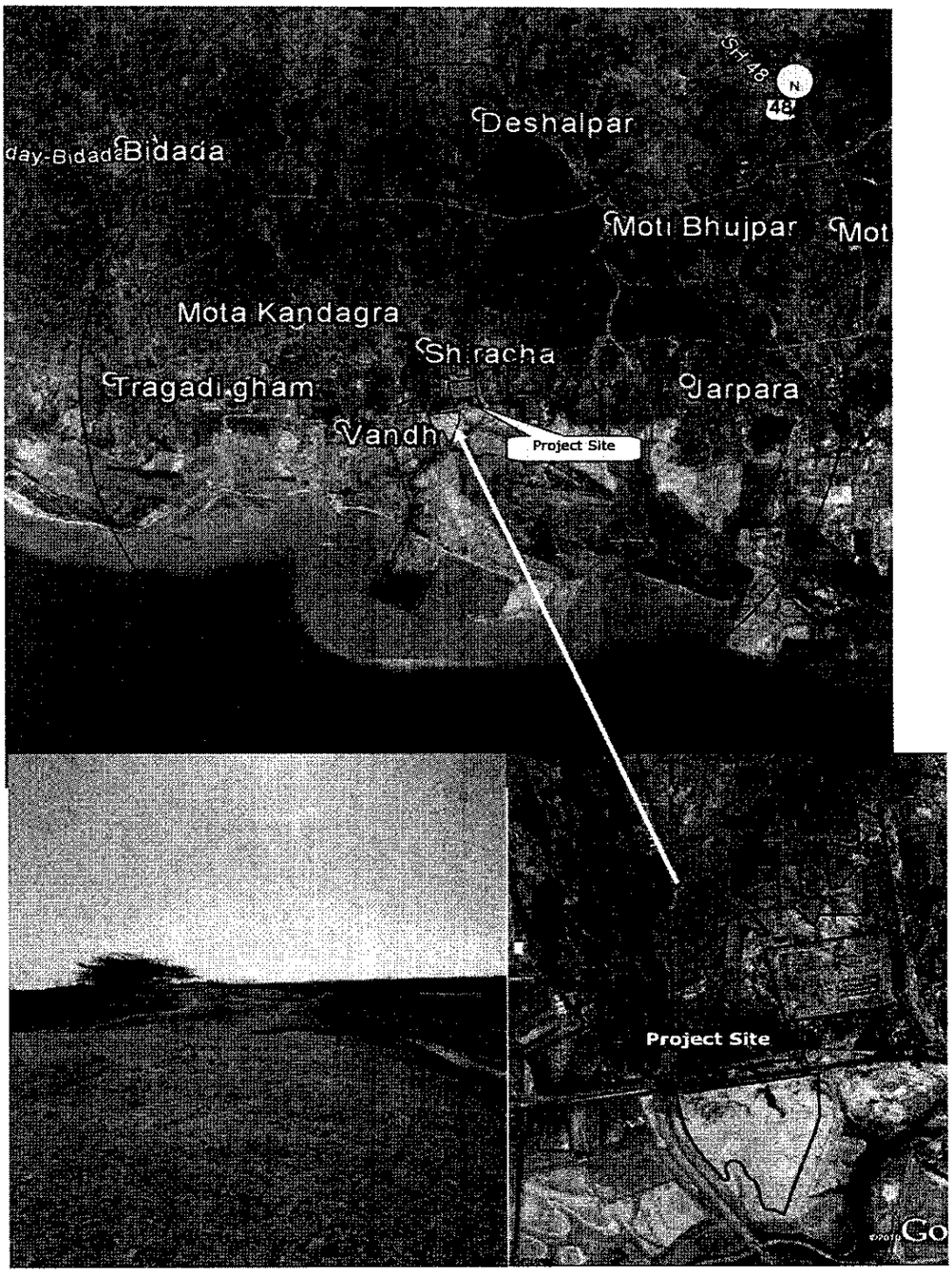
major vegetation or any human settlements present in the core area, therefore, there is no need for rehabilitation of any human settlements from the project site. Most importantly the project site does not fall in 10.0 km periphery of any National Park or Sanctuary or their eco-sensitive zones. Site is located at a substantial distance from the Coastal Regulatory Zone areas of Gulf of Kutch sea coast therefore, does not attract CRZ clearance.

Map-2.2: Proposed project location on Toposheet.



Corner Point	Latitude	Longitude
A	22°48'55.40"N	69°33'34.74"E
B	22°49'44.92"N	69°34'13.74"E
C	22°50'01.88"N	69°34'59.78"E
D	22°48'57.23"N	69°35'08.42"E
E	22°48'13.26"N	69°34'35.43"E

Map-2.3: Project location (core area) with 10.0 Km buffer (study area) in Gujarat



2.2.2. Buffer Area

The Buffer Area mainly consists of revenue areas 18 villages that fall in 10.0 km periphery of the project site (Map-2.2). The list of villages is given in Table-2.1.

Table-2.1: List of villages falling in 10 km buffer area.

No	Village	No	Village	No	Village
1	Tunda	7	Mota Bhadiya	13	Khakhar Moti
2	Shiracha	8	Kandagara Mota	14	Deshalpar
3	Navinal	9	Bhujpar Nani	15	Sukhapar
4	Jarpara	10	Bhujpar Moti	16	Nani Khakhar
5	Bidada	11	Depa	17	Gelda
6	Tragadi	12	Nana Bhadiya	18	Dhrab

Majority of the land of the buffer area is occupied by the agriculture fields, forest area, industries (Saltpans, Ports, and Power plants), open scrub vegetation, mangrove, mudflats, pond/ reservoir, roads & railway network & built up areas etc. Most importantly there are no Wildlife Sanctuaries or National Parks located in the 10.0 Km periphery of the proposed project area. The proposed project land is located at substantial distance from Coastal Regulatory Zone of Gulf of Kutch coast.

3. METHODOLOGY

3.1. Basic frame work of data collection

The prediction of impacts industries on flora and fauna depends on understanding of the proposed activities, its magnitude/extent, scale and ecological conditions in the surrounding area. Collection of comprehensive baseline information on flora and fauna is therefore a prerequisite for assessment of impacts of development activities. It would also help in advance planning and mitigate the impacts and ultimately managing the natural habitats and resources. The approach to achieve the stated objectives within defined scope of work, include field surveys, interviews, and reviews of literature. Following was the basic fame work of the data collection and analysis for the present study.

3.2. Field Surveys

Several field visits were carried out between month of February-March 2019 to understand and assess the impacts of proposed project activities on flora and fauna and natural habitats. We evaluated the distribution and abundance of flora and fauna and mangroves in project area and in buffer area separately.

3.3. Identification of Important Ecological Habitats

The important ecological habitats and features were identified based on our field visits and also mapping of landuse types in the study area. We identified ecologically important habitats through primary survey, literature survey and consulting local naturalists etc. These important ecological habitats and features were then identified on landuse map that is prepared for the study area. Land use map of 10 km radius of the proposed project site is prepared by EIA agency is used for the present study. Prominent landuse features such as, roads, rivers/waterbody/drainages, agriculture, sea, sandy beach, mangrove, mudflats, industrial and built up areas, forest area, scrubland etc. were digitized using open source software such as QGIS and their areas were calculated. There may be acceptable margin of

errors in the final map however, locations and important features are identified and shown on map.

3.4. Study of Flora

In order to study the flora we laid 10X10 m^2 size 30 quadrates in buffer and 10 quadrates in core area (Map-3.1 & 3.2). Quadrates were laid separately for detailed analysis of vegetation in the core area (project site area) and buffer areas (10 km periphery). In order to study herbs and grass species, we laid a 1X1m^2 quadrate within the abovementioned quadrates. Details of Geographic Coordinates of each of the quadrates laid are given in Map-3.1 and Annexure-1. Information on geographic coordinate, occurrence of plants, their species names, numbers and floral phenotypes, life forms etc. were collected from each quadrate we laid. Direct visual enumeration of plant species was carried out to generate data on flora. The collected data was then systematically and scientifically analyzed to produce information on following biodiversity parameters of flora. The encountered vegetation of the study area was analyzed to calculate density, frequency & abundance (Curtis and McIntosh, 1950). Total abundance, density and frequency in respect to individual species were calculated in order to understand the vegetation structure and relative importance of the sampled areas. We used Shannon Weaver Index (Shannon & Weiner, 1949) for Species diversity and Simpson dominance index (Simpson, 1949) for species dominance. Species enumeration (inventory), richness, total abundance, density, and evenness provide systematic baseline information of the vegetation community.

3.5. Study of Fauna

We mainly studied the fauna of higher trophic levels which acts as indicator of the type and health of the eco-systems.

Reptiles: Majority of the reptile species are fossorial in habit therefore the assessment of reptiles and their diversity etc. holds special significance for any development projects. It is difficult to conduct quantitative study on reptiles within a short period of time. Therefore, we relied on qualitative observations only. We carried out study based on interview survey,

secondary literature as well as direct observation on road killed reptiles. We randomly looked for various reptiles and their presence i.e. lizards, snakes etc. in the study areas. Therefore, only a check list of reptiles observed during the study period was prepared.

Birds: Birds, occupying higher trophic levels in the ecosystems, respond quickly to the changes in the habitats and therefore serve as one of the best indicators for evaluating the status of the area. Therefore, we created baseline data on birds by systematically and collected data on their occurrence i.e. presence absence in the buffer and core areas in the study area.

Map-3.1: Sampling locations for flora and fauna study in the core area.



Map-3.2: Sampling locations for flora and fauna study in the buffer area.



For creating baseline data on birds we randomly walked in the study area during early morning i.e. 6:00 AM to 9AM and 5:00PM to 7:00 PM. These time periods of the day are when maximum bird movements are expected. We walked randomly in the study area carried out sightings of birds ad libitum and recorded species based on their identification. Special reference books for bird species identification were used. Apart from walking randomly, we also relied on specific habitat search for different species i.e. dense bushes, wetland, ponds, big trees, agriculture areas etc. In order to accomplish the inventorization of the bird species found in the study area. All the bird species are classified based on their conservation status, their schedule under Wildlife Protection Act 1972, their migratory status, habitats and their feeding guilds. This was further used for finding out important bird species in the study area i.e. rare, endangered or species of high conservation significance.

Mammals: Like birds, mammals are also occupying higher trophic levels in many ecosystems and respond quickly to the changes in their habitats therefore, serves as best indicators of the ecosystem health. We therefore, chose to create qualitative baseline information on presence and absence of mammals in the study area. Since the presence of mammalian species is low affecting probability of their sightings, in the study area, it was difficult to estimate their population using line transect method. More importantly, it was difficult to accommodate the sightings of nocturnal and diurnal animals in the study. Therefore, we prepared a qualitative check list of mammals based on their presences and absence using indirect evidences and signs such as footprints, dens, droppings, diggings, scrap marks, etc. in the project area.

Apart from these, search efforts were also made for various signs of important wildlife species in the study area which includes looking for wildlife signs such as dens, diggings, scrap marks, droppings etc. The sites where likelihood of animals is higher such as shady trees, waterholes, dense and undisturbed bushes etc. were surveyed intensively during the survey in the study area. This survey has helped us in identifying various species of mammals in the study area. For mammal inventory, both direct sightings and indirect evidences (like dung, scats, pellets, foot prints, nests, dens etc.) were accounted.

3.6. Important Wildlife Habitats and Protected Areas

We assessed the presence and distances of important wildlife habitats and hotspots such as protected areas, mangroves, breeding and nesting habitats, coastal habitats, important wetlands, and grassland area from core area. These important areas such as Protected areas (National Park, Wildlife Sanctuaries, Conservation Reserves etc.), Wetlands of national importance, Ramsar sites, Important Bird Areas (IBAs), classified by the Bombay Natural History Society etc.

3.7. Rare, Threatened & Endemic Wildlife Species and Their Corridors

We also assessed the presence of rare, endangered, endemic wildlife species in the project area/core area and buffer area. Special search efforts were made during the field visits to identify any such sensitive species or their corridors etc. in the project area and buffer area. Apart from field visits we relied on interview surveys of local people, consultation with local biologists and naturalists etc.

3.8. Literature Review

Considering the time limitation to undertake statistically rigorous data gathering system, study also relied on existing knowledge about the ecology and biodiversity of the region. Importantly, there are quite a few studies undertaken in the past dealing with the impacts of Copper refinery Plants on flora and fauna and other concerns of biodiversity conservation. Literature on Copper refinery projects and associated environmental issues were downloaded and collated through internet. Various relevant literatures were surveyed during the study for collection of baseline information. Maps, reports and documents collected from the project proponent were also reviewed and used in the present study. Books on flora, fauna and wildlife were also studied in order to understand the biology of several species. Other wildlife and mangrove conservation plans submitted for the surrounding area are also referred.

3.9. Consultations

During the study, series of consultations were made with both technical and non technical stakeholders to get precise information on the project area/core area and buffer zone habitats. In order to know more about the seasonal presence of several faunal species and their movement, study team informally consulted and discussed with local naturalists and local people, from the villages, herders and farmers who inhabit close to the proposed project area.

3.10. Supplementary Information

Other than the above, for the purpose of this study, relevant information was also collected from following sources:

Research papers on flora and fauna and mangroves

Google imageries/Google Maps

Project related Maps provided by Adani Enterprise Limited

Communications with subject experts

3.11. Analysis to Evaluate the Potential Impacts

The information collected on status of flora and fauna and, their spatio-temporal distributions, hotspots, and potential impacts of proposed project development were logically analyzed and conclusions were extracted for preparation of conservation plan for the project proponent to implement.

3.12. Preparation of Wildlife Conservation Action Plan:

After identification of key impacts of the project, on flora, fauna or any key habitats of any important species or their corridors, a comprehensive wildlife conservation action plan was prepared for 5 years with monitoring mechanism and financial projections.

3.13. Limitations of the Study

The study undertaken is structured around the project information as provided by the project proponent, any change in the proposed activities may result in variation of outcome. The study is based on field visits, literature survey, consultation with local people etc. Professional judgment and subjective interpretation of facts has been applied for this study. All information's and inferences presented herein are based on the specifics currently available within the limits of the scope of work, information provided by the client or its representative, existing secondary data and schedule.

4. Ecological Assessment

The observations and assessment of overall ecological scenario presented in this chapter include details of flora, fauna, natural habitats, protected areas, wildlife species and their migration corridors etc. Such baseline information provides better understanding of the situation and overall ecological importance of the area. This baseline information viewed against proposed project activities help in predicting their impacts on the wildlife and their habitats in the region. Data collected and information gathered from secondary literature on flora, fauna, protected area, natural habitats, wildlife species etc., were analyzed and results are presented as follow.

4.1. Biogeographic Zone

The region falls in Indo-Malay Realam (IM 1303) and Deserts and Xeric Shrublands Biome as defined by WWF. The North-western Thorn Scrub Forests [IM1303] ecoregion represents a large expanse of degraded dry forest surrounding the Thar Desert. Neither exceptionally species-rich nor high in endemism, the ecoregion nevertheless harbours viable populations of antelopes.

As per classification of Indian Biogeographic zones by Rodgers et al. (2000), Kutch district falls under Biogeographic Zone 3 - the Indian Desert and the Biogeographic Province Kutch Desert- 3B.

4.2. Protected Areas

As per our information and survey there is no Sanctuary, National Park, or notified wildlife corridors within the core area and buffer area (10 km) of the project site. Marine National Park is located at 33.0 Km distance in south-west direction, Marine Sanctuary is located in same direction at 35.0 Km distance, where as Narayan Sarovar Sanctuary is located at 103.0 km in North-West direction, Kutch Desert Wildlife Sanctuary is situated in the Great Rann of Kutch at 70.0km North East direction. The Wild Ass Sanctuary is located in the Little Rann of Kutch at 120 km distance, Kutch Bustard

Sanctuary at 92.0 km in North direction and Chari-Dhand Wetland Conservation Reserve is located at 82.0 Km north. Majority of the protected areas and their eco-sensitive zones are located beyond 30 km distance from the project site (Table-4.1, Map-4.1).

Table-4.1: Protected area and their distances from proposed project site.

No	Protected Areas	Distance	Direction
1	Marine National Park	33 Km	South-West
2	Marine Sanctuary	35 Km	South-West
3	Narayan Sarovar Sanctuary	103 Km	North-West
4	Kutch Bustard Sanctuary	92 Km	North-West
5	Wild Ass Sanctuary	120 Km	East
6	Kutch Desert Sanctuary	70 Km	North-East
7	Chhari Dhandh Conservation Reserve	82 Km	North
8	Banni Grassland Important Bird Area	69 Km	North

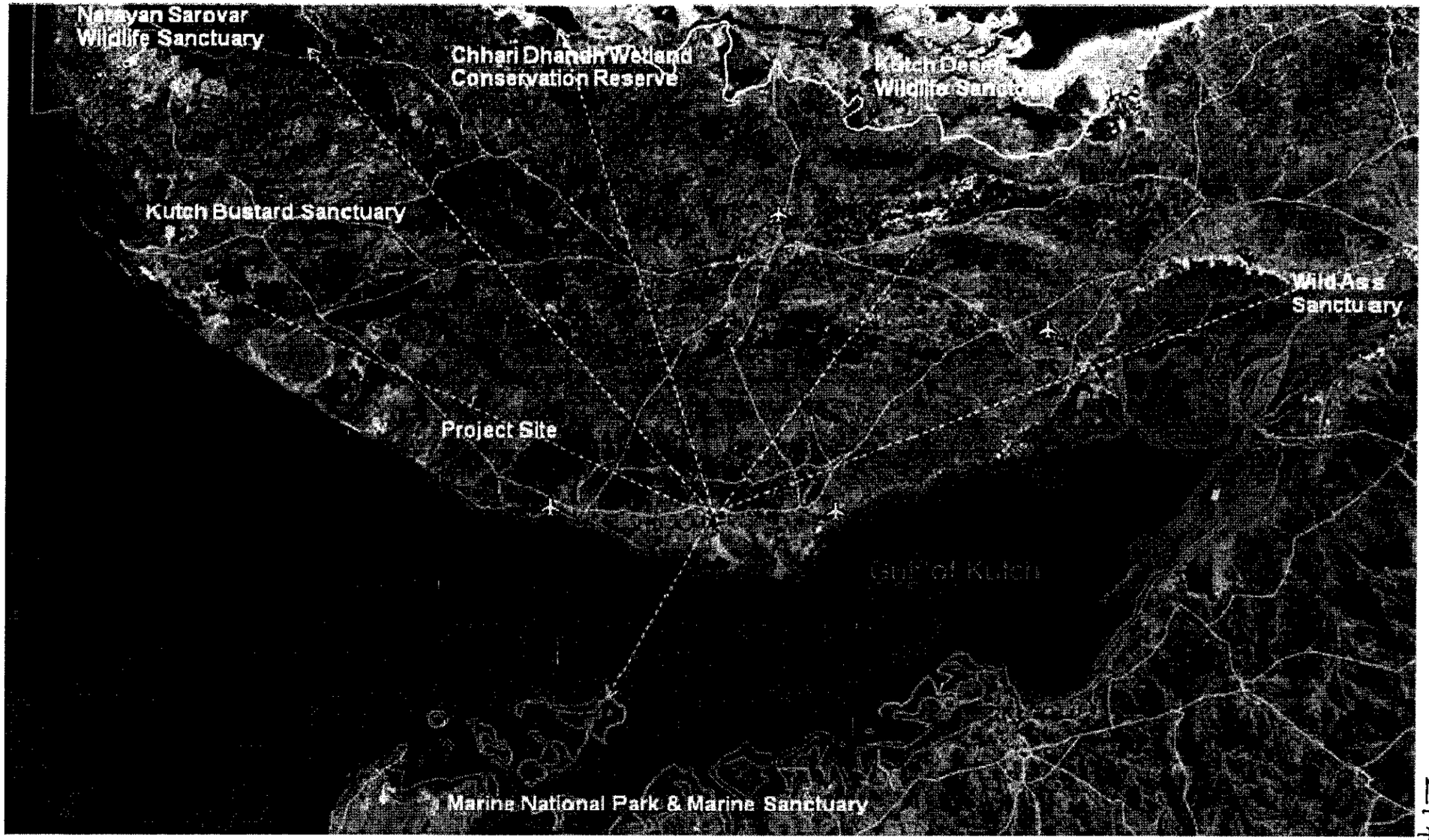
4.3. Landuse Types in the Study Area

We mapped various landuse types of the study area using field surveys and various references available online. The major landuse features are agriculture, sea, mudflats, open scrubland, sparse wasteland, mangroves etc (Table-4.2 & Figure-4.1, Plate-4.1).

Table-4.2: Area & percentages of various landuse types in the study area.

No	Landuse Type	Area (ha.)	% of Area
1	Built up Area	2103.27	5.08
2	Forests	837.62	2.02
3	Agriculture	15484.69	37.41
4	Wasteland	5620.36	13.58
5	Waterbody	9366.3	22.63
6	Wetlands	4469.36	10.80
7	Others	3512.17	8.48

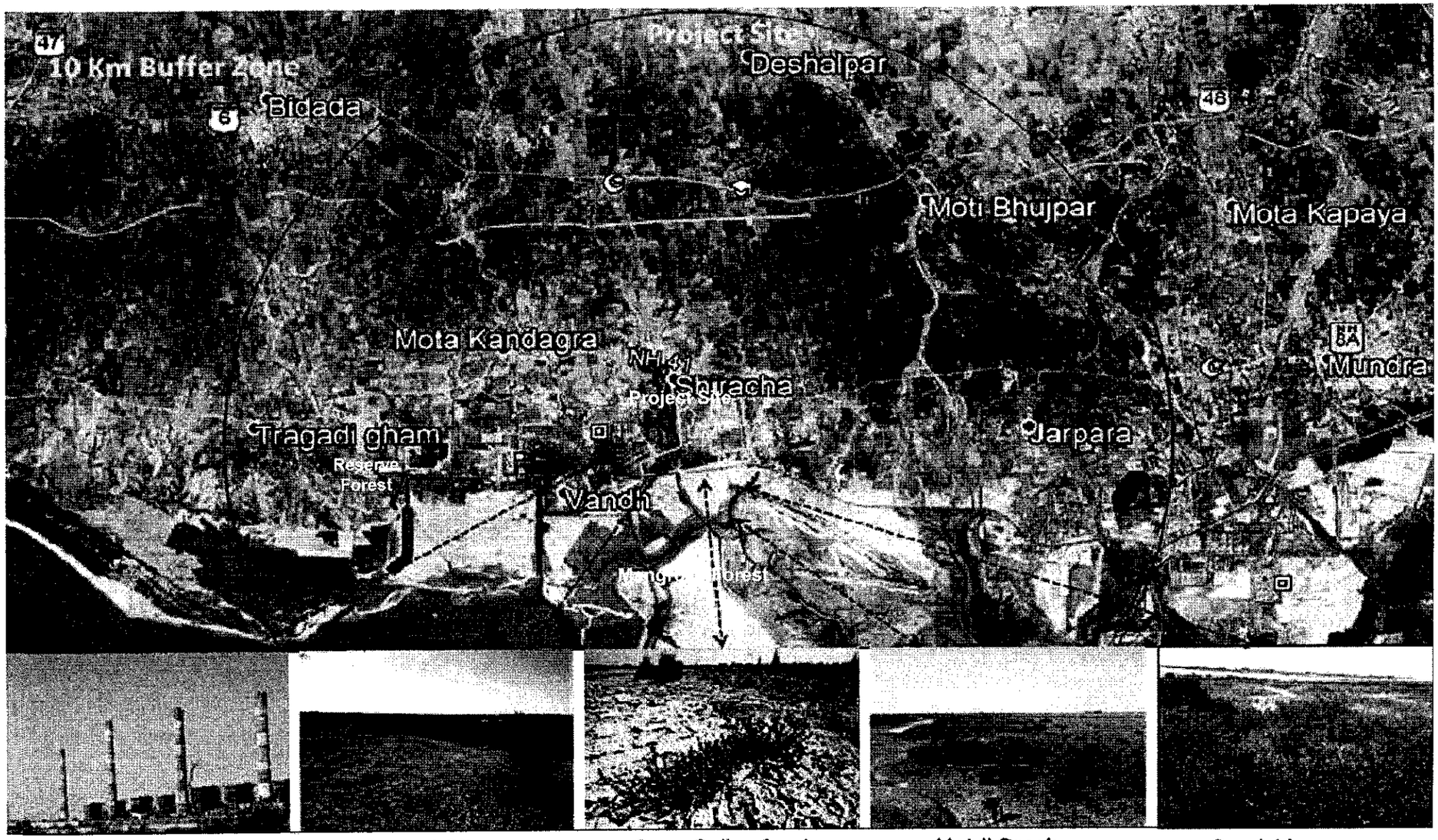
Map-4.1: Project site location vs. protected areas in Kutch district.



2171

1963

Plate-4.1: Project site location and habitat types in the 10 km buffer study area.



2172
1964

Map-4.2: Landuse pattern in the study area.

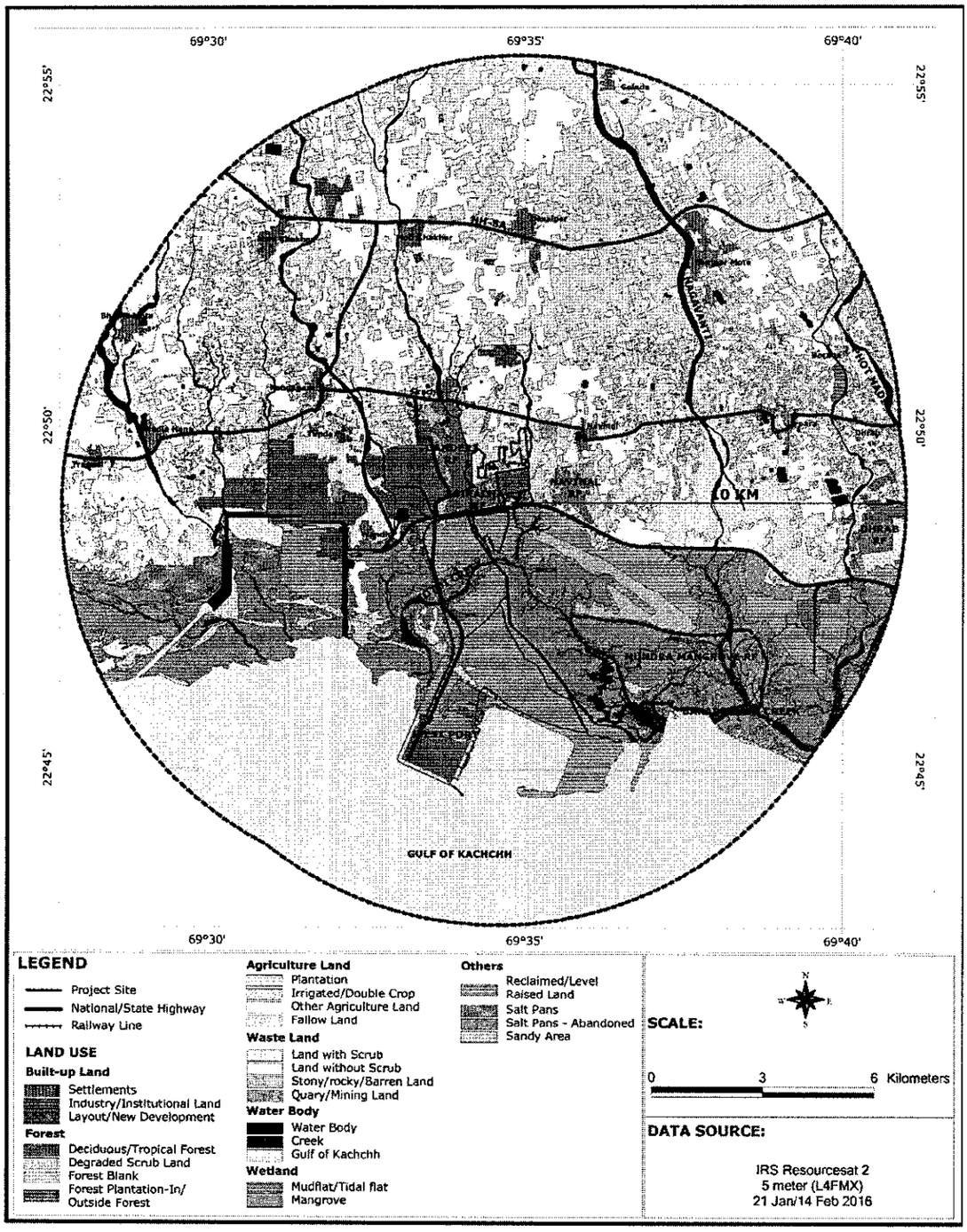
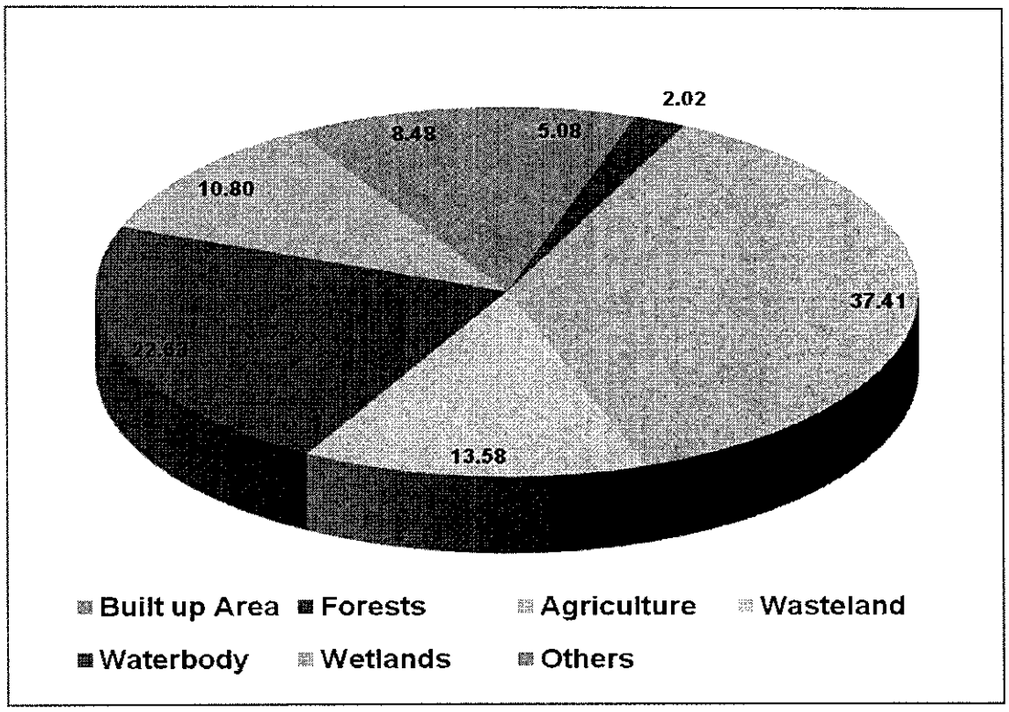


Figure-4.1: Percentage of various landuse classless in the study area.



4.4. Important Ecological Habitats

Based on our field visits and literature survey we identified two important and ecologically sensitive habitats that are located within 10km buffer zone. These habitats are listed below

i. *Forest Area*
ii. *Mangrove ecosystem*
iii. *Waterbodies*
iv. *Important birdwatching site*

4.4.1. Forest Area & Forest Type

As per information received from project proponent, the total area earmarked for the proposed project is 256.58 ha (634 acres), in which 154.19 ha (381 acres) of land belongs to APSEZ area and 102.39 ha (253 acres) of land belongs to forest area for promoting industrial development. Therefore, core project area does include forest area. Forest Clearance for this land is under process and stage-I clearance is already received for the same. MoEF&CC

Table-4.3: Details of Forest area and forest types in study area.

No	Village	Survey No	Area	Type
1	Deepa	220/p	17.36	RF Section-20
2	Borana	20/p	26.62	RF Section-20
3	Dhrab	169/p	23.43	RF Section-20
4	Dhrab	169/p	81.59	RF Section-20
5	Jarpara	169/p	26.61	RF Section-20
6	Mundra Mangrove Range	2	5333.73	RF Section-20
7	Mundra Rakhal Dhuvo	2	334.34	Reserve Forest
8	Navinal	223/p	21.85	RF Section-4
9	Navinal	223/p	89.52	RF Section-20
10	Siracha	295/p	125.00	RF Section-20
11	Siracha	295/p	209.20	RF Section-20
12	Siracha	517/p	130.00	RF Section-4

4.4.2. Mangroves Ecosystem

Kutch mangroves distributed in the arid to semi-arid coastal belts are traditionally considered as the low dense mangroves which are mostly degraded. Structural attributes of Kutch mangrove are not comparable with other luxuriant mangrove formations on other coasts of India (Sawale and Thivakaran, 2013). The semi-arid coastal belt of Kutch is known for its harsh environmental conditions like hyper-salinity (36-47 ppt), wider ambient temperature fluctuations (11.2 to 48.7oC), high evopo-transpiration (R/ETP-0.03–0.20) and frequent natural disasters like cyclones and earthquakes (Sawale and Thivakaran, 2013). Added, the recent spurt in inland watershed development schemes deprive the meagre seasonal run-off to neretic waters, rendering it singly conspecific formations of *Avicennia, marina*; a hardy species capable of tolerating high physiological stresses (Sawale and Thivakaran, 2013). Though eight true mangrove species were reported earlier from the Gulf of Kutch, *A. marina* was the only species recorded on the coast of Mundra with sporadic occurrence of *Rhizophora mucronata* and *Ceriops tagal* (Sawale and Thivakaran, 2013). Majority of the mangrove areas are represented by only one species i.e. *Avicennia marina*. Few other species such as *Rhizophora mucronata* and *Ceriops tagal* are planted by forest department as part of their mangrove conservation schemes. National

(forest conservation division) has granted Stage-I approval for diversion of 1576.81 ha. of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16 November 2018. Part of the diverted forest land area (253 acres) will be utilized for the proposed copper refinery project after all approvals.

As per the forest classification of Champion and Seth (1968), forest of Kutch district classified under the "Northern Tropical Thorn Forest". The forest area in the proposed project area consists of mostly Prosopis juliflora with scattered trees of *Anogeissus pendula, Acacia leucophloea, Zizyphus mauritiana, Prosopis cineraria, Salvadora persica* and *Salvadora oliodes etc.*

Apart from forest areas involved in the core area, there are forests areas present in the buffer zone which are under the jurisdiction of Kutch West Forest Division of Gujarat Forest Department (Table-4.3). These forest areas are well marked with a boundary wall indicating its possession by the forest department. These forest areas are of two vegetation types 1) Open scrub forest and 2) Mangroves. Total 6419.25 ha. of Reserved Forests area is present in the study area (Table-4.3). Most part of the reserve forest areas (83.0%) is in the form of mangrove forest falling in the creek systems on the coast. Remaining 17.0% falls in the open thorny scrubland forests dominated with *Prosopis juliflora*.

The inland open scrub forests are dominated with dense patches of *Prosopis juliflora* along with scattered plants of *Acacia nilotica*, *Prosopis cineraria*, *Zizyphus numularia, Salvadora persica, Salvadora oliodes, Capparis decidua, Calotropis procera, Balanites aegyptica, Butea monosperma, Acacia leucophloea, Casia auriculata etc.* The vegetation type of these forest areas are representative of desert eco-system. The details of the forest areas are given in Table-4.3.

The other type of reserve forests are located in the form of coastal area i.e. on high tidal mudflats which are harbouring sparse patches of mangroves and coastal vegetation details of these area is given in the section on mangroves.

Centre for Sustainable Coastal Management, Chennai, carried out a status survey ('Comprehensive and Integrated plan for preservation and conservation of mangroves and associated creeks in and around the Adani Ports and Special Economic Zone Ltd., Mundra, Gujarat') of the mangroves along the creeks and adjoining land/island as of 2016-17. The total mangrove cover of the area was estimated to be 2340 ha. There has been an increase of mangrove cover by 246 ha (~10%) compared to the mangrove area of 2011 (using aerial photo of 2011, NCSCM has estimated it to be 2094 ha). In 2016-17, out of 2340 ha, the dense mangroves were 629 ha contributing to 27% of total mangrove cover.

Most of the mangrove areas (83.0%) are located in the notified reserve Mangrove Forest areas of Navinal, Shiracha and Jarpara village coasts (Survey no-2 Mangrove Forests). The coastal area of Tunda, Navinal, Shiracha, Jarpara and Tragdi villages have patches of scattered, sparse and dense mangroves. Most of the mangroves are located on high-tidal mudflats and on the banks of creeks. Major creeks present in 10 km buffer zone study area are Kotdi-I, Kotdi-II, Baradimata-I and Baradimata-II. A sizable patch of dense mangrove is also located on the coast of Tragdi village. Closest mangrove distribution is located at 170 mtrs (on bank of Kotdi –II creek) from Southern most boundary of the proposed project site (Map-4.1, & Map-4.2, Plate-4.1). Dense mangrove formations are common on banks of creek from 0 to 75 meters where tidal water reaches every day. Rest of the mangroves are in the form of sparse stunted which are grown on the tertiary branches of tidal creeks.

Kotdi and Baradimata are shallow creeks compared to Bocha, Navinal and Khari creeks. Kotdi I exhibited least depth, and significant areas of the creek are exposed during low tide. In case of Kotdi II creek, though part of mouth is exposed during low tide, considerable sections of the inner parts of the creek have water at MLWS levels. The mouth regions of both main branches of Baradimata creek were covered with water during low tide. Due to the presence of water covered areas during low tide, both Kotdi II and both branches of Baradimata have conditions conducive for growth of mangroves.

4.4.3. Waterbodies

Our observation and literature review suggests that there are no major inland wetlands present within the study area i.e. core area or 10.0 km buffer area of the project site. Drainage pattern of the study area and project site are drained by several rivers and small tributaries, which are of dendritic pattern which remains dry in almost all the season. The Dhaneswari river (Danesri Nadi) a seasonal river (rain fed) flows in the western part of the project site. The water bodies flows through study area are Kotdi creek (0.5 km, S), Khari Nadi (1.9 km, W), Gulf of Kutch (3.9 km, S), Nagavanti Nadi (4.7 km, E) and Phot Nadi (8.7 km, ENE) from the project site. Natural drainage passing through the site will be suitably trained and maintained. These drainages have small check dams built on them which are known to accumulate overflowing runoff water for a short period. Apart from being important hydrological features in the semi-arid area, these check dams provide important habitat for many bird species and water source for wildlife in the region. One such drain is known as Khari River which flows from North-to South in western side of proposed project site. There is no check dam on this river in the vicinity of project site. However, all such drainages are seasonal in nature and flows only during rainy days. These drainages flows water from main land to Gulf of Kutch. Most of the stagnant water sources i.e. check-dams are located at substantial distances i.e. more than 2.5 km distance from the proposed project site. There will not be any diversion of rivers. Further, conveyer for copper concentrate and rock phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required.

4.4.4. Important Birdwatching Site

Majority of the waterbird species reported in the present study are found at Modhva mudflats located beyond 11.0 km south-west outside the study area. It is located adjacent to Sea water outfall of CGPL. Modhva area is a mix of sandy beach, saltpans, coastal mudflats with scattered mangroves and thorny bushes on the coast which provides a suitable mix of wetland habitat

to attract large populations of migratory and resident birds. Most importantly this area provides much needed staging and stop over sites for the migratory birds flying on Central Asian Migratory bird Flyway.

The Modhva coastal area is known amongst the birdwatcher as it is one of the important and prominent birdwatching and bird photography sites of Kutch. The national and international birdwatching tour agencies bring their keen birdwatching and bird photography clients to this birdwatching site of Kutch. The site is known for shore birds such as Crab plover, Oystercatcher and waterbirds such as flamingos etc. The site is therefore one of the important eco-tourism sites of Kutch. Therefore in view of its ecological and economical value, Modhva coastal area is considered as important site for conservation. Since it lies outside the study area i.e. 10.0km, there are negligible chances of impacts on this area by the proposed project.

4.5. Floral Diversity and Vegetation Type in Core & Buffer Area

We evaluated biodiversity and abundance parameters of vegetation/plant species in the core area and in the buffer area of the project site.

4.5.1. Vegetation Type & Community in Core Area & Buffer Area:

Core area: The proposed project site falls in the arid-semi arid climatic condition. Our field survey and literature review suggest that the vegetation types and community in the project area is that of semi arid-arid regions. It is represented by sparse thorny scrub vegetation in two industrial areas i.e. thermal power plants. The major part of the project area is devoid of large trees and mainly consists of dense and sparse shrubs i.e. *Prosopis juliflora, Prosopis cineraria, Acacia nilotica, Casia auriculata* and *Zizyphus numularia, caparis deciduas etc.* the major grasses include several species of *Cyperus* and herbs *Indigofera*. Details of vegetation survey results are discussed in forth coming sections.

Buffer area: The buffer area (10.0 km periphery) comprises mainly of agriculture fields, wastelands, forest plantation patches by forest department,

scattered bushes of *Prosopis juliflora, Prosopis cineraria, Acacia nilotica, Salvadora persica, Salvadora oliodes, Azadirachta indica. Prosopis juliflora* and *Zizyphus numularia* among the wild plants and cotton, coconut, dates, pomegranate, among the cultivated crops are the most dominant plants in the buffer area.

Except for highly scattered and small plants of *Commiphora wightii*, there were no rare, endangered or conservation concern species present in the close vicinity of the project area in the buffer zone. Major part of the buffer area is agriculture fields particularly on the Eastern side of the project area. Since ground water is saline up to 15 km from the coast and highly saline up to 4 km from the coast. Thus, dry land farming is practiced near the coast and irrigated farming is practiced in the farms that are 5-6 km away from the coast. Cotton, Jowar, Bajra are the main crops grown here. Some villages, especially in the central corridor are endowed with good surface water facilities, and irrigated agriculture is possible in these villages. Being semi-arid, arid zone, this region support low plant growth and therefore, not many large trees with sizable canopies are present in the buffer zone. However, at every village local people have managed to grow trees for shade, aesthetic and religious values.

Though, we could not report presence of some of the important species plant species (probably due to lack of rain species did not occur), according to literature survey, Navinal area at Mundra has representation of native vegetation of Kutch. Some of the important threatened plant species reported from the region include *Dipcadi erythraeum, Helichrysum cutchicum, Ephedra foliata, Heliotropium rariflorum, Tribulus rajasthanensis, Pavonia ceratocarpa, Convolvulus stocksii, Commiphora wightii*. Out of this *Helichrysum cutchicum, Ephedra foliata and Tribulus rajasthanensis* are endemic species. Gujarat State Biodiversity Board earlier proposed to declare the area as biodiversity heritage site. However the proposed development of the "Biodiversity Park at Navinal village, Mundra Taluka" has been shelved by Gujarat State Biodiversity Board, though initially proposed.

Hence, it is given to understand that the earlier proposed biodiversity park will not be further developed in the study area.

4.5.2. Floral Abundance, Frequency and Density

Based on our vegetation sampling data we derived various measures of abundance of plants species in the core and buffer area of the project site (Table-4.4). These parameters help understand the vegetation community structure in the project area/core area and buffer area/ surrounding area. We found total 12 species of Grass, 12 herbs, 4 shrubs and 2 tree species in the project core area. Where as we reported total 22 species of grasses, 26 species of herbs, 8 species of shrubs and 7 species of trees during our sampling efforts in the buffer areas. There could be more species of plants in the study area. However, our sampling and analysis of the vegetation data suggests that the abundance and density of plant species are lower in the core and buffer area (Table-4.4). This suggests that the area falls in Arid-semi arid condition. As per classification of biome, biogeographic zone, biogeographic province, this area falls in Indian Desert/Kutch Desert/Northern Thorny Scrub Forest. These classifications of the study area suggest lower abundance, density and diversity of plants in the region is reflected in our floral study of the project area.

4.5.3. Dominant Plant Species

Important Value Index is a parameter for calculating the dominance and diversity indices for vegetation as it is combination of frequency, density and dominance. Based on our survey results we found that *Prosopis juliflora* & *Zizyphus numularia, Salvadora,* in shrubs and *Cymbopogon martini, Aristida, Dichanthium annulatum,* in grasses and *Casia auriculata etc. in herbs* are the most dominant species in the region (Table4-4). This is derived through, the Important Value Index (IVI) that we calculated for various plant species through quadrate sampling (Table4-4). IVI for *Prosopis juliflora* was 58.7 in buffer and 103.0 in core area. Whereas, *Aeluropus lagopoides (9.5/47.2), Cymbopogon martinii (116.7/35.6)* were in the buffer and core areas respectively.

Table-4.4: Floral Diversity and their relative frequency, abundance density, important value index for core and buffer area.

No	Type/ Class	Species	Abundance		Relative Frequency		Relative Dominance		Relative Density		IVI	
			Buffer	Core	Buffer	Core	Buffer	Core	Buffer	Core	Buffer	Core
1	Grass	*Aeluropus lagopoides*	1.7	1.6	3.5	16.7	1.5	8.3	4.5	22.2	9.5	47.2
2	Grass	*Apluda mutica*	1.6	1.0	5.9	3.3	1.5	8.3	72.1	2.8	79.5	14.4
3	Grass	*Aristida adscensionis*	1.3		3.5		1.5		36.0		41.1	
4	Grass	*Aristida funiculata*	1.5	1.3	7.1	13.3	1.5	8.3	81.1	13.9	89.6	35.6
5	Grass	*Aristida histricula*	1.0		5.9		1.5		45.0		52.4	
6	Grass	*Cenchrus ciliaris*	1.0	1.0	3.5	6.7	1.5	8.3	27.0	5.6	32.1	20.6
7	Grass	*Chloris barbata*	1.2		5.9		1.5		54.1		61.4	
8	Grass	*Chloris quinquesetica*	1.0		4.7		1.5		36.0		42.2	
9	Grass	*Chrysopogon fulvus*	1.5		4.7		1.5		54.1		60.3	
10	Grass	*Cymbopogon martinii*	2.0	1.3	7.1	13.3	1.5	8.3	108.1	13.9	116.7	35.6
11	Grass	*Cynodon dactylon*	1.0		3.5		1.5		27.0		32.1	
12	Grass	*Cyperus difformis*	1.0	1.0	4.7	3.3	1.5	8.3	36.0	2.8	42.2	14.4
13	Grass	*Cyperus flavidus*	1.0	1.0	7.1	6.7	1.5	8.3	54.1	5.6	62.6	20.6
14	Grass	*Dactyloctenium aegypticum*	1.0		4.7		1.5		36.0		42.2	
15	Grass	*Dactyloctenium sindicum*	1.5		2.4		1.5		27.0		30.9	
16	Grass	*Desmostachya bipinnata*	1.0	1.0	1.2	10.0	1.5	8.3	9.0	8.3	11.7	26.7
17	Grass	*Dichanthium annulatum*	1.4	1.0	5.9	3.3	1.5	8.3	63.1	2.8	70.5	14.4
18	Grass	*Eragrostis cilianensis*	1.5	1.0	2.4	10.0	1.5	8.3	27.0	8.3	30.9	26.7
19	Grass	*Heteropogon contortus*	1.3	1.0	4.7	3.3	1.5	8.3	45.0	2.8	51.3	14.4
20	Grass	*Ischaemum indicum*	1.5		2.4		1.5		27.0		30.9	
21	Grass	*Sporolobus maderaspatenus*	1.2		5.9		1.5		54.1		61.4	

22	Grass	*Urochondra setulosa*	1.3	1.3	3.5	10.0	1.5	8.3	36.0	11.1	41.1	29.4
23	Herb	*Achyranthus aspera*	1.0	1.0	2.5	2.4	0.0	0.1	1.7	1.3	4.3	3.8
24	Herb	*Aerva javanica*	1.0	1.0	3.2	4.8	0.0	0.1	2.1	2.6	5.4	7.5
25	Herb	*Ageratum conezoides*	1.3		1.9		0.0		1.7		3.7	
26	Herb	*Aloe barbandensis*	1.0		0.6		0.0		0.4		1.1	
27	Herb	*Argemone mexicana*	1.0		1.9		0.0		1.3		3.2	
28	Herb	*Casia auriculata*	1.0	1.0	2.5	9.5	0.0	0.1	1.7	5.3	4.3	14.9
29	Herb	*Censia coromandelica*	1.0		1.9		0.0		1.3		3.2	
30	Herb	*Citrulus colocynthis*	1.0		1.9		0.0		1.3		3.2	
31	Herb	*Coculus hirsutus*	1.0		3.2		0.0		2.1		5.4	
32	Herb	*Cressa cretica*	2.3	1.0	2.5	4.8	0.0	0.1	3.8	2.6	6.4	7.5
33	Herb	*Crotolaria lutescens*	1.5		1.3		0.0		1.3		2.6	
34	Herb	*Fagonia indica*	2.0	1.0	1.9	4.8	0.0	0.1	2.6	2.6	4.5	7.5
35	Herb	*Indigofera cordifolia*	1.0	1.0	3.2	2.4	0.0	0.1	2.1	1.3	5.4	3.8
36	Herb	*Indoneesiella echioides*	1.0		1.3		0.0		0.9		2.2	
37	Herb	*Justicia procumbens*	1.0		1.3		0.0		0.9		2.2	
38	Herb	*Lepidagathis trimerus*	1.0		1.3		0.0		0.9		2.2	
39	Herb	*Leptochloa fusca*	1.0		1.9		0.0		1.3		3.2	
40	Herb	*Metanus emarginatus*	1.3	1.0	2.5	4.8	0.0	0.1	2.1	2.6	4.7	7.5
41	Herb	*peristrophe bicalyculata*	1.0	1.0	1.3	2.4	0.0	0.1	0.9	1.3	2.2	3.8
42	Herb	*Plantago ovata*	1.0		1.3		0.0		0.9		2.2	
43	Herb	*Salicarnia brachiata*	1.3	1.0	1.9	4.8	0.0	0.1	1.7	2.6	3.7	7.5
44	Herb	*Scirpus tuberosus*	1.0	1.0	1.3	4.8	0.0	0.1	0.9	2.6	2.2	7.5
45	Herb	*Solanum xanthocarpum*	1.0	1.0	3.2	4.8	0.0	0.1	2.1	2.6	5.4	7.5
46	Herb	*Suaeda meritima*	1.5	2.0	1.3	7.1	0.0	0.1	1.3	7.9	2.6	15.1

47	Herb	*Tephrosia purpurea*	1.0		1.9		0.0		1.3		3.2	
48	Herb	*Tribulus terrestris*	1.0		1.3		0.0		0.9		2.2	
49	Shrub	*Balanites aegyptica*	1.0		1.3		4.8		0.9		7.0	
50	Shrub	*Calotropis procera*	1.0	1.0	1.3	2.4	6.0	9.4	0.9	1.3	8.2	13.1
51	Shrub	*Capparis decidua*	1.0	1.0	5.1	4.8	5.2	9.4	3.4	2.6	13.7	16.8
52	Shrub	*Commiphora wightii,*	1.0		1.3		1.0		0.9		3.1	
53	Shrub	*Prosopis juliflora*	3.8	5.3	12.7	16.7	14.0	37.7	31.9	48.7	58.7	103.0
54	Shrub	*Salvadora oliodes*	1.0		2.5		12.1		1.7		16.3	
55	Shrub	*Salvadora persica*	1.0		2.5		12.1		1.7		16.3	
56	Shrub	*Zizyphus numularia*	1.3	1.0	7.6	7.1	4.8	4.7	6.8	3.9	19.3	15.8
57	Tree	*Acacia leucophloea*	1.2	1.0	3.8	4.8	4.8	18.8	3.0	2.6	11.6	26.2
58	Tree	*Acacia nilotica*	1.1	1.3	5.1	7.1	7.3	18.8	3.8	5.3	16.2	31.2
59	Tree	*Acacia senegal*	1.0		1.3		4.8		0.9		7.0	
60	Tree	*Acacia tortilis*	1.0		0.6		4.8		0.4		5.9	
61	Tree	*Avicennia marina*	5.0		0.6		4.8		2.1		7.6	
62	Tree	*Butea monosperma*	1.0		0.6		7.3		0.4		8.3	
63	Tree	*Prosopis cineraria*	1.0		3.2		4.8		2.1		10.1	

4.5.4. Invasive or Exotic Species

Prosopis juliflora is an evergreen tree native to South America, Central America and the Caribbean. In the United States, it is well known as mesquite. It is fast growing, nitrogen-fixing and tolerant to arid conditions and saline soils. *Prosopis juliflora* is an exotic and invasive widespread, multi-branched shrub/tree species in the India. It has been invading grasslands, native scrubland and forests of Gujarat and India.

Our study showed that the *Prosopis juliflora* is one of the most dominant and wide spread in the core and buffer areas of the project site. Our biodiversity, abundance, density measures suggests *Prosopis juliflora* is fast growing in the area.

4.5.5. Floral Biodiversity in the Study Area

In order to understand the status of vegetation communities in terms of stability, diversity indices such as species dominance, species diversity, similarity index and abundance are derived.

Table-4.5: Biodiversity indices (Averages) for core and buffer areas.

Indices	Buffer Area		Core Area	
	Grass	Other vegetation	Grass	Other vegetation
Specie Richness	22	41	12	18
Dominance_D	0.06	0.12	0.12	0.2573
Simpson_1-D	0.9446	0.881	0.8765	0.7427
Shannon_H	2.99	3.01	2.26	2.078
Evenness_e^H/S	0.90	0.4927	0.7988	0.4437

Shannon-Wiener Diversity Index: The biodiversity values for core and buffer areas were derived from the quadrate samples laid in the field. The value of the Shannon-Wiener Index usually lies between 1.5 and 3.5 for ecological data and rarely exceeds 4.0. Lower value of H' suggests degraded or arid conditions with low biodiversity values (Table-4.5). Our results suggest the H' value to be normal for the dry arid conditions. There was difference between the core and buffer area in terms of the diversity

indices. This was because core area mostly consists of Prosopis juliflora dominated bushes and saline land with open wasteland where as in buffer area there is variety of habitats and agriculture areas.

Species Richness (S): It is a count of the number of species found when the observers sample the community. It is represented by "S". Our data analysis for the core and buffer zone suggests that average species richness per sample is lower in core area compared to that of buffer area (Table-4.5). This is because of the difference in the land use types in core and buffer areas.

Simpson's Diversity Index (D): The Simpson index is one of the most meaningful and robust diversity measures available. In essence it captures the variance of the species abundance distribution. It is a diversity index proposed by Simpson (1949), to describe the probability that a second individual drawn from a population should be of the same species as the first. The value of D varies between 0 and 1. Our data analysis suggests that relatively core area is less diverse than the buffer area as the D value is higher in core area than in the buffer area (Table-4.5).

Evenness: It is a measure of species diversity, which quantifies how equal the community is numerically. The less variation in communities between the species show higher evenness. The value varies between 0 and 1. Our data analysis for core and buffer zone showed higher values of this index suggesting that the communities of vegetation does not vary much within the core and outside in the buffer areas (Table 4-5).

4.5.6. Endangered/Threatened/Protected Species

Our field survey in the project area suggest that there are no endangered, endemic, rare plant species present within the project boundary i.e. core area. However, we found an important species i.e. *Commiphora wightii*, in the buffer area with low abundance and frequency of occurrence (Table-4.4). This plant has high medicinal value and is facing the threats of extinction by

overexploitation for commercial purpose (GUIDE, 2009, Joshi et al. 2005) from Kutch.

4.6. Faunal Diversity and Species Inventory

The present study has made assessment of 3 major higher vertebrate classes such as Reptiles, Birds and Mammals. The assessment of fauna representing higher trophic levels in the ecosystem was carried out since their diversity acts as indicators of the health of the ecosystem in which they live. The details of the results/observations are given as following.

4.6.1. Reptiles Species Recorded During the Survey

Majority of the reptile species are fossorial in habit, therefore the assessment of reptiles and their diversity etc. holds special significance for any development project. In the present study we identified a total of 6 species of reptiles within the core area and 12 species in the buffer area (Table-4.6).

Table-4.6: Checklist of reptiles reported form the core and buffer area.

S. No.	Name of Species		Conservation Status as per IWPA-1972 (Schedule I to VI)	Conserv -ation Status as per IUCN	Observed/ Reported	
	Common Name	Scientific Name			Core Area	Buffer Area
1	Cheakered Keelback	*Natrix piscator*	Schedule-IV	LC		1
2	Common Skink	*Mubuya carinata*	Schedule-IV	LC	1	1
3	Fan Throated Lizard	*Sitana ponticeriana*	Schedule-IV	LC	1	1
4	Flap shell Turtle	*Lissemus punctatea*	Schedule-I	LC		1
5	Garden Lizard	*Calotes versicolor*	Schedule-IV	LC	1	1
6	Indian Fringe Toed Lizard	*Acanthodactylus cantoris*	Schedule-IV	LC	1	1
7	Indian monitor lizard	*Varanus bengalensis*	Schedule-I	LC		1
8	John Sand Boa	*Eryx johni*	Schedule-IV	LC	1	1
9	Rat Snake	*Ptyas mucosus*	Schedule-IV	NT		1
10	Saw scaled Viper	*Echis carinatus*	Schedule-IV	NT		1
11	Short tailed Agama	*Agama minor*	Schedule-IV	LC	1	1
12	Spiny-tailed Lizard	*Uromastix hardwickii*	Schedule-II	LC		1
VU=Vulnerable, EN=Endangered, NT=Near Threatened, LC=Least Concerned						

Of the reported reptiles species in the buffer area, 2 species (Flap shelled turtle and Indian Monitor Lizard) belong to Schedule-I of the Wildlife Protection Act 1972. No threatened species of reptiles as classified by the IUCN are reported from core or buffer area during our survey. The Indian Flap shell turtle was reported from waterbodies in buffer area which is common throughout country is also listed as least concerned by IUCN. However, one species belong to Schedule-II (Spiny tailed Lizard) where as reset of the species belong to Schedule-IV. Majority of the reptile species (except Rat snake and Saw scaled viper) reported from the buffer area fall in 'Least Concerned' category of IUCN. No endangered, rare, threatened or endemic species of reptiles was reported from the project core area.

4.6.2. Birds Species Recorded During the Survey

During the study we observed a total of 95 bird species in the study area. Majority of the species (74) are resident specie, where as only 21 species were found to be migratory (Table-4.7). Of these 95 recorded bird species, 89 belong to 'Least Concerned' category rated by IUCN where as total 6 species are i.e. Painted Stork, Oriental White Ibis, Eurasian Curlew, Lesser Flamingo, Oriental Darter and Black tailed Godwit belong to Near Threatened Species (Table-4.7).

Majority of the birds reported from the core and buffer area belong to the Schedule-IV of Wildlife Protection Act 1972 (Table-4.7). Whereas, total 5 species (Black shoulder kite, Eurasian Spoonbill, Indian Peafowl, Marsh Harrier, Shikra) belong to Schedule-I of IWPA 1972. Whereas House crow belong to Schedule-V.

The birds were recorded mainly from non-forested, degraded areas and in the surrounding agriculture landscape interspersed with scattered trees and drainages. The bird species groups observed in the study area were represented by species of open scrubland such as Passerines, Shrikes, Francolin, etc. and waterbodies birds such as Waders/shorebirds, Waterbirds, Egrets, Herons sandpipers, plovers etc. Majority of the birds

Table-4.7: Inventory of birds reported from the study area with their conservation status.

S. No.	Name of Species		IWPA-1972 Status	IUCN Status	Observation		Migratory
	Common Name	Scientific Name			Core	Buffer	
1	Asian Koel	*Eudynamys scolopacea*	Schedule-IV	LC		1	R
2	Baya Weaver	*Ploceus philippinus*	Schedule-IV	LC		1	R
3	Black drongo	*Dicrurus macrocercus*	Schedule-IV	LC	1	1	R
4	Black Francolin	*Francolinus francolinus*	Schedule-IV	LC	1	1	R
5	Black headed Gull	*Larus ridibundas*	Schedule-IV	LC		1	M
6	**Black shoulder kite**	***Elanus caeruleus***	**Schedule-I**	**LC**		**1**	**R**
7	Black winged stilt	*Himantopus himantopus*	Schedule-IV	LC		1	R
8	Black-tailed Godwit	*Limosa limosa*	Schedule-IV	**NT**		1	M
9	Blue rock pigeon	*Columba livia*	Schedule-IV	LC	1	1	R
10	Brown headed Gull	*Larus brunnicephalus*	Schedule-IV	LC		1	M
11	Cattle egret	*Bulbulcus ibis*	Schedule-IV	LC	1	1	R
12	Chestnut-bellied Sandgrouse	*Pterocles exustus*	Schedule-IV	LC		1	R
13	Comb Duck	*Sarkidiornis melanotos*	Schedule-IV	LC		1	R
14	Common babbler	*Turdoides caudatus*	Schedule-IV	LC	1	1	R
15	Common Coot	*Fulica atra*	Schedule-IV	LC		1	R
16	Common Crane	*Grus grus*	Schedule-IV	LC		1	R
17	Common Crested Lark	*Galerida cristata*	Schedule-IV	LC	1	1	R
18	Common Greenshank	*Tringa nebularia*	Schedule-IV	LC		1	R
19	Common Hoopoe	*Upupa epops*	Schedule-IV	LC	1	1	R
20	Common Iora	*Aegithina tiphia*	Schedule-IV	LC		1	R
21	Common Kingfisher	*Alcedo atthis*	Schedule-IV	LC		1	R
22	Common myna	*Acridotheres tristis*	Schedule-IV	LC	1	1	R
23	Common Redshank	*Tringa totanus*	Schedule-IV	LC	1	1	R
24	Common Sandpiper	*Actitis hypoleucos*	Schedule-IV	LC	1	1	R
25	Common tailor bird	*Orthotomus sutorius*	Schedule-IV	LC		1	R
26	Common Woodshrike	*Tephrodornis pondicerianus*	Schedule-IV	LC	1	1	R
27	Coppersmith Barbet	*Megalaima haemacephala*	Schedule-IV	LC		1	R
28	Crab Plover	*Dromas ardeola*	Schedule-IV	LC		1	M
29	Desert Wheatear	*Oenanthe deserti)*	Schedule-IV	LC	1	1	M
30	Dunlin	*Calidris alpine*	Schedule-IV	LC		1	M

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31	Eurasian collared dove	*Streptopelia decaocto*	Schedule-IV	LC	1	1	R
32	Eurasian Curlew	*Numenius arquata*	Schedule-IV	**NT**		1	M
33	Eurasian Oystercatcher	*Haematopus ostralegus*	Schedule-IV	LC		1	M
34	**Eurasian Spoonbill**	***Platalea leucorodia***	**Schedule-I**	**LC**		1	R
35	European Roller	*Coracias garrulus*	Schedule-IV	LC		1	M
36	Franklin's Prinia	*Prinia hodgsonii*	Schedule-IV	LC	1	1	R
37	Graceful Prinia	*Prinia gracillis*	Schedule-IV	LC		1	R
38	Great Cormorant	*Phalacrocorax carbo*	Schedule-IV	LC		1	R
39	Great White Pelican	*Pelecanus onocrotalus*	Schedule-IV	LC		1	M
40	Greater couckal	*Centropus sinensis*	Schedule-IV	LC	1	1	R
41	Greater Flamingo	*Phoenicopterus roseus*	Schedule-IV	LC		1	R
42	Greater Painted-Snipe	*Rostratula benghalensis*	Schedule-IV	LC		1	R
43	Green bee eater	*Merops orientalis*	Schedule-IV	LC	1	1	R
44	Green Sandpiper	*Tringa ochropus*	Schedule-IV	LC		1	R
45	Grey francolin	*Francolinus pondicerianus*	Schedule-IV	LC	1	1	M
46	Grey heron	*Ardea cinerea*	Schedule-IV	LC		1	M
47	House crow	*Corvus splendens*	Schedule-V	LC		1	R
48	House sparrow	*Passer domesticus*	Schedule-IV	LC		1	R
49	**Indian Peafowl**	***Pavo cristatus***	**Schedule-I**	**LC**		1	R
50	Indian pond heron	*Ardeola grayii*	Schedule-IV	LC		1	R
51	Indian robin	*Saxicoloides fulicata*	Schedule-IV	LC	1	1	R
52	Indian Roller	*Coracias benghalensis*	Schedule-IV	LC	1	1	R
53	Indian silverbill	*Lonchura malabarica*	Schedule-IV	LC	1	1	R
54	Jungle babbler	*Turdoides striatus*	Schedule-IV	LC	1	1	R
55	Jungle Crow	*Corvus macrorhynchos*	Schedule-IV	LC	1	1	R
56	Kentish Plover	*Charadrius alexandrinus*	Schedule-IV	LC		1	M
57	Large Egret	*Casmerodius albus*	Schedule-IV	LC		1	R
58	Laughing dove	*Streptopelia senegalensis*	Schedule-IV	LC	1	1	R
59	Lesser Flamingo	*Phoenicopterus minor*	Schedule-IV	NT		1	R
60	Little cormorant	*Phalacrocorax niger*	Schedule-IV	LC		1	R
61	Little egret	*Egretta garzetta*	Schedule-IV	LC		1	R
62	Little grebe	*Tachybaptus ruficollis*	Schedule-IV	LC		1	R
63	Little Ringed Plover	*Charadrius dubius*	Schedule-IV	LC		1	M

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64	Long tailed shrike	*Lanius schach*	Schedule-IV	LC	1	1	R
65	**Marsh Harrier**	***Circus aeruginosus***	**Schedule-I**	**LC**		1	M
66	Marsh Sandpiper	*Tringa stagnatilis*	Schedule-IV	LC		1	M
67	Median Egret	*Mesophoyx intermedia*	Schedule-IV	LC		1	R
68	**Oriental Darter**	***Anhinga melanogaster***	**Schedule-IV**	**NT**		1	R
69	Oriental magpie robin	*Copsychus saularis*	Schedule-IV	LC	1	1	R
70	Oriental White Ibis	*Threskiornis melanocephalus*	Schedule-IV	**NT**		1	R
71	Oriental White-eye	*Zoosterops palpebrosus*	Schedule-IV	LC		1	R
72	Painted Stork	*Mycteria leucocephala*	Schedule-IV	**NT**		1	R
73	Pied Avocet	*Recurvirostra avosetta*	Schedule-IV	LC		1	M
74	Pied Kingfisher	*Ceryle rudis*	Schedule-IV	LC		1	R
75	Purple Moorhen	*Porphyrio porphyrio*	Schedule-IV	LC		1	R
76	Purple sunbird	*Nectarinia asiatica*	Schedule-IV	LC	1	1	R
77	Red vented bulbul	*Pycnonotus cafer*	Schedule-IV	LC	1	1	R
78	Red wattled lapwing	*Vanellus indicus*	Schedule-IV	LC	1	1	R
79	River Tern	*Sterna aurantia*	Schedule-IV	LC		1	R
80	Rose ringed parakeet	*Psittacula krameri*	Schedule-IV	LC	1	1	R
81	Ruff	*Philomachus pugnax*	Schedule-IV	LC		1	M
82	Rufus tailed lark	*Ammomanes phoenicurus*	Schedule-IV	LC	1	1	R
83	**Shikra**	***Accipiter badius***	**Schedule-I**	**LC**		1	R
84	Singing Bush-Lark	*Mirafra cantillans*	Schedule-IV	LC	1	1	R
85	Southern Grey Shrike	*Lanius meridionalis*	Schedule-IV	LC	1	1	R
86	Stone-Curlew	*Burhinus oedicenemus*	Schedule-IV	LC	1	1	R
87	Sykes's Crested Lark	*Galerida deva*	Schedule-IV	LC	1	1	R
88	Variable Wheatear	*Oenanthe picata*	Schedule-IV	LC	1	1	M
89	Western Reef Egret	*Egretta gularis*	Schedule-IV	LC		1	R
90	White throated kingfisher	*Halcyon smyrnensis*	Schedule-IV	LC		1	M
91	White Wagtail	*Motacilla alba*	Schedule-IV	LC	1	1	R
92	White-eared Bulbul	*Pycnonotus leucotis*	Schedule-IV	LC	1	1	R
93	Wire-tailed Swallow	*Hirundo smithii*	Schedule-IV	LC		1	R
94	Wood Sandpiper	*Tringa glareola*	Schedule-IV	LC	1	1	M
95	Yellow wattled lapwing	*Vanellus malarbaricus*	Schedule-IV	LC		1	R

NT=Near Threatened, LC=Least Concerned; R=Resident, M=Migratory

observed in the study area represent birds of wetlands, coastal mudflats, wetland and semi arid non-forested landscapes etc. Moreover, many of the bird species reported in the present study are common even in human dominated landscapes such as urban cities, lakes and ponds etc. Majority of the waterbird species reported here are found from adjoining reserve forest areas, mangrove creeks, and mudflats located south-west side in the study area. Intertidal mudflats, saltpan and the coastal creeks provide suitable mix of wetland habitat which attracts large populations of migratory and resident birds. Most importantly this area provides much needed staging and stop over sites for the migratory birds flying on Central Asian Migratory bird Flyway. The Modhva coastal area is well known amongst the birdwatcher as it is one of the most important and prominent birdwatching and bird photography sites of Kutch. However, this site is located beyond 11.0 km therefore, lies outside the study area. Majority of the resident species reported in the study area are known to breed in this region as well as in entire Gujarat. No rare, endangered, endemic bird species were found to breed in the core project area.

4.6.3. Mammal Species Recorded During the Survey

We observed a total of 13 mammal species in the buffer area and 6 in the core area of the project site (Table- 4.8). The common mammalian species that were directly observed in the core area include Indian Jackal, Wild Pig, Common Mongoose, Indian Hare, Indian desert gerbil and Five Striped Squirrel etc.

No Threatened or Schedule-I species reported from the core area of the project site (Table-4.8). Indian Jackal, Jungle cat, Indian Fox, Common Mongoose belong to Schedule-II of IWPA 1972. Whereas Nilgai, Wildpig belong to Schedule-III. Rest of the species belong to Schedule-IV of WPA. Majority of the common mammalian species recorded during the survey in the core and buffer area are present throughout semiarid, non-forested and non-protected landscapes especially in Kutch region.

4.6.4. Dominant Faunal Species in the Core & Buffer Area

Based on our observations, interview survey of local people, forest officials and NGOs working in nature conservation activities in Kutch region, we found that Nilgai, Wild Pig are most common and dominant mammal species present in the landscape. Whereas there were several birds species belong to Passerine were most common and dominant group of birds present in the core and buffer area of the project site. Among reptiles, Spiny tailed Lizard, common garden lizard, monitor lizard etc. were most common species present in the buffer areas of the project site.

Table-4.8: Inventory and conservation status of mammals reported from study area.

S. No.	Name of Species		Conservation Status as per IWPA-1972	Conservation Status as per IUCN	Observation	
	Common Name	Scientific Name			Core	Buffer
1	Indian Jackal	*Canis aureus*	Schedule-II	LC	1	1
2	Jungle cat	*Felis chaus*	Schedule-II	LC		1
3	Indian Fox	*Vulpes bengalensis*	Schedule-II	LC		1
4	Nilgai	*Boselaphus tragocamelus*	Schedule-III	LC		1
5	**Chinkara**	***Gazella bennettii***	**Schedule-I**	**LC**		**1**
6	Indian Hare	*Lepus nigricollis*	Schedule-IV	LC	1	1
7	Wild Pig	*Sus scrofa*	Schedule-III	LC	**1**	1
8	Common mongoose	*Herpestes edwardsi*	Schedule-II	LC	1	1
9	Indian porcupine	*Hystrix indica*	Schedule-IV	LC		1
10	Palm squirrel	*Funambulus pennanti*	Schedule-IV	LC	1	1
11	Fruit Bat	*Cyanopterus sphynx*	Schedule-V	LC		1
12	Long-eared hedgehog	*Hemiechinus auritus*	Schedule-IV	LC	1	1
13	Indian desert gerbil	*Meriones hurrianae*	Schedule-IV	LC		1

4.6.5. Wildlife Corridors

Our observations suggested that there is no rare, endangered, conservation concern species of fauna present within the proposed project core area. The proposed project area for Copper Refinery Plant is not a part of any special habitat (breeding) for any of the Threatened or Schedule-I important fauna and does not provide any contiguity of habitats between two important habitats or any other protected areas. Moreover, the proposed project area is located in close to already industrialized zone therefore; it does not make part of any wildlife habitats. Apart from this, there are no protected areas located within 30.0km radius of the proposed project site therefore; the proposed area does not seem to make part of any wildlife corridors.

4.6.6. Identification of Species of High Conservation Significance

Based on our extensive field visits, literature survey, and consultation with experts & local people, we found following 8 species that are of high conservation significance (Table-4.9).

Table-4.9: Species of high conservation significance (Threatened or Schedule-I) present in the study area.

S. No.	Name of Species		IWPA-Status	IUCN Status
	Scientific Name	Common Name		
Reptiles	Flap shell Turtle	*Lissemus punctatea*	Schedule-I	LC
	Indian monitor lizard	*Varanus bengalensis*	Schedule-I	LC
Bird	Black shoulder kite	*Elanus caeruleus*	Schedule-I	LC
	Eurasian Spoonbill	*Platalea leucorodia*	Schedule-I	LC
	Indian Peafowl	*Pavo cristatus*	Schedule-I	LC
	Marsh Harrier	*Circus aeruginosus*	Schedule-I	LC
	Shikra	*Accipiter badius*	Schedule-I	LC
Mammal	Chinkara	*Gazella bennettii*	Schedule-I	LC

We found total 8 faunal species belong to Schedule-I of Wildlife Protection Act 1972. These species include 2 species of reptiles, 5 species of birds and one mammal. These species are present in the buffer zone of 10 km radius i.e. study area.

5. Potential impacts & Mitigations

Impacts of proposed Copper Refinery Plant on flora and fauna of surrounding area were identified mainly by using baseline ecological information presented in previous Chapter-4. The baseline information was collected through direct field visits and substantiated through secondary information including EIA, consultation with local people etc. We also utilized assessment provided in the EIA particularly Air modelling information. Finally, the baseline ecological information was juxtaposed with the project activities and impacts arising due to its construction and operation phases. The specific impacts were visualized in terms of issues related with the ecology of important species issues related with their habitats.

Following the above mentioned approach, impacts on various components of biodiversity were assessed. The component wise identification of potential impacts is deliberated below.

5.1. Anticipated Ecological Impacts of Proposed Project Activity

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha. of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology, which will be located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, Taluka Mundra, district Kutch, Gujarat.

The above mentioned project in absence of mitigation measures could have numerous ecological impacts during the construction and operation phases. The impacts during construction phase could be short term, temporary in nature and will be confined to the close boundary of the project site. Following are the general ecological impacts anticipated from the construction and operation phases of the copper refinery plant.

- Irreversible change in landuse/habitat worth the project area. Vegetation would be removed from the project site. Total 154.19 ha of APSEZ land and 102.39 ha. forest land would be converted to industrial use.

- Copper is a metal that occurs naturally in the environment, and also in plants and animals. Low levels of copper are essential for maintaining good health. Elevated levels of copper are toxic in aquatic environments and may adversely affect fish, invertebrates, plants, and amphibians.

- Chronic fugitive emissions and the material flow through water and air could potentially degrade aquatic and terrestrial eco-systems. Copper refinery is likely to release toxic fumes, pollutants such as compounds of sulphur, fumes of metals like Cd, Zn etc., & impurities like Ni, Fe, As, Sb in surrounding environment and cause irreversible damage to ecology if strict environment control measures are not implemented.

- The major impact on terrestrial ecology could be due to emission of dust which will settle on surrounding area soil and vegetation and it would gradually decrease biomass productivity of the eco-systems.

- During the construction work, the excavation of the soil take place and construction wastes such as oil, grease and debris may pollute the soil and decrease its productivity.

- The impact on the terrestrial ecology could be due to the emission of pollutants such as SO_2 and Particulate Matters (PMs) due to dusting. When sulfur dioxide combines with water and air, it forms sulfuric acid, which is the main component of acid rain. Acid rain can cause deforestation and could potentially acidify waterways to the detriment of aquatic life.

- Project site runoff drains into Kotdi creek system of Gulf of Kutch through minor drainages. Chronic spillage and flow of pollutants and

dust sediments from the project site through runoff could have severe impacts on flora and fauna of Kotdi creek system which include mangroves, birds, fishes, crabs etc.

5.2. Impacts on Terrestrial Flora

Baseline status of terrestrial vegetation clearly suggests that the project sites falls in semi-arid and coastal Biogeographic zone with low floral density and diversity.

Removal of vegetation: The proposed copper refinery Plant construction activities may involve removal of vegetation from the project site. Out of total 256.58 ha. 33% i.e. 85.79 ha. area would be used for green belt. Whereas 170.79 ha. area would be cleared off vegetation. Therefore, standing vegetation from total 170.79 ha. area would be removed permanently. The vegetation in the proposed project site consists of mostly *Prosopis juliflora* which is an invasive species. Therefore, the unavoidable removal of vegetation during construction activity from the core area could not be considered significant. However, it is recommended that minimum vegetation shall be removed from the project site and the important plant and tree species on the periphery of the project site be left as part of green belt development. Apart from this, project proponent would be providing compensatory land to forest department which would compensate the loss of forest land.

Pollution affecting soil, water & plants growth: Suspended particulate matter produced during construction and operational phase of the copper refinery plant would be deposited in the surrounding forest areas and water bodies including river will change habitat quality of aquatic and terrestrial ecosystem. Their direct deposition on vegetation causes loss of chlorophyll content in leaves, arrest of photosynthesis process, leaf injuries resulting in restricted growth and regeneration of plants. There are patches of forest plantations and mangroves located in the buffer area of the proposed project site.

According to air modelling carried out by EIA agency, it is predicted that the pollutants would travel up to 2.2 km North-East direction. The project area is partly located in the forest area. Also there are reserve forest areas located adjacent to the proposed project site, hence chances of pollutants and dust causing degradation of the forests and vegetation in surrounding area is higher if strict pollution control measures are not implemented. Development of thick green belt would also restrict pollutants spreading outside the premises. It is also recommended that a tall compound wall shall be built on the periphery of the project area premises this would restrict spread of pollutants.

Degradation of vegetation due to acid rain: It is also well known through number of studies that SO_2 emission from copper refinery plant has been a major cause of acid precipitation, commonly known as "acid rain," which can damage vegetation. These pollutants originate from copper plants and nearby thermal power plants would interact with reactants present in the atmosphere and result into acid deposition. Due to the interaction of these acids with other constituents of the atmosphere, protons are released causing increase in the soil acidity, lowering of soil pH mobilizes and leaches away nutrient cations and increases availability of toxic heavy metals. Such changes in the soil chemical characteristics reduce the soil fertility, which ultimately causes the negative impact on growth and productivity of forest trees and crop plants. Strict pollution control using state of the art technology measures would restrict emission of

Impacts on important flora: Though, we did not report presence of some of the important plant species (probably due to lack of rain species did not occur), according to literature survey, Navinal area at Mundra has representation of native vegetation of Kutch. Some of the important threatened plant species reported from the region include *Dipcadi erythraeum, Helichrysum cutchicum, Ephedra foliata, Heliotropium rariflorum, Tribulus rajasthanensis, Pavonia ceratocarpa, Convolvulus stocksii, Commiphora wightii.* Out of this *Helichrysum cutchicum, Ephedra foliata and Tribulus rajasthanensis* are endemic species. Our present survey

also reported presence of a 'Critically Endangered' species listed by IUCN i.e. *Commiphora wightii* in the surrounding forests and wasteland areas. If no strict pollution control measures are taken, these species and their habitats could be affected. *Commiphora wightii* is medicinally and economically important plant which has very slow growth rate in semi-arid zones. However, their population is quite small and isolated in the buffer area. Also they are found in quite stunted stage. It is recommended that project proponent shall financially support forest department's activities to conserve these endemic and important species found in this region by way of carrying out plantation activities specifically to conserve these species.

Impacts on Mangroves: The baseline information suggests that the coastal area of Tunda, Navinal, Shiracha, Jarpara and Tragdi villages have patches of scattered, sparse and dense mangroves. Most of the mangrove areas are located in the notified reserve Mangrove Forest areas of Navinal, Shiracha and Jarpara village coasts. Closest mangrove distribution is located at 170 meters South form the project areas on the bank of Kotdi creek (Map-4.2). However, a sizable patch of dense mangrove is also located on the coast of Tragdi village.

The closest mangrove distribution is located at 170 mtrs (on bank of Kotdi –II creek) from Southern most boundary of the proposed project site (Map-4.1, & Map-4.2). Therefore, the chances of damage to mangroves by fugitive emission are high which are located immediate south of the project site. Though the predominant wind direction is from south-west in the region, there are still chances of mangrove being impacted due to its close distance from the project site. It is therefore, recommended that strict pollution control measures shall be implemented so that the mangrove south of the project area are least affected.

Apart from the above mentioned impact, a drainage known as Dhaneshri Nadi flows through the western part of the project site and it drains into Kotdi Creek system. Kotdi creek system has sparse and dense mangrove growth on both sides. Therefore, if the Dhaneshri river/drainage is not trained

suitably, it may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity to mangrove and its habitats. Therefore, it is recommended that Dhaneshri River should be trained in such a way so that it does not carry runoff from the project area.

Since mangroves are important plants and constitutes important eco-system in the study area, it is recommended that project proponent shall chalk out a detailed mangrove conservation plan. Aim & Objective of mangrove conservation plan shall be to strictly avoid any damage by the project activities, preserve and add more mangrove areas. The mangrove conservation plan shall include following aspects.

- Identification potential mangrove plantation area in the study area for taking up mangrove plantations.
- Systematic monitoring of mangrove stock at every 5 years for 20 years. Monitoring shall include monitoring of species diversity, tree density, tree height, tree girth (GBH), regeneration classes, recruitment classes etc. in the study area.
- Creating awareness about mangrove and their conservation among local villagers in the study area.
- Review of the actions taken at every 5 years and extend the plan accordingly if necessary.

5.3. Impacts on Fauna

Though, the impacts of proposed plant and related construction activities may be on several faunal taxa, but for the present study we focused mainly on vertebrate classes i.e. reptiles, birds and mammals for identification of impacts and future monitoring purpose. Therefore, in the present study we identified impacts on the reptiles, birds and mammals particularly important, threatened, endemic and flagship species of the landscape.

5.3.1. Impacts on Reptiles

The baseline study has reported total 12 species of reptiles reported from the study area and 6 species from core area. No rare, endangered or Schedule-I species are reported from the core area i.e project site. However, Flap shell Turtle, and Indian Monitor Lizard are reported from the buffer area which belongs to Schedule-I of Wildlife Protection Act 1972. These species are listed as Least Concerned as per IUCN Red list categories. However, a species i.e. *Uromastix hardwickii* belong to Schedule-II which is reported form buffer area. This is a resident and most vulnerable species as it is localized and sedentary unlike other reptiles such as snakes and lizards. This species is often hunted or poached for their oil and meat. Therefore, it is recommended that during construction phase no construction workers shall be involved in poaching of such species. Since no rare or high conservation significance species of reptiles is present in the core and immediate buffer area of the proposed project site, the impact on the reptiles could be low.

5.3.2. Impacts on Birds

We observed total 95 species of birds in the study area. We identified total 5 species of high conservation significance which are species protected as Schedule-I species under Wildlife Protection Act 1972. Most important bird habitat is identified near Modhva coast, is located beyond 11.0 km distance i.e. outside the study area. Intertidal mudflat, sandy beach, mangrove, coastal thorn forest etc. Provide favourable and suitable habitats to large number of resident and migratory birds. Since this area is located beyound 10.0km south west from the project site, the impact of project activities is expected to be negligible due to opposite wind direction most time of the year. However, project proponent shall take utmost care in controlling dust, fugitive emissions and pollutants flowing to this area thorugh water or air. Therefore, it is recommende that the pollutoin control measures shall be strictly implimented by project proponent during construction and operation phase.

It is often noticed, that construction workers engage in poaching of wild animals particularly birds which are easy to trap using various methods. It is therefore, recommended that construction workers shall be strictly instructed so that they don't engage in such acts. It is also recommended that project proponent shall monitor the status of this ecologically and economically important birdwatching habitat as part of their periodic comprehensive biodiversity monitoring programme.

5.3.3. Impacts on Mammals

We observed a total of 14 mammal species in the buffer area and 6 in the core area of the project site. No Threatened or Schedule-I species reported from the core area of the project site. Majority of the common mammalian species recorded during the survey in the core and buffer area are present throughout semiarid, non-forested and non-protected landscapes especially in Kutch region.

There are only few most common mammals species present in the core area reported during the study. These species would be displaced during construction phase and operation phase. There is only one schedule-I species, present in the buffer area. Overall habitat degradation due to change in landuse pattern, pollution (dusting, air, and noise), increase human presence, increased illumination, increased traffic etc. in and around proposed project area would displace majority of the mammal species from the project core and surrounding buffer areas. Therefore, project proponent shall control emission and dust pollution which would not affect the forest areas and vegetation in the surrounding area which provides resting and feeding habitats to mammalian species in the study area.

this project thousands of plants were raised and planted in entire Kutch region. This project has improved the number and density of the species in the region.



Impacts: The construction of copper refinery plant and allied industrial development operations would involve large scale removal or vegetation, excavation, material handling, could result in habitat degradation due to air borne dusting from copper plant, effluent discharge, pollution load, movement of vehicle etc. can potentially affect the density and distribution of this species in the buffer area.

Recommendations: AEL shall put in place all kinds of pollution control measures so that the surrounding vegetation is not degraded and this species along other plants survive normally in the study area. AEL shall carryout comprehensive biodiversity monitoring at regular intervals in order to check impact of their project activities on surrounding area and special emphasis shall be given to this species. It is also recommended that company should take up plantation of *Commiphora wightii* by involving local forest department, which has vast experience of carrying out plantation of this specialized plant species. Since removal of vegetation would be done in the first year of commencement of the project, it is advised that the plantation shall be carried out in the first year itself. Since the plant is slow growing, it is recommended that a total of 10.0 ha. of *Commiphora wightii* plantation shall be done in the first year itself. Rest of the time Kutch East Forest Division would carry out maintenance of the plants. This plantation shall be carried out in the reserved forests, unclassed forests or roadside areas as found suitable by the Kutch East Forest Division.

6. Wildlife Conservation Plan

Based on our field observations and literature survey we found several species important plant and animal species as well as Schedule-I wildlife species in the study area (Table-6.1). We reported a plant species and 12 animal species. The faunal wildlife species include 2 species of Reptiles, 9 species of birds and one species of mammal.

Table-6.1: Species of higher conservation significance present in the study area.

S. No.	Name of Species		IWPA-1972 Status	IUCN Status
	Common Name	Scientific Name		
Plants	Gugal	*Commiphora wightii*		CR
	Mangroves	*Avicennia marina*	Important	LC
Reptiles	Flap shell Turtle	*Lissemus punctatea*	Schedule-I	LC
	Indian monitor lizard	*Varanus bengalensis*	Schedule-I	LC
Bird	Black shoulder kite	*Elanus caeruleus*	Schedule-I	LC
	Eurasian Spoonbill	*Platalea leucorodia*	Schedule-I	LC
	Indian Peafowl	*Pavo cristatus*	Schedule-I	LC
	Marsh Harrier	*Circus aeruginosus*	Schedule-I	LC
	Shikra	*Accipiter badius*	Schedule-I	LC
Mammal	Chinkara	*Gazella bennettii*	Schedule-I	LC

Species wise status, impacts and the mitigation measures are suggested in as follow.

6.1. CRITICALLY ENDANGERED PLANT SPECIES:

Gugal: (*Commiphora wightii*)

Status: Our field survey in the proposed project area revealed that there is a critically endangered plant species present in the buffer areas. However, this plant was found with low density in the buffer area. This plant has high medicinal values and is facing the threats of extinction by overexploitation for commercial purpose (Silori et al., 2004; Joshi, 2002; GUIDE 2009) from Kutch. However, recently Gujarat Forest Department has accomplished a large scale project on plantation of *Commiphora wightii* in Gujarat. Through

6.2. SCHEDULE-I FAUNA

Among the fauna, we reported total 8 animal species. As mentioned above, the faunal wildlife species include 2 species of Reptiles, 5 species of birds and a species of mammal.

6.2.1. REPTILE/ INDIAN FLAP SHELL TURTLE/ MONITOR LIZARD

Status: During our study this species of reptile was recorded form the small village ponds in the study area. The species is resident and breeding in the buffer areas. The Indian Flap shell Turtle (*Lissemys punctata*) is a freshwater species of turtles are widespread and common in the South Asian provinces. They are listed as Schedule-I species under Wildlife Protection Act 1972 and as Least Concerned as per IUCN threat categories. Monitor Lizard is also one of the reptile's species which is found in the study area.



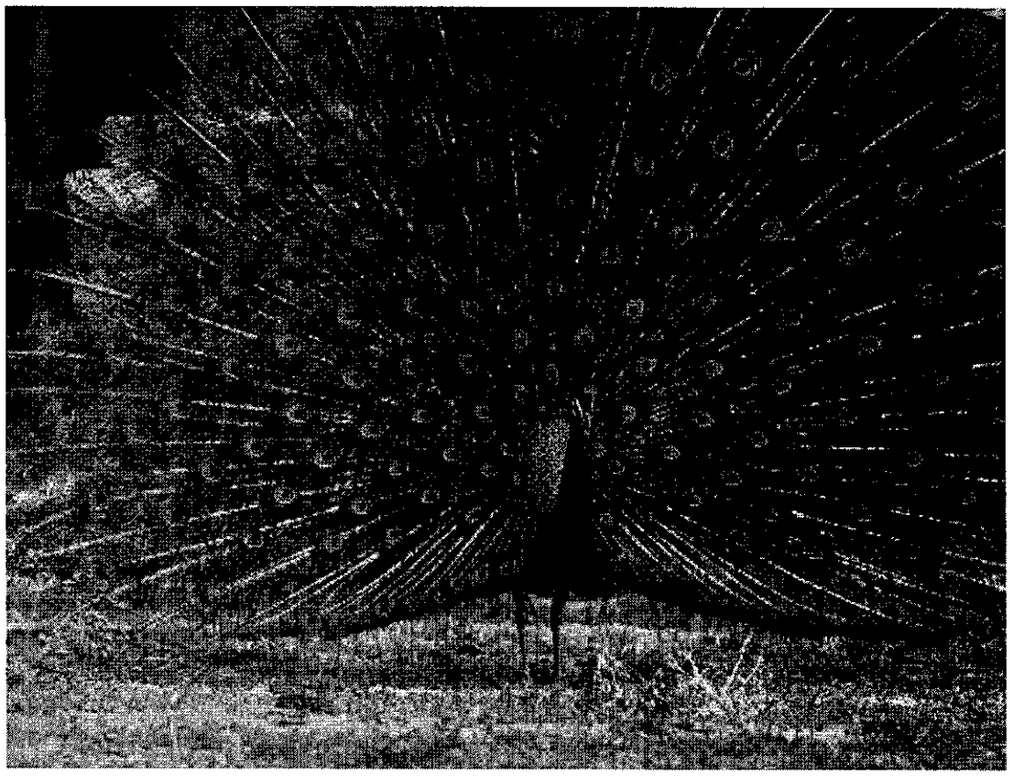
Impacts: Since this species is an aquatic and cold blooded, it may be subjected to impacts related to water pollution and hydrological impacts arising due to project activities. These may include degradation of water sources, soil characteristics, choking of drainages etc. This species is otherwise not hunted or eaten by the people. Therefore, changes of degradation of overall aquatic habitat qualities in the buffer area are likely to affect these species and their distribution.

Recommendations: AEL shall put all kind of pollution control measures in place so that surrounding area ecological conditions are not degraded. During construction it shall be seen that no drainage, ponds etc. are damaged or altered. AEL shall carryout comprehensive biodiversity monitoring at regular intervals in order to check impact of their project activities on surrounding area and special emphasis shall be given to

monitoring of surface (drainage, check dams, ponds) water and wetlands in the buffer area.

6.2.2. BIRDS/ INDIAN PEAFOWL

Status: The Indian Peafowl *(Pavo cristatus)* is a resident breeder in the Indian subcontinent. The bird was justifiably declared as the national bird of India in year 1963 due to its 'flagship' value founded on its glorious position in mythology and its widespread distribution in the country.



The species is found in dry semi-desert grasslands, scrub and deciduous forests. It forages and nests on the ground but roosts on top of trees. It eats seeds, insects, fruits, small mammals and reptiles. The Indian Peafowl is a ground nesting bird and it lays a clutch of 4-8 eggs which take 28 days to hatch. The eggs are light brown and are laid every other day usually in the afternoon. The male does not assist with the rearing, and is polygamous. Poaching of peacocks for their feathers and poisoning by feeding on pesticide treated seeds are known threats to wild birds. Under the law, collection of tail feathers is allowed only when the bird sheds them. The

Indian peafowl is under various threats that include the demand for feathers and wild meat, conflict with farmers during cropping season, increased use of chemical fertilizers and pesticides and habitat degradation.

Impacts: Our field study reported presence of Indian Peafowl in the buffer areas of project site. The species was observed in the buffer area of 10 km radius particularly near human habitations, villages and agriculture fields. Since our study reported presence of Indian Peafowl in the buffer area, its possibility of nesting in buffer area could not be ruled out. Since Indian Peafowl is a ground nester, several project activitie can have adverse impacts on their nesting grounds such as pollution, degredation of soil and vegetation from surrounding ara and in the forest areas. Direct disturbance by presence of people, vehicle, their noise, vibrations, lights etc. can potentially disturb most of the bird species.

Recommendations: following actions for the conservation and protection are suggested in wildlife conservation action plan to reduce impacts of project related activities on the species. Based on our field observation on the distribution, behavioral ecology, conservation need, and envisaged impacts of proposed copper refinery project, we identified several species specific actions that would help reduce the impacts of project on Indian Peafowl as under.

i. A rapid survey for the breeding population of Indian Peafowl during their nesting season shall be carried out in pre-monsoon season by wildlife experts so as to ensure that no nesting of the species is present in and around project or corea area.

ii. Since Indian Peafowl is a ground nesting bird, construction activities could disturb their nesting activities. Therefore if nesting of peafowl is found, in core area, construction activities should not be carried out in that particular block. Construction activities should resume only after egg hatching is completed and the fledglings leave the nest.

iii. Avoid vehicle movement in the area where nesting is found. The movement of vehicles or humans shoul be prohibited in vicinity of the nesting area.

iv. Electric lines within the project area and outside the project area shall be designed to minimize the potential for electrocution of indian peafowl and other such large birds.

v. Lightings within the project area could potentially deter the species presence. Therefore, AEL shall ensure that minimum illumination comes out from the project area. This can be done by adjusting the angles of the light sources and using low intensity focused bulbs inside the project area.

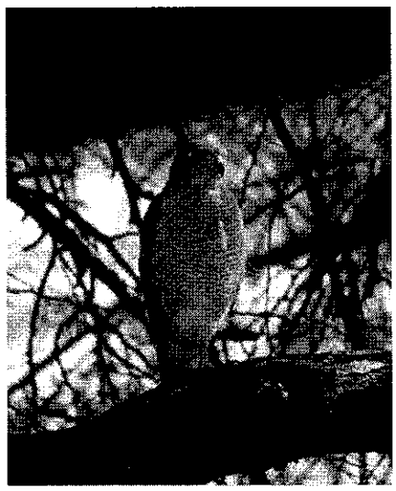
vi. Tree Plantation shall be carried out by AEL in the surrounding villages and schools etc. in the buffer area. This would help the species and provide them much needed roosting place.

vii. Staff involved in construction and operation activities shall be trained and made aware of Indian Peafowl's status as National Bird of India, and Schedule-I species protected under Indian Wildlife Protection Act 1972. This is important because if there any casualties of the species are found then they should report to the project authorities and the local forest department to carryout further necessary actions.

6.2.3. BIRDS/ SCHEDULE-I RAPTORS

Status: Total 3 bird species i.e. terrestrial Raptors belonging to Schedule-I of Wildlife Protection Act 1972 are reported from the study area. These species are Black shoulder kite, Marsh Harrier, Shikra. Of these 3 species of Raptors, none are reported from the core area and all 3 are reported from buffer area. The species of Harriers are migratory bird species whereas, rest of the species are resident species. Most of the raptor species are recently added to Schedule-I list through amendment made in year 2013.

Impacts: These 3 species of terrestrial raptors are predators and occupies tertiary consumers positions in the food chain and ecological pyramids. Therefore, any change in primary productivity would affect their distribution, density and population in the region. Therefore, project activities resulting in air, water and noise pollution, degradation of vegetation would potentially affect the habitat of these bird species and their population in the study area. Moreover, direct disturbance by presence of people, vehicle, their noise, vibrations, lights etc. can potentially displace most of the raptors species from the project area and its immediate surroundings.

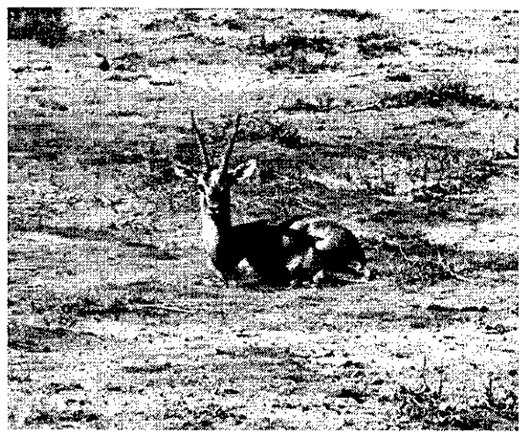


Recommendations: It is recommended that AEL shall take utmost care in controlling dust, fugitive emissions using state of the art technologies and put in place all types of pollution control measures during construction and operation phases which would ensure minimum degradation of surrounding vegetation, forest area vegetation and waterbodies. Minimize vehicle movements around the project areas. Adjust lightings within core area and ensure minimum illuminations spreads outside the project area. Keep all the machineries maintained so that minimum noise and vibrations are generated in the surrounding area. Since most of the raw materials and products are to be carried through conveyer belts the impact related to vehicle movements would be low.

6.2.4. CHINKARA (*Gazella bennettii*)

Status: The important herbivore present in the buffer area is Chinkara which is protected as Schedule-I species in Wildlife Protection Act 1972. During our survey, we reported presence of Chinkara through direct sightings in the buffer area in the study area. Indian gazelle is a shy animal and avoids human habitation. It stands at 65 centimetres and weighs about 23 kilograms. It can go without water for long periods and can get sufficient

fluids from plants and dew. Although most individuals are seen alone, they can sometimes be spotted in groups of up to four animals. It lives in grasslands and desert areas in India. Its population is on the decline due to it being hunted for game. Narayan Sarovar Wildlife Sanctuary and its surrounding areas are known for Chinkara population. The sanctuary is also known as Narayan Sarovar Chinkara Sanctuary. The species is common in landscape of Kutch and North Gujarat. The species is listed as Schedule-I in Wildlife Protection Act 1972 and as Least Concerned by IUCN. The species needs safe, undisturbed arid semi arid plains with open and sparse vegetation.



Impacts: This mammal species is likely to be using surrounding area for their feeding and breeding. They are also likely to be using waterbodies in the buffer area for their requirement of water. The impacts of copper refinery and allied development activities on herbivore are likely to be direct as they are primary consumers in the eco-system. Degradation of soil, vegetation and habitat due to chronic pollution loads the species would lose its feeding ground and breeding area. Moreover, the direct loss of habitat worth the core area is also an irreversible loss to the species. Therefore, changes in overall habitat qualities in the buffer area are likely to affect these species. The direct disturbance to these species by vehicle traffic, poaching by workers, and human intrusion in wildlife habitat is also issue of some concern.

Recommendations: It is recommended that AEL shall comply with all the pollution control and other conditions imposed in the environmental clearance by MoEF&CC. Compliance of all the conditions in environment clearance by MoEF&CC would take care of major issue of habitat degradation for the species. AEL shall instruct their own staff members and workers not to indulge in chasing or killing of Chinkara in the study area. AEL

shall also support forest department in conducting awareness of local people towards wildlife conservation and law reinforcement and anti poaching activities in the study area. AEL shall support forest department in installing sign boards on roads and strategic locations of villages informing prohibition of killing, poaching etc. under wildlife protection act 1972.

6.3. IMPACT – MITIGATION MATRIX & CONSERVATION PLAN

Based on our observation, literature review and consultation with local people, and NGO, we formulated following impact *vs* mitigation matrix (Table-6.2). The matrix is created using information and data collected during our field visits and the information available in public domain. We calculated distances of sensitive ecological receptors such as protected areas, their eco-sensitive zones, biodiversity heritage sites, important bird areas, mangrove, reserve forests, wetlands, rivers etc. from project core areas. Professional judgements and recommendations are made based on our experiences and the parameters used for predicting impacts.

6.4. WILDLIFE MITIGATION MEASURES & RECOMMENDATIONS

Based on our field study, information collected and consultation with project proponent, local community etc. we recommend following mitigation measures as self regulatory, monitoring and compensatory measures for protection, conservation and betterment of wildlife and ecology in the surrounding area of project site.

6.4.1. REGULATORY MITIGATION MEASURES & RECOMMENDATIONS

i. Since project deals with heavy metals, acids and hazardous materials, it is recommended that strict control on fugitive emission, dust pollution shall be carried out using state of the art methods and technologies. Maximum area under intensive use shall be made of hard floor. Professional dust suction system from the area under intensive use shall be placed.

Table-6.2: General Impacts vs. mitigation matrix & Conservation plan.

Issue		Status	Impacts	Mitigation
Ecosystems	Protected Areas	All the protected areas of Kutch are located beyond 70 km from the proposed project area. Marine National Park and Sanctuary areas are located beyond 30 km south of the proposed project in Gulf of Kutch.	No impacts are envisaged, as these areas are located at greater distances.	• Nil
	Eco-sensitive zone	No eco-sensitive zones of any Wildlife Sanctuary or Naitonal park are located within 30 km from the proposed project area.	No impacts are envisaged, as these areas are located at greater distances.	• Nil
	Wetlands & waterbodies	No major inland wetlands are located within study area. Marine wetlands include Kotdi creek (0.5 km, S), Baradimata creek (4.0km SE), Gulf of Kutch (3.9 km, S), Seasonal drainage/rivers are Nagavanti Nadi (4.7 km, E) and Phot Nadi (8.7 km, ENE), Khari Nadi (1.9 km, W), A drainage known as Dhaneshri Nadi flows through the western part of the project site and it drains into Kotdi Creek system. Small check-dams and nallah are present in the study area at distance.	• Kotdi creek system has sparse and dense mangrove growth on both sides. • Dhaneshri river/drainage may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity in mangrove habitats. • If dusting, fugitive emission are not controlled, it could cause major damage to mangroves.	• Therefore, it is recommended that Dhaneshri River should be trained in such a way so that it does not carry pollutants with runoff from the project area. • Install state of the art technologies so that pollution from the project area remains within applicable standards. • Check health of mangrove eco-system at regular intervals. • Prepare a comprehensive mangrove conservation plan for Kotdi and Baradimata creek system's mangroves located in the study area.

	Important Bird Areas	Banni & Naliya grasslands are two major IBAs of Kutch	No impacts are envisaged, as these IBAs are located far away, 70 km from the project site.	Nil
	Forest Area	Reserve Forest, Unclassed forest areas are located adjacent to proposed project area. In fact part of the project area would be located on diverted Forest land of Siracha village. The south of the proposed project area there are mangroves which are also declared as reserve forest areas by state forest department. Navinal reserve forest area is also located at 500 mtrs distance only from the proposed project area in east direction.	Direct loss of forest land worth 102.39 ha. Pollution loads from project activities could potentially degrade remaining forest land located in Siracha village, Navinal forest area and mangrove reserve forests. As per EIA/air modelling, it is learnt that 2.2 km North-East direction there will be impacts of air pollution. This means it would affect reserve forest area of Navinal. As per literature survey, Navinal area has presence important native species of plants. This forest area would be affected due to chronic air pollution impacts.	• Compensate loss or damage to Forest area due to pollution by taking up plantation of native species. • Construct tall wall around project boundary so that dusting, possibility of fire etc. are minimized. • No roads or trespassing shall be done by staff or workers through Forest area. • No collection of fuel wood from forest land shall be allowed. • No worker camps, dumping of solid waste, over burden inside forest land shall be allowed. • Fire and safety precautions shall be in place during construction and operation phases. • Green belts as per conditions of Environment Clearance shall be created using native species of plants in the periphery of project area. • Install state of the art technologies so that pollution from the project area remains within applicable standards.
	Mangroves	Mangroves are located at 170 mtrs from the project boundary in Kotdi and Baradimata creek systems on the coast of Gulf of Kutch	• Kotdi creek system has sparse and dense mangrove growth on both sides. • Dhaneshri river/drainage may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity in mangrove habitats.	• It is recommended that Dhaneshri River should be trained in such a way so that it does not carry pollutants with runoff from the project area. • Ensure that strict pollution control measures are implemented in the project. • Check health of mangrove eco-system at regular intervals. • Prepare a comprehensive mangrove

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			• If dusting, fugitive emission are not controlled, it could cause major damage to mangroves.	conservation plan for Kotdi and Baradimata creek system's mangroves located in the study area. • Take up mangrove restoration and afforestation activities in consultation with Kutch East forest division.
	Ramsar Site	There are no Ramsar Sites in Kutch district.	Nil	Nil
Flora	General Vegetation	This area has native vegetation representative of semi arid zones. These include typical tropical thorn forest area comprising of *Acacia, Salvadora, Caparis, Ziziphus, Commphora species.*	There will be irreversible loss of native vegetation from the core area i.e. 256.58 ha. The native vegetation from the immediate surroundings of the proposed project site would also be affected due to pollution load.	• Remove minimum vegetation from core area. • Install state of the art technologies so that pollution from the project area remains within applicable standards. • Vehicle movements shall be minimum. • No vegetation shall be cut by workers from surrounding area. • No collection of fuel wood from surrounding land shall be allowed. • Fire and safety precautions shall be in place during construction and operation Thick green belts shall be created using native species of plants in the periphery of project site.
	Important plant Species	*Commiphora wightii is* an important plant which is listed as Critically Endangered by IUCN. This plant is present in core and buffer area.	This important plant species would be affected in the surrounding area due to air and water pollution loads from project activities. As per EIA/air modelling, it is learnt that 2.2 km North-East direction there will be impacts of air pollution. Chronic air pollution would affect plant growth in this area.	• Thick green belts shall be created using native species of plants in the periphery of project area. • In order to compensate for the potential damage/degradation of *Commiphora wightii* habitats AEL shall carry out plantation through Kutch-East Forest Division, Bhuj.

Fauna	Threatened or Endemic fauna Species	No threatened fauna species are reported from the study area during survey. i.e. core or buffer area during study.	Though, not reported during the present study, there may be presence of these species in future. Degradation of overall habitat could affect these species.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Thick green belts shall be created using native species of plants in the periphery of project site. • Carryout biophysical monitoring of intertidal zone located south of project area at every 6 months.
	Schedule-I Reptiles	The Indian Flap shell Turtle (*Lissemys punctata*) is present in ponds and small wetlands of buffer area. Indian Monitor Lizard is present in agriculture, open scrubland and thorny bushes in the project area.	Degradation of overall terrestrial and aquatic habitat qualities in the buffer area are likely to affect these species and their distributions.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Monitoring of biodiversity including these species and take corrective measures if needed. • Carry out habitat improvement activities through forest department in surrounding reserve forest areas, which would ensure their long term survival in the region.
	Schedule-I Birds	Indian peafowl and 7 Schedule-I bird species i.e. terrestrial Raptors are present in study area.	Pollution load, overall habitat degradation, direct loss of habitat worth 256.58 ha. and direct disturbance due to vehicle movements, illuminations and project activities could displace and disturb these species from the immediate surroundings of the project area.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Maintain machinery so minimum vibrations and noise is controlled within the applicable standards at the boundary of the project. • Adjust lightings in the core area so minimum illumination spread outside core area. • Thick green belts shall be created using native species of plants in the periphery of project boundary. • Cary out tree plantations in surrounding villages to augment habitat for Indian Peafowl and other schedule-I birds species.

			• Monitor biodiversity including bird species and take corrective measures accordingly. • Carryout habitat improvement activities through forest department in surrounding reserve forest areas, which would ensure their long term survival in the region.
Schedule-I Mammals	Only one species of Schedule-I mammal is reported i.e. Chinkara from the study area. None from core area. It is mostly reported from the reserve forest areas within the study area.	Overall degradation of habitat due to pollution. Direct disturbance due to Noise, vibration due to vehicle movements could displace or deter this species. Lighting and illumination could displace the species from surrounding area. Hunting, chasing, killing by workers, road kills etc. are also envisaged.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Maintain machinery so minimum vibrations and noise is generated. • Adjust lightings in the core area so minimum illumination spread outside core area. • Thick green belts shall be created using native species of plants in the periphery of project area. • Monitor biodiversity including mammal species and take corrective measures accordingly. • Provide funds for habitat improvement activities by the forest department in surrounding reserve forest areas, this could ensure their long term survival in the region.
Wildlife Corridors	No wildlife corridor is identified under any legal framework in the study area.	Nil	• Nil

ii. Ambient noise pollution and vibrations during construction and operation phases of copper refinery plant shall be within limits of the standards mentioned.

iii. Plantation of thick green belt on periphery of the project site shall be created using native and hardy tree species.

iv. Ensure no movement of vehicles or people through Forest Areas located immediate north (Siracha) and east (Navinal) of proposed copper refinery plant area.

v. Ensure zero discharge of waste water from the project site into surrounding area.

vi. Ensure safe passage of runoff through drainages located within and nearby the project area. It is recommended that a seasonal drainage/river (Dhaneshri River) should be trained in such a way so that it does not carry pollutants from the project site into mangrove eco-system located immediate south of the project boundary.

vii. Ensure no dust, fly ash, sediments, or any raw materials spill out from project areas and flow into nearby drainage, forest areas during the operation phase of the project.

viii. AEL shall ensure that their construction workers and other staff during construction or operational phase shall not be involved in poaching and hunting activities of birds, reptiles or mammals around the project site.

ix. Implement state of the art technologies to control pollution caused form the proposed project.

x. No trespassing or vehicle or people shall be allowed through, surrounding forest area or the mangrove eco-system. This shall be instructed to the workers and staff in advance.

xi. No workers camps shall be established within the surrounding forest area. This shall be instructed to the workers and staff in advance.

xii. No resources (i.e. fuel wood, stones, sand, soil etc.) from the surrounding forest area shall be collected by staff or workers. This shall be instructed to the workers and staff in advance.

xiii. No workers or staff members shall be involved in poaching or killing of any wild animals throughout the project life cycle. This shall be instructed to

the workers and staff in advance and sign boards to this effect within project area.

6.4.2. MONITORING MEASURES & RECOMMENDATIONS

xiv. AEL shall regularly monitor health of the forest areas (Siracha and Navinal village), mangrove eco-system (Kotdi and Baradimata creeks) and biodiversity in the study area.

xv. AEL shall carryout annual monitoring of mangrove eco-system in Kotdi and Baradimata creeks. Details of monitoring are provided in mangrove conservation plan.

xvi. After commencement of the project AEL shall carryout comprehensive ecological & biodiversity monitoring at every 2 years for 10 years. The monitoring shall include status of flora, fauna and health of reserve forests and mangrove eco-system present in the immediate proximity of the proposed project site. In case any changes, damage is reported to them AEL shall take necessary corrective measures accordingly. AEL shall bear the cost of third party monitoring.

xvii. Overall official monitoring would be carried out by Kutch-East Forest Division, Bhuj. AEL shall pay the administrative and monitoring cost for the same.

6.4.3. COMPENSATORY MEASURES & RECOMMENDATIONS

xviii. In view of the probable impacts of construction and operation of copper refinery project on mangroves of Kotdi and Baradimata creek areas, AEL shall chalk out Mangrove Conservation plan.

xix. In order to compensate for the potential damage/degradation of *Commiphora wightii* habitats AEL shall carry out 10.0 ha. of plantation through Kutch-East Forest Division, Bhuj.

xx. In view of the distribution of species of higher conservation significance and the Schedule-I species, in the study area particularly within the reserve forests around the project area, it is recommended that AEL shall financially support wildlife habitat improvement activities being carried out by Kutch East Forest Division.

6.5. IMPLEMENTATION OF MITIGATION PLAN

- Since the project is located away from protected area and their eco-sensitive zones, most of the wildlife mitigation recommendations are self regulatory for user agency, therefore the implementation of these mitigation measures shall be carried out by the user agency (AEL) through their own staff and CER budget.
- A special emphasis on ecological conservation shall be given by extending special responsibility to senior environment authority within the management of the proposed project authority. A senior ecologist shall be employed / consulted on regular basis to oversee ecological/wildlife conservation activates under CER. The senior personal responsible for the conservation of ecology shall report directly to the head of the organization.
- Substantial budget shall be allocated to carryout ecological conservation activities by the user agency (ACL).
- Any additional conditions towards wildlife mitigation activities by any of the Environment Appraisal Committees at state or central levels or by the Forest department shall be complied with.
- Annual Compliance report for these activities shall be submitted to Kutch West East Forest Division, Bhuj, Gujarat.

6.6. MONITORING OF MITIGATION & COMPLIANCES

Though, most of the recommendations are self regulatory for user agency, monitoring of these recommendations and other conditions imposed by various agencies towards wildlife mitigation measures shall be monitored by a third party agency. Third party monitoring would involve comprehensive ecological/biodiversity study at interval of 2 years for 10 years. These studies would be carried out to evaluated long term impacts of the proposed project activities on the wildlife, biodiversity, ecology and forest areas present in the 10 km periphery of the project site. Therefore, as per guidelines issued by the Principle Chief Conservator of Forests, Wildlife dated 13th August 2018, user agency shall allocate up to 5% of the total cost of mitigation plan as third party

monitoring cost. Total Rs. 560.0 Lakh shall be allocated by the AEL for monitoring of mitigation plan for the period of 10 years.

Since the area falls under the jurisdiction of Kutch East Forest Division, the overall official monitoring of the implementation of mitigation plan would be carried out by the Kutch East Forest Division, Bhuj. Therefore, as per guidelines issued by the Principle Chief Conservator of Forests, Wildlife dated 13th August 2018, user agency shall allocate and pay the monitoring and administrative cost to the forest department. For carrying out overall monitoring activities, user agency shall pay monitoring and administrative cost to the authorities of Kutch East Forest Division.

7. MANGROVE CONSERVATION PLAN

7.1. Background

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity which would include facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology. These facilities would be located in 256.58 ha. of land which include 154.19 ha of APSEZ land and 102.39 ha. Reserve forest land. The Gulf of Kutch sea coast is located at 3.9 km south from the proposed project site.

As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. The application for prior EC for the proposed project has been submitted to MoEF&CC Terms of Reference (TORs) has been issued by MoEF&CC. The proposed industry is for handling heavy metals and hazardous chemicals which could lead to severe impacts on the surrounding environment and health of eco-systems if not done carefully. In view of the nature of proposed industry and processes involved, it is imperative to consider impacts of such industry on the surrounding eco-systems and take appropriate mitigation measures. Since mangrove eco-system is present south of project boundary, an action plan is proposed to protect and conserve the same.

7.2. Importance of Mangroves

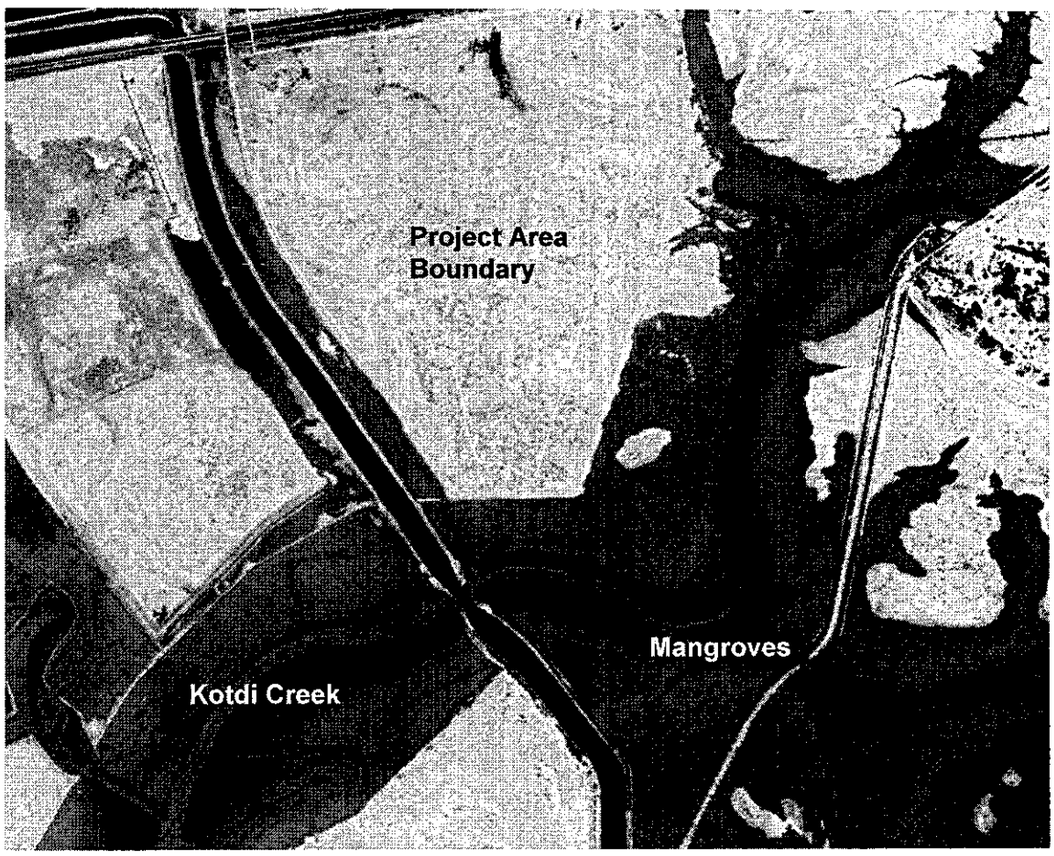
In general, mangroves are known to provide multifold eco-system benefits to mankind. Mangrove ecosystems represent natural capital capable of producing a wide range of goods and services for coastal environments and communities and society as a whole. Some of these include protection of coast from cyclones and disasters, resistant against coastal erosion, carbon sequestration, provide fodder, timber, honey etc. Improved fish production in area where mangroves are present is also reported by many studies. Mangroves are

believed to be the bio-filters of pollutants. Most importantly it provides substratum to a wide range of associated micro& macro flora and fauna which in turn constitutes a dynamic and functional mangrove eco-system that provides multifold socio-economic and environmental benefits to mankind.

7.3. Status of Mangroves Around Project Site

The baseline information suggests that the coastal area of Tunda, Navinal, Shiracha, Jarpara and Tragdi villages have patches of scattered, sparse and dense mangroves. Most of the mangrove areas are located in the notified reserve Mangrove Forest areas of Navinal, Shiracha and Jarpara village coasts. Closest mangrove distribution is located at 170 meters South form the project areas on the bank of Kotdi creek (Plate-4.1, Map-4.2). The mangrove on the banks of Kotdi-I, Kotdi-II, Baradimata and Tragdi creeks fall within 10 km radius of the proposed project area. The mangroves of Kotdi–I and Kotdi-II creeks are closest mangrove (Map-7.1, Map-7.2).

Map-7.1: Mangroves of Kotdi Creek south of Project boundary.



There are total 3 species of mangroves present in the total three species of mangroves present these include *Avicennia marina, Ceriops tagal and Rhizophora mucronata.* A study carried out by National Centre for Sustainable Coastal Management (NCSCM), Chennai in year 2018, the total mangrove cover in Kotdi-I and Kotdi-II creeks was about 410 ha. out of which dense mangroves occurred to the extent of only 50 ha (12%), followed by sparse mangroves, distributed in 189 ha. The scattered mangrove covered an area of 171 ha. (Map-7.1). The above mentioned study reported an increase of 30.0ha between year 2011 and 2016. A study by Thivakaran and Sawale (2016) reported 47 species of macrofauna in the Mundra mangrove eco-system. Total 12 species of gastropods, 14 species of crustaceans, 9 species of bivalves, 8 species of polychaetes and 4 species belonged to the category "others". Increasing spread of mangrove area and high species richness of macrofauna suggests healthy and dynamic condition of mangrove ecosystem in this area.

Map-7.2: Status of mangroves of Kotdi – I & Kotdi – II creek systems in 2016-17. (Map source: study by NCSCM 2018).

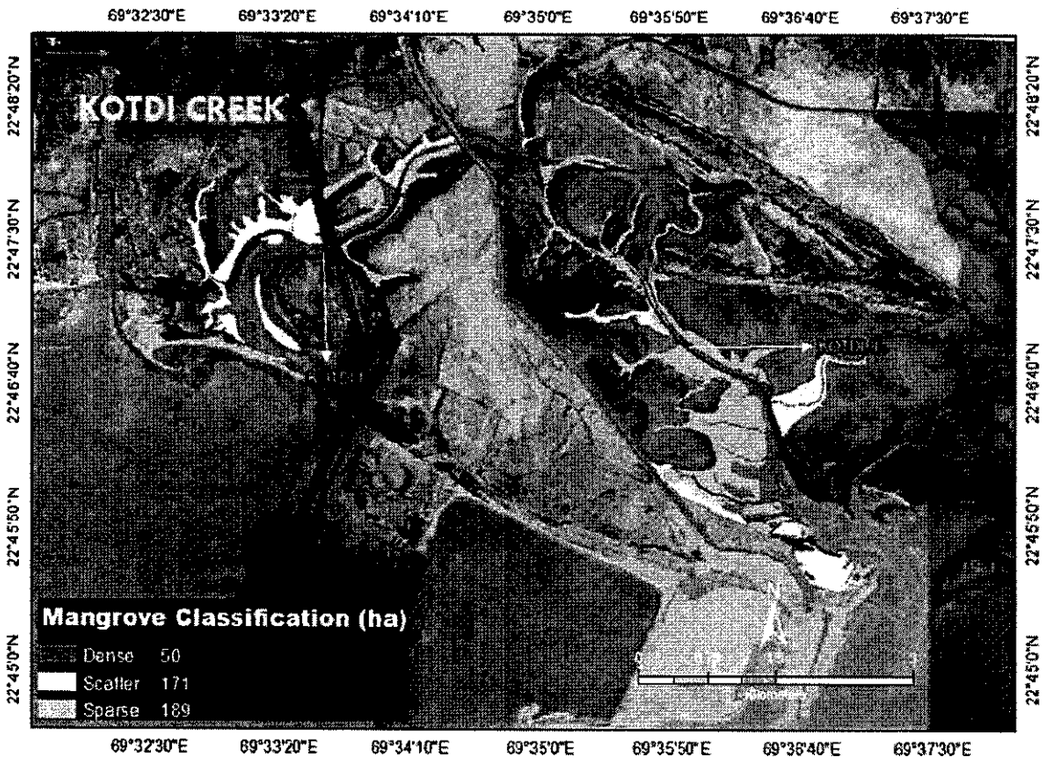
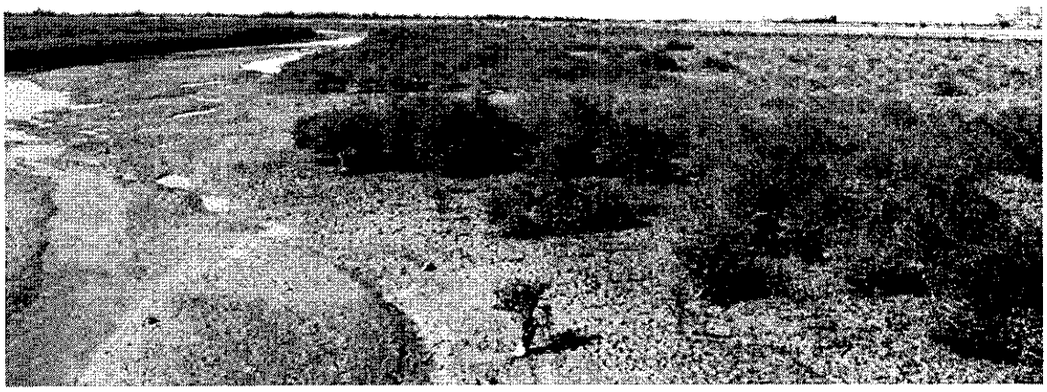


Plate-7.1: Mangroves of Kotdi-I creek.



7.4. Potential Impacts on Mangroves

Based on our survey and existing literature it is established that there are patches of scattered, sparse and dense mangroves located close to southern boundary of project area. The mangroves are located in Kotdi-I, Kotdi-II, Baradimata creeks. Since proposed project would involve large scale handling of heavy metals, hazardous chemicals and hazardous processes it could potentially affect mangroves located in the study area. Therefore, these mangroves which are located south of the project site are at higher risk of damage due to following impacts.

Air pollution: Though, the predominant wind direction is from south-west in the region, there are still chances of mangrove located on immediate southern boundary being impacted due to its close distance from the project site. Chances of damage to mangroves by fugitive emissions are high. The main sources of air pollution from the project will be from the processes and stacks. The pollutants from the plant include sulphur dioxide and particulate matter. Suspended particulate matter produced during construction and operational phases of the copper refinery plant would deposit in the surrounding mangrove ecosystem. Their direct deposition on mangrove could cause loss of chlorophyll content in leaves, arrest of photosynthesis process, leaf injuries resulting in restricted growth and regeneration of mangrove plants. Toxic metal fumes could also increase heavy metal toxicity of the mangrove eco-system.

Water pollution: There is a drainage known as 'Dhaneshri Nadi' flows through the western part of the project site and it drains into Kotdi Creek system. Kotdi creek system has sparse and dense mangrove growth on both sides. Therefore, if the Dhaneshri river/drainage is not trained suitably, it may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity to mangrove eco-system and its components. Among the various types of pollutants released from such industry, heavy metals are one of the most serious pollutants owing to their toxicity, persistence and bioaccumulation problems (Macfarlane & Burchett, 2002). The metal contamination is a major environmental problem as the metals in contaminated sediments may accumulate in the various organisms of the estuarine ecosystem and ultimately enter the food chain, thereby affecting the human well-being (Shakeri & Moore, 2010). The concentrations of heavy metals in the sediments usually exceed that of the overlying water (Zabetoglouet et al., 2002) and the high concentrations of these metals in water and sediments affect both plants and animals (Doganlar & Atmaca, 2011). Chronic heavy metal toxicity could prove to be lethal for a range of fauna present in the mangrove habitat and affect the overall function of mangrove eco-system.

7.5. MITIGATION MEASURES

In view of the above mentioned status, importance and role of mangroves and potential impacts of proposed copper refinery plant on mangroves, it is recommended to take up following measures so that the mangroves are not harmed and their health and spread improves in the study area.

7.5.1. Mitigation of Air Pollution:

- It is recommended that a tall wall around the project boundary be constructed so that dusting is controlled during construction and operation phases.
- Thick green belt around the project boundary shall be created so that particulate matters are arrested.
- State of the art technology for arresting dust pollution shall be implemented for controlling different types of pollutions from various sources in the plant areas.

7.5.2. Mitigation of Water Pollution:

- State of the art water pollution control measures shall be in place including treating industrial effluents with heavy metals.
- Train Dhaneshri river/drainage in such a way so that it does not carry spilled out pollutants from the project area to the mangrove eco-system of Kotdi creek.
- Do not release untreated sewage or effluents in to the creek areas having mangroves.

7.5.3. Plantation of Mangroves to Mitigate Heavy Metal Toxicity

Mangroves are considered as best natural bio-filters of pollutants. Mangrove trees are reported to tolerate high levels of heavy metals (MacFarlane, 2007) with *Avicennia* species exhibiting greater tolerance and accumulative properties to numerous metals than other mangrove species (MacFarlane and Burchett, 2002). The inorganic industrial waste composed basically by heavy metals do not degrade and although they can be diluted in the long run they will always be responsible for the environmental damage even if the source has ceased to operate. Mangroves have natural ability to act as a sink of anthropogenic and industrial pollutants. Mangroves are also known to arrest and carryout bioremediation of certain pollutants in local environment. Mangroves not only act as a sink or transfer the pollutants but they also oxidize the metals present in the sediment by exuding oxygen into the anoxic soil through aerial roots. Mangrove wetlands are therefore considered as low cost waste disposal site.

It is in this context, not only preservation of Kotdi and Baradimata creek mangroves are important but there is a need to increase mangrove spread in this area so that it can mitigate the impacts of proposed industry on marine water and their biota. Therefore, it is recommended that AEL shall take up intensive mangrove plantation drive particularly on the bank of Kotdi-I, Kotdi-II and Baradimata creek systems. Total 50 ha. of plantation every year shall be taken up for 10 years period. It is recommended that mangrove plantation shall be carried out by Kutch East Forest Division as the area is under their jurisdiction and the staff has vast experience in mangrove plantation and management. AEL shall allocate budget of Rs.

7.5.4. Monitor Health of Mangroves:

- It is important to regularly check the health of mangrove eco-system located in the Kotdi-I, Kotdi-II and Baradimata creek systems.
- It is recommended to carryout monitoring of heavy metal contents in the sediments and mangrove plants (root & stem) at every 6 months intervals in the Kotdi-I, Kotdi-II and Baradimata creek systems. A minimum of 20 samples of sediments shall be collected and analyzed each time. The samples shall be collected at every 200 to 500 mtrs distances starting from northern most part of creeks to southern area.
- It is recommended to monitor the spread of mangroves in the Kotdi-I, Kotdi-II and Baradimata creek systems. This shall be done at the interval of every 2 years using standard high resolution satellite imageries and Remote-sensing & GIS techniques.
- The monitoring of floristic structure of mangrove stock shall be carried out annually to check if there are changes in its composition in terms of heights, girth and regeneration classes of Kotdi-I, Kotdi-II and Baradimata creek systems. This would enable us to check if the mangroves are degrading or healthy.
- It is recommended to monitor diversity and density of mangrove associated flora as well as macrofauna annually. This would help us monitor the functioning of food chains and food webs operating in mangrove eco-system of Kotdi-I, Kotdi-II and Baradimata creek systems. An initial baseline data shall be generated on this prior to commencement of the construction of the proposed project. It is recommended to fix the location of sample plots and follow the same locations for subsequent monitoring efforts.
- It is recommended that the biological parameters of the mangrove eco-systems i.e. spread of mangroves, floristic structure, diversity, density, as well as diversity of mangrove associated flora and fauna shall be monitored by and independent NABET accredited experts.
- The samples collected from the mangrove plant and mangrove habitat sediments shall be analyzed only through NABL accredited laboratory.

7.5.5. Indicators for Monitoring of Mangroves.

Following are the indicators for monitoring of conservation plan. These indicators shall be monitored and the effectiveness of mangrove conservation plan shall be determined (Table-7.1.).

Table-7.1: Indicators for monitoring of Mangrove Conservation Plan.

No	Monitoring	Frequency	Negative Impacts	No Impacts
1	Spread of mangroves (area in ha.)	2 years	Decrease	Increase
2	Content of heavy metals in sediments	6 months	Increase	no increase
3	Content of heavy metals in mangrove plants	6 months	Increase	no increase
4	Mangrove stock structure (height, girth and regeneration classes)	Annual	Altered with decrease of area	Altered with increase area
5	Diversity of mangrove associate flora	Annual	Decrease	no increase or increase
6	Diversity of mangrove associated fauna	Annual	Decrease	no increase or increase

8. FINANCIAL LAYOUT

8.1. FINANCIAL ALLOCATION FOR WILDLIFE CONSERVATION ACTIVITIES

Following is the proposed budget estimated in consultation with forest department for 10 years towards wildlife conservation plan after approval from all statutory bodies permitting the project (Table-8.1).

Table-8.1: Proposed financial allocation for mitigation and conservation measures.

Sl	Activity	Implementing Agency	Duration Years	Rate/ Year (Lakh)	Total Amount (Lakh)
A	**Implementation Activities**				
1	Carry out Mangrove Plantation activities through Forest Dept. 50 ha. per year for 10 years. by AEL @ Rs. 30000/ha.	KEFD	10 years	15.0	150.0
2	Mangrove monitoring by third party	Project Proponent	10 years	10.0	100.0
3	Habitat improvement for Schedule-I species in Reserve Forest areas	KEFD	10 yeas	10.0	100.0
4	Carryout plantation of *Commiphora wightii* 10.0 ha. in the first years with maintenance (to be paid by AEL) @ Rs.95000/ha.	KEFD	First Year	9.5	28.5
5	Carry out tree plantation in surrounding villages for birds and Indian Peafowl	Project Proponent	10 years	1.0	10.0
				Subtotal	**388.5**
B	**Monitoring & Compliances Activities**				
7	Comprehensive ecological & Biodiversity monitoring by third party once every 2 years for 10 years after commencement of project	Project Proponent	@ 2 year for 10 years	5	25.0
8	Monitoring and administrative activity cost (5% to be paid by AEL to KEFD) to Kutch East Forest Division	KEFD	10	2.0	20.0
9	Documentation and preparation of Annual compliance report. 10 years	Project Proponent	Annual	1	10.0
				Subtotal	**55.0**
	Total (A=B) amount in Lakh				**443.5**

AEL= Adani Enterprise Limited

KEFD- Kutch East Forest Division

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Annexure-I: Coordinates of sampling locations in Buffer and Core areas of the study area.

Core area Sample Locations			
Plot No	**North**	**East**	**Habitat type**
1	22°48'43.26"N	69°34'26.89"E	Open saline land
2	22°48'47.78"N	69°34'36.48"E	Open saline land
3	22°48'40.92"N	69°34'13.65"E	Open saline land
4	22°49'30.25"N	69°34'50.59"E	Open land
5	22°49'27.38"N	69°34'34.17"E	Open scrubland
6	22°49'20.13"N	69°34'26.52"E	Open scrubland
7	22°49'16.23"N	69°34'20.21"E	Open scrubland
8	22°49'0.08"N	69°34'12.49"E	Dense Scrubland
9	22°49'21.99"N	69°34'12.60"E	Open scrubland
10	22°49'31.29"N	69°34'13.50"E	Open scrubland
Buffer area Sample Locations			
1	22°49'16.23"N	69°35'25.35"E	Open Scrubland
2	22°48'47.15"N	69°35'39.74"E	Open Scrubland
3	22°49'49.35"N	69°36'22.90"E	Fallow Agriculture
4	22°50'5.46"N	69°37'25.37"E	Open Scrubland
5	22°50'15.41"N	69°38'14.63"E	Open Scrubland
6	22°50'34.88"N	69°34'30.17"E	Open Scrubland
7	22°50'29.27"N	69°33'0.13"E	Fallow Agriculture
8	22°49'56.48"N	69°31'17.98"E	Open wetland edge
9	22°49'50.35"N	69°30'37.38"E	Open Scrubland
10	22°49'35.06"N	69°29'48.16"E	Open Scrubland
11	22°49'33.20"N	69°28'56.54"E	Fallow Agriculture
12	22°50'11.94"N	69°29'0.95"E	Open Scrubland
13	22°48'55.92"N	69°28'43.35"E	Dense Scrubland
14	22°51'50.67"N	69°32'15.60"E	Open Scrubland
15	22°52'25.78"N	69°32'32.67"E	Fallow Agriculture
16	22°53'13.44"N	69°32'51.48"E	Open Scrubland
17	22°53'38.09"N	69°32'44.84"E	Open Scrubland
18	22°53'4.82"N	69°34'12.08"E	Open Scrubland
19	22°52'57.20"N	69°34'35.93"E	Fallow Agriculture
20	22°53'0.63"N	69°37'22.55"E	Dry River bed
21	22°51'47.01"N	69°37'30.81"E	Dry River bed
22	22°50'29.42"N	69°37'35.47"E	Dry River bed
23	22°50'19.32"N	69°37'34.24"E	Dry River bed
24	22°48'18.47"N	69°36'19.97"E	Open saline land
25	22°48'21.81"N	69°37'0.83"E	Open saline land
26	22°48'15.62"N	69°37'42.99"E	Wet mudflat
27	22°48'23.89"N	69°37'39.89"E	Open saline land
28	22°48'15.97"N	69°38'41.74"E	Open saline land
29	22°48'45.25"N	69°38'58.00"E	Dense Scrubland
30	22°49'30.21"N	69°38'58.00"E	Open saline land

EAC OBSERVATION

Storage arrangements made for the raw materials are found to be not adequate. Open storage of raw materials such as coal, limestone etc., shall be avoided.

REPLY:

Raw Material Storage Plan

Copper Concentrate:

Copper Concentrate will be unloaded from the vessel and transported to port storage godown by closed conveyor system. Godown at the port and plant will be a concrete walled with covered roof and paved with concrete. All the transfer points will be fitted with dust extraction/ suppression system to handle dust.

A preliminary drawing is shown in **Annexure-11**.

Rock Phosphate:

Rock Phosphate will be unloaded from the vessel and transported to port storage godown by closed conveyor system. Godown at the port and plant will be a concrete walled with covered roof and paved with concrete All the transfer points will be fitted with dust extraction/ suppression system.

A preliminary drawing is shown below in **Annexure-11**.

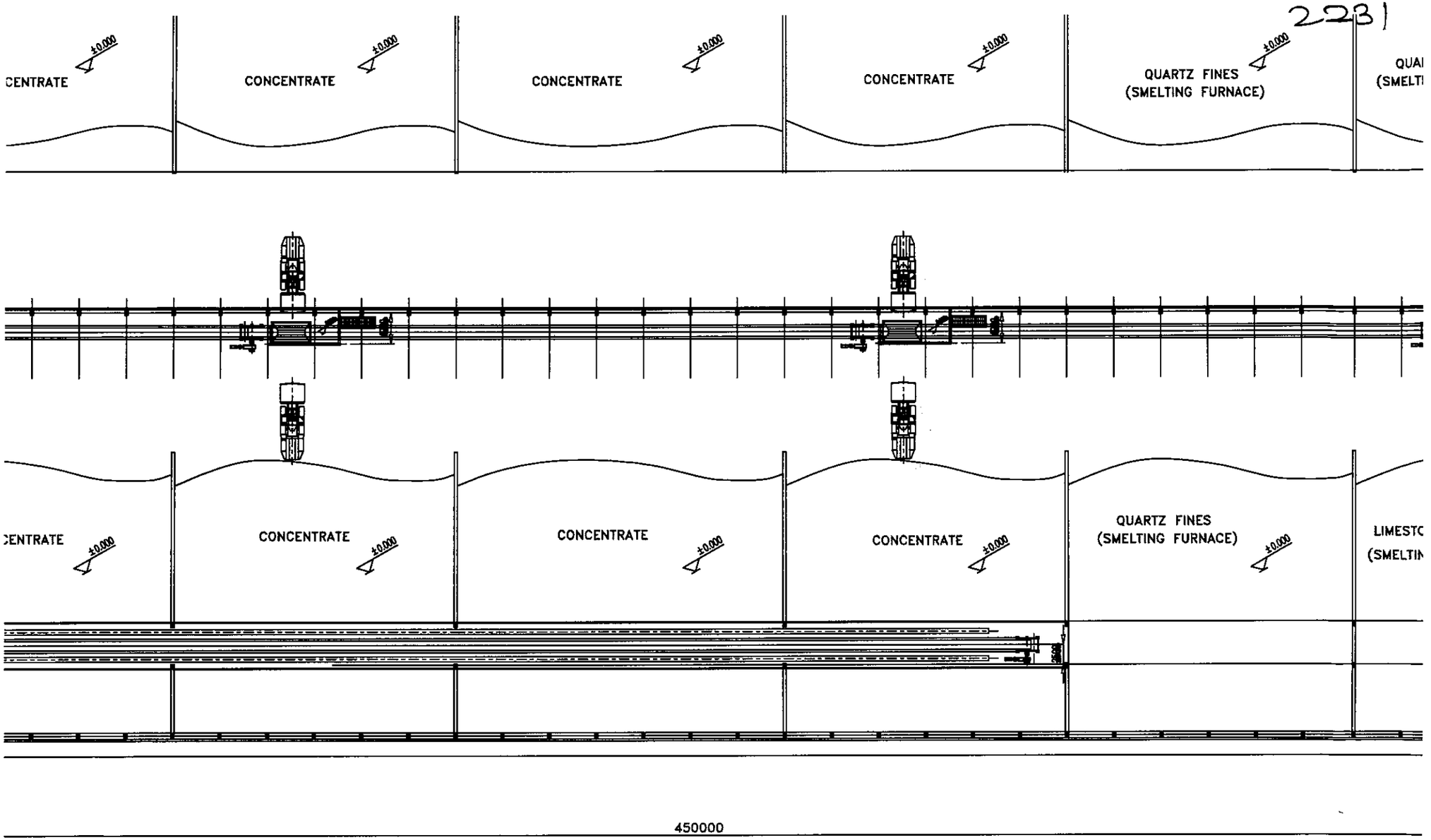
Other Raw Materials in Copper Smelter:

Quartz Sand, Quartz Chips, Lime stone Powder, Crushed and Powdered Reverts:

Quartz Sand, Quartz Chips, Lime stone Powder, Crushed and Powdered Reverts will be received by covered trucks/ tippers and will be unloaded in the covered storage godown, which is paved with concrete and covered with roof. All the transfer points will be fitted with dust extraction/ suppression system to handle dust.

A preliminary drawing is shown below in **Annexure-11**.

2231



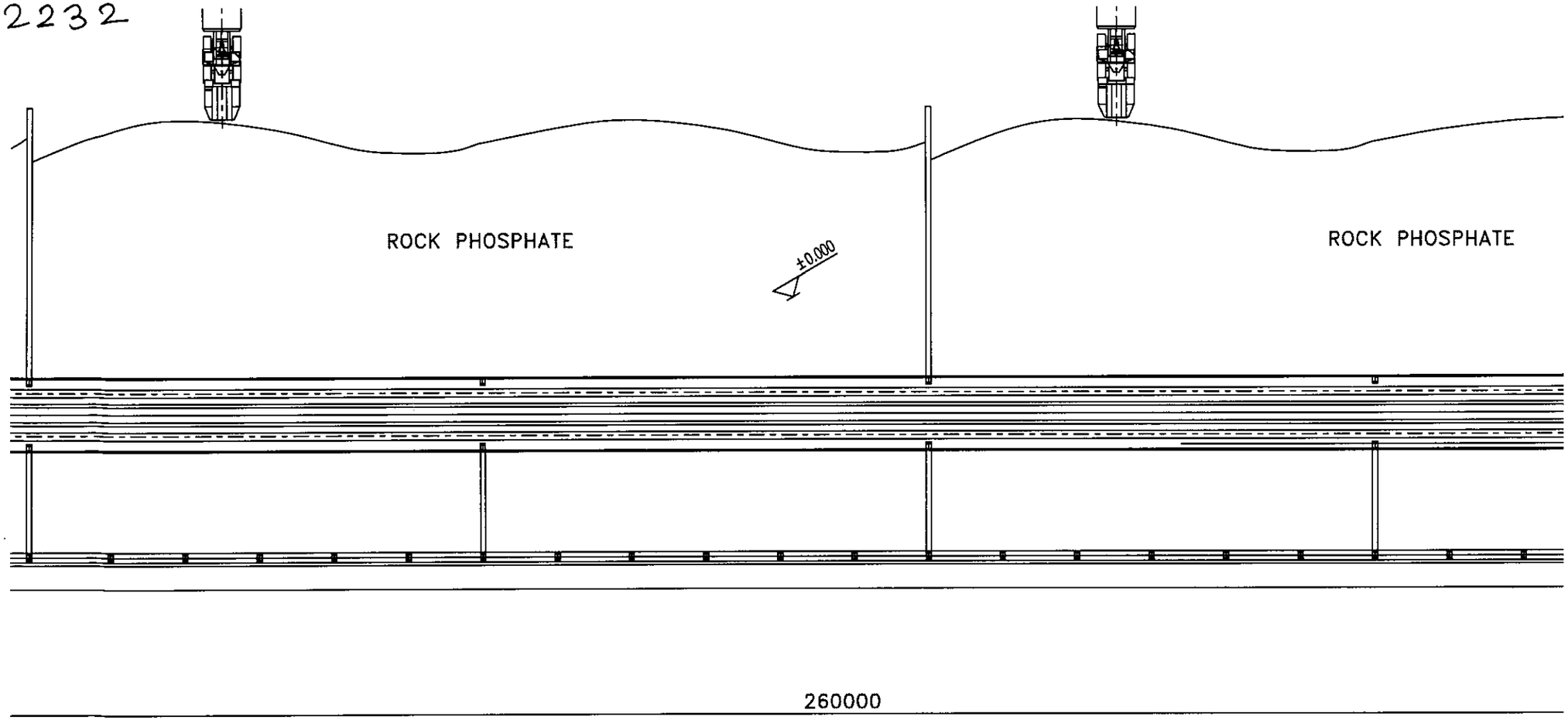
II–II

DUST SUPPRESSION SYSTEM

III–

2025

2232



TELESCO PIC CHUTE ARRANGEMENT FOR
UNLOADING ROCK PHOSPHATE FROM
CONVEYOR

2026

2233

EAC OBSERVATION NO.-7

EAC OBSERVATION:

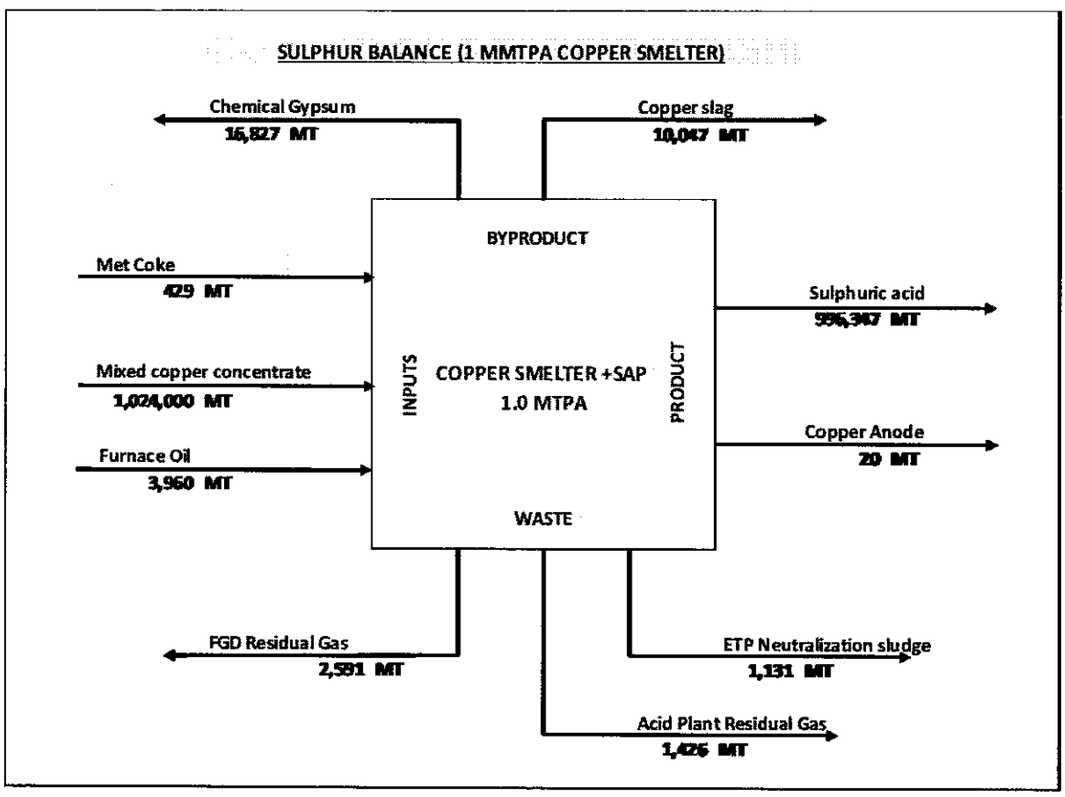
Sulphur balance of the copper smelter unit has not been submitted.

REPLY:

Sulphur is one of the major ingredient in the copper concentrate. Sulphur from the copper concentrate will be largely converted as Sulphur DI- Oxide during smelting process which will be input raw material for Sulphuric Acid plant for production of Sulphuric Acid with 98% concentration. Sulphuric Acid plant is designed to convert 99.847% of SO_2 into concentrated Sulphuric Acid.

A detail sulphur balance has been worked out considering various input and output material characteristics. Sulphur from various sources such as Copper concentrate, Furnace Oil, Met Coke will largely (~ 97%) converted into concentrated Sulphuric Acid and rest will be available in by product (Copper slag) and waste material such as chemical gypsum and ETP sludge. Residual Off- gas from Sulphuric Acid plant and Flue Gas Desulphurization system will have SO_2 ranging from 400-600 mg/Nm^3.

Below table provides the sulphur balance envisaged for the proposed Copper Plant.



EAC OBSERVATION:

Copper slag disposal site co-ordinates, concrete mode of utilization, maximum time frame envisaged for the storage at the disposal yard i.e., one month (or) 15 days has not been submitted.

REPLY:

Copper slag disposal site co-ordinates are marked in Plot Plan in **Annexure-8(a).**

Copper Slag from smelting furnace and PS Converter will be treated in Electric furnace and slag cleaning furnace for recovery of the Copper.

Copper Slag is known as Ferro Sand in Japan and Korea. In Europe it is also called as Iron Silicate.

Typical analysis is as below:

Sr. No.	Parameter	UOM	Value
1	Cu	%	< 1
2	Fe	%	40 - 50
3	SiO2	%	26 - 35
4	CaO	%	< 4
5	Al2O3	%	1 - 4
6	MgO	%	0.5 - 2
7	S	%	< 0.5

In India Copper slag is used in the following application:

- Abrasive Blasting Grit
- Aggregates for Concrete Mix
- Cement Manufacturing
- Pavement: As an additive to improve sintering and abrasion resistance.
- Road Construction: As an additive in bed structure stabilisation and substitute for stone flour in asphalt.

Directive from National Highway Authority of India for utilization of copper slag is attached for ready reference in **Annexure-8(b) and 8(c).**

Copper Slag/ Ferro Sand/ Iron Silicate is used in the following applications in European Countries, South East Asia and China:

- Abrasive Blasting Grit
- Aggregates for Concrete Mix
- Cement Manufacturing
- Pavement: As an additive to improve sintering and abrasion resistance.
- Reinforcement : Coastal, Riverside and land slide
- Road Construction: As an additive in bed structure stabilisation and substitute for stone flour in asphalt.
- Bricks: Partial substitute for natural clay – reduces shrinkage and enhances colour.
- Iron Making: Iron bearing material for sinter and pellet production.
- Backfilling: Additive for underground mine and road construction.

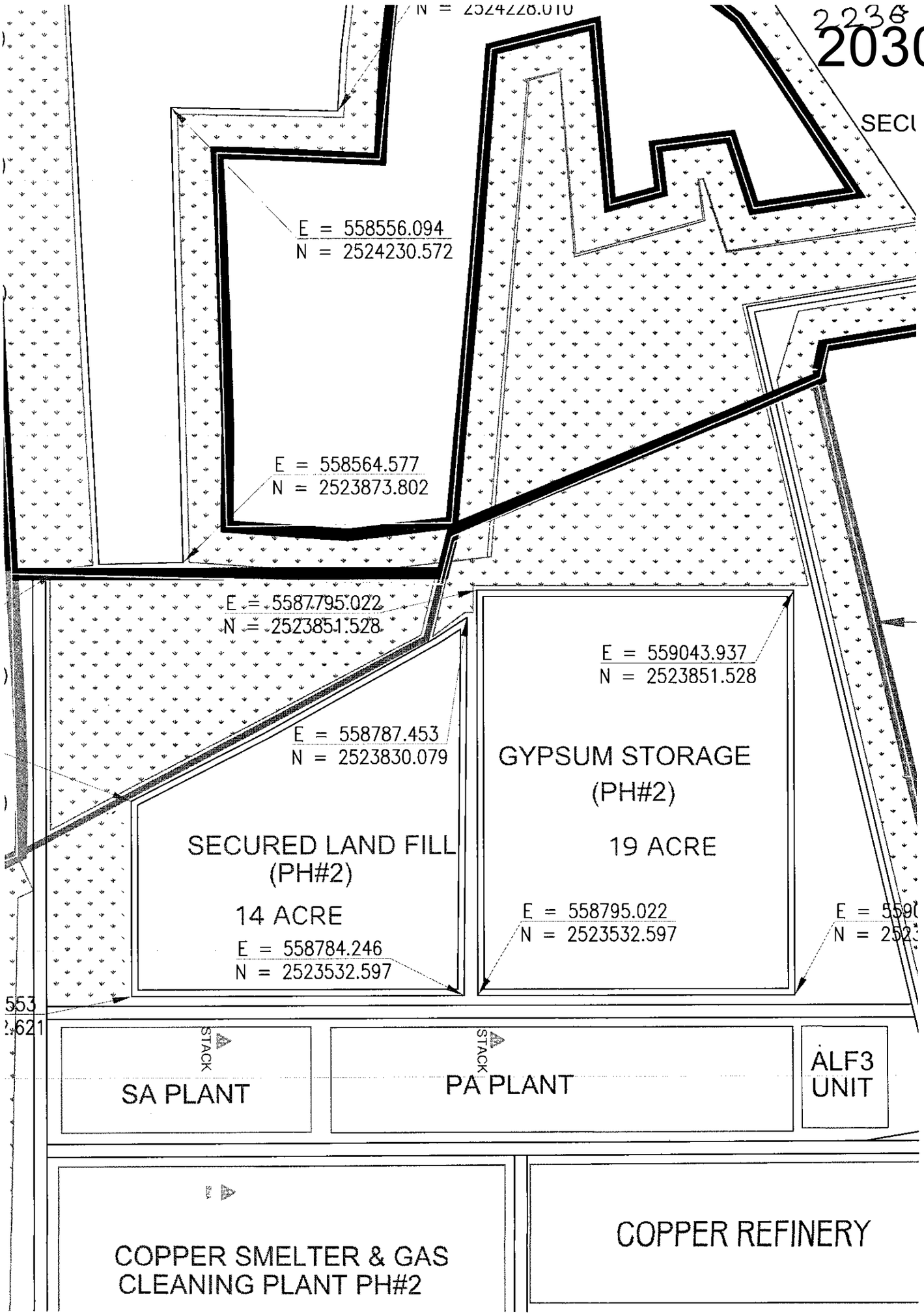
2235

EAC OBSERVATION NO.-8

Total Area allocated for storage of Copper Slag is around 47 Acres. Base of the storage will be prepared to take the load of copper slag to the height of minimum 15m. Greenbelt of 15 m width will be developed all around the storage area.

This area is sufficient for 6 years, considering NO sales.

For concrete mode of utilization of copper slag various cement companies and road construction companies were approached to utilize in the respective applications. The MoUs w.r.t. utilization of copper slag with various companies is attached in **Annexure-8(d).**


N = 2524228.010
SECU
E = 558556.094
N = 2524230.572
E = 558564.577
N = 2523873.802
E = 558795.022
N = 2523851.528
E = 559043.937
N = 2523851.528
E = 558787.453
N = 2523830.079
GYPSUM STORAGE
(PH#2)
19 ACRE
SECURED LAND FILL
(PH#2)
14 ACRE
E = 558795.022
N = 2523532.597
E = 558784.246
N = 2523532.597
553
621
STACK
SA PLANT
STACK
PA PLANT
ALF3
UNIT
COPPER SMELTER & GAS
CLEANING PLANT PH#2
COPPER REFINERY

Annexure-8(b)

2237

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Road Transport and Highways)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली-110075
G-5 & 6, Sector-10, Dwarka, New Delhi-110075

दूरभाष / Phone : 91-11-25074100/25074200
फैक्स / Fax : 91-11-25093507 / 25093514

No. NHAI/TIC/R&D/2016-85846

19th July'16

To,
ALL Regional Officers
National Highways Authority of India.

Sub : Use of alternative material such as Steel Slag in road construction.

Sir,

The Hon'ble Minister of RT&H has shown his keen interest in use of alternative waste material in road construction such a Steel Slag etc.

2. In this regard, it is to inform that MoRT&H vide OM No. RW/NH—35075/1/2010-S&R (R) dated 6th August'14 **(copy enclosed)** has accredited the use of Processed steel slag Aggregate on trial basis as a replacement for natural aggregates in Bitumen roads. This will provide better bonding with bitumen, high abrasion resistance, improved skid resistance, cost effective alternative to natural aggregates and safe non-hazardous recycled material.

3. Further, Bureau of Indian Standards as per IS 383 :2016, Indian Standard for Coarse and Fine Aggregate for Concrete—Specification (Third Revision) vide para 4.2.2 (Table 4.2.1) has provision of following :

Sr. No.	Type of Aggregate	Maximum Utilization		
		Plain concrete	Reinforced concrete percent	Lean concrete (less than M15 Grade percent
(1)	(2)	(3)	(4)	(5)
i) Coarse aggregate	a) Iron slag aggregate	50	25	100
	b) Steel Slag aggregate	25	Nil	100
	c) Recycled concrete aggregate (RCA) (see note 1)	25	20 (only upto M25 grade)	100
	d) Recycled aggregate (RA)	Nil	Nil	100
	e) Bottom ash from Thermal Power Plants	Nil	nil	25
ii) Fine Aggregate	a) Iron Slag Aggregate,	50	25	100
	b) Steel slag aggregate	25	Nil	100
	c) Copper slag aggregate	40	35	50
	d) Recycled concrete aggregate (RCA) (see note 1)	25	20 (only upto M25 Grade)	100

8609
19/7/16

M&R(SN)
ALA
2017

To all PD's for n.a.

Amitava
PJ
N.A.

2238

See A-3 for brief information on recycled aggregates (RA) and recycled concrete aggregates (RCA)

Notes :

1. It is desirable to sources the recycled concrete aggregates from site being redeveloped for use in the same site.
2. In any given structure, only one type of manufactures coarse aggregate and one type of manufactured fine aggregate shall be used.
3. The increase in density of concrete due to use of copper slag and steel slag aggregates need to be taken into consideration in the design of structures.
4. While using manufactured aggregate as part replacement for natural aggregate, it should be ensured that the final grading meets the requirements specified in table 7 table 8 and table 9.

4. The same has also been accredited by Indian Road Congress (IRC) as per IRC letter no. IRC-24 (12)/2014 (ACC-129) dated 26th June 2014.

5. In view of the above, you are suggested to use steel slag in upcoming / on-going projects as per requirement and intimate the performance on the use of steel slag to the undersigned. Further, a quarterly statement to the extent of use of steel slag be provided to this office for record & perusal.

6. This may please be noted that NHAI should not bear any contractual implications on this account. The regulation of use of above material shall be kept in line with the existing provision of contract/ concessionaire Agreements. Deviation, if any should be got approved from competent Authority accordingly.

7. This issues with the approval of Competent Authority.

Yours faithfully,

Sabharwall 19/7/16

(Ajay Kumar Sabharwall)
General Manager (TIC)

~~2239~~ 2289

Annexure - I

GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT & HIGHWAYS

Parivahan Bhavan,
1, Sansad Marg
New Delhi-110001

No. RW/NH-35075/1/2010- S&R (R) Dated: 6th August, 2014

OFFICE MEMORANDUM

Subject: Use of emerging new materials and techniques in construction of National Highways.

In continuation of SR&T (Roads) Zone's OM of even number dated 08.10.2013, the minutes of the meeting of Coordination Committee dated 22nd May, 2014 in respect of newly accredited materials/ techniques such as Instant road repair cold mix compound – INSSTAPATTCH, Anti stripping additive (Zycosoil) & water proofing compounds – Terrasil, Terraprime and IPPL SS –IX - Soil Stabilizer, containing merits and demerits were circulated to all project zones vide SR&T (Roads) Zone letter of even number dated 30th May, 2014 with the request to incorporate and utilize considering their suitability in different States on trial basis. The list of new accredited materials/ techniques, as on date, is as below:

(i) Geocells,
(ii) Warm Mix Asphalt Technology,
(iii) Water Proofing Membranes,
(iv) Non-woven, Woven Geotextiles & Techglass,
(v) Jarofix,
(vi) Thiopave – Asphalt Modifier,
(vii) Infrared Recycling Pothole Repair System,
(viii) Water proofing for Bridge decks and pavements,
(ix) Copper Slag,
(x) Processed Steel Slag Aggregates,
(xi) RoadstaB Technology,
(xii) Evercrete Deep Penetrating Sealer,
(xiii) RBI Grade-81,
(xiv) Tenax 3D Grids and
(xv) Roadcem
(xvi) Instant road repair cold mix compound - INSSTAPATTCH
(xvii) Anti stripping additive (Zycosoil) and water proofing compounds – Terrasil, Terraprime
(xviii) IPPL SS –IX - Soil Stabilizer

2. It is requested that the status of utilization of the new materials/ techniques along with performance feedback, if any, may be provided to SR&T (Roads) Zone for necessary action. The specific use and suitability of the new materials/ techniques is enclosed at Annex-I.

[Gulshan]

Enclosure: Annex-I

Assistant Executive Engineer (R) (S, R&T)
For Director General (Road Development) & SS

Contd. on P-2/-

2239

To:

1. CE (P-1)/ CE (P-2)/ CE (P-3)/ CE (P-4)/ CE (P-5)/ CE (P-6)/ CE (P-7)/ CE (NHDP-IV)/ CE (NE)/ CE (EAP)/ CE (LWE)
2. Sr. Tech. Director (NIC) – For uploading on Ministry's website under "Roads & Highways → Circulars/ Notices on National Highways" and "What's New".

Copy for kind information to:

1. PPS to DG (Roads)
2. PPS to ADG-I/ PPS to ADG-II/ PPS to ADG-III

2240

Annex-I

List of new materials/ technologies with their use and benefits on National Highways

S. No.	Name of the New material / Technology	General use and Benefits	Suitability
1.	Geocells	StrataWeb® is a 3D cellular confinement system which confines the infill material and improves the load bearing capacity of the base.	Over weak soils – expansive soils, clays and soils with low CBR values
2.	Warm Mix Asphalt Technology	Allows mix production at about 30°C lower temperatures that conventional hot mix, thus imparting performance benefits, constructability advantages and environmental benefits as well.	For bituminous woks.
3.	Water Proofing Membrane	Super Thermolay APP PI/MT Membranes are ideal for a wide range of water proofing applications including roofs, reservoirs, basements, basement roof, sunken slabs, tunnels, terrace garden and car parking. Advantages: (i) Total impermeability (ii) Excellent resistance to ageing and weathering. (iii) Outstanding bond-ability and seam integrity. (iv) Stability at high temperatures	To prevent the intrusion of corrosive substance into the concrete, which will result in deterioration of the structures, leading to spalling of concrete
4 (i).	Woven geo-textiles	Filtration / Separation and Soil Stabilization	It can be used between granular sub-base / base course and the sub-grade.
4 (ii).	Non-Woven geo-textiles	Filtration / Separation, Paving fabrics / Slope protection	It can be used in side drainage for its functions.
4 (iii).	Techglass	Rehabilitation & Preservation of Pavements	Used to reduce the development of reflection cracks.
5.	Jarofix	It is at par with conventional material and also the material is on OMC.	In embankment and sub-grade construction.
6.	Shell Thiopave	In cold and seasonal climates where thermal cracking is an issue, Shell Thiopave allows the use of softer bitumen with improved low temperature properties without sacrificing high temperature properties. In hot climates, where conventional bitumen often do not deliver the high level of stiffness required, Shell Thiopave improves anti-rutting performance while still allowing the effective use of locally available bitumen.	For bituminous woks
7.	Nu-phalt Infrared Recycling Pothole Repair System	(i) It rejuvenates the existing asphalt, thereby, saving on material and making the process eco-friendly. (iii) This system allows the surface to be heated to about 150 to 160 °C without damaging, destroying or burning the existing asphalt.	Suitable for potholes, failed joints, cracked and undulated road surface.

2241

8.	Polyguard NW-75 for Bridge Decks or pavement waterproofing	It can be applied to highways, bridge decks, parking garages etc. prior to overlay. Polyguard under seal provides an impermeable layer protecting seal rebar from moisture and corrosion.	For highways, bridge decks, parking garages
9.	Copper slag	Copper slag is non hazardous and best suited for (i) Land reclamation. (ii) Cement & concrete application. Benefits: (i) Huge saving on natural resources. (ii) Non-toxic and non leachable in nature.	It can be used as sub-base layer after mixing with pond ash. It can also be used in different bituminous mixes.
10.	Processed Steel Slag Aggregate	1. Intended use: As a replacement for natural aggregates in Bitumen roads. 2. Benefits: (i) Better bonding with Bitumen (ii) High abrasion resistance (iii) Improved skid resistance (iv) Cost effective alternative to natural aggregate (v) Safe / Non-hazardous recycled material.	In bituminous roads
11	RoadstaB Technology	RoadstaB Technology can be used in bases and sub-bases of the road crust.	For soil stabilization.
12.	Evercrete Deep penetrating Sealer	Evercrete Deep Penetrating Sealer (DPS), is water based, ready to use, concrete sealer that strengthens, preserves and enhances life of concrete structures.	It prevents concrete from chlorides ion ingress, corrosion and hence enhances the life of concrete structures.
13.	RBI Grade 81 – Soil Stabilizer	It reduces requirement construction materials like aggregates; borrow pit soil etc. thus reducing the transportation cost It also reduces Life Cycle Cost.	It can be used in various pavement layers i.e. for sub-grade, sub-base and base layers.
14.	Tenax 3D Grids	To increase the interlocking and bearing capacity of the unbound layers within Indian Highway Road Construction Layers (Sub-grade, GSB, WMM and DBM). Benefits: (1) Reduce the thickness of WMM and DBM thereby reducing the overall cost of the road pavement (2) Improve bearing capacity of soil.	It can be used in Sub-grade, GSB, WMM and DBM layers.
15.	RoadCem	It is used in combination with cement and sometimes fly-ash to form a base for a road with the soil available on site. Benefits: (1) No damage from water (2) High quality road with a low maintenance cycle (3) Faster construction (4) Stabilization of Black Cotton Soil (5) Environmental feasibility	
16.	Instant road repair cold mix compound - INSSTAPATTCH	INSSTAPATTCH can be used for Instant repairs of Potholes and Patches on city roads and Highways. Potholes repaired by INSSTAPATTCH are time saving, cost saving, does not cause any traffic hindrance and is environmental friendly.	For road repairs

2242

17.	Zycosoil Nano Technology Terrasil Terraprime	Reactive anti-strip additive in hot mix bnder and Soil & aggregate waterproofing Sub-grade multilayer waterproofing to eliminate capillary rise Penetrative waterproofed prime coat	Reactive anti-strip additive for asphalt layers Waterproofing of in-situ soil Waterproofing of soil/ stone base of WMM/ WBM
18	IPPL SS – IX (SoilTech MK-III) Soil Stabilizer	The product is used for stabilizing the base and sub-base layers of roads, Mine Haul Roads, Parking lots, hard stands and Container Depots. Benefit: The product intends to substantially reduce the quantity of aggregates from quarries / borrow pits. Due to the flexible nature of the Polymers, the pavement surface allows a certain amount of flexibility on the road and does not become brittle which dramatically reduces the maintenance of the stabilized roads.	The IPPL SS – IX Polymer stabilizer is water based which can be used extensively for stabilizing the base and sub-base layers of road. The product gains excellent strength from mechanical compaction and is an excellent solution for heavily trafficked roads and hard stands.

Microsoft Outlook Web App

Type here to search | Entire Mailbox | Options | Sign out

Mail
Calendar
Contacts

Deleted Items
Drafts [27]
Inbox (3)
Junk E-mail [39]
Sent Items

Click to view all folders

Archive
Drafts
Inbox Old
Junk E-mail
Outbox

Manage Folders...

Reply | Reply All | Forward | Close

FW: Use of alternative material such as Steel Slag in raod construction.

Web Admin

Sent: 19 July 2016 17:45
To: ALL_RO
Cc: Sabharwall Ajay, GM(T)
Attachments: 85846 (1).PDF (330 KB) [Preview on web]

-----Original Message-----
From: Sabharwall Ajay, GM(T)
Sent: Tuesday, July 19, 2016 5:43 PM
To: Web Admin
Subject: Use of alternative material such as Steel Slag in raod construction.

Kindly forward the above mail to all RO's.

Regards,

(Ajay Kumar Sabharwall)
General Manager (Tech.)
TIC Division
Extn: 1810

Received on: 8609
Not Verified: 19.7.16
भा.रा.रा.प्रा. क्षेत्रीय कार्यालय, कोलकाता
NHAI, Regional Office, Kolkata

Connected to Microsoft Exchange

Annexure-8(c)

2245

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(पोत परिवहन, सड़क परिवहन और राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Shipping, Road Transport and Highways)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली-110 075
G-5 & 6, Sector-10, Dwarka, New Delhi-110075

दूरभाष / Phone : 91-11-25074100/25074200
फैक्स / Fax : 91-11-25093507 / 25093514
एक्स. / Extn.: 2223 / 2318 / 2468 / 2553

No.: 11041/218/2007-Admn. **8th January 2010**

POLICY MATTERS – TECHNICAL (41/2010)
(Decision taken on TIC Division's File No. NHAI/Tech/TIC/Genl/2009)

Sub: Encouraging the use of Slag Aggregate in Granular Sub-Base (GSB).

The Steel Plants in the country generate large amount of slag which remains unutilized. Reference have been received from various steel plants such as Bokaro Steel Plant to use slag aggregates in road projects as an environmental friendly measure. Specification for Road and Bridge works issued by Ministry of Road Transport and Highways also allow the use of crushed slag for Granular Sub-Base (GSB).

2. It has been therefore, decided to use steel furnace/blast furnace/copper slag aggregates in Granular Sub-Base provided that the same satisfies the physical requirements/gradings etc. as stipulated in the specifications. The Contractors/Concessionaires shall use slag aggregates in GSB especially in the projects lying in the regions of these types of slag production.

3. This issues with the approval of Chairman, NHAI.

K. Venkata Ramana

(K. Venkata Ramana)
General Manager (Coord.)-I

To:

1. PS to Chairman
2. PS to All Members
3. PS to All CGMs/CVO
4. All GMs/DGMs/Managers
5. All PIUs/CMUs/SPVs
6. Librarian/Hindi Officer

2246

adani

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 09 day of April Month 2019 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

Adani Infra (India) Limited, a Company registered under the Company's Act 1956 and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AIIL"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and AIIL may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as **"CP"**) and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **"Slag"**) which can be utilized in road construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

The Parties hereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of AIIL from the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL & AIIL shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

ADANI ENTERPRISES LTD. AHMEDABAD

Adani Infra (India) Ltd

Adani Infra (India) Ltd
Adani House
Shantigram, S G Highway
Ahmedabad 382 421
Gujarat, India
CIN: U45204GJ2010PLC059226

Tel +91 79 2555 7555
Fax +91 79 25830177
info@adani.com
www.adani.com

2247

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYAPRAKASH

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature: _____

Name: RAVI KAPADIA

For AIIL

Signed and delivered by the

Signature: _____

Name: VISHAL KUMAR

Adani Infra (India) Ltd.

Witness:

Signature: _____

Name: Ambaram parbidar.

EKK INFRASTRUCTURE LIMITED

CIN : U45201TN2015PTC100062
Corporate Office: II[nd] Floor - Municipal Building,
A.M. Road, Perumbavoor-683 542, Ernakulam Dist.,
Kerala, Tele Fax : 0484 : 2523603, 8111888811
Email: info@ekk.co.in, www.ekk.co.in

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 04 day of April Month 2019 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

EKK INFRASTRUCTURE LTD, a Company registered under the Company's Act 1956 and having its registered office at Second Floor, Municipal Building, A.M Road, Perumbavoor, Ernakulam, Kerala (hereinafter referred to as **"EKK INFRASTRUCTURE LTD"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and EKK INFRASTRUCTURE LTD may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as **("CP")** and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **("Slag")** which can be utilized in road construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

.The Parties hereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of M/s EKK Infrastructure Ltd from the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL &M/s EKK Infrastructure Ltd shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

ADANI ENTERPRISES LTD. AHMEDABAD

EKK INFRASTRUCTURE LIMITED PERUMBAVOOR 683 542 VI/558

2249

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: P.A.Durgarao

Name: PRASAD SURYARAO

Witness:

Signature:

Name: RAVI KAPADIA

ADANI ENTERPRISES LTD. AHMEDABAD

For M/s EKK INFRASTRUCTURE LTD

Signed and delivered by the

Signature:

Name: SANJU REDDY

EKK INFRASTRUCTURE LIMITED

Witness:

Signature:

Name: SUNISH SUDHAKARAN

2250

MEMORANDUM OF UNDERSTANDING (MOU) FOR SUPPLY OF COPPER SLAG

This MOU is entered on this 24th Day of January 2019 between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

Sanghi Cement Ltd, a Company registered under the Company's Act 2013 and having its office at 10th Floor, Kataria Arcade, Off S.G. Highway, Makarba, Ahmedabad-380051, India (hereinafter referred to as **"SANGHI"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and SANGHI may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Refinery Complex at Mundra, Gujarat (hereinafter referred to as **"Project)** and shall be generating in process, 2.0 Million Ton per annum quantity of copper slag (hereinafter referred to as **"Slag"**) which can be utilized in cement for manufacturing and Ready mix concrete (RMC), Paver Blocks Manufacturing, Replacement of Sand for metal surface blasting purpose, Road Construction, etc.

AEL & SANGHI after discussion hereto have decided to enter into an MOU for utilizing this Slag in the SANGHI's cement plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available to SANGHI, the Slag that will be generated from its Project from the commercial date of operation. The quantity, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation.

2.0 AEL & SANGHI shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

SANGHI IND. LTD. AHMEDABAD

ADANI ENTERPRISES LTD. AHMEDABAD

2258

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature:

Name: PRASAD SURYA

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature:

Name: Rais Tapare

For SANGHI

Signed and delivered by the

Signature:

Name: R.K. Chaturvedi

SANGHI IND. LTD. AHMEDABAD

Witness:

Signature:

Name: Amit Kumar Ghosh

M/s Radheshyam Agrawal
A - Class Govt. Civil Contractor
Shri Shyam Tower,Kavita Nagar,Main Road
Avanti Vihar, Raipur (C.G.) 492001
Phone : 0771-4048777, Mob.: 94252-50314
BRANCH : Near Girls College, Seva Kunj Road ,
RAIGARH 496001 (C.G.) Ph.: 07762-225919
GST No. 22AACFR8916J1Z3

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 09th day of April Month 2019 Year between **AdaniEnterprises Limited,** a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

M/s Radheshyam Agrawal a Company registered under the Company's Act 1956 and having its registered office at Raigarh (hereinafter referred to as **"RSA"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

BothAEL and RSA may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as "CP") and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **"Slag"**) which can be utilizedinroad construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

The Partieshereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of RSAfrom the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL &RSA shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

ADANI ENTERPRISES LTD. AHMEDABAD

M/S. RADHESHYAM AGRAWAL Raipur (C.G.)

2253

M/s Radheshyam Agrawal
A - Class Govt. Civil Contractor
Shri Shyam Tower,Kavita Nagar,Main Road
Avanti Viher, Raipur (C.G.) 492001
Phone : 0771-4048777, Mob.: 94252-50314
BRANCH : Near Girls College, Seva Kunj Road ,
RAIGARH 496001 (C.G.) Ph.: 07762-225919
GST No. 22AACFR8916J1Z3

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYARAO

For RSA

Signed and delivered by the

Signature: _____

Name: SANJAY KUMAR AGRAH

Witness:

Signature: _____

Name: RAVI TAPARIA

Witness:

Signature: _____

Name: Rahul Agrawal

ADANI ENTERPRISES LTD. AHMEDABAD

M/s. RADHESHYAM AGRAWAL Raipur (C.G.)

CHEVROX

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 09th day of April Month 2019 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

M/s Chevrox Constructions Private Limited a Company registered under the Company's Act 1956 and having its registered office at Ahmedabad (hereinafter referred to as **"CCPL"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and CCPL may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as **"CP"**) and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **"Slag"**) which can be utilized in road construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

The Parties hereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of CCPL from the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL & CCPL shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

ADANI ENTERPRISES LTD. AHMEDABAD

2255

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: P.A. Suryarao

Name: PRASAD SURYARAO

Witness:

Signature:

Name: RAVI PAPARIA

ADANI ENTERPRISES LTD. AHMEDABAD

for CCPL

Signed and delivered by the

Signature:

Name: Kishan Prakash Puri

Witness:

Signature:

Name: Bharat Bhardwaj

CHEMTROL CONSTRUCTIONS PVT. LTD. AHMEDABAD

EAC OBSERVATION:

Phospho-gypsum disposal site co-ordinates, concrete mode of utilization, maximum time frame envisaged for the storage at the disposal yard i.e., one month (or) 15 days has not been submitted.

REPLY:

Phospho-gypsum disposal site co-ordinates are marked in Plot Plan and is attached in **Annexure-9(a)**

Criteria for Phospho Gypsum Storage (As per CPCB Guideline)

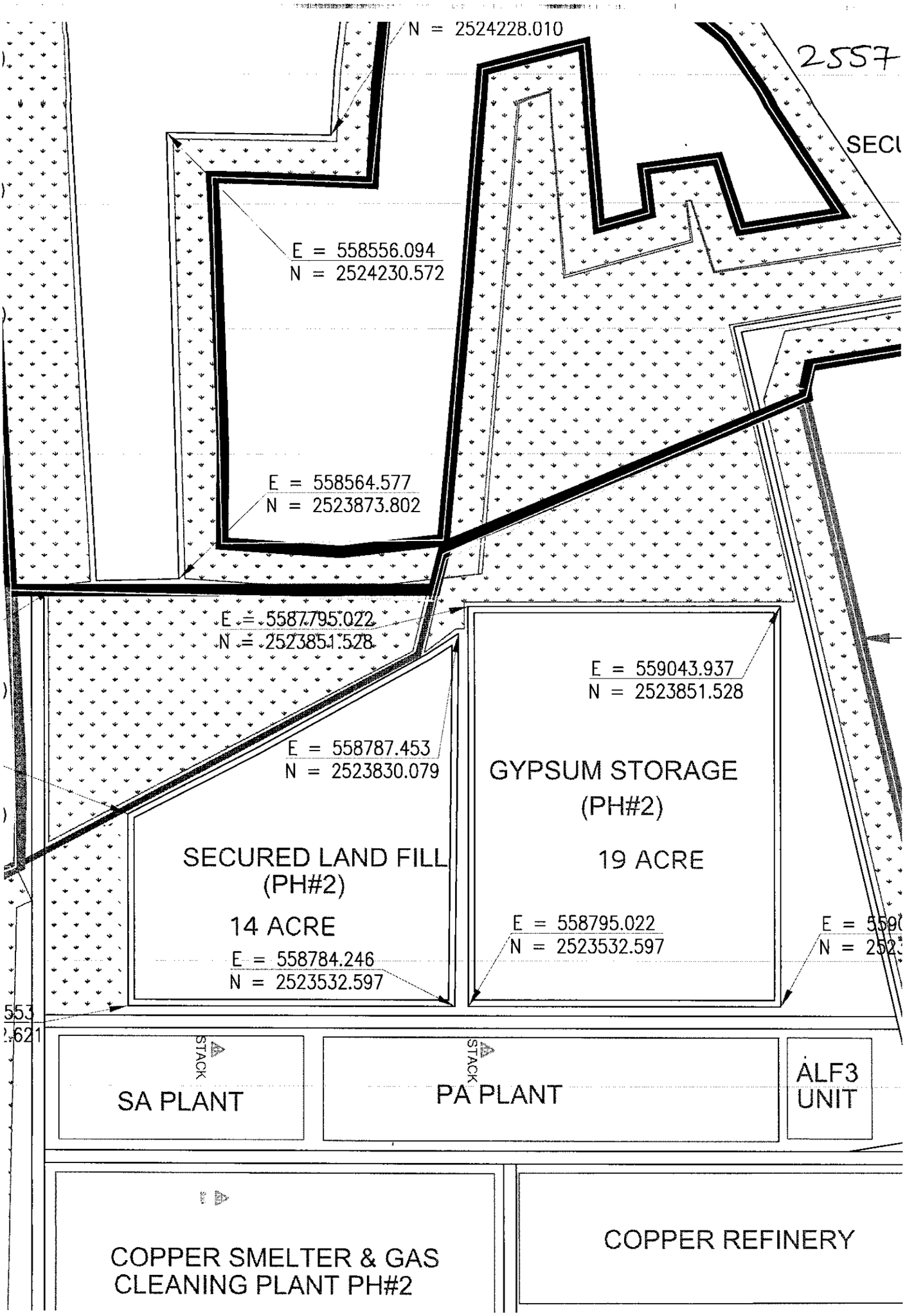
Sr. No.	Description	Locational Criteria	Compliance
1	Lake or Pond	Distance More than 200m	Storage-I: 850m from nearest pond Storage-II: 830m from nearest pond
2	Flood Plan	No Construction 100 Year flood Plain	Since no flow data is available for Danesri Nadi , a tentative estimate of run-off from Danesri Nadi catchment and discharge at railway line near project site is done based on the catchment characteristics.
3	Habitation	Distance More than 1 KM	Storage-I: 1350m from Navinal Storage-II: 1950m from Navinal

Phospho gypsum is widely used in cement manufacturing. Company will be making effort to sell the Phospho gypsum to nearby cement companies. MOU with the prospective cement companies are attached as **Annexure-9(b).**

Phospho gypsum is also used for agriculture purpose and therefore efforts will be made to sell for the agriculture requirement.

Total Area allocated for storage of Phospho Gypsum is around 51 Acres. Gypsum will be stored to 15 meter height above the base of the storage. Greenbelt of 15 m width will be developed all around the storage area.

This area is sufficient for 3 years, considering NO sales.


N = 2524228.010
2557
SECU
E = 558556.094
N = 2524230.572
E = 558564.577
N = 2523873.802
E = 5587795.022
N = 2523851.528
E = 559043.937
N = 2523851.528
E = 558787.453
N = 2523830.079
GYPSUM STORAGE
(PH#2)
19 ACRE
SECURED LAND FILL
(PH#2)
14 ACRE
E = 558784.246
N = 2523532.597
E = 558795.022
N = 2523532.597
E = 559
N = 252
553
621
STACK
SA PLANT
STACK
PA PLANT
ALF3
UNIT
COPPER SMELTER & GAS
CLEANING PLANT PH#2
COPPER REFINERY

2258

MEMORANDUM OF UNDERSTANDING (MOU) FOR SUPPLY OF PHOSPHO GYPSUM

THIS MOU is entered on this 31st day of December 2018 between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

Adani Cementation Ltd, a Company registered under the Company's Act 2013 and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"ACL"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and ACL may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Refinery Complex at Mundra, Gujarat (hereinafter referred to as **"CP"**) and shall be generating in process, 2.5 Million Ton per annum quantity of Phospho-gypsum (hereinafter referred to as **"Gypsum"**) which can be utilized in manufacturing cement, gypsum board fertiliser applications, etc.

AEL & ACL after discussion hereto have decided to enter into an MOU for utilizing this Gypsum in the ACL's cement plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available to ACL 0.30 Million Ton per annum of cement grade Gypsum that will be generated from its CP from the commercial date of operation. The delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation.

2.0 AEL & ACL shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

ADANI ENTERPRISES LTD. AHMEDABAD

ADANI CEMENTATION LIMITED AHMEDABAD

2259

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYARAO

Witness:

Signature: _____

Name: _____

For ACL

Signed and delivered by the

Signature: _____

Name: ROHIT VOHRA

Witness:

Signature: _____

Name: _____

MEMORANDUM OF UNDERSTANDING (MOU) FOR SUPPLY OF PHOSPHO GYPSUM

This MOU is entered on this 24th Day of January 2019 between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

Sanghi Cement Ltd, a Company registered under the Company's Act 2013 and having its office at 10th Floor, Kataria Arcade, Off S.G. Highway, Makarba, Ahmedabad-380051, India (hereinafter referred to as **"SANGHI"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and SANGHI may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Refinery Complex at Mundra, Gujarat (hereinafter referred to as "**Project**) and shall be generating in process, 2.5 Million Ton per annum quantity of Phospho-gypsum (hereinafter referred to as "**Gypsum**") which can be utilized in manufacturing cement, gypsum board fertiliser applications, etc.

AEL & SANGHI after discussion hereto have decided to enter into an MOU for utilizing this Gypsum in the SANGHI's cement plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available to SANGHI the cement grade Gypsum that will be generated from its Project from the commercial date of operation. Currently, SANGHI consumes around 0.20 MTPA of Gypsum in their manufacturing process which is likely to be increased to about 0.40 MTPA after their capacity expansion. The quantity, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation.

2.0 AEL & SANGHI shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

AHMEDABAD * SANGHI IND. LTD. *

ADANI ENTERPRISES LTD. AHMEDABAD

2261

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYA

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature: _____

Name: Rais Tafaie

For SANGHI

Signed and delivered by the

Signature: _____

Name: R.K. Lodha

SANGHI IND. LTD. AHMEDABAD

Witness:

Signature: _____

Name: Amit Kumar Ghosh

EAC OBSERVATION:

Lining details for Phospo-gypsum disposal yard, leachate collection system envisaged and details of piezo-well installations has not been made available.

REPLY:

Phosphogypsum storage yard will be developed strictly as per CPCB Guidelines for Management and handling of phosphogypsum generated from phosphoric acid plants.

M/s. Garware Technical Fibres Limited (Geosynthetics Division), Pune; has been engaged to carry out a detailed technical study for the construction of the Phosphogypsum storage and same is attached as **Annexure-10(a)**

The thickness of the liner shall be 1.5 mm thick (min) made through flat cast extrusion technology to keep the thickness variation across the rolls to less than 5% and the minimum width of the membrane shall not be less than 7.5 m and length shall not be less than 150 m to reduce the number of joints. Understanding the seriousness of the project Naue –Germany / Equivalent -GSE-Germany make shall be used. HDPE liner make will be laid at the prepared base areas as well as on the dike slopes. A detailed technical specifications has been provided as a part of the technical proposal attached.

Leachate collection system shall be installed and leachate will be recycled back into Phosphoric Acid Plant operation and thereby reducing the fresh water requirement. Capacity of the leachate collection (Gypsum Return Water Pond) will be ~ 3000 m^3 per Gypsum storage.

Piezo well shall be installed based on the hydrogeology study carried out to identify any contamination of the ground water if any. Location of the Piezo wells have been marked on the plot plan and same is attached as **Annexure-10(b)**

Additionally there will be 2 nos of rainwater collection pond having capacity of 4,000 m^3 from gypsum storage runoff.

ANNEXURE-10(a)

2263

Brief Note

on

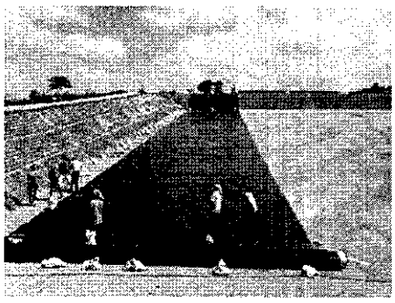
Technical Elements of

Phosphogypsum Stack Project

at

Adani Copper Refinery

Mundra, Gujarat, India





Submitted by

GARWARE TECHNICAL FIBRES

GARWARE TECHNICAL FIBRES LIMITED

(Geosynthetics Division)

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1 Cover Note

With reference to the subject cited above, it give us pleasure to receive the enquiry and would like to place on record our desire to associate in the subject project for the construction of the Geosynthetic Lined Gypsum Stack construction. Sir, we at Garware Technical Fibres Ltd (GTFL)-Geosynthetics Divn have been striving tirelessly to Design, supply, install and commission the best Environmental protection Structures for the Waste/Process residue management for the industries as well as municipal corporations. We are also working in many diverse areas of Ground/Geotechnical/Geo-environmental engineering with prime focus on environmental protection, resource Conservation. In specific to the complexity of the project which Adani Enterprises Ltd is planning to undertake, we would like to put forth the following points

GTFL has been associated with similar Phosphogymsum Stack projects in the past for Coramnadal Fertilizers, Paradeep Phosphate and IFFCO (2006-2010).We are also executing Phosphogymsum Stack expansion for Paradeep Phosphate Ltd and IFFCO as per CPCB Guidelines-2014. GTFL has also been involved in design, engineering and execution of large number of Secure Landfill Projects for its customers including Indian Oil, Sterlite Industries, Cairn Energy, HZL, Vedanta Aluminium Ltd, Pimpri Chinchwad Municipal Corporation, KMML-Kerala to name a few.

We have also knowledge of the legal and statutory requirements of the project of such nature and have been associated with various Pollution Control Boards on behalf of the industry and thereby handling and holding hand in explaining the technicalities and compliance related issues.

Above all, our experience of past **20 years in Geosynthetic Lining and related construction with cutting edge technology** has always given industry the confidence to associate with us.

We would be pleased to associate with you to deliver the best available design, products and services for your project

We are also sure that your company will be equally interested to give us an opportunity to demonstrate our Supply/Service capability for the subject project.

2 Brief about Phosphogypsum Stack

The following pages gives only brief outline of key elements of the Phosphogypsum Stack for explanation purpose which Adani Copper Refinery is proposing. Adani Copper Refinery is proposing to construct at its upcoming Copper Refinery located at Mundra, Gujarat. At a later stage, detailed engineering, planning including drawing, material specifications shall be made and the same shall be submitted for approval before starting of the construction of the facility.

2.1 Phosphogymsum Stack Layout

The construction of Phospo Gypsum Stack facility at Adani Copper Refinery site is proposed to be executed with detailed planning and engineering, design of the facility. Broadly it shall consist of Access Road, Perimeter Road, Electrical Lighting, outer/perimeter embankment, inner embankment for disposal of the gypsum, installation of various Geosynthetics materials. drainage trench, outlet and lined channels around the gypsum stack, installation of the Geosynthetic materials, air vent system on the prepared base areas, installation of a 1.5 mm thick smooth & friction high density polyethylene (HDPE) liner-Naue Germany make and as per European standards on the inboard perimeter dike slopes and prepared base areas and construction of the under drains and outlets.

2.2 Site Investigation Criteria

2.2.1 Preliminary Boreholes and Geophysical Investigation:

At each site, as a part of preliminary data collection, one to two boreholes will be drilled and samples collected at every 1.5m interval to a depth of 20m below the ground surface. The following information will be obtained:

(a) soil type and stratification;

(b) permeability of each strata;

(c) strength and compressibility parameters (optional);

(d) ground water level & quality and depth to bedrock.

In addition to preliminary boreholes, geophysical investigations (electrical resistivity/seismic refraction/others) will be undertaken to assess the quality of bedrock at different sites.

A detailed site investigation program will comprise of

(a) subsoil investigation,

(b) ground water/hydrogeological investigation.

(c) hydrological investigation,

(d) topographical investigation and

(e) geological investigation.

The output expected from each investigation is listed below:

a) **Subsoil Investigation:** A detailed investigation plan may be drawn up in consultation with a geotechnical engineer The output from such an investigation should yield the following:

   (i) Stratification of subsoil -type of soil and depth

   (ii) Depth to ground water table and bedrock (if located within 15m of base of landfill)

   (iii) Permeability of various strata beneath the landfill.

   (iv) Strength and compressibility properties of subsoil

(v) Extent of availability of liner material, drainage material, top soil and protective soil in adjacent borrow areas.

(vi) Subsoil properties along approach road.

A minimum of 3 boreholes per hectare of landfill area upto 15m beneath the base of the landfill shall be drilled and in-situ tests as well as laboratory tests shall be performed for permeability, strength, compressibility and classification of soils.

In addition, test pits and boreholes shall be drilled at borrow area for liner and cover materials as well as along approach road.

b) **Ground Water/ Hydrogeological Investigation:** A detailed investigation plan may be drawn up in consultation with a ground water specialist or a hydrogeologist. The output from such an investigation should yield the following:

(i) Depth to groundwater table and its seasonal variations.

(ii) Ground water flow direction

(iii) Baseline ground water quality parameters -all drinking water quality parameters.

c) **Topographical Investigation:** Construction of a landfill involves a large quantity of earthwork. It is essential to have an accurate topographical map of the landfill site to compute earthwork quantities precisely. A map of 0.3m contour interval is considered desirable.

d) **Hydrological Investigation:** The objective of a hydrological investigation is to estimate the quantity of surface runoff that may be generated within the landfill to enable appropriate design of drainage facilities. If additional run off from areas external to the landfill is likely to enter the landfill, this quantity should also be estimated to design interception ditches and diversion channels. Such an investigation shall yield estimates of peak flows if seasonal rivers or streams run close to the site hydrological investigation should indicate the possibility of flooding of the site under one in 100 year flood flows. Surface water samples for water quality analysis may be collected from dUring hydrological studies.

e) **Geological Investigation and Seismic Investigation:** Geological investigations shall delineate the bedrock profile beneath the landfill base, if not confirmed by subsoil investigations. Geophysical surveys may be designed in consultation with a geologist. In hilly areas or in quarried rocks. Geological investigations should indicate the quality of surficial rock, depth to sound rock and the possibility of interconnected aquifers beneath the landfill base In the rock mass. Detailed seismic data may be obtained as a part of geological investigations.

2.2.2 Base Stability, Slope Stability and Seismic Aspects:

For landfills construction on the soil, the base will be checked for stability against bearing failure or excessive settlements.

The stability of side slopes of a landfill shall be checked for the following cases (Fig. 9).

(a) stability of excavated slopes

(b) stability of liner system along excavated slopes

(c) stability of temporary waste slopes constructed to their full height (usually at the end of a phase)

(d) stability of slopes of above-ground portion of completed landfills

(e) stability of cover systems in above ground landfills.

The stability analysis shall be conducted using the following soil mechanics methods depending upon the shape of the failure surface

(a) failure surface parallel to slope;

(b) wedge method of analysis;

(c) method of slices for circular failure surface and

(d) special methods for stability of anchored geomembranes along slopes.

In preliminary design of a landfill section, the following slopes will be adopted.

(a) Excavated soil slopes (2.5 horizontal : 1 vertical)

(b) Temporary waste slopes (3.0 horizontal : 1 vertical)

(c) Final cover slopes (4.0 horizontal : 1 vertical)

Slopes can be made steeper, if found stable by stability analysis results. Acceptable factors of safety may be taken as 1.3 for temporary slopes and 1.5 for permanent slopes.

In earthquake prone areas, the stability of all landfill slopes shall be conducted taking into account seismic coefficients as recommended by BIS codes.

2.3 Lining System

2.3.1 Bottom Liner System

The lining system is additional to the separation or unsaturated zone comprising soil or sand between the wet season high elevation of the ground water and the stack yard. These liner consist of native clayey soil/amended soil/ad-mixture soil. The permeability of the soil / amended soil should be less than or equal to 1×10-7 cm/sec. As an alternative to clay Geosynthetic Clay Liner made from Natural Sodium Bentonite sandwitched between two layer of Geotextile known as Bentofix made by Naue-Germany meeting the regulatory requirement may be used.

A schematic cross section of the bottom Liner system is given in **Figure 1**.

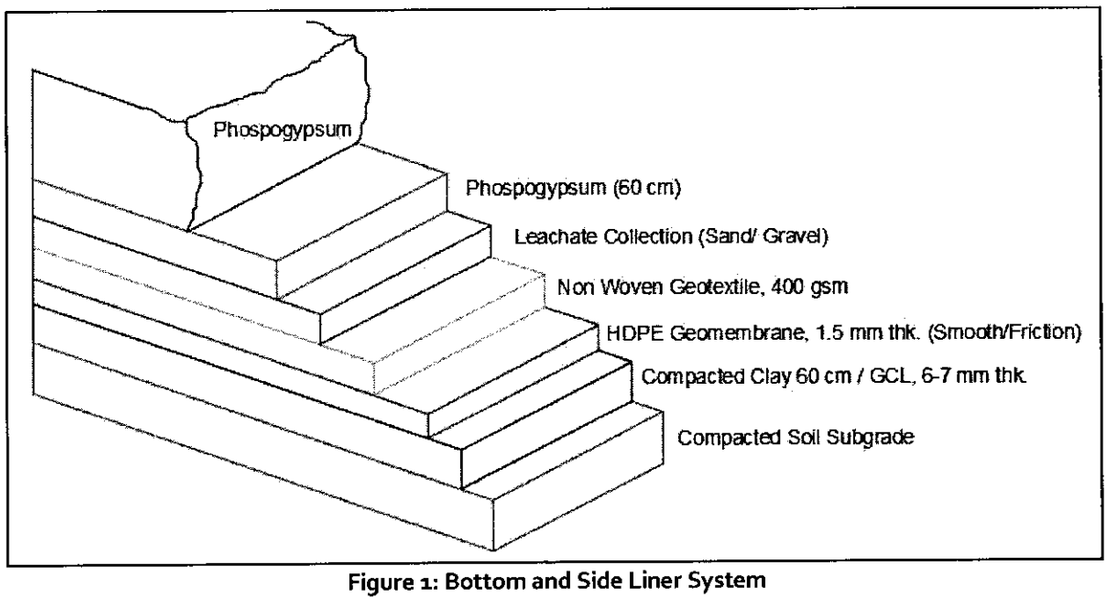


Figure 1: Bottom and Side Liner System

2.3.1.1 Geomembranes

These are flexible sheets made from various plastic materials. The recommended liner along the side as well as the bottom of the facility is HDPE Liner. HDPE lining is effected by overlapping the strips and joining them with a special welding technique.

The thickness of the liner shall be 1.5 mm thick (min) made through flat cast extrusion technology to keep the thickness variation across the rolls to less than 5% and the minimum width of the membrane shall not be less than 7.5 m and length shall not be less than 150 m to reduce the number of joints. Understanding the seriousness of the project Naue –Germany / Equivalent -GSE-Germany make has been recommended for use. Detailed Material Specifications are given in the annexure. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance.

2.3.1.2 Protection Layer (Non Woven geotextile)

To protect the geo membrane against the mechanical stress and failure thereby, non-woven needle punched Geo textile manufactured through mechanically bonding and made from continuous fibres/filaments and made of 100% UV stabilized Polypropylene is to be used on the HDPE Liner on the bed as well as the slopes. For the protection purpose, 400 gsm overlay Non-Woven Geotextile has been recommended. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance. The minimum width of the Non Woven Geotextile shall be 4 m and minimum length shall be 90.0m.

2.3.1.3 Drainage Layer

The Gypsum Stack facility essentially generates significant quantity of leachate due to inherent moisture present in the waste body and the rain water precipitation. This leachate is impregnated with harmful chemicals and pollutants. This is to be collected, removed from the facility and treated. In order to collect the leachate from the waste body a Drainage layer of 30 cm granular material of permeability>1*10-2 cm/sec is put over the protective layer of Geotextiles.

Looking at the following aspects of the Gypsum Stack the following drainage medium has been recommended:

(a) Structural profile and geometry

(b) Bottom and side slope pattern

(c) Performance of various geological and synthetic material for drainage function

Hence for the side slope geocomposite drainage net and for the bottom slopes, Sand/gravel as a drainage medium for the primary and secondary layer of desired specification has been recommended.

2.3.2 Side liner system of Gypsum Stack

The side liner system is on the inner side of soil bunds with slope 1:3 (V: H).The construction procedure of each layer of sideliner system is shown in Figure No: 02.

GCL-Bentofix-Naue Germany make of minimum 6-7mm thickness with powdered bentonite to be used instead of compacted clay as the slope is not so gentle and it is difficult to compact the clay on steep slope.

Moreover on the Non-Woven Geotextile, Geocomposite Drainage Net shall be used as a Drainage Medium instead of Sand/ Gravel. **A schematic sketch of the side liner system anchoring with gas venting system is shown in Figure 2.**

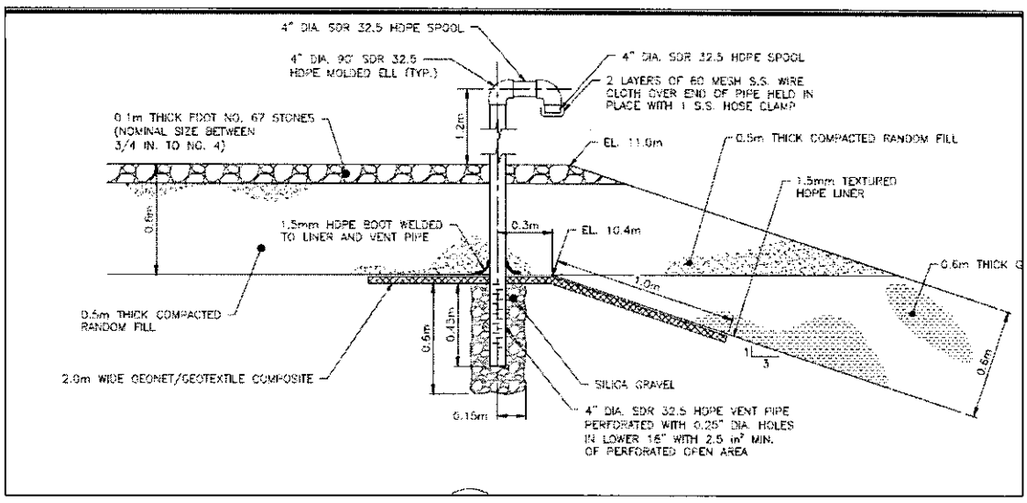


Figure 2: Side Liner System

2.4 Leachate Drainage, Collection & Removal System

In order to collect and convey the leachate generated to the collection sump, a Leachate collection System has been designed. It comprises of the following:

(a) Drainage Layer.

(b) A Perforated Pipe Collector System.

(c) Sump Collection Area.

(d) Removal of the leachate.

The leachate drainage is usually achieved using graded under-liner and drains which lead to a collection system/ Surge Pond leading to a sump. A typical layout of the stack area, leachate Channel and surge pond is shown in **Figure 3**.

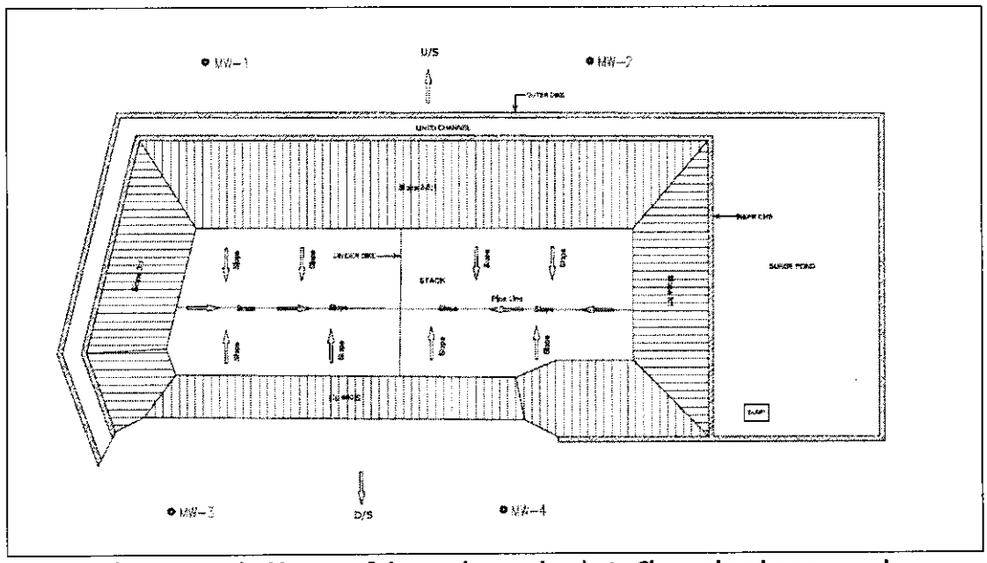


Figure 3: Typical layout of the stack area, leachate Channel and surge pond

The technical details of the leachate drainage are as under:

Thickness of the Drainage Layer should be designed in such a way so that, the leachate can be evacuated quickly. Broadly, 150 mm for arterial pipes for collecting and 200 mm main header line for transporting the leachate from the body of Gypsum stack would be able to carry the leachate to the sump. Gravel/Sand to be used for the smooth drainage of the leachate from the stack area to the piping system. A typical drain section is shown in **Figure 4**.

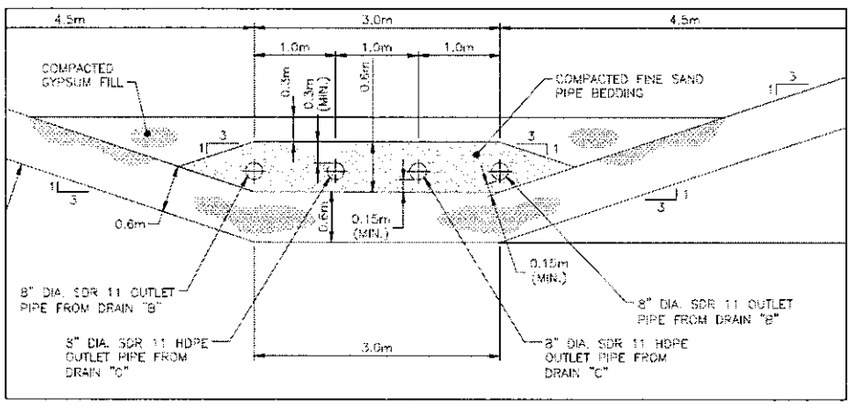


Figure 4: Typical Drain Section

2.5 Construction of Embankment

Embankment shall be designed based on sound engineering practices and also shall be checked for slope stability analysis considering seismic factors of Mundra-Gujarat region.

The embankment shall be constructed to the lines and grades shown on the drawings. Placement of fill shall be performed in an orderly way and in an efficient and workman like manner, so as to produce fills having such quantities of density, strength and permeability as will ensure the highest practicable degree of stability and performance of the embankment.

The slopes of embankment shall be maintained as per specific structures drawing.

2.5.1 Fill Materials

The materials for embankment shall be obtained from the available excavated material. Some earth material available from the excavation in the pond area if found suitable will also be used for the embankment construction. Morrum / Yellow soil or soil which satisfy the accepted civil engineering property of the bund construction shall be accepted.

2.5.2 Placing the fill material Compaction of the Embankment and Base: (IS: 2720)

The combined excavation and placing operations shall be such that the materials when compacted in the fill will be blended sufficiently to produce the specified degree of compaction and stability. The earth obtained from a particular borrow area as far as possible shall be used in forming the complete cross-section of the fill for a particular stretch.

No stones cobbles or rock fragments, having maximum dimensions of more than 5 cm shall be placed in the fill. Such stones and cobbles shall be removed either at the borrow pit or after being transported to the site but before the materials in the fill are rolled and compacted. Such stones or cobbles shall be placed in other portions of embankment if found suitable or rejected as directed. The materials shall be placed in the fill in continuous horizontal layers, stretching right across the whole section, not more than 0.4 m in compacted thickness

Vibratory rollers/static roller shall be used for compacting cohesive materials and pneumatic rollers and vibratory rollers shall be used for compacting cohesion less materials. The compaction in

horizontal layers will be done using standard compaction equipment or in inclined layers using slope compactors/appropriate method.

2.6 Inspection Test

Control tests shall be carried out in laboratory from time to time to determine whether the earth produced by methods employed satisfies the requirements of the specifications and documented for verification by the Officer- in –Charge of the regulatory authority and the work shall be inspected periodically.

Complete documentation of all quality control records and their submission to the GPPCB along with showing satisfactory achievement of acceptance criteria.

The quality control tests for compacted clay layer (or amended soils) as well as the leachate collection/drainage layer will include

(a) In-situ density tests.
(b) in-situ moisture content tests.
(c) Compaction tests.
(d) Permeability tests,
(e) Grain size distribution tests and
(f) Atterberg's limits tests
(g) Others as defined by GPCB.

The quality control tests for geomembrane liners shall be carried at as per QA/QC protocol and shall include the following:

(a) Thickness tests,
(b) Density tests,
(c) Strength tests,
(d) Field seam strength & leak tests

The Officer- in -Charge shall determine whether the desired results are being obtained.

Dressing and Trimming of the slopes

The outer slopes of the embankment shall be neatly dressed to line. Compaction shall extend over the full width of the embankment and the material in the slopes shall be compacted as for the rest of structure. To ensure proper compaction at the outer edge, the fill shall be constructed for a minimum of 0.5 m/1.0m extra width on either edges or the outer edge dressed to true width and slope after compaction. No earth slope shall be left without trimming to design slope.

2.7 Design of Storm Water Drain:

The catchment includes the top or cap of the Gypsum Stack facility as well as the outer slope of embankment and site upto fencing. Hence to divert the incoming water at the surface level as well as the slope and terraces of the Gypsum Stack facility, adequate storm water drainage channels need to be designed, constructed. The channel has to ultimately carry water to the storm water pond for storage or evaporation purpose in case not discharged outside.

2.8 Surface Water Drainage System

Surface water management shall be designed to ensure that rainwater run-off does not drain into the waste from surrounding areas and that there is no waterlogging/ponding on covers of landfills. A schematic surface water drainage system comprising of channels, drains, culverts and basins (Fig8) shall be designed to ensure the following:

(a) Rainwater running off slopes above and outside the landfill area shall be intercepted and channelled to water courses without entering the operational area of the site. This diversion channel may require a low permeability lining to prevent leakage into the landfill
(b) Rain falling on active tipping areas shall be collected separately and managed as leachate, via the leachate collection drain and leachate collection sumps to the leachate treatment and disposal system.
(c) Rainfall on areas within the landfill site, but on final covers of phases which have been completed and are not actively being used for waste disposal shall be diverted in drainage channels away from active tipping areas, and directed through a settling pond to remove suspended silt, prior to discharge.
(d) Any drainage channels or drains constructed on the restored landfill surface shall be able to accommodate settlement, resist erosion and cope with localised storm conditions.
(e) The horizontal surface of the final cover shall be provided a slope of 3 to 5% for proper surface water drainage. The slope of the cover on the sides will be higher and governed by slope stability considerations
(f) All Interceptor channels, drainage channels and settling ponds (storm water basins) shall be designed by a hydrologist using hydrometerological data.
(g) It shall be ensured that water collected by surface water drainage system and leachate collected by the leachate collection system do not get intermixed at any stage of collection or storage This shall apply to the 'active' and 'post closure' periods of the landfill

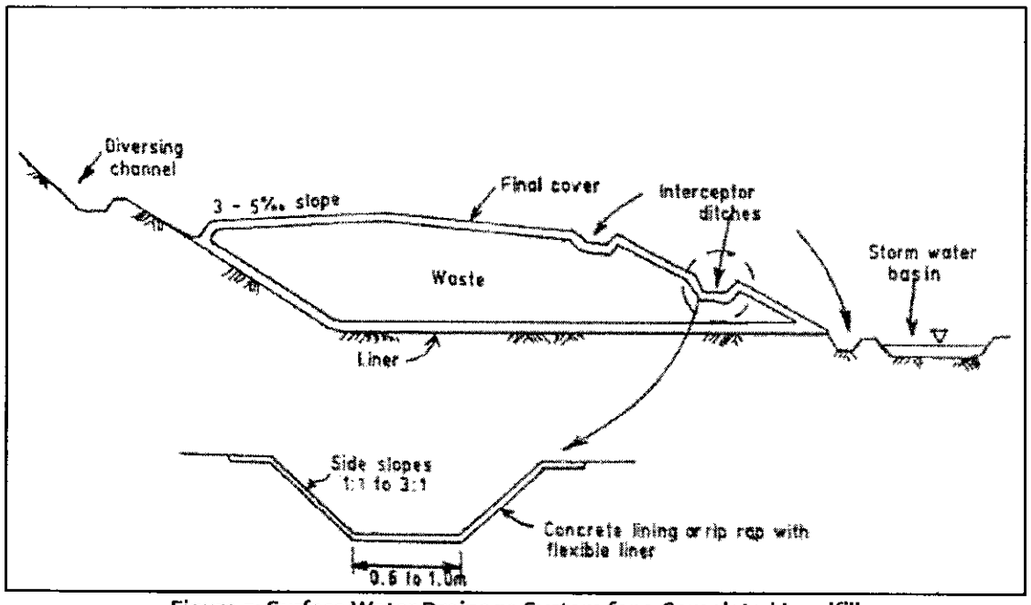


Figure 5: Surface Water Drainage System for a Completed Landfill

The design of following components will be undertaken:

(a) storm water drains, diversion channel
(b) storm water basin
(c) culverts if required

2.9 Piezometric Well

Piezometer shall be constructed to monitor the quality of groundwater. Two piezometers shall be installed on the downstream side of the SLF. Two piezometers shall be installed on the upstream side of the Gypsum Stack. At present, possible locations have been shown where the installation cane be done. But, exact location of the monitoring well shall be finalized in consultation with Gujarat State Pollution Control Board. The piezometer consist of a stand pipe made up of stainless steel/PVC which shall be screened along the entire aquifer depth i.e. the standpipe shall be- screened from a depth of 1 m to 10m or depending on ground water depth. The screened interval shall be encased in a filter zone made up of gravel and sand layer. The function of the filter zone is to allow free flow of groundwater into and out of standpipe and prevent fines from entering the standpipe. Immediately above the screened interval, a clay and bentonite seal shall be placed. The thickness of clay seal shall be 0.5 m. Above the clay and bentonite seal, a grout seal consisting of cement and bentonite shall be constructed which provides a barrier for preventing surface water and ground water from elsewhere from migrating into the screened interval. At the ground level, a steel casing embedded in concrete pad shall be employed. A cap shall be placed on the top of steel casing to prevent rainwater and surface water from entering into the standpipe. The piezometer shall be constructed at a minimum distance of 7 m from outside edge of the embankment. A schematic sketch of a Piezometer is shown in **Figure 6**. The location is shown in figure no 4.

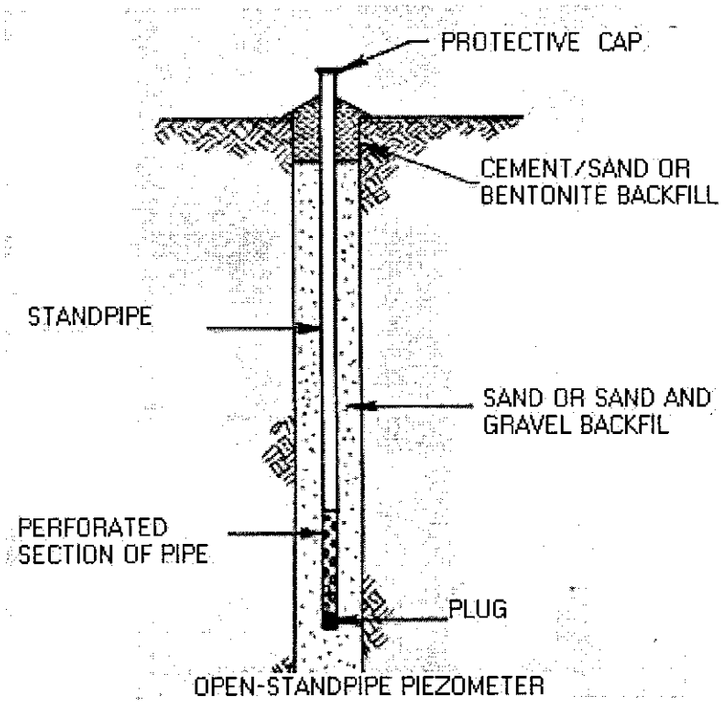


Figure 6: Piezometer

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2.10 Annexure

Liner Make: Naue, Germany, Thickness: 1.5 mm-Smooth

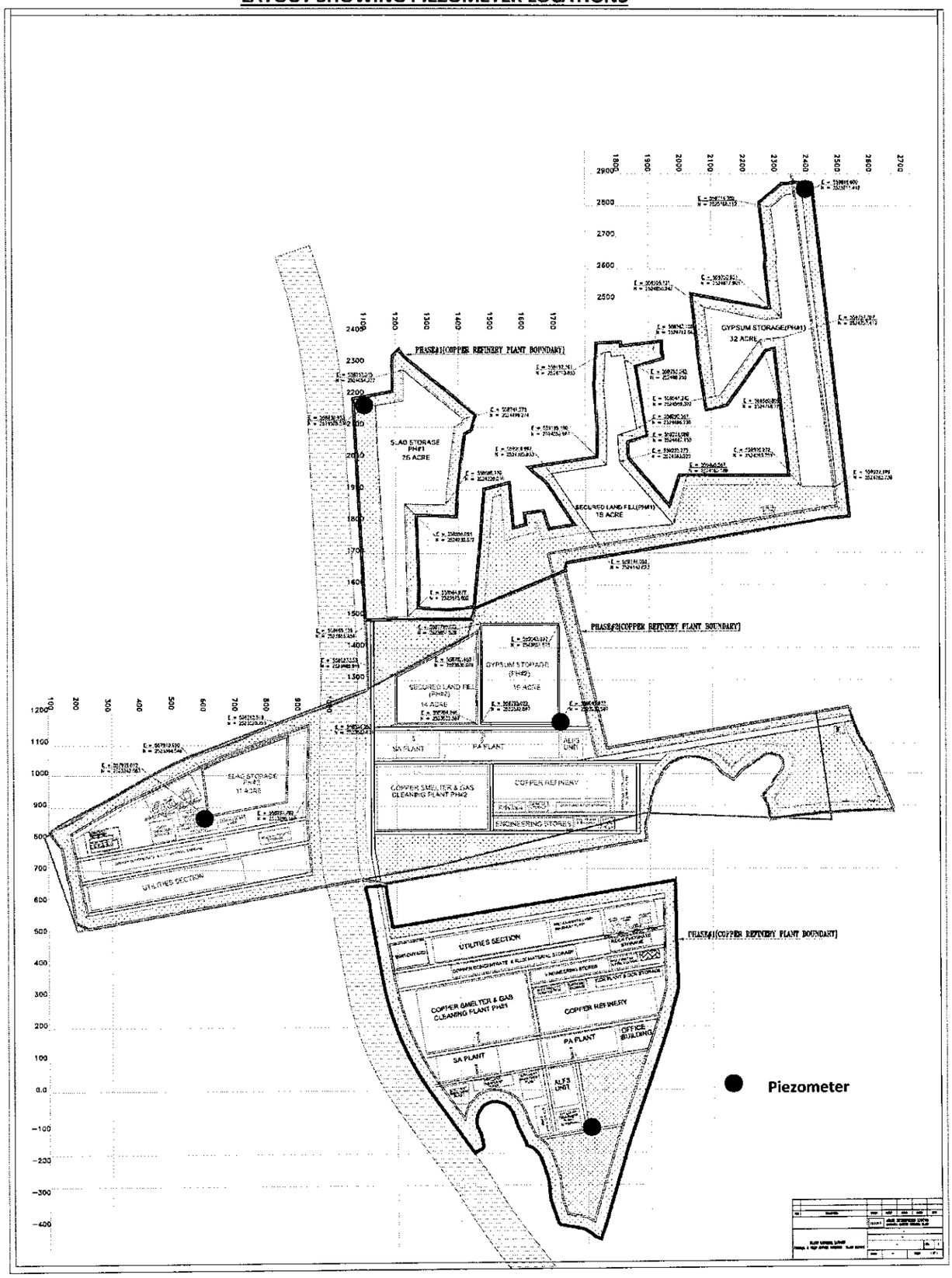
Length:150m, Width:7,5m

Property	Test Method	Unit	Value
Thickness Nominal	EN-1849-(2)/ASTM D 5199	mm	1.50
Lowest individual value	EN-1849-(2))/ASTM D 5199	mm	1.42
Density	EN ISO 1183/ASTM D 1505	Gm/cc	0.942
Melt Flow Index	EN ISO 1133/ASTM D 1238-190/2.16	Gm/10 min	<1.0
Tensile Strength at Yield	EN ISO 527-3/ASTM D 6693	N/mm	22
Tensile Strength at break	EN ISO 527-3/ASTM D 6693	N/mm	42
Elongation at Yield	EN ISO 527-3/ASTM D 6693	%	12%
Elongation at Break	EN ISO 527-3/ASTM D 6693	%	700
Tear Resistance	ISO 34-1/ASTM D 1004	N	215
Puncture Resistance	ASTM D 4833/EN ISO 12236	N	500
Carbon Black Content	ASTM D 1603	%	>2
Carbon Black Dispersion	ASTM D 5596	Cat	1-2
Dimensional Stability	EN 1107-2/ASTM D 5397	%	+/- 2

Tolerance: 10% on values except thickness, Carbon Black for which a range is given.

Annexure-10(b)

LAYOUT SHOWING PIEZOMETER LOCATIONS



EAC OBSERVATION NO.-11

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EAC OBSERVATION:

Secured land fill site co-ordinates, lining details, leachate collection system envisaged and details of piezo-well installation has not been made available.

REPLY:

Site Coordinates are marked in Plot Plan and attached in annexure **Annexure-11(a)**

Secured land fill will be developed strictly as per CPCB Guidelines for Criteria for Hazardous Waste Landfills series: HAZWAMS/17/2000-01.

Criteria for Site Selection for storage of Hazardous Waste (As per CPCB Guidelines)

Sr. No.	Description	Locational Criteria	Compliance
1	Lake or Pond	Distance More than 200m	Storage-I: 550m from pond located on North West Side Storage-II: 850m from pond located on North Side
2	River	Distance More than 100m	Storage-I: 640m from River flowing on west side Storage-II: 50m from River flowing on west side
3	Flood Plain	No Construction 100 Year flood Plain	Since no flow data is available for Danesri Nadi , a tentative estimate of run-off from Danesri Nadi catchment and discharge at railway line near project site is done based on the catchment characteristics.
4	Highway	Distance More than 500m	Storage-I: 850m from SH-6 which is on north side Storage-II: 1900m from SH-6 which is on north side
5	Habitation	Distance More than 500m	Storage-I: 1800m towards north Storage-II: 2400m towards north
6	Public Parks	Distance More than 500m	Storage-I: 1850m towards north Storage-II: 2450m towards north
7	Critial Habitat Area	Nothing within critical Habitat areas including reserved forest area	NA
8	Wetlands	No construction within wetlands	Storage-I: 2.5 km from mangrove near kotdi creek Storage-II: 2.0 km from mangrove near kotdi creek
9	Airports	No construction within zone around aiports as notified by regulatory authority or aviation autority	Bhuj Airport: 50km Mundra Airport: 30km
10	Water Supply Well	Distance More than 500m	1.7km from well in navinal
11	Coastal Regulation Zone	No construction in Coastal Regulatory Zone	Storage-I: 750m from CRZ Line Storage-II: 600m from CRZ Line

12	Ground Water Table Level	No Construction where ground water table will be less than 2m below the base of the landfill	<2m to 10m

M/s. GARWARE TECHNICAL FIBRES LIMITED (Geosynthetics Division), Pune; has been engaged to carry out a detailed technical study for the construction of the secured land fill and same is attached as **Annexure-11(b).**

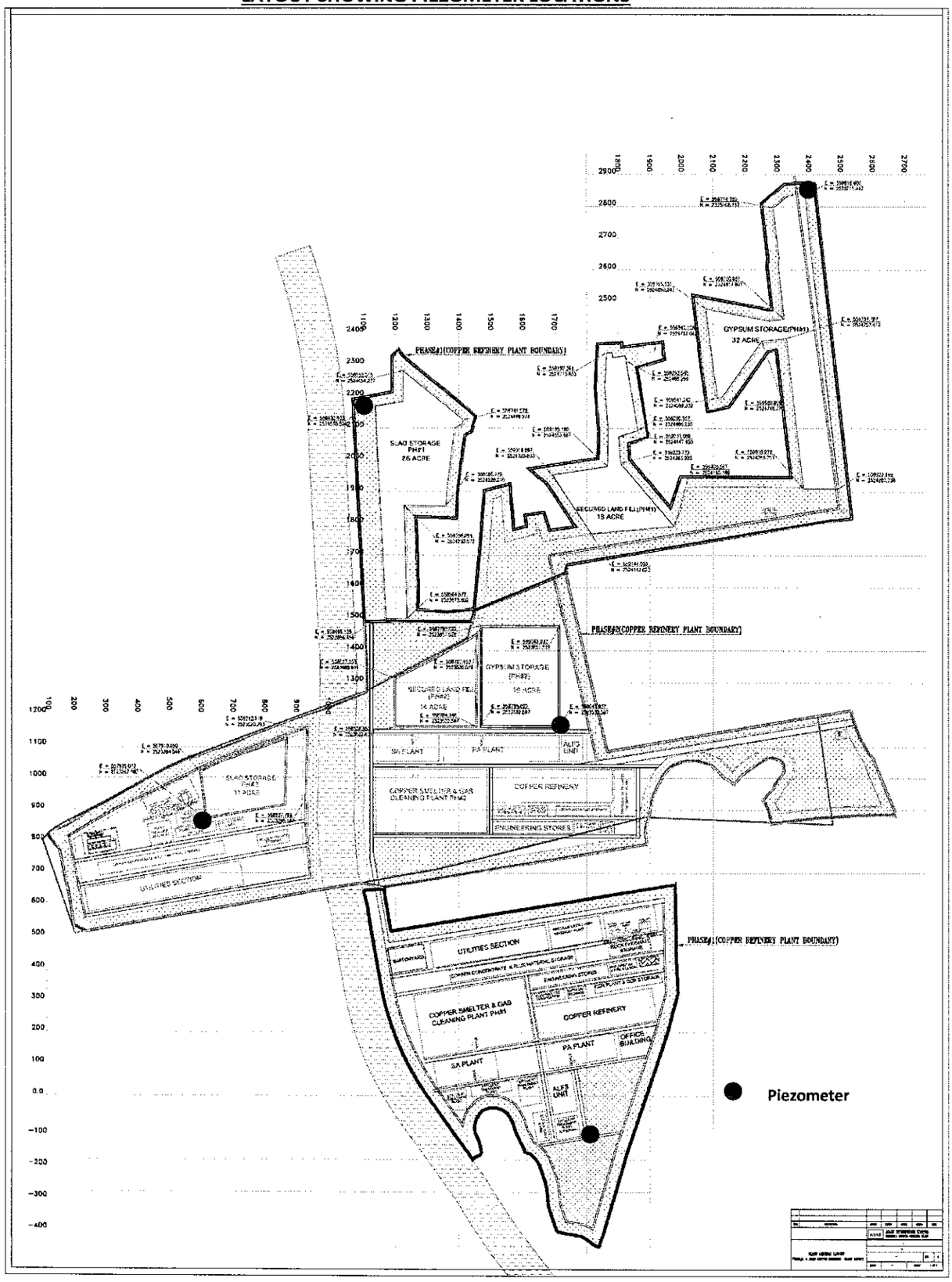
The thickness of the HDPE liner shall be 2.0 mm thick (min) made through flat cast extrusion technology to keep the thickness variation across the rolls to less than 5% and the minimum width of the membrane shall not be less than 7.5 m and length shall not be less than 120 m to reduce the number of joints. Understanding the seriousness of the project Naue– Germany/ Equivalent– GSE Germany make shall be used. HDPE liner make will be laid at the prepared base areas as well as on the dike slopes. A detailed technical specifications has been provided as a part of the technical proposal attached.

Leachate collection system shall be installed and leachate will be treated into effluent treatment plant. A 60 m^3 leachate collection sump will be provided along with pumping system to transfer to ETP for treatment and consumption.

Piezo well shall be installed based on the hydrogeology study carried out to identify any contamination of the ground water if any. Location of the Piezo wells have been marked on the plot plan and same is attached as **Annexure-11(a).**

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Annexure-11(a)
LAYOUT SHOWING PIEZOMETER LOCATIONS



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Brief Note

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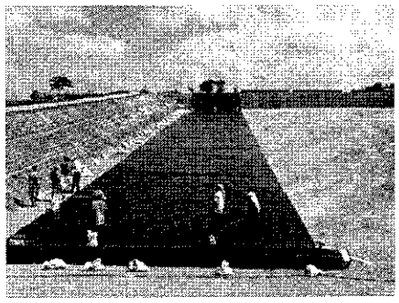
Technical Elements of

Secure Landfill Facility

at

Adani Copper Refinery

Mundra, Gujarat, India





Submitted by

GARWARE
TECHNICAL FIBRES

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1 Cover Note

With reference to the subject cited above, it give us pleasure to receive the enquiry and would like to place on record our desire to associate in the subject project for the Design and Development of Secure Landfill Facility as per the CPCB guidelines. Sir, we at Garware Technical Fibres Ltd (GTFL)-Geosynthetics Divn have been striving tirelessly to Design, supply, install and commission the best Environmental protection Structures for the Waste/Process residue management for the industries as well as municipal corporations. We are also working in many diverse areas of Ground/Geotechnical/Geo-environmental engineering with prime focus on environmental protection, resource Conservation. In specific to the complexity of the project which Adani Enterprises Ltd is planning to undertake, we would like to put forth the following points:

GTFL has been involved in design, engineering and execution of large number of Secure Landfill Facility –Design & Development Projects as per CPCB Guidelines for its customers including Indian Oil, Sterlite Industries, Cairn Energy, HZL, Vedanta Aluminium Ltd, Pimpri Chinchwad Municipal Corporation, KMML-Kerala to name a few.

We have also knowledge of the legal and statutory requirements of the project of such nature and have been associated with various Pollution Control Boards on behalf of the industry and thereby handling and holding hand in explaining the technicalities and compliance related issues to the regulators and other stakeholders.

Above all, our experience of past **20 years in Geosynthetic Lining and related construction with cutting edge technology** has always given industry the confidence to associate with us.

We would be pleased to associate with you to deliver the best available design, products and services for your project We are also sure that your company will be equally interested to give us an opportunity to demonstrate our Supply/Service capability for the subject project.

2 Brief about Secure Landfill Facility

The following pages gives only brief outline of key elements of the Secure Landfill Facility for explanation purpose which Adani Copper Refinery is proposing to construct at its upcoming Copper Refinery located at Mundra, Gujarat. At a later stage, detailed engineering, planning including drawing, material specifications shall be made and the same shall be submitted for approval before starting of the construction of the facility.

2.1 SLF Layout

The site layout shall be designed with the Secure Landfill Facility's construction, closure and end use closely in mind as this decides the final shape or the contours of the landfill. The Landfill broadly consists of the following in its proposed area:

- Body of the Facility where disposal will take place
- Supporting Infrastructure for smooth functioning of the facility.

The supporting infrastructures will also be decided based on the following:

- Size of the Facility. al
- Volume of waste it is going to handle.
- No. of trips the vehicle will make on daily basis.
- Loading and unloading conditions.
- No. of rainy days.
- Legal Requirements.

The processes taking place in a Secured Landfill Facility can be briefly described as the following. The waste coming into the landfill shall be checked and sent to the landfill facility. This waste when in contact with rain water produces leachate which is collected through leachate collection pipe network to the Leachate collection sump and further sent to Solar evaporation pond by pumping.

2.1.1 Associated Infrastructure

1. Main Entrance and Gate
2. Security cabin/ Administration building
3. Fill Soil Area
4. Storm Water Drain
5. Access Road
6. Ground Water Monitoring Well (Piezo metric Well)
7. Fencing & Greenery
8. Waste Stabilization Area of Hazardous Waste

2.1.2 SLF & its Elements

9. Secured Landfill Facility: for Hazardous and Non Hazardous Waste
10. Approach Ramp
11. Leachate Collection Sump
12. Leak Detection Sump

2.1.3 Site Investigation Criteria

2.1.3.1 Preliminary Boreholes and Geophysical Investigation:

At each site, as a part of preliminary data collection, one to two boreholes will be drilled and samples collected at every 1.5m interval to a depth of 20m below the ground surface. The following information will be obtained:

(a) soil type and stratification;
(b) permeability of each strata;
(c) strength and compressibility parameters (optional);
(d) ground water level & quality and depth to bedrock.

In addition to preliminary boreholes, geophysical investigations (electrical resistivity/seismic refraction/others) will be undertaken to assess the quality of bedrock at different sites.

A detailed site investigation program will comprise of:

(a) subsoil investigation,
(b) ground water/hydrogeological investigation.
(c) hydrological investigation,
(d) topographical investigation and
(e) geological investigation.

2.1.3.2 The output expected from each investigation is listed below:

I. **Subsoil Investigation:** A detailed investigation plan may be drawn up in consultation with a geotechnical engineer. The output from such an investigation should yield the following:

(a) Stratification of subsoil -type of soil and depth
(b) Depth to ground water table and bedrock (if located within 15m of base of landfill)
(c) Permeability of various strata beneath the landfill.
(d) Strength and compressibility properties of subsoil
(e) Extent of availability of liner material, drainage material, top soil and protective soil in adjacent borrow areas.
(f) Subsoil properties along approach road.

A minimum of 3 boreholes per hectare of landfill area upto 15m beneath the base of the landfill shall be drilled and in-situ tests as well as laboratory tests shall be performed for permeability, strength, compressibility and classification of soils.
In addition, test pits and boreholes shall be drilled at borrow area for liner and cover materials as well as along approach road.

II. **Ground Water/ Hydrogeological Investigation:** A detailed investigation plan may be drawn up in consultation with a ground water specialist or a hydrogeologist. The output from such an investigation should yield the following:

(a) Depth to groundwater table and its seasonal variations.
(b) Ground water flow direction
(c) Baseline ground water quality parameters -all drinking water quality parameters.

III. **Topographical Investigation:** Construction of a landfill involves a large quantity of earthwork. It is essential to have an accurate topographical map of the landfill site to compute earthwork quantities precisely. A map of 0.3m contour interval is considered desirable.

IV. **Hydrological Investigation**: The objective of a hydrological investigation is to estimate the quantity of surface runoff that may be generated within the landfill to enable appropriate design of drainage facilities. If additional run off from areas external to the landfill is likely to enter the landfill, this quantity should also be estimated to design interception ditches and diversion channels. Such an investigation shall yield estimates of peak flows if seasonal rivers or streams run close to the site hydrological investigation should indicate the possibility of flooding of the site under one in 100 year flood flows. Surface water samples for water quality analysis may be collected from during hydrological studies.

V. **Geological Investigation and Seismic Investigation:** Geological investigations shall delineate the bedrock profile beneath the landfill base, if not confirmed by subsoil investigations. Geophysical surveys may be designed in consultation with a geologist. In hilly areas or in quarried rocks. Geological investigations should indicate the quality of surficial rock, depth to sound rock and the possibility of interconnected aquifers beneath the landfill base In the rock mass. Detailed seismic data may be obtained as a part of geological investigations.

2.1.3.3 Base Stability, Slope Stability and Seismic Aspects:

For landfills construction on the soil, the base will be checked for stability against bearing failure or excessive settlements.

The stability of side slopes of a landfill shall be checked for the following cases (Fig. 9).

(a) stability of excavated slopes
(b) stability of liner system along excavated slopes
(c) stability of temporary waste slopes constructed to their full height (usually at the end of a phase)
(d) stability of slopes of above-ground portion of completed landfills
(e) stability of cover systems in above ground landfills.

The stability analysis shall be conducted using the following soil mechanics methods depending upon the shape of the failure surface.

(a) failure surface parallel to slope;
(b) wedge method of analysis;
(c) method of slices for circular failure surface and
(d) special methods for stability of anchored geomembranes along slopes.

In preliminary design of a landfill section, the following slopes will be adopted.

(a) Excavated soil slopes(2.5 horizontal : 1 vertical)
(b) Temporary waste slopes(3.0 hOrizontal : 1 vertical)
(c) Final cover slopes(4.0 horizontal : 1 vertical)

Slopes can be made steeper, if found stable by stability analysis results. Acceptable factors of safety may be taken as 1.3 for temporary slopes and 1.5 for permanent slopes.

In earthquake prone areas, the stability of all landfill slopes shall be conducted taking into account seismic coefficients as recommended by BIS codes.

2.2 Basic Design of Secured Landfill Elements

2.2.1 Bottom Liner System

The lining system is additional to the separation or unsaturated zone comprising soil or sand between the wet season high elevation of the ground water and the Landfill. These liner consist of native clayey soil/amended soil/ad-mixture soil. The permeability of the soil / amended soil should be less than or equal to 1×10-7 cm/sec.

A schematic cross section of the bottom Liner system is given in **Figure 1**.

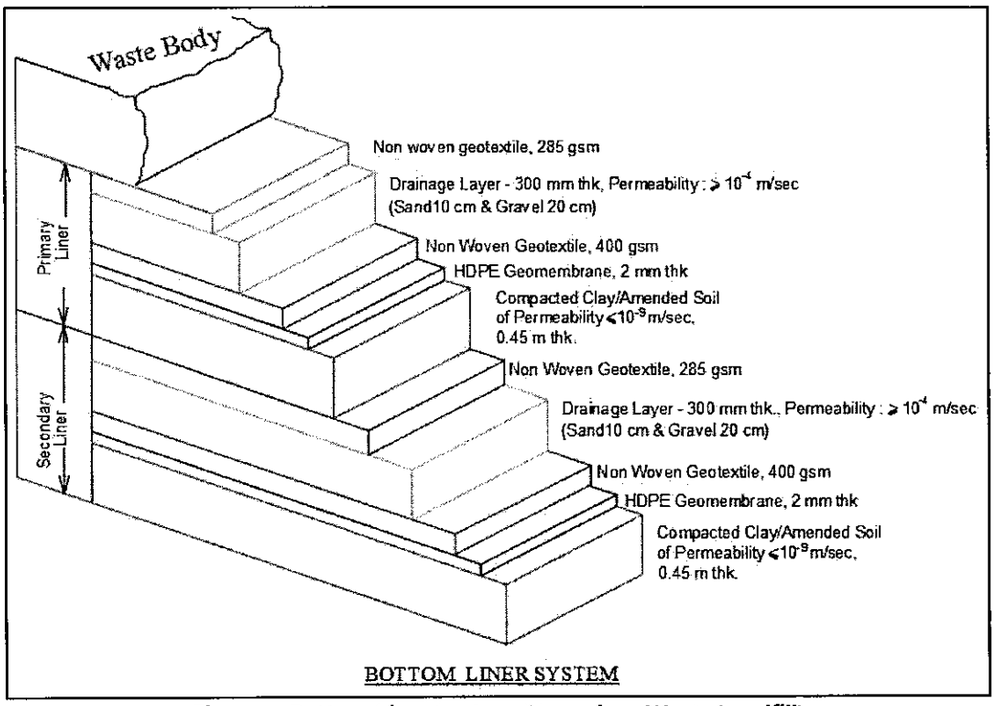


Figure 1: Bottom Liner System (Hazardous Waste Landfill)

2.2.1.1 Geomembranes

These are flexible sheets made from various plastic materials. The recommended liner along the side as well as the bottom of the facility is HDPE Liner. HDPE lining is effected by overlapping the strips and joining them with a special welding technique.

The thickness of the HDPE liner shall be 2.0 mm thick (min) made through flat cast extrusion technology to keep the thickness variation across the rolls to less than 5% and the minimum width of the membrane shall not be less than 7.5 m and length shall not be less than 150 m to reduce the number of joints. Understanding the seriousness of the project Naue –Germany / Equivalent -GSE-Germany make has been recommended for use. Detailed Material Specifications are given in the annexure.. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance.

2.2.1.2 Protection Layer (Non Woven geotextile)

To protect the geo membrane against the mechanical stress and failure thereby, non-woven needle punched Geo textile manufactured through mechanically bonding and made from continuous fibres/filaments and made of 100% UV stabilized Polypropylene is to be used on the HDPE Liner on the bed as well as the slopes. For the protection purpose, 400 gsm overlay Non-Woven Geotextile has been recommended. Equivalent product's details must be shown to the Technical Engineer for

review of its properties/performance. The minimum width of the Non Woven Geotextile shal be 4 m and minimum length shall be 90.0m.

2.2.1.3 Separation Layer (Non Woven geotextile)

After the construction of the primary lining system, separation textile of 285 gsm to be laid over the drainage layer before the waste laying is done. The minimum width of the Non Woven Geotextile shall be 4 m and minimum length shall be 125.0 m.

2.2.1.4 Drainage Layer

The landfill facility essentially generates significant quantity of leachate due to inherent moisture present in the waste body and the rain water precipitation. This leachate is impregnated with harmful chemicals and pollutants. This is to be collected, removed from the facility and treated. In order to collect the leachate from the waste body a Drainage layer of 30 cm granular material comprising of 10 cm coarse sand and 20 cm of gravel & having permeability>$1*10^{-2}$ cm/sec is to be laid over the protective layer of Geotextiles.

Looking at the following aspects of the landfill the following drainage medium has been recommended:

i. Structural profile and geometry

ii. Bottom and side slope pattern

iii. Performance of various geological and synthetic material for drainage function

Hence for the side slope geonet manufactured from Polyethylene and of minimum width of 4.0m to be used and for the bottom slopes, Sand/gravel as a drainage medium for the primary and secondary layer of desired specification has been recommended.

2.2.2 Side liner system of Secured Landfill Facility

The side liner system is on the inner side of soil bunds with slope 1:3 (V: H).The construction procedure of each layer of sideliner system is shown in **Figure 2**Figure 1.

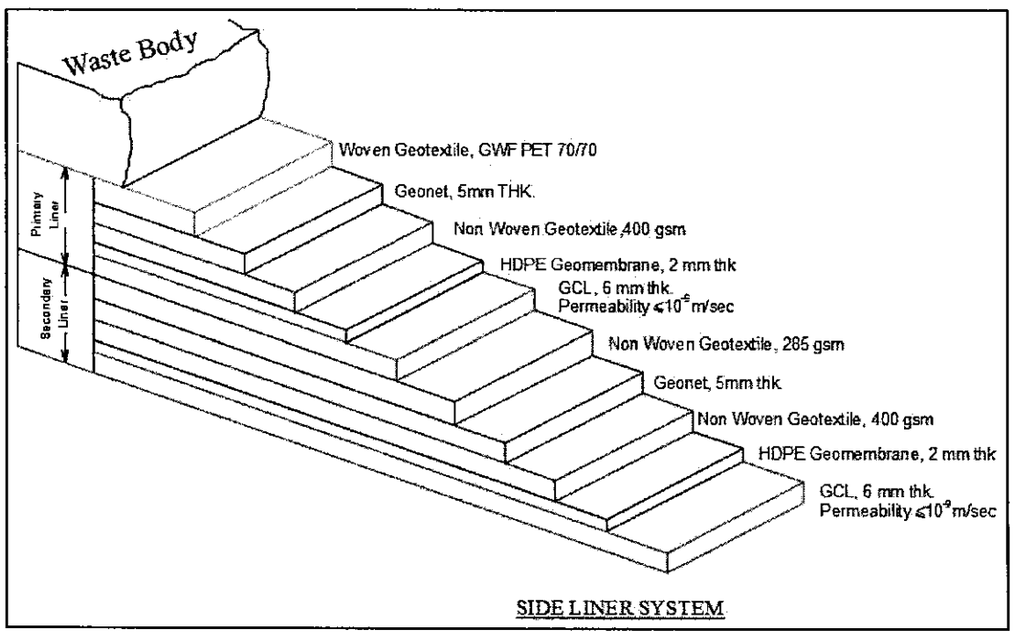


Figure 2: Side Liner system for Hazardous Waste Landfill

GCL-manufactured through use of powdered bentonite sandwitched between two layer of geotextiles and needle punched to keep the bentonite in place such as Bentofix-Naue Germany

make/equivalent of minimum 6-7mm thickness to be used instead of compacted clay as the slope is not so gentle and it is difficult to compact the clay on steep slope. Minimum width of the GCL shall be 5.0m and minimum length shall be 40.0m. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance.

2.2.3 Top Liner System

After the completion of each phase of the operation, the landfill has to be closed /insulated by putting the final cover. The final cover has the following advantages:

(a) It enhances surface drainage
(b) Minimizes infiltration
(c) Vegetation grows on it

The following Final Cover System is recommended. Over the waste body a soil cover of 150mm thick and a Gas collection media of 100mm thick is proposed. Geosynthetic Clay Liner (GCL of 6 to 7 mm thick) has to be laid over the Gas collection media. Beyond this compacted clay/GCL, HDPE of 1.5 mm is to be laid. Over the HDPE, a drainage layer of Geocomposite drainage net shall be laid. And the final top soil layer of 600 mm thick (450mm soil+150mm Vegetative soil) has to be put for restricting the soil erosion from the final cover.

A cross section of the top liner system is given below in **Figure 3**.

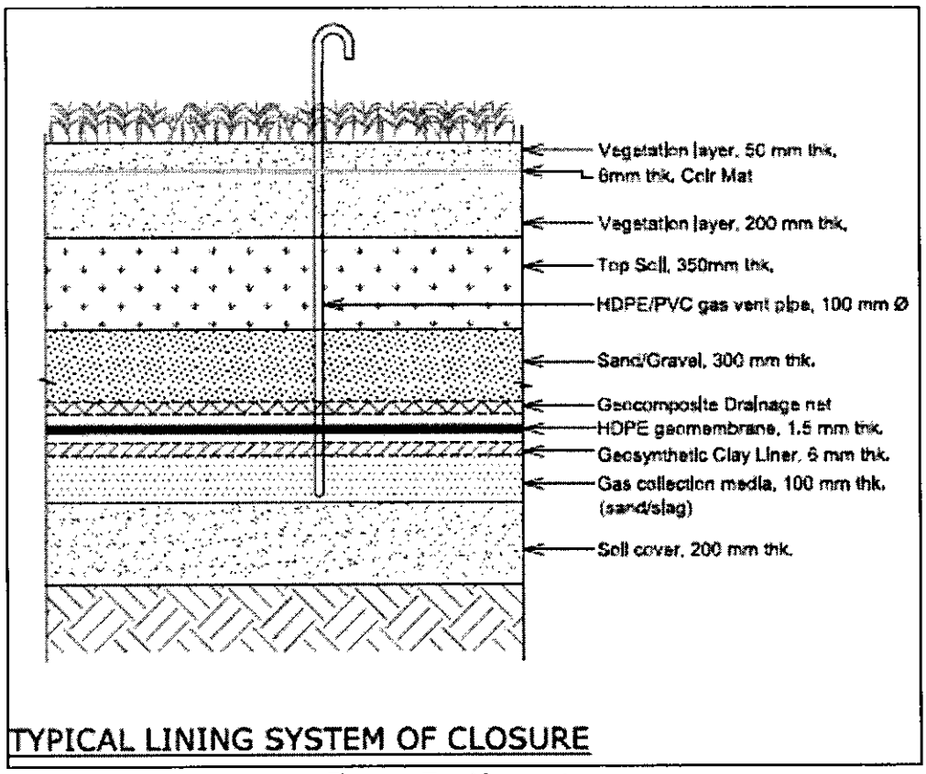


Figure 3: Top Liner system

2.2.4 Leachate Drainage, Collection & Removal System

In order to collect and convey the leachate generated to the collection sump, a Leachate collection System has been designed. It comprises of the following:

(a) Drainage Layer.
(b) A Perforated Pipe Collector System.
(c) Sump Collection Area.

(d) Removal of the leachate.

The leachate drainage is usually achieved using graded under-liner and drains which lead to a collection system or a sump. The technical details of the leachate drainage are as under:

(a) Thickness of the Drainage Layer: 150 mm for arterial pipes for collecting and 200 mm main header line for transporting the leachate from the body of SLF
(b) Material: Gravel/Sand for secondary bottom liner and geonet for primary bottom liner, primary and secondary side liner
(c) Permeability: 0.01 cm/sec

Natural slope shall be preferred for the transport of the generated leachate which will be collected in the channel and conveyed to the sump via collector pipe due to the designed longitudinal slope by gravity. A typical plan is shown in **Figure 4**:

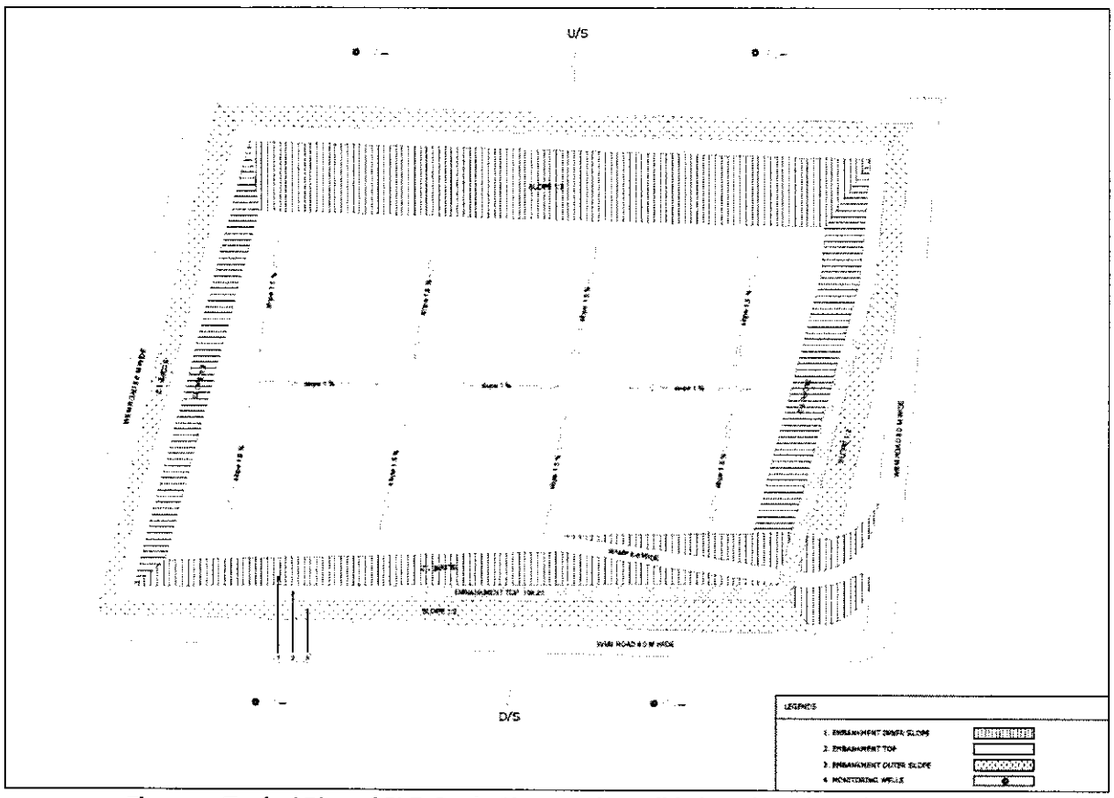


Figure 4: Typical Plan of SLF, Drain Slope and possible location of Monitoring well

The sectional plan for leachate conveyance system comprises of the following:

(a) Central Leachate carrying pipe in conjunction with the drainage layer
(b) Estimation of pipe diameter based on the leachate quantity
(c) Design of slope of Leachate Pipe

A schematic drawing of leachate conveyance is shown in **Figure 5** for reference purposes.

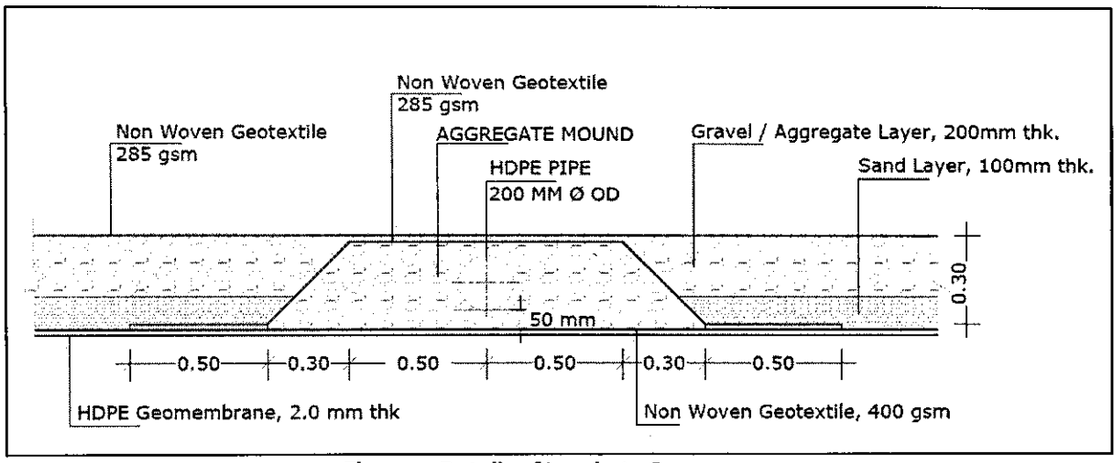


Figure 5: Details of Leachate Conveyance

A typical sectional view of the Landfill lining and anchoring system along with piping is shown below:

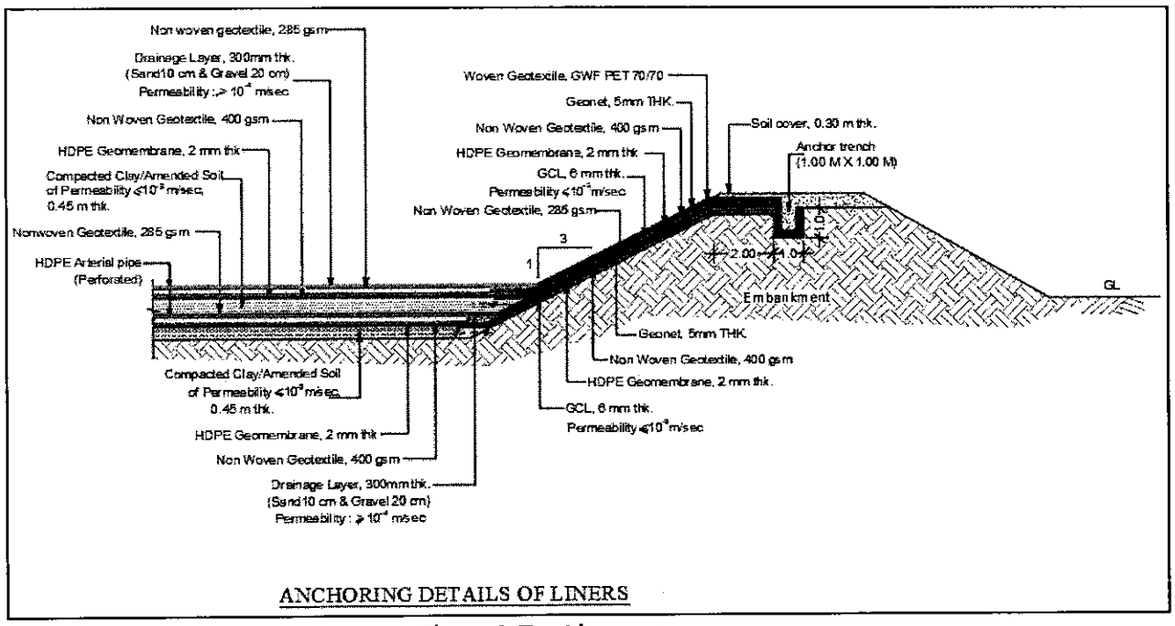


Figure 6: Top Liner system

2.2.5 Surface Water Drainage System

Surface water management shall be designed to ensure that rainwater run-off does not drain into the waste from surrounding areas and that there is no waterlogging/ponding on covers of landfills. A schematic surface water drainage system comprising of channels, drains, culverts and basins (Fig8) shall be designed to ensure the following:

(a) Rainwater running off slopes above and outside the landfill area shall be intercepted and channelled to water courses without entering the operational area of the site. This diversion channel may require a low permeability lining to prevent leakage into the landfill

(b) Rain falling on active tipping areas shall be collected separately and managed as leachate, via the leachate collection drain and leachate collection sumps to the leachate treatment and disposal system.

(c) Rainfall on areas within the landfill site, but on final covers of phases which have been completed and are not actively being used for waste disposal shall be diverted in drainage channels away from active tipping areas, and directed through a settling pond to remove suspended silt, prior to discharge.

(d) Any drainage channels or drains constructed on the restored landfill surface shall be able to accommodate settlement, resist erosion and cope with localised storm conditions.
(e) The horizontal surface of the final cover shall be provided a slope of 3 to 5% for proper surface water drainage. The slope of the cover on the sides will be higher and governed by slope stability considerations
(f) All Interceptor channels, drainage channels and settling ponds (storm water basins) shall be designed by a hydrologist using hydrometerological data.
(g) It shall be ensured that water collected by surface water drainage system and leachate collected by the leachate collection system do not get intermixed at any stage of collection or storage This shall apply to the 'active' and 'post closure' periods of the landfill

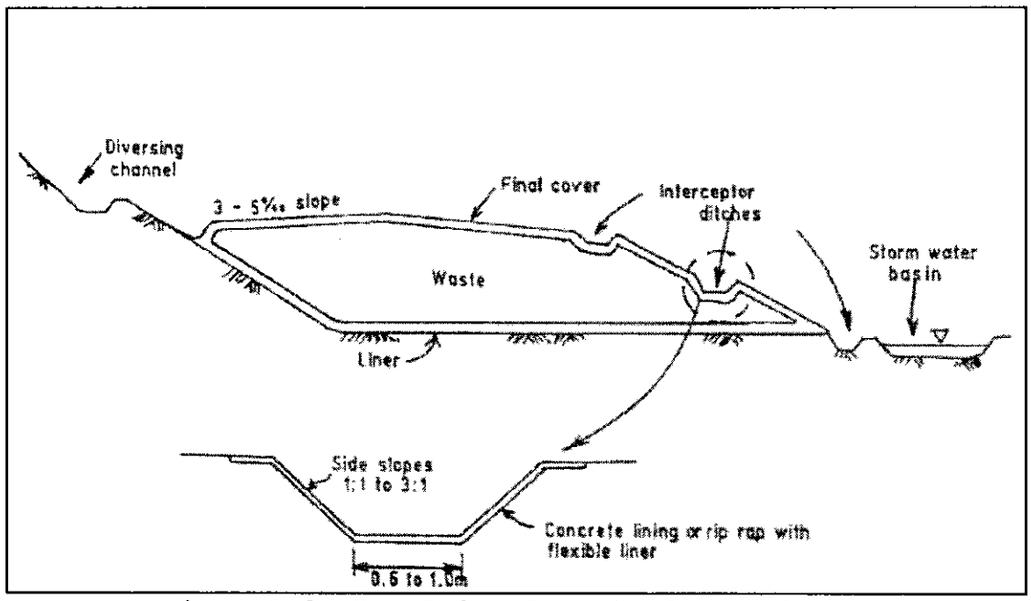


Figure 7: Surface Water Drainage System for a Completed Landfill

The design of following components will be undertaken:

(a) storm water drains, diversion channel
(b) storm water basin
(c) culverts if required

2.2.6 Construction of Embankment

Embankment shall be designed based on sound engineering practices and also shall be checked for slope stability analysis considering seismic factors of Mundra-Gujarat region.

The embankment shall be constructed to the lines and grades shown on the drawings. Placement of fill shall be performed in an orderly way and in an efficient and workman like manner, so as to produce fills having such quantities of density, strength and permeability as will ensure the highest practicable degree of stability and performance of the embankment.

The slopes of embankment shall be maintained as per specific structures drawing.

2.2.6.1 Fill Materials

The materials for embankment shall be obtained from the available excavated material. Some earth material available from the excavation in the pond area if found suitable will also be used for the embankment construction. Morrum / Yellow soil or soil which satisfy the accepted civil engineering property of the bund construction shall be accepted.

2.2.6.2 Placing the fill material, Compaction of the Embankment and Base: (IS: 2720)

The combined excavation and placing operations shall be such that the materials when compacted in the fill will be blended sufficiently to produce the specified degree of compaction and stability. The earth obtained from a particular borrow area as far as possible shall be used in forming the complete cross-section of the fill for a particular stretch.
No stones cobbles or rock fragments, having maximum dimensions of more than 5 cm shall be placed in the fill. Such stones and cobbles shall be removed either at the borrow pit or after being transported to the site but before the materials in the fill are rolled and compacted. Such stones or cobbles shall be placed in other portions of embankment if found suitable or rejected as directed. The materials shall be placed in the fill in continuous horizontal layers, stretching right across the whole section, not more than 0.4 m in compacted thickness.

Vibratory rollers/static roller shall be used for compacting cohesive materials and pneumatic rollers and vibratory rollers shall be used for compacting cohesion less materials. The compaction in horizontal layers will be done using standard compaction equipment or in inclined layers using slope compactors/appropriate method.

2.2.6.3 Inspection Test

Control tests shall be carried out in laboratory from time to time to determine whether the earth produced by methods employed satisfies the requirements of the specifications and documented for verification by the Officer- in –Charge of the regulatory authority and the work shall be inspected periodically.

Complete documentation of all quality control records and their submission to the GPPCB along with showing satisfactory achievement of acceptance criteria.

The quality control tests for compacted clay layer (or amended soils) as well as the leachate collection/drainage layer will include

(a) In-situ density tests.
(b) in-situ moisture content tests.
(c) Compaction tests.
(d) Permeability tests,
(e) Grain size distribution tests and
(f) Atterberg's limits tests
(g) Others as defined by GPCB.

The quality control tests for geomembrane liners shall be carried at as per QA/QC protocol and shall include the following:

(a) Thickness tests,
(b) Density tests,
(c) Strength tests,
(d) Field seam strength & leak tests

Dressing and Trimming of the slopes

The outer slopes of the embankment shall be neatly dressed to line. Compaction shall extend over the full width of the embankment and the material in the slopes shall be compacted as for the rest of structure. To ensure proper compaction at the outer edge, the fill shall be constructed for a minimum of 0.5 m/1.0m extra width on either edges or the outer edge dressed to true width and slope after compaction. No earth slope shall be left without trimming to design slope.

2.2.7 Design of Storm Water Drain

The catchment includes the top or cap of the landfill facility as well as the outer slope of embankment and site upto fencing. Hence to divert the incoming water at the surface level as well as the slope and

terraces of the landfill facility, adequate storm water drainage channels need to be designed, constructed. The channel has to ultimately carry water to the storm water pond for storage or evaporation purpose in case not discharged outside.

2.3 Piezometric Well

Piezometer shall be constructed to monitor the quality of groundwater. Two piezometers shall be installed on the downstream side of the SLF. Two piezometers shall be installed on the upstream side of the SLF. At present, possible locations have been shown where the installation cane be done. **But, exact location of the monitoring well shall be finalized in consultation with Gujarat State Pollution Control Board**. The piezometer consist of a stand pipe made up of stainless steel/PVC which shall be screened along the entire aquifer depth i.e. the standpipe shall be- screened from a depth of 1 m to 10m or depending on ground water depth. The screened interval shall be encased in a filter zone made up of gravel and sand layer. The function of the filter zone is to allow free flow of groundwater into and out of standpipe and prevent fines from entering the standpipe. Immediately above the screened interval, a clay and bentonite seal shall be placed. The thickness of clay seal shall be 0.5 m. Above the clay and bentonite seal, a grout seal consisting of cement and bentonite shall be constructed which provides a barrier for preventing surface water and ground water from elsewhere from migrating into the screened interval. At the ground level, a steel casing embedded in concrete pad shall be employed. A cap shall be placed on the top of steel casing to prevent rainwater and surface water from entering into the standpipe. The piezometer shall be constructed at a minimum distance of 7 m from outside edge of the embankment. A schematic sketch of a Piezometer is shown in **Figure 8**. The location is shown in figure no 4.

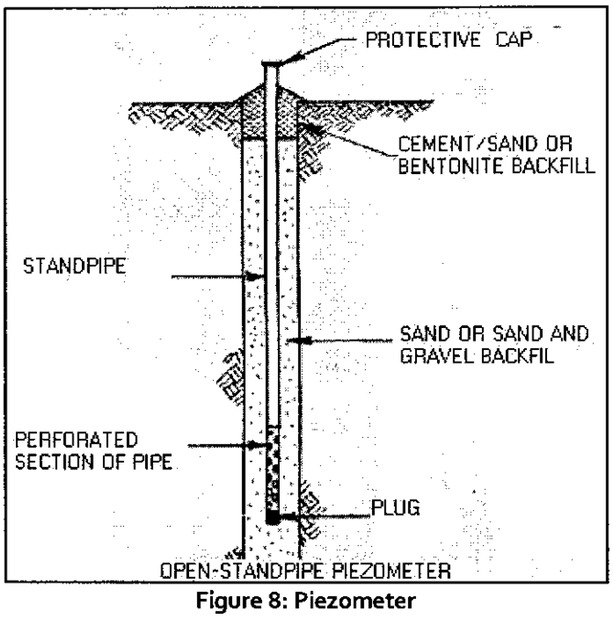


Figure 8: Piezometer

2.4 ANNEXURE

Liner Make: Naue, Germany, Thickness: 2.0 mm
Length:120m, Width:7,5m

Property	Test Method	Unit	Value
Thickness Nominal	EN-1849-(2)/ASTM D 5199	mm	2.00
Lowest individual value	EN-1849-(2))/ASTM D 5199	mm	1.90
Density	EN ISO 1183/ASTM D 1505	Gm/cc	0.942
Melt Flow Index	EN ISO 1133/ASTM D 1238-190/2.16	Gm/10 min	<1.0
Tensile Strength at Yield	EN ISO 527-3/ASTM D 6693	N/mm	33
Tensile Strength at break	EN ISO 527-3/ASTM D 6693	N/mm	60
Elongation at Yield	EN ISO 527-3/ASTM D 6693	%	12%
Elongation at Break	EN ISO 527-3/ASTM D 6693	%	700
Tear Resistance	ISO 34-1/ASTM D 1004	N	250
Puncture Resistance	ASTM D 4833/EN ISO 12236	N	700
Carbon Black Content	ASTM D 1603	%	2-3
Carbon Black Dispersion	ASTM D 5596	Cat	1-2
Dimensional Stability	EN 1107-2/ASTM D 5397	%	+/- 2

Tolerance: 10% on values except thickness, Carbon Black for which a range is given.

EAC OBSERVATION NO.-12

2295

EAC OBSERVATION:

Baseline health status of the people living in the study area of the project site has not been collected.

REPLY:

Baseline Health Status Study within 10 Km Radius of the Proposed Copper Refinery Project has been conducted by M/s TALEEM Foundation (A research unit of ZEE Group), Ahmedabad. The study was conducted based on the secondary data available at PHC, CHC, district hospital and relevant secondary report published by Ministry of Health & Welfare, Govt of India.

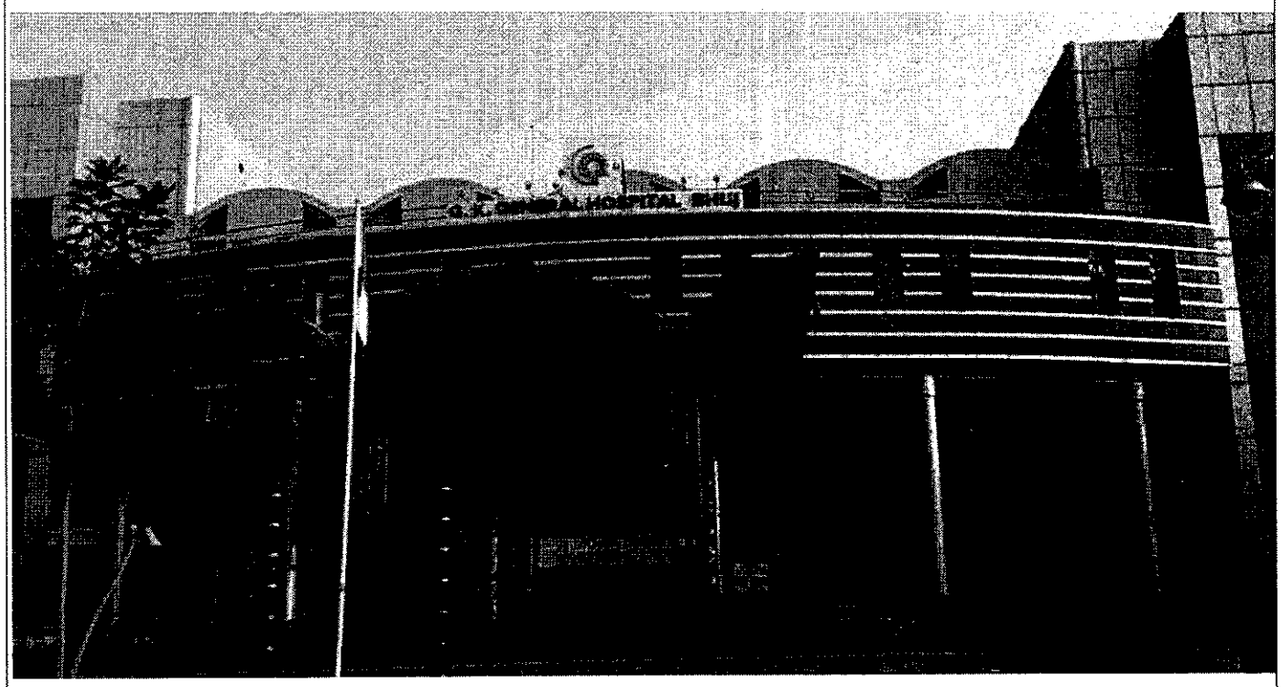
M/s TALEEM Foundation, Ahmedabad has engaged Prof. A K Sharma, IIT Kanpur and Dr. Sapan Pandya, medical consultant, Ahmedabad; for baseline Health Status Study. Prof. A K Sharma, IIT Kanpur has provided technical support for preparation health index and Dr. Sapan Pandya, medical consultant has provided orientation for collection of health data. The community health index has been developed using the statistical method adopted by World Health Organisation (WHO) considering the list of 47 diseases under classification of communicable and non-communicable diseases to compare the health performance of project area with the district and state as a whole.

A detailed study report is attached as **Annexure-12.**

Study to Establish Community Health Baseline Index within 10 Km Radius of the Proposed Copper Refinery Project in Mundra Taluka of Kutch District (Gujarat)

Submitted to

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Date: April 30, 2019

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Preface and Acknowledgement

At the outset, we are grateful to Adani Enterprises Ltd. (AEL) for having entrusted TALEEM Research Foundation, Ahmedabad for the present study aiming to develop health index for the community residing in 16 villages within 10 kilometres radius of a proposed copper refinery project in Mundra taluka of Kutch district.

The study provides an overall health status of 16 project villages in comparison to block average and the district as a whole. This report is largely based on IDSP and HMIS data of six PHCs, two CHCs and District Hospital. Apart from collecting secondary data, health facility survey was conducted to understand the adequacy of health infrastructure and primary healthcare services. The present report is expected to serve as a baseline to measure the impact of the proposed project and various community development initiatives of AEL in future.

We express our sincere gratitude to the team of AEL for their continuous interaction with the core team of TALEEM and extending support and guidance to complete the study on time.

We express our appreciation to Dr Kashyap M Buch, Chief District Medical Officer (CMO) of District Hospital of Kutch district and MIS staff of PHC, CHC and DH for extending their support and cooperation in providing the relevant information for their respective health facilities. We express our sincere thanks to all of them.

We gratefully acknowledge the participation and technical support provided by Professor A.K. Sharma of IIT, Kanpur for developing health index and Dr Sapan Pandya, Medical Consultant for reorienting the survey team on health facility survey tools.

We greatly acknowledge the untiring efforts of TALEEM core team members and support staff for the timely completion of the study.

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Ahmedabad

April 30, 2019

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Chapter 1: Introduction

Health, as defined by World Health Organization (WHO), is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Health is influenced by a number of factors that broadly include genetics, environment, lifestyle, socio-economic conditions and access to health services.

Knowing status of health of community or any area is very crucial for policy decision, planning and need-based-demand-driven programme intervention. Adani group have been pioneers in corporate social responsibility and made significant contributions to improve quality of people's life in the entire region they operate in. Gujarat, APSEZL and AEL have started key initiatives in support of sustainable development aiming at bettering the socio-economic and cultural status of local people.

The present study covering 16 villages within 10 km radius of proposed "*Copper Refinery Project*" at Adani Port Special Economic Zone (APSEZ) intends to generate a health index of the catchment area and to establishing benchmark indicators to measure the impact of various community development initiatives by AEL over a period of time.

Objectives

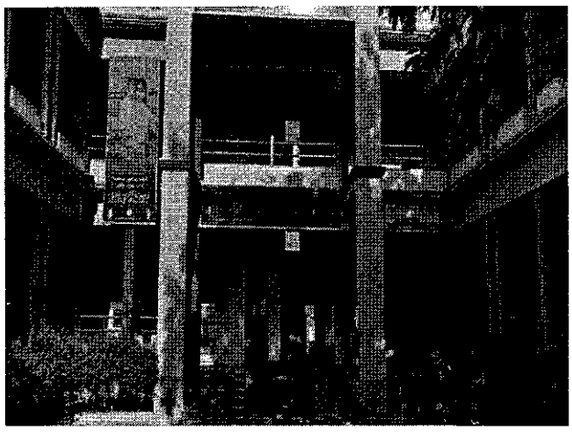
The broad aim of the present study is to develop community health index of area within 10 km radius of proposed copper refinery project. The specific objectives of study are as under:

1. To establish the Community Health Index of 10 Km. radius area using suitable methodology and input parameters (a. Communicable diseases, b. Non-Communicable diseases, c. Status of facilities available, d. Utilization of health services)
2. Compare the data of BASELINE parameters (Communicable and Non-Communicable diseases) of the study area with data of district and the State as a whole.

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3. Mapping of Community Health Resources present in the study area.

Data Collection



PHC Mota Kandagara, Kachchh

In order to establish health index of project areas covering 16 villages (Table 1) catered by six PHCs namely Kandagara Mota, Bhujpur, Jarpara, Nani Tunbadi, Talwanaand Gundiyari and one CHC Mundra where these six PHCs generally refer the patients for specialized health services insub-district hospital (upgraded CHC) of Mandvi and district hospital of Bhuj, Kachchh district were covered.

Table 1: Project Villages

SN.	*Taluka*	Village	Population (Census 2011)	Name of Panchayat
1	**Mundra**	Tunda	12471	Tunda Juth
2		Shiracha	1879	Shiracha
3		Navinal	3100	Navinal
4		Deshalpar	2611	Deshalpar
5		Khakhar Moti	2139	Khakhar Moti
6		Kandagara Mota	4461	Kandagara Mota
7		Nani Bhjpar	1056	Mota Bhujpar Juth
8		Moti Bhujpar	9278	
9		Pratappar	268	
10		Jarpara	7352	Jarpara
11		Borana	377	Nana Kapaya
12		Dhrab	3281	Dhrab
13	**Mandvi**	Nani Khakhar	3412	Nani Khakhar
14		Nana Bhadiya	4318	Nana Bhadiya
15		Mota Bhadiya	3284	Mota Bhadiya
16		Tragadi	1238	Tragadi

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From these facilities, data were collected on existing building infrastructure, human resources (medical, para-medical, lab technicians and support staff), pathology laboratory, surgical and examination equipments, labour room and operation theatre, drugs and drugs kits, medicine dispensing, indoor and outdoor health services. Apart from existing facilities, service statistics for last three years were collected.

Type of Data

Mainly secondary data has been collected from a CHC, PHCs and a District Hospital. In addition, secondary data from Department of Health and Family Welfare, Govt. of Gujarat, Census of India 2011, SRS Bulletin, HMIS for 2017-18 and 2018-19 were collected.

Operational Plan

A very experience research team having experience of developing MIS were pooled from the Foundation's core team who were deputed for data collection from health facilities.

These teams were reoriented one day by the medical doctor who broadly covered all technical aspects of medical infrastructure, equipments, operation theatre and drug dispensing. The data collection was carried out during March 12 to 22, 2019.

Data Analysis and Report Preparation



Brain Storming Session at TALEEM with Adani representative

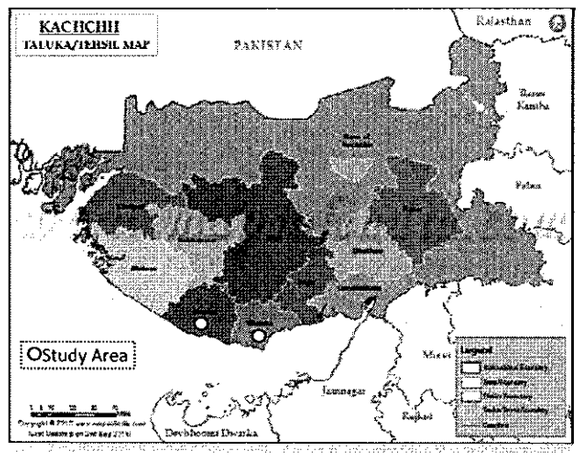
The Sr. faculty members of the Foundation and Statistician Expert involved in the study have prepared detailed analysis and tabulation plan. The community health index has been developed using the statistical method adopted by WHO considering the list of 47 diseases under classification of communicable and non-communicable diseases to compare the health performance of project area with the district and state as a whole. The same statistical technique was more or less adopted by IIM for developing health index of Indian States.

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Chapter 2: Profile of the District and Study *Taluka*(Mandvi and Mundra)

Kachchh is district of Gujarat State in western India covering an area of 45652 sq. km which is 23.3% of the total state geographical areas. It is the largest district in the State of Gujarat and second largest district of India after Leh. It is bounded on the north and north-west by Pakistan, on the north-east by Rajasthan state, on the east by the Banas Kantha and Patan districts of Gujarat, on the south- east by Surendranagar district, on the south by the gulf of Kachchh and Rajkot district and on the south-west by the Arabian sea.

It lies between the parallels of latitude 220.45' to 240 .40' and the meridians of longitude 680.9' to 710 .45.The length from north to south of this territory is about 220.32 km. and from east to west about 376.80 km. The district has the longest coast line of about 406 km. The district has 10 *Talukas* (namely Bhuj, Mandvi, Mundra, Abdasa, Bhachau, Lakhpat, Anjar, Nakhatrana, Rapar and Gandhidham), six Nagar Palika and 949 Revenue villages. Interestingly, there are 19 villages from different sub-districts of Kachchh having population less than 50.



Kachchh district is the 14th most populated district in the State with a total population of 2092371 as per 2011 Census. The district has a population density of 46 inhabitants per sq. kilometer. Its population growth over the decade 2001-2011 was 32.16%. Kachchh has a sex ratio of 908 female for every 1000 males. The distribution of population indicates that Bhuj is the most populous (443269) and Lakhpat is the least populous(62552)*Taluka* of the district. The urban population of

District at a Glance

Area (sq. km)	45652
Population	2092371
Urban Population	34.8%
SC Population	12.37%
ST Population	1.16%
Hindu	76.89%
Muslims	21.14%
Sex Ratio	908
Literacy Rate	70.6%
No. of Taluka	10
Nagar Palika	6
Revenue Villages	949

Source: Census2011

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the district accounted for only 34.82 percent of the total population. The district has 76.89% Hindu while Muslims constitute the second largest religious group with 21.14% of the total district population. Similarly, Scheduled Castes (SC) and Scheduled Tribes (ST) constitute 12.37% and 1.16% of the total district population.

The literacy rate of the district as per Census 2011 was 70.6% (with 79.4% for male and 60.9% for female) which is significantly lower than the State average of 78.0%. The rural urban literacy gap is of about 16.0% (64.9% rural and 80.8% urban). The district is ranked 23rd in education in 2011 among all the districts of Gujarat.

The district has a total of 277 SCs, 42 PHCs and 14 CHCs. The number of PHCs providing health services is highest in Bhuj *Taluka* with seven followed by Mundra *Taluka* with sixin number. The highest number of sub-centres (SC) is found to be in Mundra with 52 followed by Bhuj *Taluka* having 44. Anjar *Taluka* has maximum of three CHCs while Bhuj and Mundra *Taluka* have two CHCs in each. The remaining seven *Taluka* has one CHC each.

Taluka	SC	PHC	CHC
1. Lakhpat	27	5	1
2. Rapar	17	2	1
3. Bhachau	19	3	1
4. Anjar	34	5	3
5. Bhuj	44	7	2
6. Nakhtrana	13	4	1
7. Abdasa	34	4	1
8. Mandvi	30	5	1
9. Mundra	52	6	2
10. Gandhidham	7	1	1
Total	**277**	**42**	**14**

Source: District Human Development Report- 2016

Mandvi and Mundra *Talukas* have about 2.3 and 1.5 lakhs populations respectively. Mandvi constitutes 25.2% urban population as against 13.2% for Mundra. SC population constitutes 13.3% of the total population of each of the two *Talukas.* Sex ratio is more skewed in Mundra (868) as compared to Mandvi with 970 female for every 1000 male. Overall, literacy rate is 75.1% for Mandvi as compared to a little over 77.4% in Mundra. Mundra *Taluka* has relatively more number of SC, PHC and CHC as compared to Mandvi.

Mandvi and Mundra *Talukas* at a glance		
Indicators	Mandvi	Mundra
Population	203373	153219
Urban population	25.2%	13.2%
SC population	13.3%	13.2%
ST population	2.0%	1.3%
Sex ratio	970	868
Literacy rate	75.1	77.4
No. of Sub Centres	30	52
No. of PHC	5	6
No. of CHC	1	2

Source: District Human Development Report- 2016

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Chapter 3: Existing Government Health Facilities

As mentioned in Chapter 1, one District Hospital (DH) (Bhuj), two Community Health Centres (CHCs) and six Primary Health Centres (PHCs) have been covered in the study. District hospital is located at district headquarters, i.e. Bhuj and is known as G K General Hospital. Two Community Health Centres one at Mundra and other at Mandvi were included in the study to obtain information on vital statistics. At sector level, six PHCs covering 16 villages around the project sites have been covered for collecting data.



CHC, Mundra, Kachchh

Health Care Delivery System in Gujarat

Before getting into detail of health facilities covered in this study, it is worth while taking a peep into the health care Delivery System in Gujarat. The health care delivery in Gujarat is organized in a three tier system;

i) At the primary level, there are sub health centres and primary health centres (PHCs).

ii) At the intermediate level, there are community health centres (CHCs), taluka hospitals and district hospital. About 3-4 PHCs are affiliated to CHCs. It has been planned to develop CHCs as a first referral units (FRU), because they are scattered all over the state and can provide hospital services at the doorstep of the patient. Almost all CHCs are located in taluka headquarters or other important towns of a taluka. There is at least one operational hospital in each district headquarters

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iii) The tertiary or referral level facilities are affiliated to medical college and specialized hospitals. Norms for health facilities are ;

Table 3.1: Population covered under Health Facility for specific Areas

Sr. No.	Health Facility	Areas	Population covered
1	PHC	All Areas	30,000
2	PHC	Tribal, Hilly & Inaccessible areas	20,000
3	Sub-Centre	All Areas	5,000
4	Sub Centre	Tribal, Hilly & Inaccessible areas	3,000
5	CHC	All Areas	100,000

In view of very small number of private practitioner providing health care services, Government sub health centres, primary health centres, community health centres and hospitals are very important in the sense that they provide essential basic health services to the rural as well as urban population. In the entire district of Kachchh 361 government health facilities are functioning. Taluka-wise view of number of health facilities is given in Table 3.2.

Table 3.2: Taluka-wise SCs, PHCs and CHCs in Kachchh district

Sr. No.	Taluka	Sub-Health Centre (SCs)	Primary Health Centres (PHCs)	Community Health Centres (CHCs)
1	Abdasa	34	6	1
2	Anjar	34	7	2
3	Bhachau	19	7	3
4	Bhuj	44	11	3
5	Gandhidham	7	2	0
6	Lakhpat	27	4	1
7	Mandvi	30	8	1
8	Mundra	52	7	2
9	Nakhtrana	13	6	2
10	Rapar	17	9	2
Total		**277**	**67**	**17**

Source: https://gujhealth.gujarat.gov.in/images/pdf/1474-list-18.pdf

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As per Table 3.2, there are 277 health sub centres SCs), 67 Primary Health Centres (PHCs) and 17 Community Health Centres (CHCs) in Kachchh district of Gujarat.

Functional Status of Health Facilities

As mentioned earlier, one district hospital (DH) at Bhuj, two (02) CHCs (one each at Mandvi-upgraded into SDH and Mundra) and six (06) PHCs (2 in Mandvi and 4 in Mundra) have been covered under this study. Brief description of infrastructure facility, available at the health facilities covered, has been presented hereunder;

Infrastructure

Seven out of nine health facilities covered, i.e. one (01) district hospital (DH), two (02) community health centres (CHCs) and six (06) primary health centre (PHCs) have own building, PHC at Mota Kandagara and Bhujpur villages do not have own building for PHCs. Two PHCs, i.e. PHC at Zarpara and Bhujpur have borewell/tubewell as main source of water while seven other health facilities including district hospital at Bhuj have piped water as main source of water supply. Water supply is available round the clock in all health facilities covered. Operation theatres and labour rooms in each health facility at taluka level (CHC) and at district level (DH) has regular water supply, however, at sector level, two out of six PHCs, one at Mota Kandagara (no OT or labour room as it is running in a sub-centre) and other at Zarpara villages do not have regular water supply in labour room.

Functional toilet facility with running water is available at all nine health facilities while all but one health facilities (PHC at Kandagara) does not have separate toilet facility for male and female. Three health facilities, i.e. district hospital and two CHCs at Mandvi and Mundra do provide food to in-patients; laundry facility is also available at district hospital and CHC at Mandvi. Outsourced laundry facility is also available at CHC Mundra.

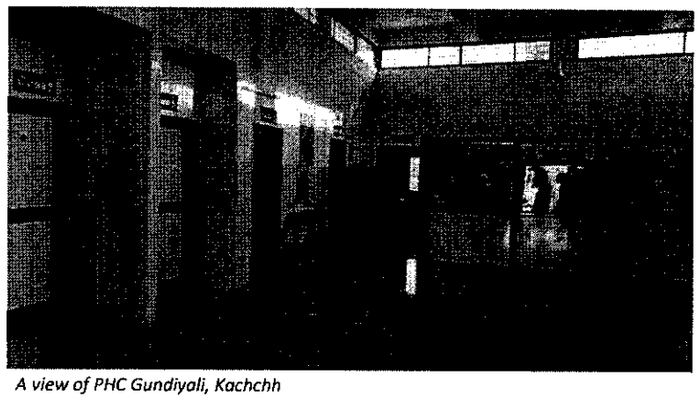
Electricity connection is available in all health facilities and its parts the data indicates while standby facility (generator/inverter) is not available in four out of six PHCs (Table 3.3). Generator backup is assured at all time and is connected to labour room/Ice refrigerator

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(ILR)/wards of health facilities where standby facility is available. It has been revealed that adequate funds are available for operating generator/standby facility.

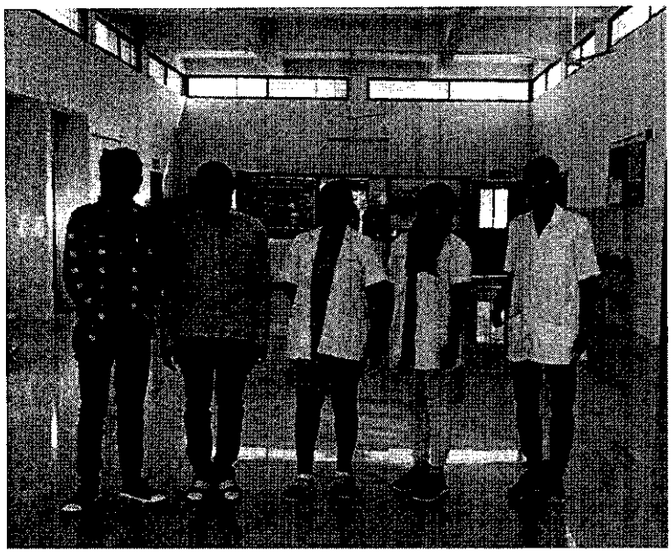
Facilities like Vehicle including Ambulance, Jeep and Car in functional condition, OPD for RTI/STI, name plates/guidelines and counseling is available in all nine health facilities covered at sector, taluka and district level. Barring one PHC at Mota Kandagara village, Eight (08) out of nine (09) health facilities covered have facility available for privacy during examination and separate aseptic labour room. Gynecology /obstetrics OPD facility is available only at CHC and District hospital, not at PHC while telephone facility is available at district hospital, both community health centres and PHCs at Bhujpur and Nani Tumbdi villages.

Staff quarters for RMO and Nurses are available only at Mandvi health facility (CHC/SDH). General medicine ward for male and female separately is available at all health facilities covered. Data also indicates that ANC ward is available in all health facilities covered for obtaining secondary information. Separate registration counters (DH-1, CHCs-2 and PHC-1), complaint/suggestion box, drug storage and drug dispensing (DH-1, CHCs-2 and PHCs-4) and facility for sterilizing instruments (DH-1 and CHCs-2) are available but facility for disposing of bio medical waste is outsourced in all nine health facilities (Table 3.3 – appendix 1).



A view of PHC Gundiyali, Kachchh

2009



The Staff of PHC Gundiyali, Kachchh

Staff Position

As regards staff position, data indicates status of medical and paramedical staff in position in health facilities. Medical superintendent/PMO is in position in all nine health facilities. Barring district hospital, no other health facility has specialist in Medicine and surgery. Obstetrician/gynaecologist, general duty doctor, staff nurse, dresser, lab technician and ophthalmic assistant are available at Mandvi and Mundra CHCs. More number of staff is available in Mandvi CHC (now upgrades as sub district hospital) than Mundra CHC. At Mandvi CHC/SDH one pediatrician, one Pathologist/Microbiologist one ophthalmologist, one dentist, 17 public health Nurses, two technicians, five pharmacists, one physiotherapist are in position. At PHC level, four PHCs have AYUSH physician, two PHCs namely, Zarpara and Bhujpur do not have AYUSH Physician. All PHCs do have at least one pharmacist, medical officer and laboratory technician (Table 3.4– appendix 1).

Training Received by Staff

Information on training received by the staff during past five years or ever reveals that no medical staff is trained for RTI/STI, SBA or basic emergency obstetric care, non scalpel vasectomy (NSV) and Mini laprotomy at district hospital whereas at least one medical staff has received training for other major areas mentioned in the Table 3.5. At CHC level, Mandvi CHC/SDH has at least one trained medical staff for new born care, RCH foundation skill, F-IMNCI, SBA/basic emergency obstetric care, integrated management of neonatal and childhood illness (IMNCI), HIV/AIDS prevention, care and support and immunization whereas Mundra CHC has at least one medical person having received training on new born care, RCH foundation skill, F-IMNCI, SBA/basic emergency obstetric care, NSSK (Navjat Shishu Suraksha

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Karyakram), vector borne diseases, adolescent reproductive sexual health (ARSH), IUD insertion and immunization.



The laboratory of CHC Mundra, Kachchh

Table 3.5 points out at medical/support staff posted at PHCs having received training on various areas. According to table 3.5, medical officer posted at all six PHCs have received training on new born care, Navjat Shishu Suraksha Karyakram (NSSK), Maternal death review (MDR) and immunization. Medical officer of all six PHCs (except PHC at Nani Tumbdi) have received training on RTI/STI, integrated management of neonatal and childhood illness (IMNCI) and SBA or basic emergency obstetric care (except PHC at Zarpara) and directly observed treatment short course (DOTS) (except PHC Bhujpur). Similarly, medical staffs at four out of six PHCs have received training on vector born disease control program (VBDCP) (except PHCs at Bhujpur and Nani Tumbdi) and, adolescent reproductive sexual health (ARSH) (except PHCs at Bhujpur and Gundiyali) (Table 3.5– appendix 1).

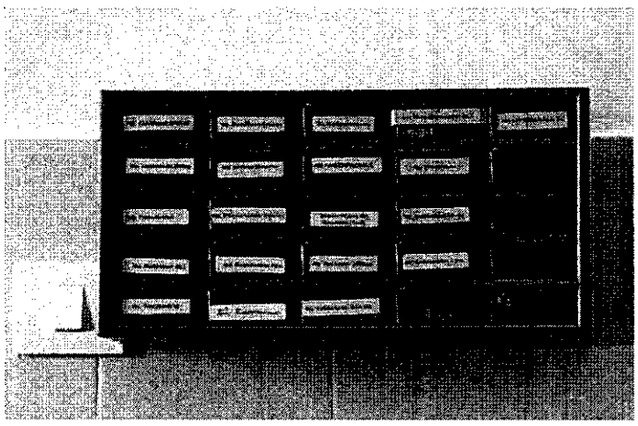
Investigation and Laboratory Services

Among investigation /laboratory services, facilities for urine analysis, pap smear test, sputum test, blood sugar test, RPR for syphilis and pregnancy test are available at district hospital, both CHCs and all six PHCs covered whereas hematology test, blood creation, diagnosis of RTI/STD with wet mounting, grams stain test coomb's test, widal test and X-ray facility is available only at district hospital and both CHCs. Apart from this, some of the investigation facility like stool (PHC Gundiyali), diagnosis of RTI/STDs with wet mounting grams stain (Bhujpur, Nani Tumbdi and Gundiyali PHCs)), ELISA test for HIV (Mota Kandagara & Gundiyali) and VDRL test (Mota Kandagara) is available at few PHCs. However, most of the investigating/laboratory facilities mentioned in the table are available at district hospital Bhuj only and are not supposed to be available at CHCs and PHCs as per standard norms (Table 3.6– appendix 1).

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Other Services

Other services like conducting deliveries (normal and assisted) and new born care, administration of parental oxytopics, antibiotics, administration of magnesium sulphate injection, management of post-partum hemorrhages, management of other delivery complications, management of low birth weight babies and C-section are available 24x7 at district hospital and both CHC at Mandvi and Mundra. In addition, blood storage facility, services like resuscitation, thermal protection, manual vacuum aspiration (MVA), electric vacuum aspiration (EVA) and dilation & curettage are also available at district hospital and both CHCs (Mandi & Mundra). Services for conducting normal deliveries and new born care, administration of parental antibiotics and resuscitation are available at PHC Zarpara and PHC Bhujpur, PHC Talvana and PHC Gundiyali. Besides, resuscitation facility at PHCs (Bhujpur, Talvana and Gundiyali), thermal protection at PHCs (Bhujpur&Gundiyali) and manual and electric vacuum aspiration are available at PHC Zarpara (Table 3.7 -appendix 1).

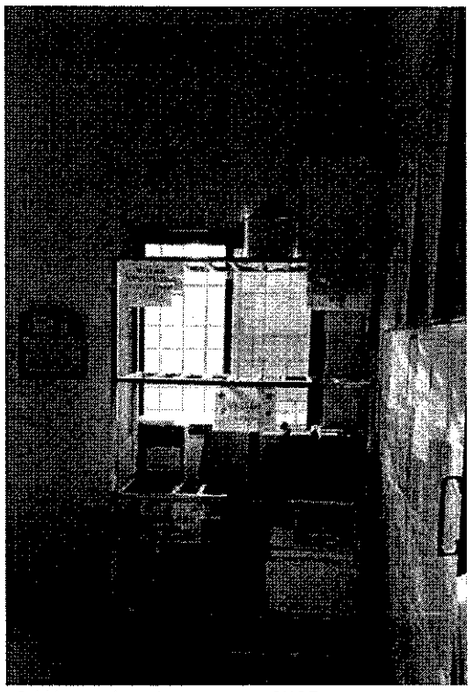


Essential drugs storage in PHC Gundiyali, Kachchh

Supply of Healthcare Kits

So far as supply of health care kit is concerned, all kits mentioned in Sr. 1 to 9 of Table 3.8 are available at CHC Mundra. This information, however, is not obtained from district hospital (Bhuj) and Sub district hospital (Mandvi). The same is true for PHC Bhujpur barring Kit O and Kit P (donor blood transfusion). In that respect the worst could be seen in PHC Kandagara where there is no supply of any kit mentioned in the Table 3.8. PHC at Nani Tumbdi has supply of only one kit, i.e. Kit I (normal delivery equipment) whereas PHC Talvana has supply of four kits (emergency obstetric care drug kit, RTI/STI laboratory kit, Kit G (IUD insertion kit) and Kit N (equipment for neonatal resection)and PHC at Gundiyali has RTI/STI laboratory kit, Kit G (IUD insertion kit) and Kit N (equipment for neonatal resection), Kit I (normal delivery kit/labour room kit) and Kit N (equipment for neonatal resection)(Table 3.8 -appendix 1).

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Cold box and vaccine storage at PHC Zarpara

Stock of Specific Items

Among other supplies, stock of specific items like Nirodh pieces, Oral pill cycles, IUDs, IFA (large), Vitamin A solution and ORS packets are available at all six PHCs and one CHC at Mundra. However, this information has not been obtained from district hospital and sub district hospital at Mandvi (Table 3.9 -appendix 1).

Equipments

Equipments such as Cardiac monitor, Oxygen cylinder, Shadow less lamp pedestal for minor OT, High pressure sterilizer (horizontal /vertical), X-ray machine (functional), ECG machine (functional), Ice Lined Refrigerators and Deep Freezer are available at CHC Mundra. At PHC level, cold chain equipment and deep freezer are available at all six PHCs whereas ice lined refrigerator is available in all but Nani Tumbdi PHCs and shadow less lamp pedestal is reported to be available at only three out ofsix PHCs i.e. Bhujpur, Talvana and Gundiyali (Table 3.10-appendix 1).

Adequacy of Means

Based on the criterion of adequately equipped (if health center is having 60 percent of sanctioned, infrastructure, supply, equipment, etc.) position of the Primary Health Centers, Community Health Centers and District Hospitals have been given in the Table 3.11, 3.12 and 3.13 respectively.

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According to Table 3.11, PHC Mota Kandagara adequately is equipped in medical staff, paramedical staff and supplies but not in infrastructure and equipments. PHC Zarpara is adequately equipped in infrastructure, medical staff, paramedical staff, supply and equipment. PHC Bhujpur is adequately equipped in medical staff, paramedical staff, supply and equipment. PHC Nani Tumbdi, is equipped adequately in infrastructure, medical staff, paramedical staff and supply. In the two PHCs of Mandvi- Talvana and Gundiyali the latter is more adequately equipped than Talvana in terms of paramedical staff and equipment.



A view of G.K. District Hospital, Bhuj, Kachchh

Community Health Centres (Table 3.12) at Mandvi and Mundra too are adequately equipped as per the criterion. Mandvi Community Health Centre is lacking in terms of staff position such as General Surgeon, Radiologist and a Dental Assistant whereas in the Mundra CHC, General Surgeon, Pediatrician, Radiographer and Dental Assistant are not in position.

According to Table 3.14, the District Hospital at Bhuj is adequately equipped so far as infrastructure, medical staff, paramedical staff, supply and equipment are concerned. Barring Dilatation and Curettage (D&C) and Facility of Blood Bank, the

District Hospital is adequately equipped (Tables 3.11, 3.12, 3.13 and 3.14 – Appendix 1).

Infrastructure includes overhead tank pump and facility, electricity in all parts of hospital, availability of generators, telephone functional vehicles, laboratory, operation theatre, and separate aseptic labour room.

1. Includes obstetrician/gynaecologist, paediatrician and anaesthetist.
2. Include staff nurse. ANM, pharmacist, laboratory technician, PHN, health assistant



Waiting Area of Maternity Ward Of PHC Gundiyali, Mandvi, Kachchh

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male and female.

3. Includes tual ring, set of standard surgical kits, emergency obstetric care kit, new born care kit, RTI/STI kits and delivery kit I.
4. Includes Boyle's apparatus, shadow less lamp and oxygen cylinder.
5. Calculated from the number of health facilities which facilities have conducted delivery.

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Chapter 4: Health Index Measurement

Better health status of the population leads to demographic transition steadying the population growth rate essential for sustainable development. Health index provides relative measures of the health status of a particular area or population.

In the present study efforts were made to develop methodology for measuring the health index for 16 project villages and compared with blocks and district in which these villages fall. In order to do so, secondary data from six PHCs, two CHCs and district hospital were collected. In addition, relevant data from Census (2011), IDSP (2017-180, HMIS (2017-18), and Human Development Report of Kachchh district (2016) were pooled for this purpose.

Health Management Information System (HMIS) is the main source of data for public health indicators covered under National Health Mission (NHM) that combines both National Rural Health Mission (NRHM) launched in 2005 and National Urban Health Mission (NUHM) initiated later in the year 2013. In addition, Government of India also initiated Integrated Diseases Surveillance Programme (IDSP) under National Surveillance Programme for Communicable Diseases (NSPCD) to strengthen diseases surveillance for communicable and non-communicable infectious diseases to detect and respond to outbreak immediately. IDSP data is collated at National Centre for Diseases Control (NCDC) by compiling State/District surveillance data to interpret diseases trend in any specific area of the country. However, there has been several limitations of reporting and compiling diseases related data at PHC, CHC and even at District level.

Table 4.1 indicates that data for most of the infectious diseases are not available at all levels. Even if data is available for some diseases, the numbers are too small. Thirdly, there have been relative inconsistencies in PHC, CHC and DH data. Consequently, HMIS data on relevant public health indicators was used for developing Health Index (HI).

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It must be mentioned that efforts were made to use IIM Ahmedabad methodology for development and estimation of Health Index for the 16 project villages. IIM Ahmedabad collected data on a large number of outcome and input variables and ran the principal component analysis to identify factor loadings/weights of a smaller set of variables and classified the Indian States according to outcome and input factors. Taking lead from there, detailed schedules were developed for collecting secondary data from PHCs, CHCs and the district hospital.

However, a number of difficulties were faced in applying the method:

a. Lack of data at all levels –village, PHC and CHC– for all the outcome and input variables
b. A low case- variable ratio that does not permit us to apply factor analysis
c. While some values are shown in percentages, e.g. percent ANC-4, other values are given in absolute numbers, e.g. malaria in children 0-5 years of age
d. There is also a methodological issue. The project villages are subject to three different effects - intervention effect, programme effects, and other effects such as ongoing development and media effects. Therefore the difference, if any, between baseline and endline indices cannot be routinely attributed to intervention effects only

   In notations, change in health status of the Project villages

   $\delta V = \delta I + \delta P + \delta O$

   δI = change in health status due to intervention

   δP= change in health status due to programme

   δO= change in health status due to other effects

   Therefore, $\delta I = \delta V - \delta P - \delta O$
e. At the grassroots level there is an interaction between input and outcome processes.

Keeping the above facts in mind we first identified all the variables on which information for all aspects of health is available at the village level. Those variables are:

1. % Pregnant Women who received four or more ANCs
2. % Pregnant Women who are not anemic i.e. HB >11 Mg
3. % Total Institutional Births
4. % Live Births (among total pregnancies)

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5. % Live Births > 2.5 KG
6. % Mothers received TT
7. % Children who received BCG
8. % Children immunized for measles
9. % Children who received Vit-A
10. % Infant Survived Till the First Birthday

Then seven more variables were identified on which information for both the Blocks were available. They are,

11. % Pregnant Women Examined for Syphilis
12. % Women Getting 1st Post Partum Checkup Between 48 Hours and 14 Days
13. % Newborns Breastfed within 1 Hour of Birth to Total Live Births
14. Sex Ratio at Birth (Female Live Births/ Male Live Births *1000)
15. %Children Fully Immunized (9-11 Months)
16. % Children Immunized for both BCG and Measles
17. % Children (0-5 Yrs) who never had Diarrhea

Except sex ratio, values of all the indicators lie between 0 and 100. Now the values of different indicators were standardized using the formula:

$$SI_i = \frac{SI_{iv} - MinSI_{id}}{MaxSI_{id} - MinSI_{id}}$$

Where SI_i refers to standardized value of the i^{th} indicator, $MinSI_{id}$ refers to minimum value of the SI_i, for any district in Gujarat and Max SI_{id} refers to the maximum value of the SI_i for any district in Gujarat. It may be noted that originally some indicators such as infant deaths in one year moved in a reverse direction. For exhibiting them in the table of health indicators they were replaced by a positive indicator by subtracting their value from 100. For them the following formula was used to arrive at SI_i:

$$SI_i = \frac{Max\ SI_{id} - SI_{iv}}{Max\ SI_{id} - MinSI_{id}}$$

Finally, the Health index was defined as an average value of all the SI_is. Separately, all SI_is lie between 0 and 1. Therefore, the average of them also lies between 0 and 1.

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Using the same approach SI_is were computed for the Block level 17 indicators. Finally, the similar exercise was done for the district in which these Blocks and villages fall. Finally, a number of health indices were constructed:

- Village Health Index based on ten variables
- Block Health Index based on ten variables
- Block Health Index based on all 17 variables
- District Health Index based on all 17 variables
- State Health Index based on all 17 variables

The health indices lies between 0 and 1 and for analytical purpose, may be broadly interpreted as the probability that a randomly selected person from the population is healthy. Here, health is defined in the context of Gujarat as the framework of good and bad indicators depends on the minimum and maximum values for different districts of Gujarat. One may use the standards of India as well and compute new indices but health being a state subject and socio-economic and cultural conditions within states being more homogeneous it makes greater sense to use state standards.

To test for the significance of difference in health indicators, interpreted as probabilities, the test for independent samples is applied

$$t_{n1+n2-2} = \frac{p_1 - p_2}{\sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}}$$

Where, n_1 refers to the size of one sample and n_2 to the size of the other sample. For villages and Blocks the respective values of n_1 and n_2 are 16 and 2.

For comparing villages and Blocks with the district, 95% confidence interval is estimated and it is checked whether the district and state Health Indices fall within the confidence interval or not. The confidence interval is given as:

$$p_1 \pm 2 \sqrt{\frac{p_1 q_1}{n_1}}$$

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We believe that change of any other more sophisticated formulae would not change the inference considerably.

Findings

Tables 4.2 and 4.3 exhibit the estimates of Health Index. Table 4.2 is based on 10 indicators for which all data were available for all the 16 villages. Table 4.3 is based on 17 variables for which data were available only for Blocks, district and the State.

Table 4.2 shows that the Project villages are better than the Blocks in the following aspects:

1. ANC- 4
2. Live Births

On the other hand the Project villages are not as good as the Blocks in terms of:

1. Anemia among pregnant women
2. BCG among children

The table also shows that the Project villages are better than the district in terms of:

1. ANC – 4
2. Live Births
3. Infant Survival

But the villages are not as good as the district in terms of anemia, %TT injection and BCG.

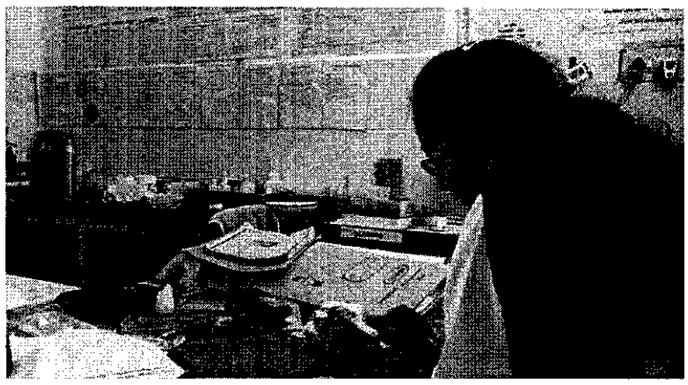
Table 4.2 shows that the estimate of the village Health Index is 0.81. The estimate of Block Health Index is 0.75.

It is found that the difference between the village Health Index and the Block Health Index is not statistically significant (t= .19). The 95% confidence interval of the village Health Index is .7 – .91 which contains the value of the district, but not the State and, therefore, it may be said that the differences between villages, Blocks and district are not statistically significant. Yet, the 16 project villages are significantly better than the state.

Table 4.3 shows that on the basis of 17 indicators of health, the two Blocks seem to be slightly backward Blocks (.62) of the district (.65) but they are at the same level of health as the Gujarat state (HI=.62).However, the difference between Blocks and the district is not statistically

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significant (t = -.15). The 95 percent Confidence Interval of the Health Index of the two Blocks is - .10 – 1.26 and the value of the Health Index of the district lies within this interval.



Medical Officer at PHC Mota Kandagara, Kachchh

Table 4.3 also exhibits that when 17 rather than 10 indicators are used there is deterioration in the Health Index at all levels – Block, district and state. This is because of the relatively lower values of sex ratio at birth, full immunization, breastfeeding and diarrhoea at all the levels. This implies that the project should particularly focus on gender sensitization and full immunization amongst children. Since the health indicators for them are lower, greater investment in these aspects of health may yield better results and will be cost effective.

Limitations

There are several limitations of the study:

1. In developing the health index, input and outcome variables are not separated because the outcome variables such as IMR, <5 MR cannot be estimated at the village level
2. In cases such as diarrhea in children 0-5 years of age the size of exposed population is not available and therefore in constructing the index total population of the village, Block, district or state was used for computing indicator ratios.
3. Due to errors in data and otherwise due to specific rule of standardization, if a SI showed a value of more than 1 it was replaced by 1.

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Table 4.1 Absolute number of cases reported at different PHC, CHC and DH for Communicable and Non-Communicable diseases – 2017-18 (as per WHO indicators)

Diseases List	Kandagara Mota	Jarpara	Bhujpur	Nani Tunbadi	Talwana	Gundiyari	CHC-Mundra	DH-Bhuj
Communicable Diseases								
Acute diarrhoeal diseases	173	54	321	209	159	408	1640	543
Malaria	1012	1313	0	0	955	828	7594	0
Acute respiratory infection	434	145	262	230	2190	964	1462	3293
Japanese encephalitis	0	0	0	0	0	0	0	0
Viral hepatitis	0	0	0	0	0	0	0	72
Acute encephalitis syndrome	0	0	0	0	0	0	78	0
Dengue	0	0	0	0	3	0	0	0
Cholera	0	0	0	0	0	0	0	0
Typhoid	0	0	0	0	1	2	94	0
Tetanus neonatal	0	0	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0	0	12
Whooping cough	0	0	0	0	0	0	0	0
Measles	0	0	0	0	0	0	0	1
Rabies	0	0	0	0	180	32	0	0
Polio	0	0	0	0	0	0	0	0
Pneumonia	0	0	0	0	1	0	0	177
Meningococcal meningitis	0	0	0	0	0	0	0	0
Syphilis	0	0	0	0	0	0	0	0
Gonococcal infection	0	0	0	0	0	0	0	0
Pulmonary Tuberculosis	12	68	34	18	17	24	0	0
Leprosy	0	0	0	0	1	0	0	0
Kala azar	0	0	0	0		0	0	0
Swine flu	0	0	0	0	3	0	0	0
Chikungunya fever	0	0	0	0	1	0	0	0
Acute flaccid paralysis (AFP)	0	0	0	0		0	0	0
Gonococcal infection	0	0	0	0	0	0	0	0
Non Communicable Diseases								
Coronary heart disease	0	0	0	0	4	4	0	807
Ischemic heart diseases	0	0	0	0	3	12	0	0
Burden of ischemic heart diseases	0	0	0	0	0	0	0	0
Burden of stroke	0	0	0	0	23	0	0	0
Diabetes	0	0	0	0	250	32	0	636
Hypertension	0	0	0	0	300	26	0	0
Incidences of blindness	0	0	0	0	0	0	0	0
Cancer	0	0	0	0	0	3	0	222

The zero data against some of the diseases represents that no cases of this diseases were reported at PHC and CHC, however it does not mean that these diseases were not present in that area. Hence zero data diseases has not been considered for calculation of the health index in the report

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Table 4.2 : Health Index (Based on 10 Indicators)

Indicators	Village		Block		District		State	
	16 Project Villages	Index	Mundra & Mandvi	Index	Kachchh	Index	Gujarat	Index
POPULATION	48376		178296		2092371		60439692	
% Pregnant Women who received four or more ANCs	84.6	0.8	63.6	0.3	73.0	0.5	72.8	0.5
% Pregnant Women who are not anemic i.e. HB >11 Mg	22.6	0.7	33.9	1.0	50.2	1.0	30.6	0.9
% Total Institutional Births	87.4	0.8	90.9	0.8	91.8	0.8	84.9	0.7
% Live Births (among total pregnancies)	98.8	1.0	98.6	0.2	99.0	0.8	98.9	0.9
% Live births > 2.5 KG	96.2	1.0	93.7	1.0	93.8	1.0	87.7	0.3
% Mother Received TT	88.3	0.5	88.3	0.5	100.0	1.0	96.0	0.8
% Children who Received BCG	84.4	0.4	95.0	0.8	97.1	0.9	100.0	1.0
% Children Immunized for Measles	99.7	1.0	100.0	1.0	100.0	1.0	91.9	0.8
% Children who received Vitamin-A	99.7	1.0	100.0	1.0	100.0	1.0	100.0	1.0
% Infant Survived till the First Birthday	98.9	0.9	98.3	0.9	98.9	0.1	98.2	0.1
	Total	**8.1**	-	**7.5**	-	**8.1**	-	**7.0**
	Mean	**0.81**	-	**0.75**	-	**0.81**	-	**0.70**

Table 4.3 : Health Index (Based on 17 Indicators)

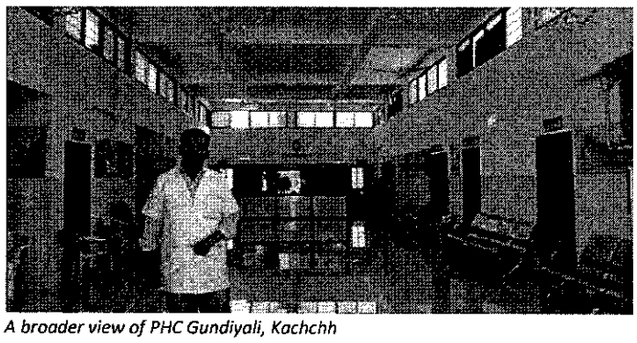
Indicators	Block		District		State	
	Mundra & Mandvi	Index	Kachchh	Index	Gujarat	Index
POPULATION	178296		2092371		60439692	
% Pregnant Women who received four or more ANCs	63.6	0.3	73.0	0.5	72.8	0.5
% Pregnant Women who are not anemic i.e. HB >11 Mg	33.9	1.0	50.2	1.0	30.6	0.9
% Total Institutional Births	90.9	0.8	91.8	0.8	84.9	0.7
% Live Births (among total pregnancies)	98.6	0.2	99.0	0.8	98.9	0.9
% Live births > 2.5 KG	93.7	1.0	93.8	1.0	87.7	0.3
% Mother Received TT	88.3	0.5	100.0	1.0	96.0	0.8
% Children who Received BCG	95.0	0.8	97.1	0.9	100.0	1.0
% Children Immunized for Measles	100.0	1.0	100.0	1.0	91.9	0.8
% Children who received Vitamin-A	100.0	1.0	100.0	1.0	100.0	1.0
% Infant Survived till the First Birthday	98.3	0.9	98.9	0.1	98.2	0.1
% pregnant women examined for Syphilis	19.3	0.3	7.3	0.1	12.0	0.2
% Women getting 1st Post Partum Checkup between 48 hours and 14 days	41.5	0.1	51.4	0.3	74.2	0.6
% Newborns breast fed within 1 hour of birth to Total Live Births	99.1	1.0	82.9	0.6	86.1	0.6
Sex Ratio at birth (Female Live Births/ Male Live Births *1000)	917	0.7	942	0.8	910	0.6
% Children fully immunized (9-11 months)	81.70	0.2	95.0	0.4	93	0.4
% Children Immunized for both BCG & Measles	72.5	0.1	82.4	0.1	88.7	0.3
% Children (0-5 yrs) never had Diarrhoea	99.3	0.7	99.3	0.7	99.5	0.8
Total		**10.6**		**11.1**		**10.5**
Mean		**0.62**		**0.65**		**0.62**

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Chapter 5: Conclusion and Recommendations

The present study broadly attempted to examine the adequacy of government health services and determining the health index of 16 project villages in comparison of *Taluka*(Block) and District as a whole. For this purpose, IDSP and HMIS data of six PHCs, two CHCs and District Hospital were examined and facility survey was conducted.

The analysis of facility survey data indicated that more or less all six PHCs are adequately equipped to provide primary healthcare services to their respective catchment areas. While both the CHCs are not adequately equipped as per the norms particularly, in areas of medical and para-medical staff affecting the delivery of specialized medical services to PHCs referral patients. However, District Hospital at Bhuj seems to be adequately equipped in terms of infrastructure, medical and para-medical staff in position, supply and equipments compensating the demand of specialized medical services of both rural and urban areas of the district.

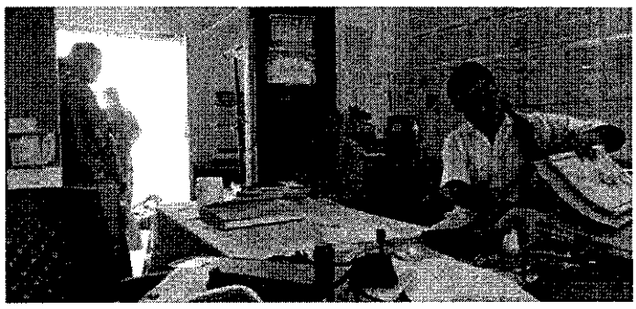


A broader view of PHC Gundiyali, Kachchh

Due to limitations of IDSP data on communicable and non-communicable infectious diseases, HMIS data on relevant public health indicators was used for developing health indices. Further, due to non-availability of village level public health data at PHCs, health index for 16 project villages falling under six PHCs of Mundra and Mandvi CHCs was measured on 10 available health indicators. The analysis demonstrated that project villages are better than the block average in terms of ANC coverage and live birth but lag behind anaemia among pregnant women and BCG vaccination coverage.

It was also found that project villages are better than the district in ANC coverage, live birth and infants' survival but the project villages are not as good as the district in terms of anaemia, %TT and BCG. It is evident from Table 4.1 that the Health Index of project villages are 0.81 as compared to block level of 0.75. Moreover, the differences between project villages, block and district are not statistically significantly though better than the state.

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Doctor examining patient in PHC Mota Kandagara, Mundra, Kachchh

Further, considering all 17 health indicators available for Block, district and state rather than 10 indicators, the health index at block, district and state levels deteriorated because of the relatively lower values of sex ratio at birth, full immunization, breastfeeding and diarrhoea at all the levels. This implies that the project should particularly focus on gender sensitization and full immunization coverage amongst children. Since the health indicators for them are lower, CRS investment in coordination with government existing Health facilities which are by and large adequately equipped may yield better results and will be cost effective too.

Based on the present exercise, it is greatly felt that there is a need for collecting primary data at village level on all major health indicators at the household level in all intervention villages to have more sound estimates. For instance, If we have primary data on deaths by age we can calculate life expectancy at the village/Block level for comparison between the start of the intervention and its completion even without data on age distribution. Life expectancy is a good summary measure of health and changes in age-distribution of deaths will affect the changes in the disease burden, due to communicable and non-communicable diseases and other causes and overall improvement in life expectancy. It is further suggested that a few qualitative interviews with stakeholders and administrators will also help in identifying the priorities areas and the approaches to delivery which is area-specific and as per the needs of the people.

Alternatively, if it is not possible to collect primary data at village level, the baseline value of 0.81 may be taken as the value of Health Indicator of the Project villages and using the same methodology a similar value may be obtained for project evaluation in the endline study. This comparison will show the effect of project intervention net of other factors which may change the health conditions in the villages.

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Appendix 1

Table 3.3: Infrastructure Available at Covered Health Facilities

Sr. No.	Infrastructure facility	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Own Building	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
2.0	Main source of Water	Piped	Piped	Piped	Piped	Borewell/ Tubewell	Borewell/ Tubewell	Piped	Piped	Piped
2.1	Running water supply available for 24 hours at facility (DH/CHC/PHC)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.1	Regular water supply available in OT?	Yes	Yes	Yes	-	-	-	-	-	-
2.3	Regular water supply available in Labour room	Yes	Yes	Yes	-	-	Yes	Yes	Yes	Yes
3.0	Proper drainage and sanitation system for waste water, surface water, sub soil water and sewerage exists in the facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.0	Functional toilet facility with running water available	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.1	Separate toilet facility available for males and females	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
5.0	Is in-house laundry facility available at facility DH/CHC/PHC)	Yes	Yes	No		-	-	-	-	-
5.1	If in-house laundry not available, is it outsourced?	No	No	Yes		-	-	-	-	-
6.0	Facility of providing food for inpatients available	Yes	Yes	Yes		-	-	-	-	-
7.0	Electricity connection available	Complete	Complete	Yes	Complete	Complete	Complete	Complete	Complete	Complete
7.1	Standby facility of generator/inverter available in working condition	Yes	Yes	Yes	No	No	Yes	No	Yes	No
7.2	Capacity of the generator in KW	1000			-	-	-	-	-	-

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7.3	Generator supply is connected to Labour room/Ice line refrigerator (ILR)/wards	Yes	Yes	Yes	-	-	Yes	-	Yes	-
7.4	Generator backup is assured at all time	Yes	Yes	Yes	-	-	Yes	-	Yes	-
7.5	Adequate fund available for operating Generator	Yes	Yes	Yes	-	-	Yes	-	Yes	-
8.0	Operation Theatre	Yes	Yes	Yes		-	-	-		-
9.0	Separate aseptic Labour room available	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
10.0	Telephone facility available/Intercom	Yes	Yes	Yes	No	No	Yes	Yes	No	No
11.0	Vehicle on road (Ambulance, Jeep, and Car functional)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.0	OPD facility for RTI/STI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.1	Gynecology/obstetric OPD facility	Yes	Yes	Yes	No	No	No	No	No	No
12.2	Nameplates guidelines	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.3	Privacy during examination	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
13.0	Facilities for counseling available	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14.0	Linkage with district blood bank	Yes	Yes	Yes	-	-	-	-		-
14.1	Regular blood supply available	Yes	Yes	Yes	-	-	-	-		-
15.0	Quarters for obstetrician/gynecologists	No	No		No	No	No	No	No	No
15.1	Quarters for RMO	No	Yes		No	No	No	No	No	No
15.2	Quarters for Nurse	No	Yes		Yes	No	No	No	No	No
16.0	Security (at least 1 person available round the clock)	Yes	Yes	No	No	No	No	Yes	No	No
16.1	Critical care Area available at DH/SDH	Yes	Yes	Yes	-	-	-	-	-	-
16.2	Integrated Counseling and Testing Center (ICTC) there in DH/SDH	Yes	Yes	Yes	-	-	-	-	-	-

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17.0	Wards and Number of beds	DH		Mandvi (SDH)		Mundra		Mundra PHC 1 (Mota Kandagara)		Mundra PHC 2 (Zarpara)		Mundra PHC 3 (Bhujpur)		Mundra PHC 4 (Nani Tumbdi)		Mandvi PHC 5 (Talvana)		Mandvi PHC 6 (Gundiyali)	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
17.1	General Medicine ward	90	60			yes	yes	-	-	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
17.2	General Surgery ward	90	60					-	-	-	-								
17.3	Pediatric ward	90					yes	-	-	-	-								
17.4	Intensive Medicare ward	8						-	-	-	-								
17.5	Post Operation ward	8						-	-	-	-								
17.6	Labour Room		6				yes	-	No	-	No	-	yes	-	yes		yes		yes
17.7	ANC ward				07		yes	-	yes	-	yes	-	yes		yes		yes		yes
17.8	PNC ward		2		21		yes	-	-	-	No	-	yes		yes		yes		yes
17.9	Post Partum ward		2				yes	-	-		-		-						
17.10	High Dependency ward							-	-		-								
17.11	Burn ward	12					Yes	-	-										
18.0	Prominent display boards regarding service availability in Local Language display at District Hospital?	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
18.1	Separate registration counters	Yes		Yes		Yes		No		Yes		No		No		No		No	
18.2	Complaint box/ Suggestion box	Yes		Yes		Yes		No		No		No		No		Yes		Yes	
18.3	Pharmacy of drug storage and drug dispensing	Yes		Yes		Yes		No		Yes		No		Yes		Yes		Yes	
19.0	Facility for sterilizing instruments available/ Whether CSSD (Central Sterile and Supply Department) is there at DH/SDH?	Yes		Yes		Yes		-		-		-		-		-		-	
19.1	Where instruments & items are sterilized?	7		7		7		7		7		7		7		7		6	
20.0	Facilities available for disposing of bio medical waste (*Incinerator, Auto Claving/ Microwaving, Shredder, Needle And Syringe Destroyer, Other Reasons)*	7		7		7		7		7		7		7		7		6	
20.1	If not in-house, are Biomedical disposal services out sourced	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
20.2	Color coded waste bags available for segregated waste	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	

20.3	Mode of infectious /biomedical waste and non infectious waste disposal*	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI
		7	7	7	7	7	7	7	7	7	8	7	7	7		7	6&7	6	6

***Answer Codes for Q.20 (In for Infectious, NI for Non-infectious)**

1. Bury in deep burial pit	2. Bury in pit	3. Throw in common public disposal pit	4. Throw outside hospital compound
5. Throw inside hospital compound	6. Use incinerator	7. Out sourced	8. Other

Table 3.4: Staff Position in Health Facility (DH/CHC/PHC)

Sr. No.	Medical and Paramedical Staff	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Medical Superintendent/ PMO	1	1	1	1	1	1	1	1	1
2.0	Specialist (Medicine)	4	-	0	-	-	-	-	-	-
3.0	Specialist (Surgery)	5	0	0	-	-	-	-	-	-
4.0	Obstetrician / Gynecologist	7	1	1	-	-	-	-	-	-
5.0	Pediatrician	5	1	0	-	-	-	-	-	-
6.0	Anesthetist	5	0	1	-	-	-	-	-	-
7.0	Pathologist/ Microbiologist	9	1	-	-	-	-	-	-	-
8.0	Radiologist	5	0	-	-	-	-	-	-	-
9.0	Dermatologist/ Venerologist	2	-	-	-	-	-	-	-	-
10.0	Ophthalmologist	3	1	-	-	-	-	-	-	-
11.0	Dentist	2	1	0	-	-	-	-	-	-
12.0	E.N.T. Specialist	3	-	-	-	-	-	-	-	-
13.0	General Duty Doctor	-	3	1	No	1	1	-	1	1
14.0	AYUSH Physician	1	-	-	1	No	No	1	1	1
15.0	other MOs OR SPECIALISTS _____ (Specify) (list out all other categories of MOs and specialists in the facility)				No	No	No	No	No	No
16.0	Public Health Nurse	0	17	0	4	9	7	4	1	-
17.0	Nurses Working In Obstetric-Gynae Department	8	-	-	-	-	-	-	-	-
18.0	Auxiliary Nurse Midwife(ANM)	-	-	-	4	9	7	4	1	4

19.0	Staff Nurse (Excluding Those Already Covered)	8	2	7	-	0	0	0	0	0
20.0	Technician	17	2	-	-	-	-	-	-	-
21.0	Radiographer	7		0	-	-	-	-	-	-
22.0	Pharmacist	6	5	-	1	1	1	1	1	1
23.0	Physiotherapist	2	1	-	-	-	-	-	-	
24.0	Medical Record Officer	2	0	2	1	1	1	2	1	1
25.0	Compounder	0	0	1	-	-	-	-	-	-
26.0	Dresser	0	1	1	-	-	-	-	-	-
27.0	Public Health Programme Manager	0	0	0	-	-	-	-	-	-
28.0	Lab. Technician	-	2	1	1	1	1	1	1	1
29.0	Ophthalmic Assistant	2	1	1	-	-	-	-	-	-
30.0	Dental Hygienist	0	0	-	-	-	-	-	-	-
31.0	Any Other Staff_____ **(Specify)** (List Out All Other Paramedical Categories In The Facility)	-	-	-	No	No	LHV, Class IV employee and Male health assistant	Class IV employee	Class IV employee	ASHA Worker

Note: (-) indicates not in position as per standard primary health centre (PHC) norms. (-) at some places does indicate information not available

Table 3.5: Training Received by the Staff (DH/CHC/PHC) (Past 5 years or Ever)

Sr. No.	Medical and Paramedical Staff	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	RTI/STI	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
1.1	New-born care	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.2	Medical Termination of pregnancy (MTP)	Yes	No	No	No	No	No	Yes	No	No
1.3	RCH Foundation Skill Training	Yes	Yes	Yes	-	-	-	-	-	-
1.4	F-IMNCI (Facility Based IMNCI) training	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
1.5	NSSK (Navjat Shishu Suraksha Karyakram) Training	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes

1.6	Blood grouping and cross matching training	Yes	No	No	No	No	No	-	-	-
1.7	Integrated Management of Neonatal and Childhood Illnesses (IMNCI) training	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
1.8	SBA or Basic Emergency Obstetric Care training	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
1.9	Electro Cardiogram (ECG) training	Yes	No	No	-	-	-	-	-	
1.10	Dental Hygiene		No		-	-	-	-	-	
1.11	Mother Child tracking system	Yes	No	No	No	No	No	No	Yes	No
1.12	MDR (Maternal Death Review) Orientation	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.13	Non Scalpel Vasectomy (NSV) training	No	No	No	No	No	No	Yes	No	No
1.14	Vector Born Disease Control Programme (VBDCP) training	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
1.15	Directly Observed Treatment- Short Course (DOTS) training	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
1.16	Immunization training	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.17	Adolescent Reproductive Sexual Health (ARSH) Training	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No
1.18	Minilaprotomy training	No	No	No	No	No	No	Yes	No	No
1.19	IUD insertion training	Yes	No	Yes	Yes	No	No	Yes	No	No
1.20	HIV/AIDS Prevention, Care and Support training	Yes	Yes		-	-	-	-		
1.21	Emergency Obstetric Care(including C-Section) training	Yes	Yes	Yes	No	No	No	No	No	No
1.22	Health Management Information System (**HMIS**) Training	Yes	Yes	No	No	No	No	No	Yes	No
1.23	Any Other Training (Specify)	-	-	-	MR, MI, Polio, Swineflu	NQAS	-	-	Kayakalp, NVBCP, MR, Bridge	No

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Table 3.6: Investigation and Laboratory Services

Sr. No.	Investigative/Laboratory Services	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	**CLINICAL PATHOLOGY**									
	(a). Hematology	Yes	Yes	Yes	-	-	-	-	-	-
	(b). Urine analysis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(c). Stool analysis	Yes	No	No	-	-	-	-	-	Yes
1.1	**PATHOLOGY**									
	(a). Pap smear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(b). Sputum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(c). Histopathology	Yes	Yes		-	-	-	-	-	-
1.2	**MICROBIOLOGY**									
	(a). Diagnosis of RTIs/ STDs with wet mounting, grams stain, etc.	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
	(b). RPR for Syphilis	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.3	**BIOCHEMISTRY**									
	(a). Blood sugar	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(b). Blood urea	Yes	Yes		-	-	-	-	-	-
	(c). Blood creation	Yes	Yes	Yes	-	-	-	-	-	-
1.4	**SEROLOGY**									
	(a). Pregnancy test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(b).Coomb's test	Yes	Yes	Yes	-	-	-	-	-	-
	(c). Widal test	Yes	Yes	Yes	-	-	-	-	-	Yes
	(d). Elisa for HIV test	Yes	Yes	Yes	Yes	No	No	No	-	Yes
	(e). R A factor test	Yes	Yes		-	-			-	-
	(f).VDRL test	No	Yes	Yes	Yes	No	No	No	-	-
1.5	**INVESTIGATION**									
	(a). ECG	Yes	Yes	-	-	-	-	-	-	-
	(b).STRESS TEST (TMT)	Yes	No	-	-	-		-	-	-
	(c).2D- ECHO	Yes	No	-	-	-	-	-	-	-
1.6	**RADIOLOGY**									
	(a). X – RAY	Yes	Yes	Yes	-	-	-	-	-	-
	(b). ULTRA SOUND	Yes	No	Yes	-	-	-	-	-	-
1.7	**BLOOD BANK**									
	Fully Operational Blood Bank	Yes	No	No	-	-	-	-	-	-
1.8	**PHYSIOTHERAPY UNIT**									
	Fully Functional Physiotherapy Unit	Yes	Yes	-	-	-	-	-	-	-

Table 3.7: Availability of Services

Sr. No.	Supply of Kits	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Deliveries are conducted (1. 24x7, 2. day time only or 3. no)	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
2.0	Services related to 'delivery and ' new born care' are provided in this facility (rec.1,2 or 3)	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
	(a) Normal Delivery	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
	(b) Assisted delivery(forceps delivery/vacuum)	24x7	24x7	24x7	No	No	No	No	No	No
	(c) Administration of parental oxytocics	24x7	24x7	24x7	No	Day time only	24x7	No	No	No
	(d) Administration of parental antibiotics	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
	(e) Administration of Magnesium sulphateinjection	24x7	24x7	24x7	No	Day time only	24x7	No	No	No
	(f) Management of post-partumhemorrhages	24x7	24x7	24x7	No	No	24x7	No	No	No
	(g) Management of other deliverycomplications	24x7	24x7	24x7	No	No	24x7	No	No	No
	(h) Caesarian section	24x7	24x7	24x7	-	-	-	No	-	-
3.0	Is there a blood bank available in thisfacility? if yes, it is functional 24 X 7	No	No	No	No	No	No	No	No	No
4.0	Blood storage facility available inthis facility?	Yes	Yes	Yes	No	No	No	No	No	No
5.0	Are low weight birth babies managedat the facility	24x7	24x7	24x7	No	Yes	Yes	No	Yes	Yes
6.0	is new born care facility available atfacility	24x7	24x7	24x7	Yes	Yes	Yes	Yes	Yes	Yes
7.0	Resuscitation	Yes	Yes	24x7	No	Day time only	24x7	No	24x7	24x7
8.0	Thermal protection (warmer/ table lamp)	Yes	Yes	24x7	No	No	24x7	No	24x7	24x7
9.0	Manual Vacuum Aspiration	Yes	Yes	24x7	No	Yes	No	No	No	No

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	(MVA)									
10.0	Electric Vacuum Aspiration (EVS)	Yes	Yes	24x7	No	Yes	No	No	No	No
11.0	Dilatation & Curettage (D & C)	Yes	Yes	24x7	-	-	-	-	-	-

Table 3.8: Supply of Healthcare of Kit

Sr. No.	Supply of Kits	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Standard surgical kit (all six sets)	Yes	Yes	Yes	No	No	Yes	No	No	No
2.0	Emergency obstetric care drug kit	-	-	Yes	No	Yes	Yes	No	Yes	No
3.0	RTI/STI laboratory kit	-	-	Yes	No	Yes	Yes	No	Yes	Yes
4.0	Kit G (IUD insertion kit)	-	-	Yes	No	No	Yes	No	Yes	Yes
5.0	Kit for new born care equipment	-	-	Yes	No	No	Yes	No	No	Yes
6.0	Kit I (normal delivery kit/labour room kit)	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
7.0	Kit N (equipment for neonatal resection)	-	-	Yes	No	Yes	Yes	No	Yes	Yes
8.0	Kit O (side laboratory test and blood transfusion)	-	-	Yes	No	No	No	No	No	No
9.0	Kit P (donor blood transfusion)	-	-	Yes	No	No	No	No	No	No

Table 3.9: Stock of Specific Items of Health Care

Sr. No.	Supply of Kits	Taluka Level (CHC)	(PHC)					
		Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Nirodh pieces	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.0	Oral pill cycles	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.0	IUDs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.0	IFA (large)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5.0	Vitamin A solution	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6.0	ORS packets	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Table 3.10: Heal Care Establishment with Specific Equipments

Sr. No.	Supply of Kits	Taluka Level (CHC)	(PHC)					
		Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.1	Shadow less lamp pedestal for minor OT	Yes	No	No	Yes	No	Yes	Yes
1.2	Cold chain equipment (functional)	No	Yes	Yes	Yes	Yes	Yes	Yes
1.3	Ice Lined Refrigerators	Yes	Yes	Yes	Yes	No	Yes	Yes
1.4	Deep Freezer	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.11: Adequacy of Infrastructure, Staff, Supply and Equipment at PHCs

(As per PHC Guideline)*	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
Medical Officer (1)	1	1	1	1	1	1
Pharmacist (1)	1	1	1	1	1	1
Staff Nurse (1)	4	9	7	4	1	4
Data Entry Operator (1)	1	1	1	2	1	1
Laboratory Technician (1)	1	1	1	1	1	1
Class IV (4)	2	2	2	2	1	2
Own Building	No	Yes	No	Yes	Yes	Yes
Main source of Water	Yes	Yes	Yes	Yes	Yes	Yes
Proper drainage system	Yes	Yes	Yes	Yes	Yes	Yes
Toilet	Yes	Yes	Yes	Yes	Yes	Yes
Electricity connection available	Yes	Yes	Yes	Yes	Yes	Yes
OPD facility	Yes	Yes	Yes	Yes	Yes	Yes
Labour Room	No	No	Yes	Yes	Yes	Yes
Normal Delivery Kit	No	Yes	Yes	Yes	No	Yes
Equipment for assisted vacuum delivery.	No	No	No	No	No	No
Equipment for assisted forceps delivery	No	No	No	No	No	No
Standard Surgical Set (for minor procedures like episiotomies stitching).	No	No	Yes	No	No	No
Equipment for Manual Vacuum Aspiration	No	Yes	No	No	No	No
Equipment for New Born Care and Neonatal Resuscitation	No	Yes	Yes	No	Yes	Yes
IUCD insertion kit	No	No	Yes	No	Yes	Yes
Cold chain equipment (functional)	Yes	Yes	Yes	Yes	Yes	Yes
Ice Lined Refrigerators	Yes	Yes	Yes	No	Yes	Yes

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Deep freezer	Yes	Yes	Yes	Yes	Yes	Yes
Oral pill cycles	Yes	Yes	Yes	Yes	Yes	Yes
IUDs	Yes	Yes	Yes	Yes	Yes	Yes
IFA (large)	Yes	Yes	Yes	Yes	Yes	Yes
Vitamin A solution	Yes	Yes	Yes	Yes	Yes	Yes
ORS packets	Yes	Yes	Yes	Yes	Yes	Yes
Cases Referred to Higher Centres	0	0	0	0	7	8

**Source: Indian Public Health Standards (IPHS): Guidelines for Primary Health Centres, 2012*

Table 3.12: Adequacy of Infrastructure, Staff, Supply and Equipment at CHCs

As per CHC Guidelines*	Mandvi (SDH)	Mundra
Block Medical Officer/Medical Superintendent (1)	1	1
General Surgeon (1)	0	0
Obstetrician & Gynecologist (1)	1	1
Pediatrician (1)	1	0
Anesthetist (1)	-	1
General Duty Medical Officer (2)	3	1
Staff Nurse (1)	19	7
Lab. Technician (2)	2	1
Radiographer (1)	0	0
Dental Assistant (1)	0	0
Statistical Assistant/ Data Entry Operator (2)	1	2
Own Building	Yes	Yes
Main source of Water	Yes	Yes
Proper drainage system	Yes	Yes
Toilet	Yes	Yes
Electricity connection available	Yes	Yes
OPD facility	Yes	Yes
Labour Room	Yes	Yes
Nameplates guidelines	Yes	Yes
Regular blood supply available	Yes	Yes
Critical care Area	Yes	Yes
Security (at least 1 person available round the clock)	Yes	No
Integrated Counseling and Testing Center (ICTC) there in DH/SDH	Yes	Yes
Facility for sterilizing instruments available/ Whether CSSD (Central Sterile and	Yes	Yes

SupplyDepartment) is there at DH/SDH?		
Color coded waste bags available for segregated waste	Yes	Yes
Standard surgical kit (all six sets)	Yes	Yes
Emergency obstetric care drug kit	-	Yes
RTI/STI laboratory kit	-	Yes
Kit G (IUD insertion kit)	-	Yes
Kit for new born care equipment	-	Yes
Kit I (normal delivery kit/labour room kit)	Yes	Yes
Kit N (equipment for neonatal resection)	-	Yes
Kit O (side laboratory test and blood transfusion)	-	Yes
Kit P (donor blood transfusion)	-	Yes
Nirodh pieces	-	Yes
Oral pill cycles	-	Yes
IUDs	-	Yes
IFA (large)	-	Yes
Vitamin A solution	-	Yes
ORS packets	-	Yes

**Source: Indian Public Health Standards (IPHS): Guidelines for Community Health Centres, 2012*

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Table 3.13: Adequacy of Infrastructure, Staff, Supply and Equipment at District Hospital

(As Per DH Guidelines)*	DH
Medical Superintendent/ PMO	1
Specialist (Medicine) (5)	4
Specialist (Surgery) (4)	5
Obstetrician / Gynecologist (6)	7
Pediatrician (5)	5
Anesthetist (4)	5
Pathologist/ Microbiologist (4)	9
Radiologist (2)	5
Dermatologist/ Venerologist (1)	2
Ophthalmologist (2)	3
Dentist (3)	2
E.N.T. Specialist (2)	3
AYUSH Physician (2)	1
Staff Nurse (min. 45 for a standard of a hospital having 100 beds)	8
Radiographer (9)	7
Pharmacist (12)	6
Physiotherapist (3)	2
Medical Record Officer (1)	2
Lab. Technician (18)	17
Ophthalmic Assistant (2)	2
Own Building	Yes
Main source of Water	Yes
Proper drainage system	Yes
Toilet	Yes
Electricity connection available	Yes
OPD facility	Yes
Labour Room	Yes
Nameplates guidelines	Yes
Regular blood supply available	Yes
Critical care Area	Yes
Security (at least 1 person available round the clock)	Yes
Integrated Counseling and Testing Center(ICTC) there in DH/SDH	Yes
Facility for sterilizing instruments available/ Whether CSSD (Central Sterile and SupplyDepartment) is there at DH/SDH?	Yes
Color coded waste bags available for segregated waste	Yes
Standard surgical kit (all six sets)	Yes
Kit I (normal delivery kit/labour room kit)	Yes
Deliveries are conducted	Yes
Services related to 'delivery and ' new born care' are provided in this facility	Yes

(a) Normal Delivery	Yes
(b) Assisted delivery(forceps delivery/vacuum)	Yes
(c) Administration of parental oxytocics	Yes
(d) Administration of parental antibiotics	Yes
(e) Administration of Magnesium Sulphateinjection	Yes
(f) Management of post-partumhemorrhages	Yes
(g) Management of other deliverycomplications	Yes
(h) Caesarian section	Yes
Is there a blood bank available in thisFacility? If yes, it is functional 24 X 7	No
Blood storage facility available inthis facility?	Yes
Are low weight birth babies managedat the facility	Yes
Is new born care facility available atfacility	Yes
Resuscitation	Yes
Thermal protection(warmer/ table lamp)	Yes
Manual Vacuum Aspiration(MVA)	Yes
Electric Vacuum Aspiration(EVS)	Yes
Dilatation & Curettage(D & C)	No

*Source: *Indian Public Health Standards (IPHS): Guidelines for District Hospitals, 2012*

Table 3.14: Facilities

Sr. No.	Particulars	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1	Infrastructure	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
2	Medical Staff[1]	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes
3	Paramedical Staff[2]	Yes	Yes	Yes	No	No	No	No	Yes	Yes
4	Supply[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Equipment[4]	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
6	Referred delivery cases attended during last three months[5]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

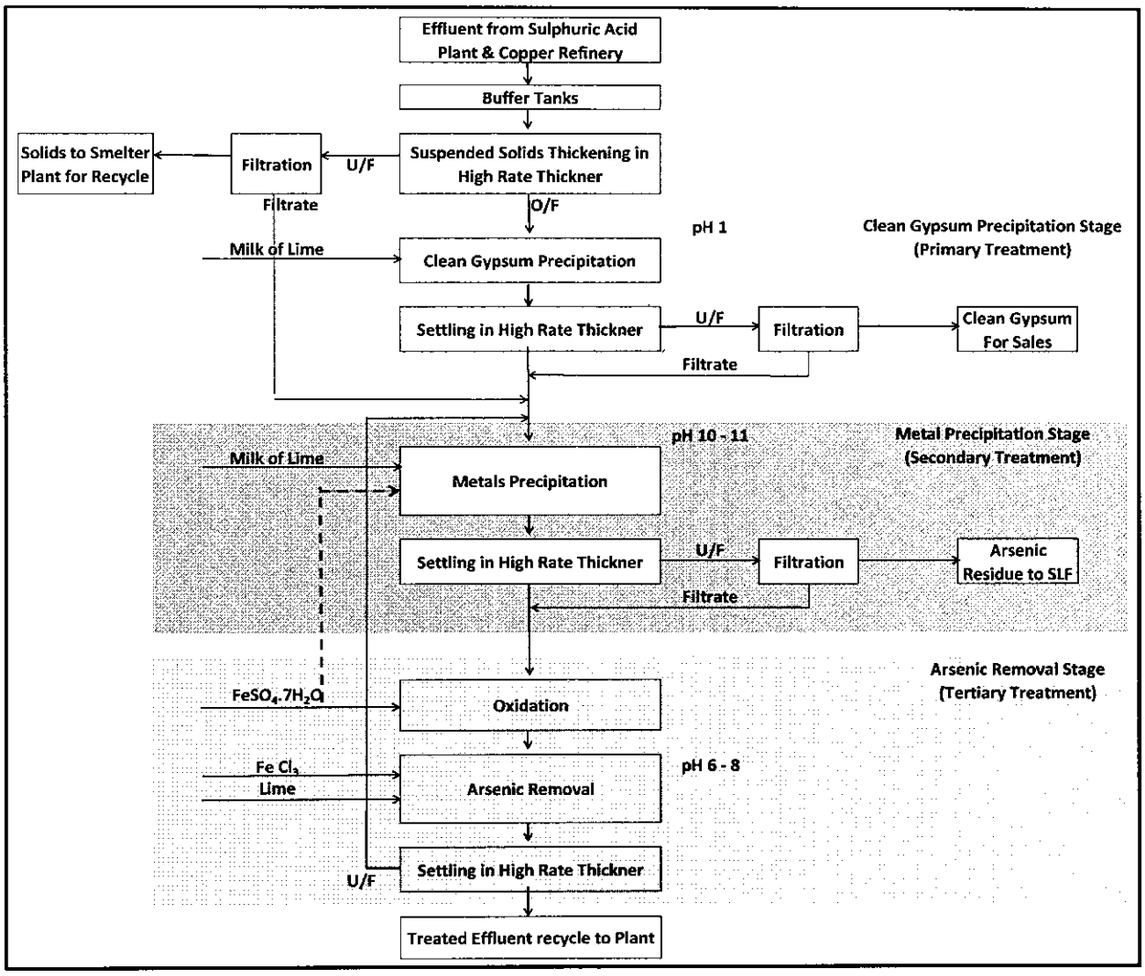
EAC OBSERVATION NO.-13

EAC OBSERVATION:

Details regarding disposal of arsenic bearing sludge has not been submitted.

REPLY:

Effluents from the gas cleaning plant of Sulphuric Acid and Copper Refinery will be treated in a state of art Effluent Treatment Plant (ETP) facility. The process flow is shown as below.



The Arsenic bearing sludge generated in ETP will be sent to Secured Land Fill (SLF), which will be constructed as per CPCB Guideline. For construction of secured land fill (SLF) refer Annexure-11(b).

Disposal Procedure:

Arsenic bearing sludge will be collected at the outlet of the filter press in the truck and will be transported to SLF for safe disposal. Waste shall be discharged by tipping at the

working area of the SLF. Once the waste has been discharged it shall be spread in layers and compacted with the help of Roller in a well-defined manner to ensure that the completed slopes are at the designated gradients.

Leachate collected through the leachate collection system will be sent to ETP through pipeline for treatment purpose and the treated effluent will be recycled for the plant operations.

Dust from the Landfill:

Dust from landfill operations is mainly a problem during periods of dry weather. Fugitive dust control will be addressed by;

a. Limiting vehicle speed;
b. Spraying roads with water; and
c. Spraying site and powder type waste with water;
d. Green Belt around the Landfill.

Road Maintenance:

To avoid the mud/ dust is not carried off site by vehicles adequate wheel cleaning facilities will be provided. The water after cleaning will be recycled back in the ETP operation.

Landfill Safety Aspects:

Employees training shall include site safety, first aid and the handling of dangerous materials where appropriate. Emergency plans shall be laid down. Landfill sites shall be regarded as potentially hazardous locations and the operator shall have a written safety plan for the site and Safety hazards present at landfill sites. All employees and visitors to the site shall be made aware of the potential hazards and the safety procedures to be implemented including fire safety.

Record Keeping:

Record keeping procedures as well as waste acceptance procedures to be followed at the landfill site shall be formulated.

Records shall be kept as per the consent conditions. In addition a site Manual shall be kept at the site office giving all site investigation, design and construction details.

Landfill Closure:

When landfill reaches the final height, it will be closed as per CPCB Guidelines. HDPE liner with 1.5 mm thickness will be used for landfill cover. It is compacted with smooth steel drum rollers and provided a suitable gradient (3 to 5%) to encourage surface water

to run-off from the cover and thus minimise infiltration. The side slopes of the intermediate cover are compacted by the crawler tracked dozer moving up and down the slope. An access road is provided on the landfill cover to enable easy approach for routine inspection of the landfill cover. Long-term vegetative stabilisation will be undertaken to return the land to its original and natural vegetative landform.

Landfill Layout Display Board:

A site layout will be displayed at the entrance of the SLF entry in Local as well as Hindi and English language. Layout will typically will include

a. Access roads;
b. Equipment shelters;
c. Temporary waste storage and/or disposal sites for special wastes:
d. Demarcation of the landfill areas and areas for stockpiling cover maternal and liner material;
e. Location of surface water drainage facilities,
f. Location of landfill leachate management facilities;
g. Location of gas management facilities (optional);
h. Location of monitoring wells/environmental monitoring facilities,
i. Fencing and green belt along the peripheral boundary and
j. Emergency exit.

EAC OBSERVATION NO.-14

2343

EAC OBSERVATION:

Mercury in ambient air has not been monitored.

REPLY:

Mercury (Hg) in ambient air was monitored during the period of month of January and February 2019 at eight locations within the 10 km radius study area.

For the mercury sampling IS: 5182-Part-23 has been followed. The collected sample has been extracted by microwave extraction (Method IO-3.1) method. The extract has been analysed by the ICP MS having least count of 5.0 ng/m^3

The Hg content in the ambient air found to be <5.0 ng/m^3

Details of Mercury in ambient air sampling locations and analysis is provided in **Annexure-14.**

2344

ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR

1.0 INTRODUCTION

During the EAC meeting, it was desired by the EAC to monitor the concentration of mercury in ambient air quality within the study area. Hence, mercury concentration in ambient air was monitored during 28th January, 2019 till 2nd February, 2019 at eight locations within the 10 km radius study area. The sampling methodology and concentrations are given below:

The details of sampling locations are given in **Table-1** and shown in **Figure-1.**

TABLE-1
DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS

Station Code	Location	Distance from Centre of Project Site (km)	Direction w.r.t. Centre of Project Site
AAQ1	Project Site	-	-
AAQ2	Navinal	1.7	ENE
AAQ3	Bhujpar Mota	6.2	NE
AAQ4	Jarpara	6.8	ENE
AAQ5	Wandh	1.8	SW
AAQ6	Kandagara	4.4	NW
AAQ7	Siracha	1.7	NNW
AAQ8	Moti Khakhar	5.9	NNW

2.0 METHODOLOGY OF SAMPLING

Sampling Procedure

For the mercury sampling, IS: 5182-Part-23 has been followed. The Respirable Dust Sampler (RDS) has been used and 24-hour sample was collected by using whatman filter paper (8 inch x 10 inch). Flow rate of 1.0-1.5 m^3/min has been maintained. During the monitoring period, hourly reading of flow rate has been recorded to capture the flow fluctuations. After the required time of sampling, the flow meter reading was recorded and the filter paper from the sampler and put in a envelope for further analysis.

Sample Storage

After collecting samples, The filter papers have been transported the laboratory, taking care to minimize contamination and loss of the sample. These samples have been stored in a protective environment up to 30°C until analysis. Even though, the sample holding can be up to 180 days, the samples have been analyzed within 10 days' time after collection.

Extraction of Samples

The collected sample has been extracted by microwave extraction (Method IO-3.1) method. The extract has been injected into the ICP MS.

2345

ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR

Microwave Extraction

The filter paper was cut 1"x 8" strip or half the filter from the 8"x10" filter sample and placed on its edge in a labeled centrifuge tube using vinyl gloves or plastic forceps. Using the plastic forceps, crush the filter strip down into the lower portion of the centrifuge tube to ensure acid volume will cover entire filter. Add 10.0 ml of the extraction solution to each of the centrifuge tubes (3% conc. HNO_3 and 8% conc. HCl). Place the centrifuge tubes in a 3Teflon vessel containing 31 ml of deionized water. Place the vessel caps with the pressure release valves on the vessels hand-tight and tighten using the capping station to a constant torque of 12 ft-lb. Place the vessels in the microwave carousel. Connect each sample vessel to the overflow vessel using the Teflon connecting tubes. Place the carousel containing the 12 vessels on to the turntable of the microwave unit. Irradiate the sample vessels at 486 W (power output) for 23 min.

Allow the pressure to dissipate, then remove the carousel containing the vessels and cool in tap water for 10 min. Using the caping station uncap the microwave vessels, remove the labeled centrifuge tube containing samples. Add 10 ml of deionized water to each centrifuge tube. Cap the centrifuge tube tightly and mix the contents thoroughly for 2-3 minutes to complete extraction. The final extraction volume is 20 ml based upon the above procedure. Filter the extracted fluid with Whatman No. 41 and make up the final volume to 100 ml, the filtered sample is now ready for analysis.

Metal Concentration

$C\ ng/m^3$ $(Ms - Mb) \times Vs \times Fa \times 1000/V \times Ft$

Where,

C = Concentration, ng/m^3

Ms = Metal concentration µg/ ml
Mb = Blank concentration µg/ ml
Vs = Total volume of extraction in Ml
Fa = Total area of exposed filter in cm^2
V = Volume of air sampled in m^3
Ft = Area of filter taken for digestion in cm^2

ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR

3.0 DATA ANALYSIS

Mercury analysis results in the ambient air are given in **Table-2**

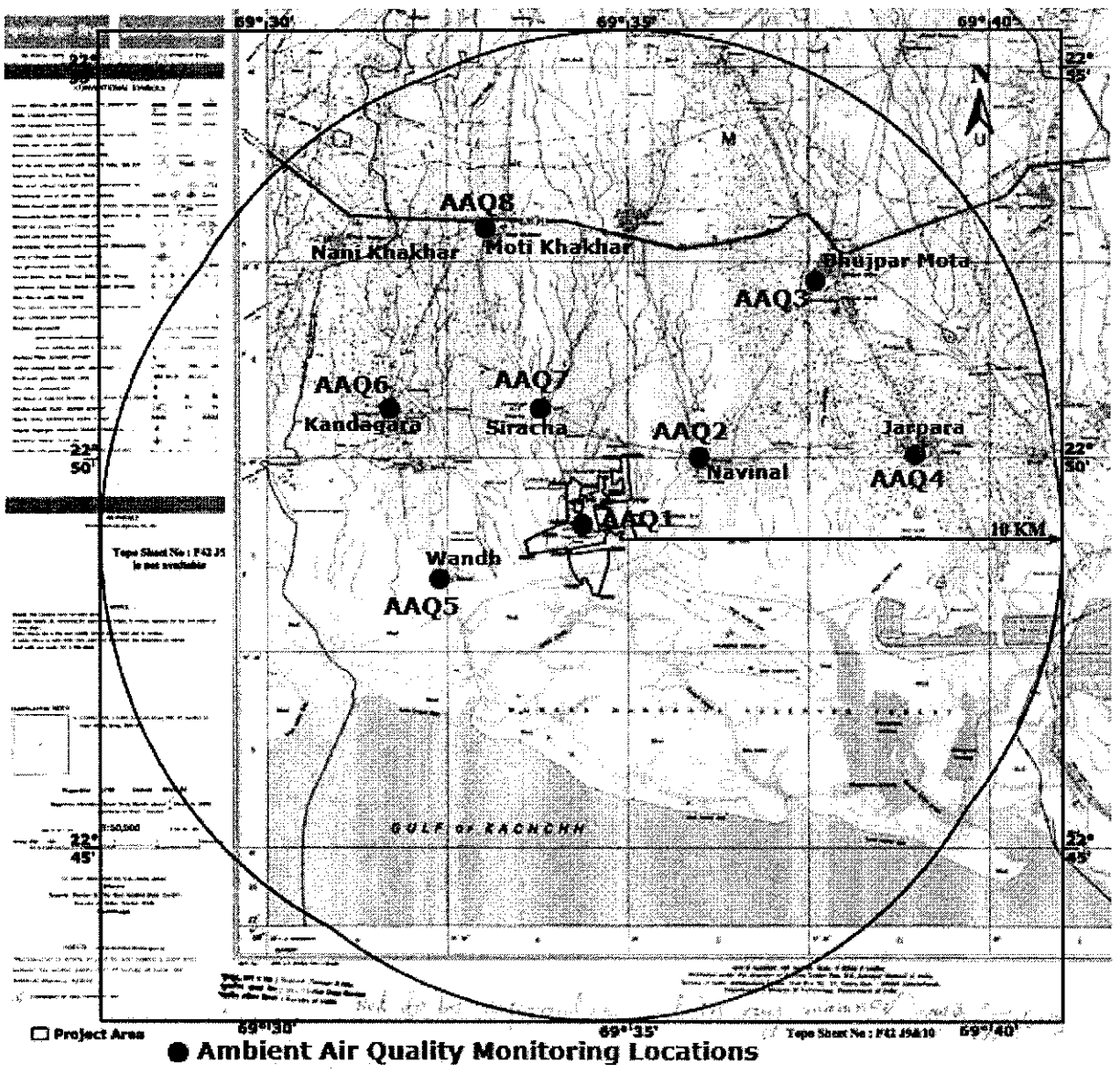
TABLE-2
MERCURY ANALYSIS REPORT

Sr. No	Date	Station Code	Locations	Mercury as Hg (ng/m^3)
1	28-Jan-2019	AAQ-1	Project Site	<5.0
2	28-Jan-2019	AAQ-5	Wandh	<5.0
3	28-Jan-2019	AAQ-6	Kandagara	<5.0
4	28-Jan-2019	AAQ-7	Siracha	<5.0
5	29-Jan-2019	AAQ-1	Plant area	<5.0
6	29-Jan-2019	AAQ-5	Wandh	<5.0
7	29-Jan-2019	AAQ-6	Kandagara	<5.0
8	29-Jan-2019	AAQ-7	Siracha	<5.0
9	01-Feb-2019	AAQ-2	Navinal	<5.0
10	01-Feb-2019	AAQ-4	Japara	<5.0
11	01-Feb-2019	AAQ-3	Bhujpar Mota	<5.0
12	01-Feb-2019	AAQ-8	Moti Khakhar	<5.0
13	02-Feb-2019	AAQ-2	Navinal	<5.0
14	02-Feb-2019	AAQ-4	Japara	<5.0
15	02-Feb-2019	AAQ-3	Bhujpar Mota	<5.0
16	02-Feb-2019	AAQ-8	Moti Khakhar	<5.0

~~234~~

2397

ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR



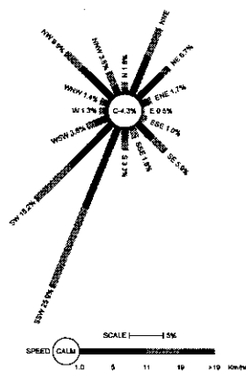


FIGURE-1
AIR QUALITY SAMPLING LOCATIONS

EAC OBSERVATION:

Conservation plan prepared for the Schedule-I species is not meeting the requirement of the conservation of the species that are identified. Therefore, the plan shall be revised considering the requirements of the conservation of the species identified and shall be approved by the competent authority concerned.

REPLY:

Wildlife Conservation Plan & Mangrove Conservation Plan study for Proposed Greenfield Copper Refinery Project has been conducted by Dr. Bharat Jethva, NABET Accredited FAE Cat-I, Ecology & Biodiversity of M/s Bhagwati Enviro Care Pvt. Ltd.

The study was conducted during month February-March 2019. During the primary field survey study total 8 faunal species belong to Schedule-I of Wildlife Protection Act 1972 were found in the study area. These species include 2 species of reptiles, 5 species of birds and one mammal.

The impacts during construction phase could be short term, temporary in nature and will be confined to the close boundary of the project site. General ecological impacts anticipated from the construction and operation phases of the copper refinery plant and mitigation measures are presented in the report as **Annexure-5**.

Budget for conservation for Schedule 1 spices has been revised as per field scientific study from **Rs 40 Lakhs** to **Rs. 193 Lakhs.**

A detailed report (**Annexure-5**) is submitted to Divisional Forest Officer (Kutch- East) on 25th March 2019 and onwards for approval of Conservation and Management Plan from Chief Wildlife Warden (CWLW), Kutch and the approval is pending at level of Deputy Conservator of Forest, East, Kutch.

2349

EAC OBSERVATION NO.-16

EAC OBSERVATION:

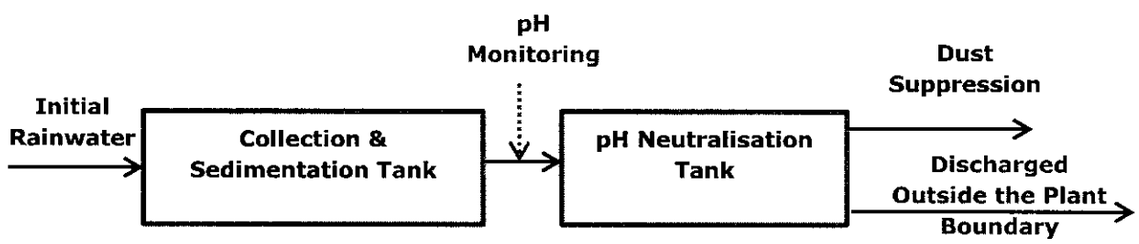
Collection of runoff water from the raw material storage area, slag and gypsum storage yard and its treatment has not been submitted.

REPLY:

Treatment of Initial Rainwater

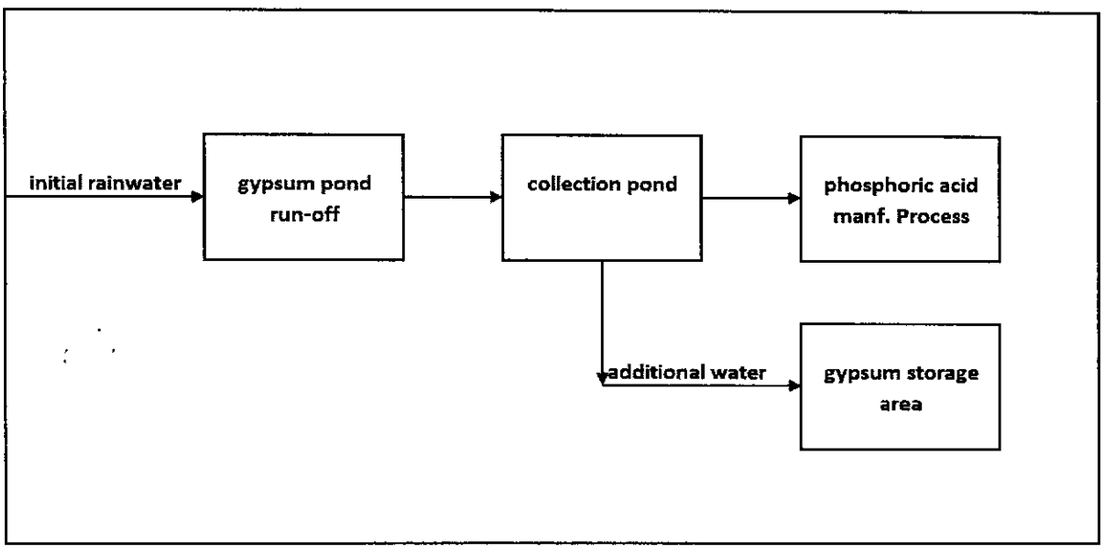
Part A: (raw material storage area & slag)

The rainwater runoff from raw material storage area & slag will be collected in a storm water collection pond for sedimentation of suspended solid materials. Provision for pH monitoring and provision for neutralisation will be made as required. The preliminary flow diagram is as shown below. The water after sedimentation and neutralisation will be utilised within the plant for dust suppression in raw material storage areas and copper slag granulation. The balance water will be discharged outside the plant boundary after conforming to the discharge standards. The bottom sludge of the sedimentation tank will be recycled back to smelter.



Part B: Treatment of Initial Rainwater (Gypsum Storage)

Collecting amount of initial rainwater: The initial rainwater in gypsum storage area will be collected through the garland drains to the dedicated collection pond of 4,000 m^3. This water will be reused in the phosphoric acid manufacturing process and for dust suppression in the Gypsum Storage Area.


initial rainwater
gypsum pond run-off
collection pond
phosphoric acid manf. Process
additional water
gypsum storage area

EAC OBSERVATION NO.-17

2351

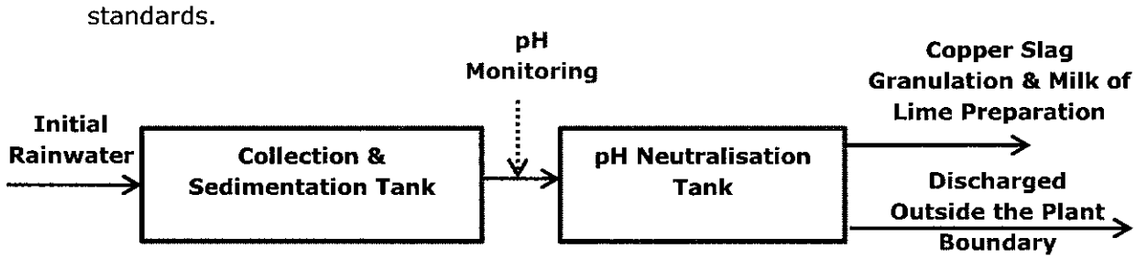
EAC OBSERVATION:

Study on installation of rain water harvesting structure based on annual rain fall pattern and details regarding amount of water to be conserved has not made available.

REPLY:

Rain water harvesting:

a. **Within the production plant premises:** The initial rainwater collecting tank shall be installed in the areas to collect the all rooftops runoff. The same will be connected to a common collection tank; where the runoff from the other areas such as raw material storage, Smelter Plant area is collected in a storm water collection pond. Here, the provision for pH neutralisation will be provided. The water after sedimentation and neutralisation will be utilised within the plant for copper slag granulation and milk of lime preparation. The balance water will be discharged outside the plant boundary after conforming to the discharge standards.



b. **Within the administrative building premises:** The initial rainwater collecting tank shall be installed in the areas to collect the all roofs runoffs from the administrative buildings. The run offs will be pass through the sand soak pits and reused for domestic sewage requirements (Flushing purpose).

Total plant area 634 acre

1. Green Belt Area -212 acre
2. Storage of Slag Gypsum and Hazardous Waste- 138 acre
3. Road and Drains - 40 acre
4. Roof area – 65 acre
5. Paved area- 187 acre

The annual volume of rain water available from the project site spread in 256.57 ha (634 acres) is estimated at 6,43,658 m^3 (0.64 MCM) and during South West (SW) and North East (NE) monsoon periods is 6,32,123 m^3 (0.63 MCM). Considering only 80% of the run-off as available volume after evaporation, spillage and first flush wastage, 5,566 m^3 (0.006 MCM) of rain water is available from the roof top areas for harvesting and use.

Two nos. of 4,000 m^3 capacity each for rain water collection are proposed for the project.

A detailed report on hydrogeology and rainwater harvesting has been conducted and is available as **Annexure-18**

EAC OBSERVATION:

Impact on hydro geology regime of the project site has not submitted.

REPLY:

Detailed Hydrogeology studies were conducted in 10-km radius areas of the proposed copper Greenfield copper refinery project. No ground water is proposed to abstract for the project usage. The plant will be designed and operated on Zero Liquid Discharge (ZLD) system. No effluent will be discharged outside of the plant premises. Hence, there will not be any impact envisaged on ground water regime. Additionally, a ground water level monitoring system shall be established within the plant premises for monitoring of ground water quality.

The total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/ Quaternary sediments with surface lithological boundaries running almost parallel to coast line (E-W). Proposed project site, Adani Power & other industrial set-ups in APSEZ area are located on older coastal plain. Resistivity of different lithological units in the study area range from <1 Ωm to >300 Ωm. ERT1 and 2 are located in project site lying on older tidal flat and marsh deposit with resistivity ranging from <1.0 Ωm to 5.0 m. The resistivity at these locations decreases to <1.0 Ωm with depth indicating saline nature.

The average ground water recharge by rainfall infiltration and increment in ground water storage is 78.15 MCM. However, the huge difference in recharge by rainfall infiltration and increment in ground water storage indicates that the ground water draft is much more than ground water recharge.

The annual volume of rain water available from the project site spread in 256.57 ha (634 acres) is estimated at 6,43,658 m^3 (0.64 MCM) and during SW and NE monsoon periods is 6,32,123 m^3 (0.63 MCM). Considering only 80% of the run-off as available volume after evaporation, spillage and first flush wastage, 5,566 m^3 (0.006 MCM) of rain water is available from the roof top areas for harvesting and use.

Ground water in the study area is developed through shallow dug wells and tube wells for domestic, irrigation and industrial purpose. Dug wells are mainly seen along and in the stream courses and near water bodies/check dams. With the increase of tube wells in the area and lowering of water table, most of the dug wells are abandoned. The depth to water level in dug wells during field visit (2^{nd} week of February 2019) ranges from 7.85 m to 16.12 m bgl whereas the depth to water level in tube wells ranges from 2.00 m bgl in Adani Power's piezometers near project site to 44.38 m bgl in an agricultural well near Gelada. The average water levels in dug wells during field visit, pre and post monsoon are 12.42 m, 12.13 m and 6.23 m bgl respectively with a water level fluctuation of 7.15 m.

General ground water flow direction in major part of the study area is towards Gulf of Kachchh with depressions of deeper levels below mean sea level between Bhadia Mota and Bhadia Nana, around Navinal and east of Bhujpar Mota. Reduced water levels <0 around Bhadia Mota, Bhadia Nana, Tragadi, CGPL and Wandh in the west and to the east of Bhujpar Mota in the northeast indicate that ground water movement is towards inland encouraging sea water intrusion.

EAC OBSERVATION NO. -18 2353

TDS of Moti Khakhar, Desalpar and Siracha (2660.7 mg/l to 3322.3 mg/l), Total Hardness of Siracha (659.9 mg/l), Chlorides of Siracha (1321.6 mg/l), Sulphates of Moti Khakhar (486.5 mg/l), Manganese of Siracha (0.36 mg/l) and Iron of Jarpara (0.31 mg/l) samples show higher values than permissible limits. In the present study, water type of all ground water samples is Sodium Chloride indicating brackish/saline origin.

The present stage of ground water development in the study area is estimated as 102.37% and can be categorized as "Over-exploited". However no ground water extraction is envisaged for the Project.

The Secured Land Fill will have impervious layers of clay liner and HDPE liner. This will ensure that the ground water will not be impacted by the storage of the ETP cake. In case of any rupture/breakage or failure of the SLF bottom liner, any contaminant reaching sub-surface strata and water table will move towards Gulf of Kachchh following the ground water flow direction in the project area.

Danesri Nadi, a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. There are no other drainage courses in the project site. Danesri Nadi along the project boundary will not be disturbed and maintained with necessary bank stabilization will be done with compaction/stone pitching and raising the bund up to 2.0m. The Danesri Nadi conservation plan will include a 50 m corridor from HFL along the stream course for green belt development and another 50 m along the green belt where any storage is coming (Total of 100 m from HFL along the stream course near the storage areas) as presented in plant layout hereunder. No effluent will be discharged into this stream from the plant. Storm water drains carrying excess storm water from the plant area will be provided sand filters to arrest any suspended particles and quality will be monitored periodically to ensure contaminant free storm water only reaches Danesri Nadi.

1.0 INTRODUCTION

1.1. Background

Adani Group is one of India's leading global integrated infrastructure players holding a company of M/s Adani Enterprises Limited (AEL). It was ranked among the top 50 Asian companies by Forbes Asia in 2009. Adani Enterprises is quoted on the Indian Stock Exchange, together with its fourgroup companies – Adani Ports SEZ Limited, Adani Green Energy Limited, Adani Gas Limited and Adani Power Limited. M/s Adani Enterprises Limited is listed on the Bombay Stock Exchange (BSE) and National Stock Exchange of India (NSE).

Adani Enterprises Limited is one of the fastest growing diversified conglomerates with business interests across – Integrated Coal Management and mining, solar cells and module manufacturing, agri-storage infrastructure and services as well as edible oils and food products. This business mix – business-to-business and business-to-consumer – is directed at enhancing access to basic services (electricity through timely coal availability), creating a less polluted world, delivering quality food grain and providing healthy cooking media.

1.2 Project

M/s Adani Enterprises Limited (AEL) intends to set up a Greenfield Copper Refinery project at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat. The project includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel etc. with state of art environment friendly technology.

M/s Vimta Labs Limited, Hyderabad has assigned Multi-Tech Services, Hyderabad carrying out geological and hydrogeological studies in 10 km radius area of proposed Copper Refinery project indicating the impact of the project on the water regime along with rain water harvesting and artificial recharge strategies.

1.3 Location, Extent and Communication

The proposed project will be located in Siracha and Navinal villages at APSEZ, Mundra taluka, Kutch district, Gujarat. AEL proposes to set up a Greenfield Copper Refinery project of 10 LTPA (1.0 MTPA) capacity in 256.57 ha (634 acres) of area.

The proposed project site lies between latitudes 22°48'15.65"N to 22°50'03.86"N and longitudes 69°33'38.12"E to 69°35'10.76"E. The area is covered by Survey of India toposheet no. F42J9-10 (41F9-10) on the scale of 1:50000.

Geographically, the study area lies between 22°42'49.30"N to 22°55'29.74"N latitudes and 69°27'45.00"E to 69°41'02.95"E longitudes and is covered by Survey of India toposheet nos. F42J9-10 (41F9-10) and F42J5 (41F5) on the scale of 1:50000. The study area encompasses the geographical area of Mundra and Mandvi taluks, Kutch district, Gujarat.

The proposed project site is well connected by the existing National/State highways, cargo rail link which is about 2.0 km away from the project site. The nearest airport is Mundra airport owned by Mundra International Airport Pvt. Ltd., a subsidiary of Adani Group located at 20 km in SE direction of the project site and another is at Bhuj, located at a distance of 65 km from the project site. The nearest railway station is Adipur/Gandhidham, which is about 80 km from project site and nearest town is Mundra which is about 20 km from the project site. The national highway NH-8A is passing at about 15.0 km away from the site. State highway SH-6 is about 3.0 km north of proposed site. The site is well connected with Ahmedabad city located at about 460 km.

Location of the proposed project site is shown in **Figure-1** and the study area is presented in **Figure-2**.

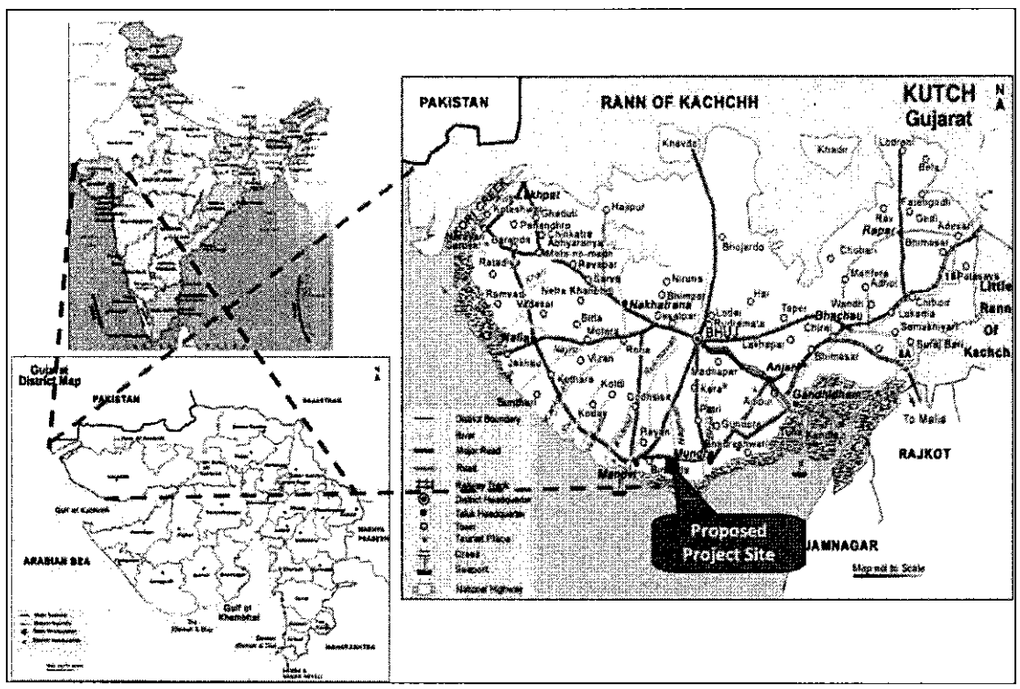


Figure-1. Location Map of Proposed Copper Refinery



22°48'56.62"N, 69°35'08.94"E



22°48'41.07"N, 69°34'14.03"E

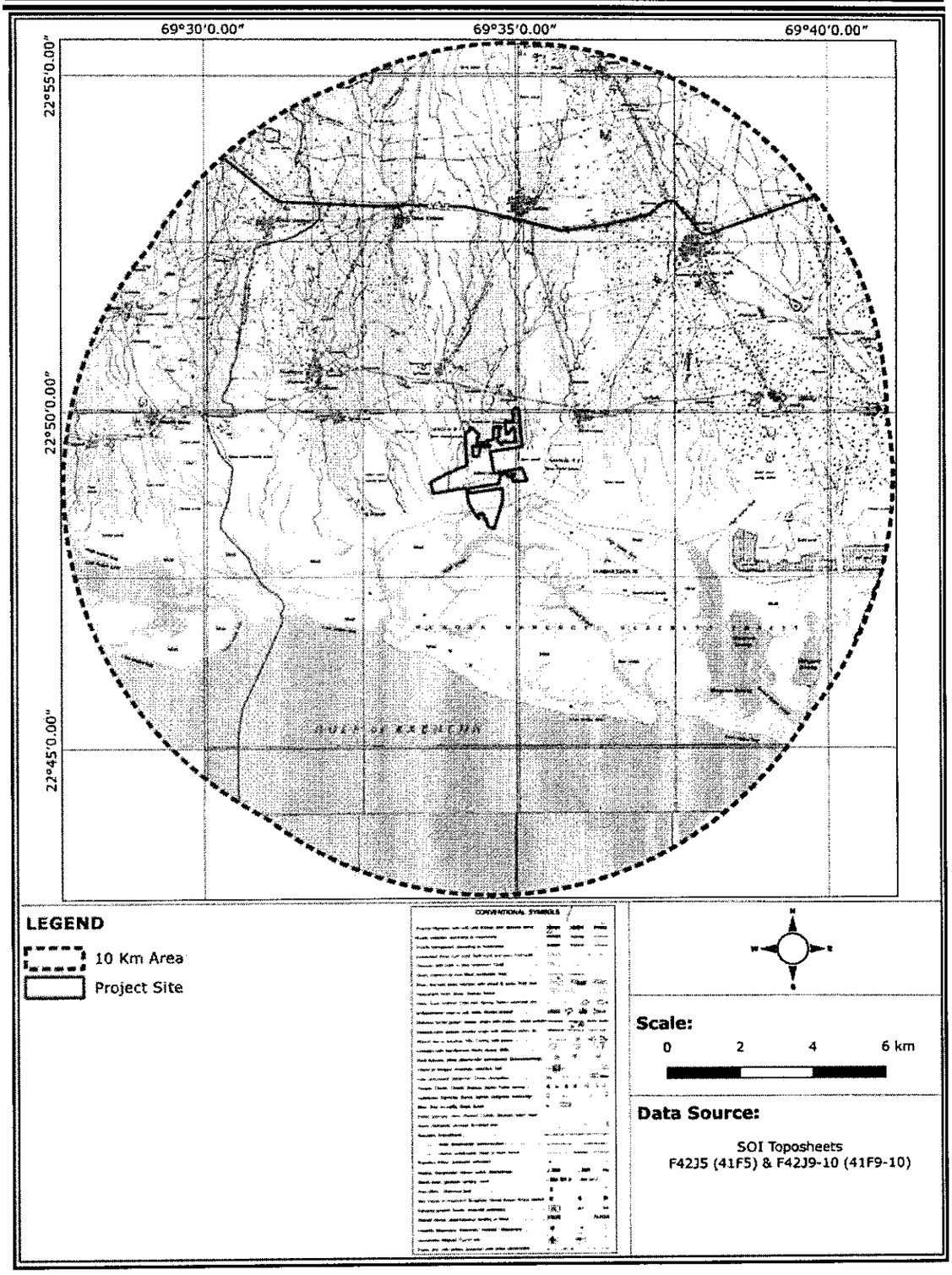


Figure-2. Study Area – 10 km Radius Area of the Project

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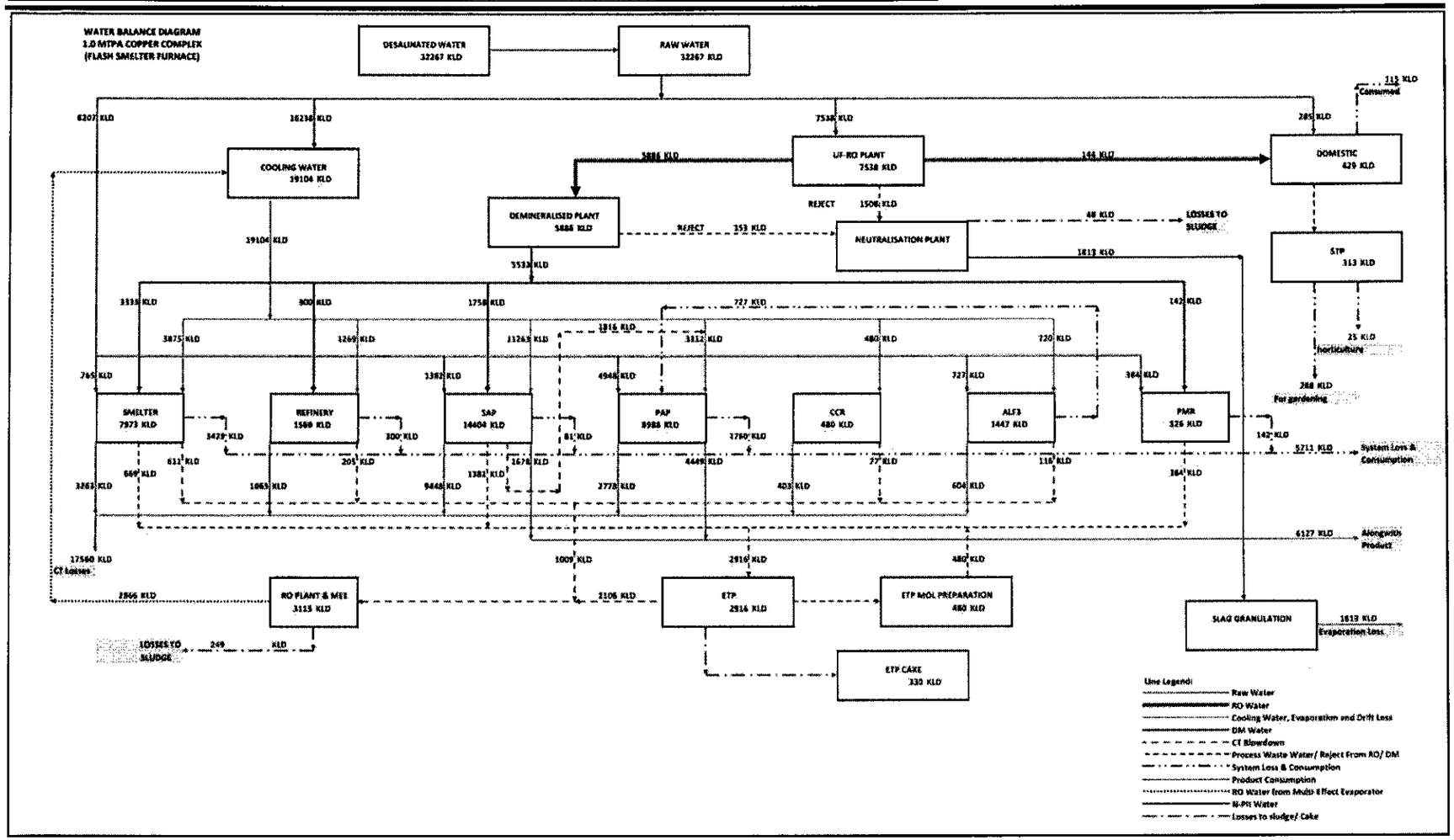


Figure-3. Water Balance – 1 MTPA Copper Plant

1.4 Water Source and Requirement

The total water requirement for the project (phase-I & phase-II) is about 35,496 KLD (35.5 MLD). 32,267 KLD (32.27 MLD) would be sourced from desalination plant of APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). Balance will be met from treated/blowdown recycled water for greenbelt/cover, lime slurry preparation and reverse osmosis plant and multi effect evaporator. The water allocation letter is enclosed as **Annexure-I**.

An integrated water system is proposed. The effluent from the process units is treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEE) for further recovery and solids generated will be sent to Secured Land Fill (SLF).

Water demand is made up of the following:

- Water for product purpose like sulphuric acid and phosphoric acid;
- Make-up losses for copper slag granulation preparation;
- Make-up losses in the cooling towers and heat exchangers/circuits;
- Steam losses from the steam and power systems; and
- Steam consumed directly in the process etc.

The details of usage of water and water balance are presented in **Table-1** and **Figure-3**.

Table-1. Water Requirement for Copper Refinery Plant

Sr.No.	Purpose	Raw (Fresh) Water m^3/day	Treated/ Recycled Water m^3/day	Total m^3/day
1	Phosphoric Acid Plant	31838	2106	**33944**
2	Sulphuric Acid Plant			
3	Copper Smelter Plant + Scrap Meting Furnace			
4	Copper Refinery & PMR			
5	CCR Plant			
6	Domestic	429	0	**429**
7	Greenbelt/Green Cover	0	313	**313**
8	Lime Slurry Preparation	0	810	**810**
Grand Total		**32267**	**3229**	**35496**

2.0 HYDROLOGY

2.1 Climate

The study area falls in South Kachchh and North Kathiawar Peninsular, which is hot arid Ecological Sub Region (L12Et2) with deep, loamy saline and alkali soils, low Available Water Capacity (AWC) and a Length of Growing Period (LPG) of 60-90 days.

Regional Climate around Bhuj

The climate in Bhuj area is called a desert climate. During the year, there is virtually no rainfall in Bhuj area. The average annual temperature is 26.3°C. The rainfall here averages 358 mm. Bhuj has a borderline hot desert climate just short of hot semi-arid climate. Although annual rainfall "averages" around 330 mm on 14.3 average rainy days, the variability is among the highest in the world with coefficient of variation of around 60%. Recorded annual rainfall has been as low as 21.9 mm in 1899 – yet in 1926 a total of 1,177.1 mm fell and in the incomplete year of 1959 rainfall exceeded 1,160 mm of which 730.6 mm fell during Bhuj's wettest-ever month of July 1959. The heaviest rainfall recorded in 24 hours was 467.9 mm on 15.07.1959.

Apart from the cool mornings of the "winter" season from December to February, temperatures are very warm to sweltering throughout the year, which further reduces the effectiveness of the erratic monsoonal rainfall. During the "hot" season from mid-March to mid-June, temperatures of 40°C are frequent, whilst during the monsoon season they exceed 34°C with high humidity except during rainy spells accompanied by cooler temperatures but oppressive humidity.

Climate around Mundra and Mandvi

The climate around Mundra and Mandvi area is called a desert climate. During the year, there is virtually no rainfall in this area. The average annual rainfall based on IMD data is 432.4 mm on 15 average rainy days. About 94.71% of the rainfall is received during South West monsoon (June-September). The highest average monthly rainfall, 206.92 mm occurs in July contributing 47.85% of the total rainfall.

A review of annual rainfall at Mundra and Mandvi for 124 years between 1879 and 2013 indicate that the average annual rainfall in the area during this period is 415.45 mm. The lowest rainfall recorded at Mundra and Mandvi are 30.80 mm and 2.20 mm respectively during 1987 where as the highest rainfall recorded at Mundra and Mandvi are 1079.60 mm during 1961 and 1193.04 during 1926 respectively. The rainfall pattern in the area during this period shows a standard deviation of 222.01 mm with coefficient of variation of 54.21%.

The annual mean temperature is 26.2°C and monthly mean temperatures range between 10.1°C during January to 38.7°C during May. Summer temperature ranges from 18.3°C in March to 38.7°C in May. December and January are coolest months with temperature ranging from 10.1°C to 26.1°C.

Being arid climatic conditions, air is generally dry except during the monsoon season. However, the relative humidity in the coastal parts of the area is high throughout the year exceeding 60% on the average. During monsoon months, the relative humidity exceeds 80% in the coastal region and over 65% in the interiors of the area. The rest of the year the air is dry with relative humidity to the order of 25% or less. March and April months are the driest months.

The prevailing wind direction in the study area is south-westerly during summer and monsoon seasons and north-easterly during winter season. The mean wind speed ranges from 5.9 to 13 kmph during winter months and 26 to 36.9 kmph during monsoon months. During the months of April-May, the mean wind speed is around 17.5 to 23.8 kmph.

Meteorological data of Mundra and Mandvi from IMD, Bhuj is presented in **Table-2** and graphical representation is made in **Figure-4a&4b**.

Table-2.Meteorological Data of Mundra and Mandvi - IMD, Bhuj

Month	Temperature (^{0}C) (Max-Min)		Humidity (%) (Max-Min)		Mean Total Rainfall (mm)		Wind Speed (km/hr)	
	Mundra	Mandvi	Mundra	Mandvi	Mundra	Mandvi	Mundra	Mandvi
January	26.1-10.1	25.6-14.2	48–24	65-59	1.88	2.8	7.9	13
February	29.1-12.9	26.3-14.8	52–17	69-71	3.06	2.3	8.1	16.4
March	34.0-18.3	29.8-18.6	59–26	80-77	0.99	1.3	8.5	20.3
April	37.6-22.7	32.3-22.3	57– 22	79-77	0.06	0.4	11.2	23.8
May	38.7-25.6	32.7-26.2	66–33	84-83	0.71	2	17.6	30.1
June	36.7-27.4	33.0-28.4	72–50	88-85	66.67	39.3	21	32.8
July	33.0-26.3	31.1-26.9	77–64	87-86	214.13	199.7	26	36.3
August	31.7-25.3	30.3-26.1	80–62	89-85	95.31	108.4	17	33.1
September	33.2-24.1	30.5-25.4	77–54	87-82	41.61	53.8	13	26.5
October	35.6-21.5	31.9-22.8	64–26	77-70	9.68	7.2	8.6	16.9
November	32.3-15.6	30.5-19.2	55–27	61-62	9.16	1	7	13.8
December	28.0-11.2	26.9-15.6	56–25	64-63	1.72	1.7	5.9	14.3
Range/ Total/Average	**33.0-20.1**	**30.1-21.7**	**63 –36**	**77-75**	**444.98**	**419.90**	**12.65**	**23.11**

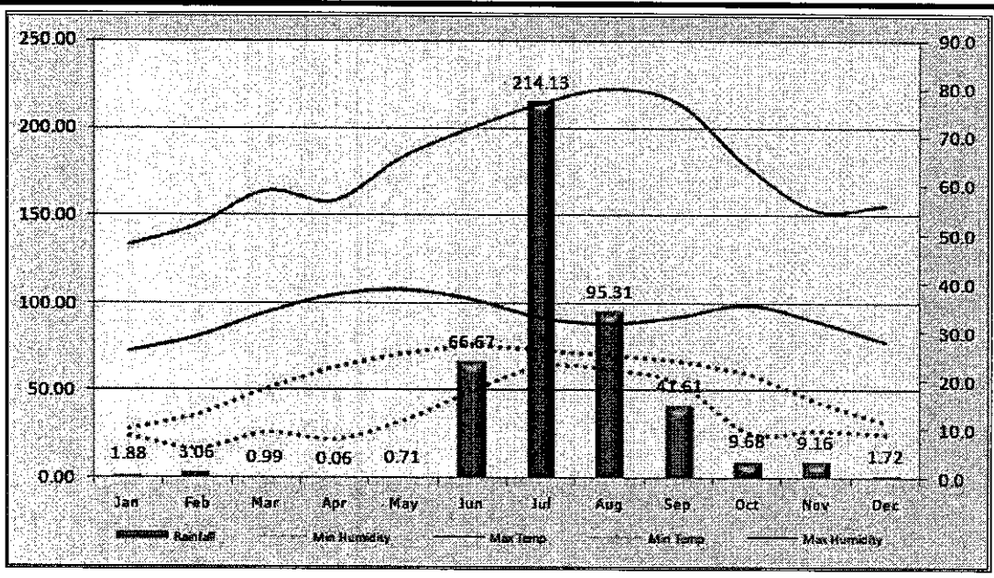


Figure-4a.Climate Graph – Mundra

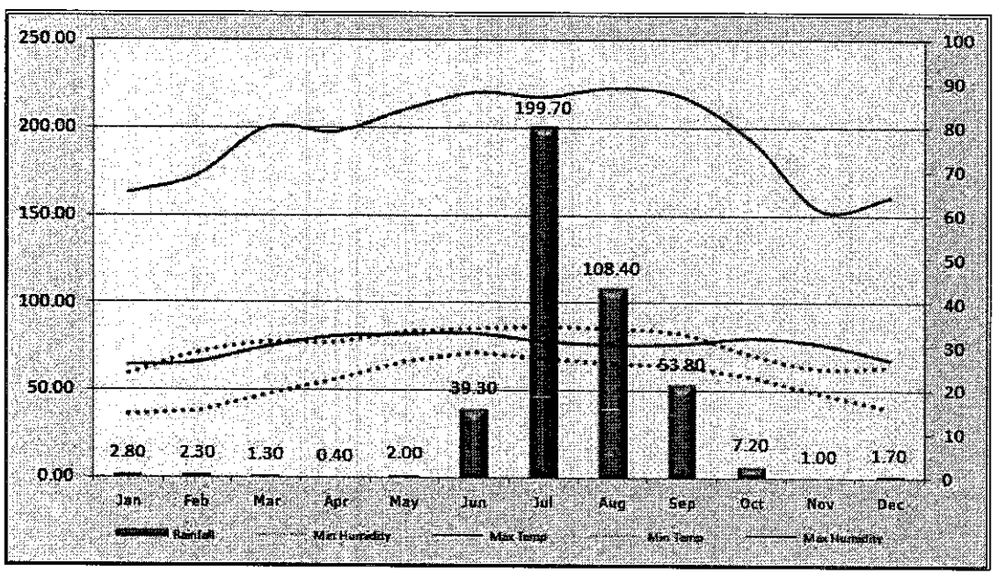


Figure-4b.Climate Graph – Mandvi

2.2 Physiography and Drainage

2.2.1 Physiography

Physiographically, Kachchh district can be divided into:

a) Central high land and the upland in the Rann area;
b) Central plain in the southern part;
c) Little and Great Rann areas; and
d) Banni plains.

The study area forms part of central plain with fringes of ridges in the northern part around Gelada.The study area is fairly flat with growth of prosopisjuliflora. The highest elevation and lowest topographic elevations of the area are around 65.00 m(in the northern part west of Gelada) and 0.00 m above mean sea level (amsl) along coast line. The general slope in the study area is towards south towards Gulf of Kachchh. Elevation in the project site ranges from 3.0 m amsl in the south 9.0 m amsl in the north with general slope towards south into Gulf of Kachchh.

Danderi RF NW of project site, Siracha RF in the western part of project site, Navinal RF towards east of project site, Dhrab RF in the east (south of Dhrab) and Mundra Mangrove RF along Baradi Mata Creek are the forest covers in the study area.

2.2.2 Drainage

According to River Basin Atlas of India, Ministry of Water Resources, the study area forms part of B20RAN14, 15 & 16 watersheds in Rann Sub-basin of West Flowing Rivers of Kutch and Saurashtra including Luni Basin.

The drainage of the study area is largely governed by the combination of lithology and tectonics however, the influence of sea level fluctuations during Quarternary period is also obvious. Khari nadi (1.9 km, W), Danesri Nadi (in the western part), Nagavantinadi(4.7 km, E) and Phot nadi(8.7 km, ENE) are the streams in the study area flowing southwards into Arabian Sea, the Gulf of Kachchh. The drainage network in the study area is generally dendritic to sub-parallel and controlled by these streams. These streams are seasonal and rarely seen in flowing condition only during peak rainfall events. The study area is having a drainage density of 1.27 km/sq km. There are a few small to medium ponds/tanks spread over the entire study area and a number of check dams were constructed on stream courses.

Kotdi creek towards south of project site and Boradi Mata creek towards southeast of project site are the major creeks in the study area. Arabian Sea, the Gulf of Kachchh is in the southern part occupying 18% of the study area. Physiography and drainage network in the study area is presented in **Figure-5**.

Danesri Nadi , a seasonal stream passes through western part of the project site.Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. Stream flow only for a few hours after peak rainfall events is reported in this stream at Siracha, 1.5 km NW of project site. Danesri Nadi merges into Kotdi creek area after railway crossing near project site and after this point, it has more of tidal/backwater influence than run-off from rainfall.Since no flow data is available for Danesri Nadi , a tentative estimate of run-off from Danesri Nadi catchment and discharge at railway line near project site is done based on the catchment characteristics.

The run-off values calculated for different land uses in the catchment area are presented in **Table-3**. The annual volume of surface run-off available from the catchment area is

estimated at 5.33 MCM while the volume of water available during southwest monsoon period is 5.05 MCM.

Table-3. Annual and Monsoon Run-off from Danesri Nadi Catchment

Sr.No.	Land Use	Area (sq.km)	Run-off Coefficient	Annual Rainfall (m)	Annual Run-off (MCM)	Monsoon Rainfall (m)	Monsoon Run-off (MCM)
1	Residential Land	0.68	0.50	0.432	0.15	0.410	0.14
2	Industrial Land	0.45	0.70	0.432	0.14	0.410	0.13
3	Barren Land	0.15	0.70	0.432	0.05	0.410	0.04
4	Forest Land	0.76	0.20	0.432	0.07	0.410	0.06
5	Scrub Land	5.33	0.25	0.432	0.58	0.410	0.55
6	Cultivated Land	29.99	0.30	0.432	3.89	0.410	3.68
7	Water Body	1.20	0.90	0.432	0.47	0.410	0.44
Total/average		**38.57**	**0.51**	**0.432**	**5.33**	**0.410**	**5.05**

Danesri Nadi discharge at railway crossing near project site is estimated using Rational Formula considering maximum one day rainfall of 129 mm for Mundra area. In the absence of short duration rainfall data, India Meteorological Department (IMD) empirical reduction formula has been used for estimation of 1 hour rainfall (44.72 mm/hr). Danesri Nadi peak discharge at railway crossing near project site is estimated at 256.83 cumecs which will occur only for few hours after peak rain events of magnitude mentioned above.

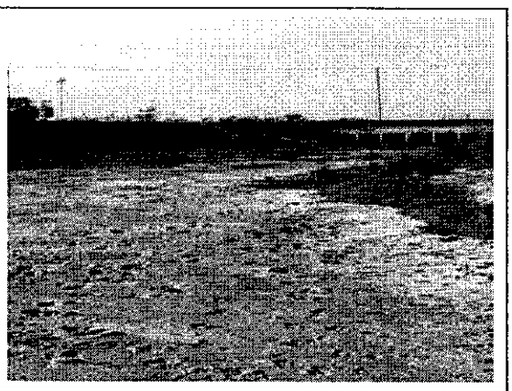
Rational Formula as applicable for catchments <50 sq km: Qp = 1/36(KPcA)

where Qp = Discharge in Cumecs
K = Run-off Coefficient
Pc = Critical rainfall intensity in cm/hr
A = Catchment area in ha

Qp = 1/36(0.536 x 44.72 x 3875)
= 256.83 cumecs



Danesri Nadi near Siracha



Danesri Nadi after Railway Crossing

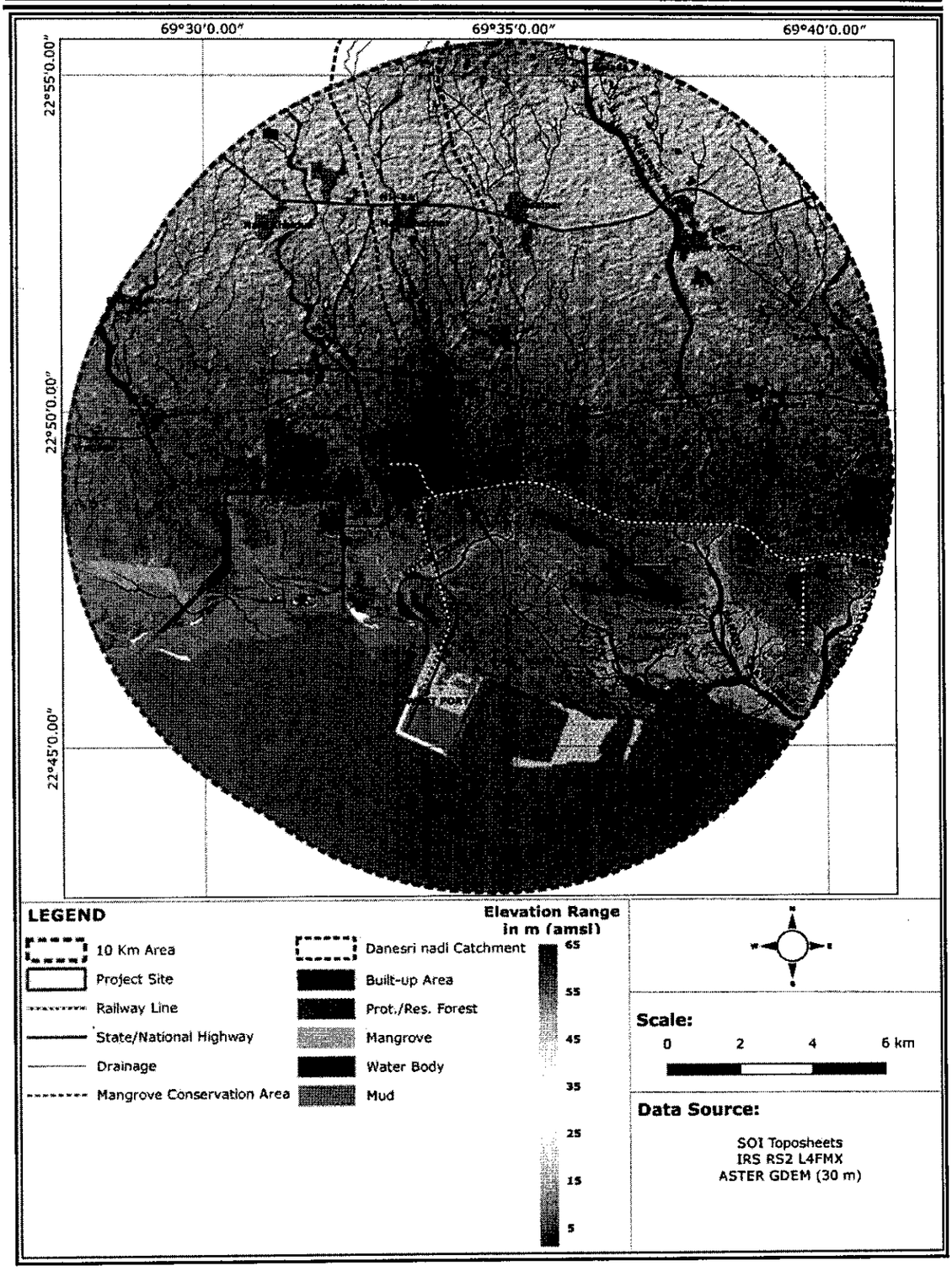


Figure-5. Physiography and Drainage Map of the Study Area

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Geology & Hydro-geology in 10 km radius area of Proposed Greenfield Copper Refinery Project at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat

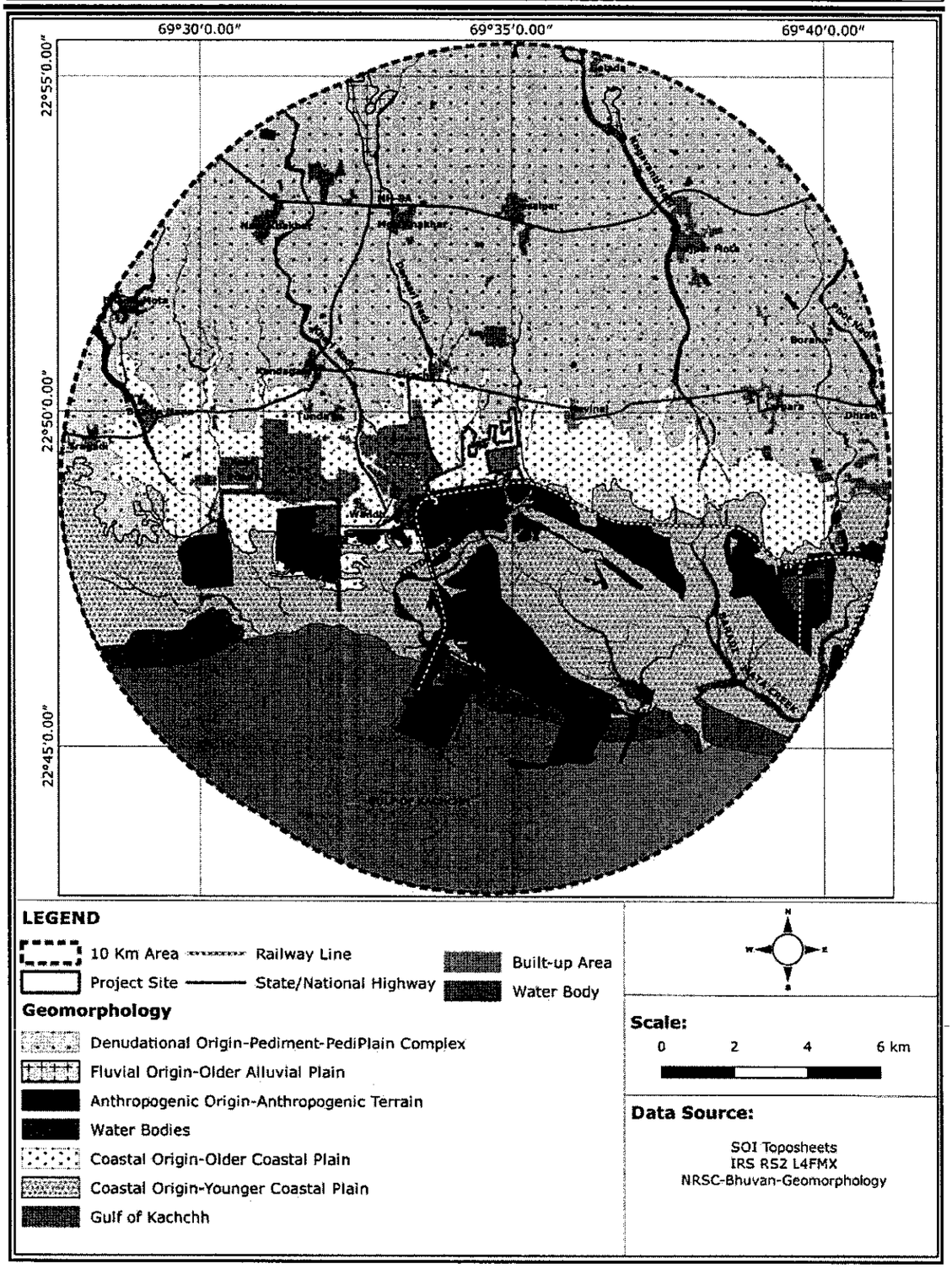


Figure-6. Geomorphology of the Study Area

Note: The older tidal flat deposits are currently inactive or no tidal activity at present in the older tidal flat deposits. Part of this area around Tragadi, Siracha, Navinal, Dhrab and Jarpara has been converted into agriculture and/plantations.

3.0 GEOLOGY

3.1 Geomorphology

Geomorphological features on earth surface craft by various geomorphic processes such as erosional, depositional, tectonic etc. Geomorphological characteristics of the region facilitate important hydrologic processes like surface run-off and infiltration. Geomorphology map of the study area has been prepared based on Geomorphology Theme (2005-06), Bhuvan, National Remote Sensing Center (NRSC) with landforms classified at Level-2 and is presented in **Figure-6**.

Geomorphologically, the study area can be divided into:

- Denudational origin
  - Pediment-Pediplain complex
- Fluvial origin
  - Younger Alluvial plain
- Coastal origin
  - Older Coastal plain
  - Younger Coastal plain
- Anthropogenic origin
  - Anthropogenic terrain
- Water bodies

The geomorphological boundaries in the study area run W-E following the coast line trend.

Pediment occurs as gently sloping rocky surface covered intermittently with weathered debris, residual gravel, wind-blown and sheet wash sand/silt deposits of variable thickness (Twidale, 1978b). Pediplain is an extensive plain formed by the coalescence of pediments. Pediment-Pediplain complex occurrence in the study area is mainly in the form of pediplain covering central to northern part.

Alluvial Plainis a largely flat landform created by the deposition of sediment over a long period of time by one or more rivers coming from highland regions, from which alluvial soil forms. Alluvial plains of the study area are compositionally sand dominant and occur along Danesri and Nagavantinadis in the northern part.

Coastal Plain is flat, low-lying land adjacent to a sea coast. Older coastal plain extends E-W from Bhadia Nana and Jarpara between pediplain and younger coastal plain. Younger coastal plain extends E-W between younger coastal plain and Gulf of Kachchh. Proposed project site, Adani Power & other industrial set-ups in APSEZ area are located on older coastal plain.

Anthropogenic Terrain is a landform created due to human intervention. Reclaimed lands for industrial set-ups in younger coastal plain of the study area are shown as anthropogenic terrain.

3.2 Regional Geology

The Katchchch district comprises lithounits of the Mesozoic sediments, the Deccan Volcanics, the Palaeogene and Neogene sediments of Tertiary age and the Quarternary sediments.

The Mesozoic sediments, represented by the Pachchham, the Chari, the Katrol and the Bhuj Formations, comprise mainly conglomerate, sandstone, shale, siltstone, clay, limestone, marl, etc. Various vertebrate, including dinosaurian remains (near Ler and Anjar) and footprints (near Fategarh) and invertebrate fauna and flora of Gondwana affinity are present in these sediments.

Alkaline intrusive, basaltic flows, basaltic/doleritic and olivine gabbro intrusive and andesitic trachyte represent the Deccan Volcanics. The basaltic flows, are also associated with inter-trappean horizons containing dinosaurian remains.

The Deccan Volcanics are unconformably overlain by the lateritic horizons of the Matanomadh Formation and the sedimentary rocks belonging to the Kakdinadi, the Fulra, the Maniyara Fort, the Khari Nadi, the Gaj and the Sandhan Formations. These sediments are fossilliferous and include limestone, shale, siltstone, marl, sandstone, conglomerate, etc.

The Pleistocene sediments include coarse clastics of the Kothara Formation and predominantly calcareous rocks of the Miliolite Formation.

The youngest sediments belong to the Holocene period and are represented by the Rann Clay and MahuvaFormatios (marine), Rann Formation (fluvio-marine), Katrol and Varahi Formations (fluvial) and Jantral Formation (Aeolian).

The regional stratigraphic succession based on Geological Survey of India (GSI) publication, 2000 is given in **Table-4**.

Table-4. Regional Stratigraphic Succession

Lithology	Formation	Group/Series	Age
Younger tidal flat and marsh deposits	Mahuva Formation (ME)		
Older tidal flat and marsh deposits	Rann Clay Formation (ME)		
Rann clay and mud deposits	Rann Formation (FME)		Holocene
Younger flood plain, channel-fill and deltaic deposits	Varahi Formation (FE)		
Older flood plain and channel-fill deposits	Katpur Formation (FE)		
Unstabilized sand sheet and sand dune deposits	Jantral Formation (AE)		

Lithology	Formation	Group/Series	Age
Miliolite limestone, shell limestone, calcareous sandstone, pebbly limestone and conglomerate	Miliolite Formation	Porbander Group	Lower Pleistocene
Pebbly sandstone, conglomerate gravel and sand	Kothara Formation		Lower Pleistocene
Micaceous sandstone, mottled clay, siltstone, conglomerate and calcareous clay and marl	Sandhan Formation		Pliocene
Shale interbedded with fossilliferous marl	Gaj Formation		Lower to Middle Miocene
Variegated siltstone and gypseous claystone	Khari Nadi Formation		Upper Oligocene to Lower Miocene
Calcareous and gypseous claystone/siltstone, clay, coral limestone and sandstone	Maniyara Fort Formation		Middle to Upper Oligocene
Foraminiferal limestone, glauconitic shale and clay	Fulra Formation		Middle Eocene
Gypseous, lignite-bearing shale, fossilliferous nodular limestone and clay, ferruginous shale and clay with intercalated marl	KakdiNadi Formation		Lower Eocene
Laterite, sandstone, conglomerate and bentonitic and kaolinitic clay	Matanomadh Formation		Palaeocene
Andesitic trachyte	Extrusive	Deccan Volcanics	Upper Cretaceous to Eocene
Olivine gabbro	Intrusive		
a. Basalt and dolerite dyke, b. Plug and sill			
Basalt flows with inter-trappean sediments	Extrusive		
a. Alkali gabbro, b. Alakali basalt			
Gluconitic and burrowed sandstone, siltstone, shale, limestone, marl, conglomerate, ironstone and clay with marine and plant fossil	Bhuj Formation		Cretaceous
Shale, fossilliferous sandstone, marl and conglomerate	Katrol Formation		Upper Jurrasic to Lower Cretaceous
Gypseous shale, siltstone and conglomerate with phosphatic nodule, colitic limestone	Chari Formation		Middle to Upper Jurassic
Gypseous shale, siltstone, limestone, sandstone and conglomerate	Pachchham Formation		Middle Jurassic

(Source: GSI Publication, 2000)

3.3 Geology of the Study Area

Of the total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/Quarternary sediments with surface lithological boundaries running almost parallel to coast line (E-W).

Holocene sediments of the study area comprises of younger and older tidal flat and marsh deposits of Mhuva and Rann Clay Formations respectively from sea towards inland and younger flood plain, channel-fill and deltaic deposits from tidal flats towards inland. The tidal flat and marsh deposits occupy 41.31% of the study area covering170.88 sq km. Flood plains belonging to Varahi Formation extend from central to northern part of the study area covering 161.48 sq km (39.03%). Coastal region also have aeolian sands deposited under strong wind action from gulf occupying a small area 5.65 sq km (1.37%).

Recent flood plain sediments are deposited by rivers flowing southerly and ultimately meet to Gulf of Kachchh in south. Alluvium sediments composed of sand, gravel, beachsand, dunal sand and tidal mud. The thickness of alluvium is observed to be 2.0 m in the north to 18.0 m. The recent sediments are well exposed in cliff sections of Danesri, Nagavanti and Phot nadis. Alluvium is highly porous in nature and is a good aquifer of coastal region.

Geology of the study area based on GSI publication, 2000 is presented in **Figure-7**.

3.4 Sub-Surface Lithology and Resistivities in the Study Area

3.4.1 Sub-Surface Lithology

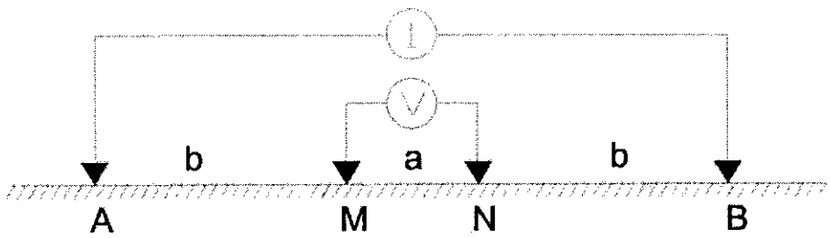
Sub-surface lithological information collected from the local tube well driller for two tube well locations in Bhujpur and Siracha is presented in the form of lithologs in **Figure-8**.Top soil at these locations is reported to be around 2.00 m followed by alluvium extending up to 15.00 m. At Bhujpur, alluvium is underlain by compact sandstone and disintegrated sandstone occurring as alternate layers up to 182.00 m with lateritic gravel between 61.00 m and 76.00 m. Disintegrated/fractured sandstone from 122.00 m to the bottom of the well is water yielding acting as aquifer. At Siracha, alluvium is followed by calcareous kankar up to a depth of 30.00 m. Below this, compact sandstone and disintegrated sandstone occur as alternate layers up to 122.00 m. Disintegrated/fractured sandstone from 107.00 m to the bottom of the well is water yielding and acting as aquifer.

3.4.2 Sub-Surface Resistivities

Application of geophysical methods will help us to identify the nature and thickness of sub-surface formation by studying the variation of their physical properties through the measurements made at the surface. Several surface geophysical methods are deployed to reach the purpose. All these methods rely upon the principle that each lithological assemblage has independent physical properties and identification of these properties helps to recognize the formation. One such property easily detectable is its electrical character for the passage of known strength of current. These testing methods are applied for arriving information on sub-surface lithological data and vertical layering of water structure in the surveyed area.

In geo-electrical methods, the centre of the configuration (O) is kept at fixed location and measurements are made by successively increasing electrode spacing. In this, current is sent into the ground through a pair of electrodes called current electrodes and resulting potential difference across the ground is measures with the help of another pair of electrodes called potential electrodes. The ratio between the potential difference (ΔV) and current (I) gives the resistance (R), which depends on the electrode arrangement and on the resistivity of the sub-surface formations. The apparent resistivity values obtained with increasing values of electrode separations are used to estimate the thickness and resistivity of the sub-surface formations. The plot between apparent resistivity values obtained with increasing values of electrode separations and corresponding current electrodes separation from the centre is used for analysis of thickness and true resistivity of the sub-surface formations.

There are two popular surface electrical methods in geophysical investigations namely Schlumberger and Werner configurations. The Schlumberger method of Electrical Resistivity Test (ERT) was used in the present study with the help of a DC resistivity meter - DDR-3 of IGIS, Hyderabad. In Schlumberger configuration, all the four electrodes (A, B, M and N) are kept in a line. The outer electrode spacing (b) is kept large, compared to the inner electrode spacing (a), usually more than 5 times. Field resistance values will be obtained at every change of electrode spacing for calculating apparent resistivity values. The disposition of electrodes for Schlumberger configuration is shown in below picture and the apparent resistivity ρ_a for a specified configuration is computed with below mentioned formula.



Schlumberger Configuration

Apparent Resistivity $\rho_a = \pi kR$

where, 'k' is the constant = $\pi/a(AB/2^2-MN/2^2)$
'AB' is current electrode spacing and
'MN' is potential electrode spacing
$R = \Delta V/I$

For obtaining the thickness and true resistivity of sub-surface lightological units within the study area, Electrical Resistivity Tests (ERTs) were conducted at 15 different locations following Schlumberger configuration with a maximum AB/2 separation of 100.5 m. The DC resistivity meter model DDR-3 of IGIS, Hyderabad make is used in the present geophysical investigations.Locations for conducting ERTs were selected considering topography & space to run electrodes up to 100 m on either side, site conditions including surface moisture etc.



Out of these, 2 ERT locations were within the project site and rest are spread in the study area. These locations are designated as ERT1 to ERT15 and shown in **Figure-7**.

At ERT1, 2, 5, 6, 7, 10, 12, 13, 14 and 15, field data could not be captured for the complete AB/2 separation of 100.5 m even after several attempts and the data capture at these locations ranged from 21.0 m to 59.0 m. The following reasons may be attributed for not capturing data beyond mentioned AB/2 separation at these locations:

- The layers present below respective depths having very low resistivity values <1Ωm
- The layers are highly altered or highly brackish or saline

The resistivity data obtained is interpreted in terms of physical parameters viz., resistivity and thickness of the formations. In the present study, Inverse Slope method of interpretation is used to interpret the data acquired from the field. Resistivity and thickness of each layer at 15 locations are presented in **Table-5**.

Resistivities of different lighological units in the study area range from <1 Ωm to >300 Ωm.ERT1 and 2 are located in project site lying on older tidal flat and marsh deposit with resistivities ranging from <1.0 Ωmto 5.0 m. The resistivity at these locations decreases to <1.0 Ωm with depth indicating saline nature. The other sub-surface lithological units in the study area represent alluvium of fluvial origin, laterite as capping and extending as lens into sandstone and sandstone with resistivities ranging between 5.0 Ωm to >300 Ωm. At ERT5, 6, 7, 10, 12, 13, 14 and 15 also, resistivity below 21.0 m to 59.0 m is very low <1.0 Ωm indicating formation salinity.

Table-5.Resistivity and Thickness Details from Electrical Resistivity Tests (ERTs)

Sr.No	ERT No.	Resistivity Ωm	Depth m		Thickness m
			From	To	
1	ERT1	5	0	12	12
		2	12	21	9
		<1	21	Below	-
2	ERT2	2	0	48	48
		<1	48	Below	-
3	ERT3	15	0	2	2
		55	2	27	25
		20	27	48	21
		7	48	100	52
4	ERT4	15	0	1	1
		60	1	27	26
		80	27	60	33
		25	60	100	40
5	ERT5	20	0	10	10
		71	10	15	5
		31	15	21	6
		14	21	38	17
		<1	38	Below	-
6	ERT6	20	0	1	1
		65	1	24	23
		<1	24	Below	-

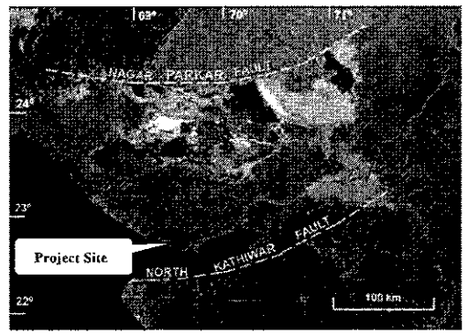
Sr.No	ERT No.	Resistivity Ωm	Depth m		Thickness m
			From	To	
7	ERT7	15	0	1	1
		14	1	24	23
		56	24	48	24
		<1	48	Below	-
8	ERT8	15	0	21	21
		44	21	50	29
		14	50	100	50
9	ERT9	15	0	5	5
		64	5	27	22
		51	27	59	32
		17	59	100	41
10	ERT10	15	0	5	5
		38	5	15	10
		65	15	27	12
		<1	27	Below	-
11	ERT11	20	0	2	2
		18	2	48	46
		10	48	100	52
12	ERT12	20	0	1	1
		27	1	9	8
		50	9	21	12
		>300	21	38	17
		<1	38	Below	-
13	ERT13	20	0	1	1
		60	1	27	26
		>300	27	38	11
		11	38	48	10
		<1	48	Below	-
14	ERT14	15	0	21	21
		<1	21	Below	-
15	ERT15	20	0	12	12
		34	12	48	36
		10	48	59	11
		<1	59	Below	-

A review of soil analysis results indicate that the soils in the proposed project site are of clay loam type with slow permeability, high water holding capacity, 1.1 g/cc of bulk density and saline in nature. The project proponent is advised to take up detailed geo-technical investigations to further gaining an engineering decision on foundation and construction of buildings.

3.5 Tectonic Setup and Lineaments/Faults

The Kachchh district lies 3-400 km from the plate boundary between the Indian Plate and the Eurasian Plate, but the current tectonics is still governed by the effects of the continuing continental collision along this boundary. During the break-up of Gondwana in the Jurassic, this area was affected by rifting with a roughly west-east trend. During the collision with Eurasia the area has undergone shortening, involving both reactivation of the original rift faults and development of new low-angle thrust faults. The related folding has formed a series of ranges, particularly in central Kachchh.

Kachchh geological province, Gujarat is often referred to as "Kachchh Basin", "Kachchh Rift Basin" or "KachchhAulacogen", in tune with the usage by workers involved in the exploration of oil in the terrain. The Kachchh basin is bounded between the Nagar Parkar Fault (NPF) in the north and North Kathiawar Fault towards south.



(Source: Current Science, Vol 112, No.5, 10 Mar 2017)

The study area form part of Kachchh Basin and does not show any major tectonic evidences except few geomorphic lineaments parallel to drainage courses and a minor fault of structural origin in the SE (**Figure-7**). The nearest major fault is North Kathiawar Fault (NPF) towards south.

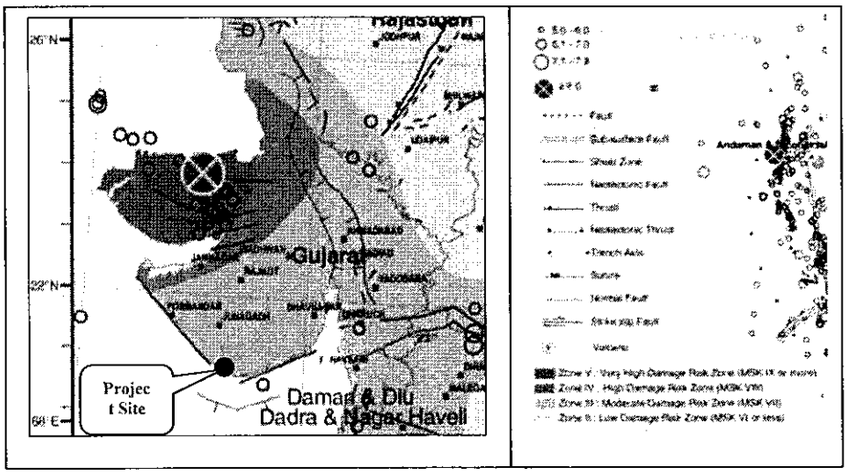
3.6 Earthquakes

The Indian subcontinent has a history of devastating earthquakes. The major reason for the high frequency and intensity of the earthquakes is that the Indian plate is driving into Asia at a rate of approximately 47 mm/year. Geographical statistics of India show that almost 54% of the land is vulnerable to earthquakes. The latest version seismic zoning map of India given in the earthquake resistant design code of India (IS 193 (Part 2) 2002) assigns four levels seismicity for India in terms of zone factors. In other words, the earthquake zoning map of India divides India into 4 seismic zones (Zone 2, 3, 4 and 5) unlike its previous version, which consisted of five or six zones for the country. According to the present zoning map, Zone 5 expects the highest level seismicity whereas Zone 2 is associated with the lowest level of seismicity. The MSK (Medvedev-Sponheuer-Karnik) intensity broadly associated with the various seismic zones is VI (or less), VII, VIII and IX (and above) for Zone 2, 3, 4 and 5 respectively, corresponding to Maximum Considered Earthquake (MCE). Each zone indicates the effects of an earthquake at a particular place based on the observations of the affected areas and can also be described using a descriptive scale like Modified Mecalli Intensity Scale or the Medvedev-Sponheuer-KarnikSclae.

Earthquake risk is very high in Gujarat and the state has suffered major earthquakes in 1819, 1845, 1847, 1848, 1864, 1903, 1938, 1956 and 2001 (9 times in past 200 years). The 2001 Kachchh earthquake also known as Bhuj earthquake was the third largest and second most

destructive earthquake in India over the last two centuries. The epicentre was about 9 km south-southwest of the village Chobari in Bachau taluka of Kachchh district. The intraplate earthquake reached 7.7 on the moment magnitude scale.

As per Earthquake Hazard Map of India, Building Material and Technology Promotion Council (BMTPC) prepared based on digitized data of SOI, GOI; Seismic Zones of India Map IS:1893-2002, BIS, GOI; Seismotectonic Atlas of India and its Environs, GSI, GOI, the study area falls in Very High Damage Risk Zone – Zone V (MSK IX or more).



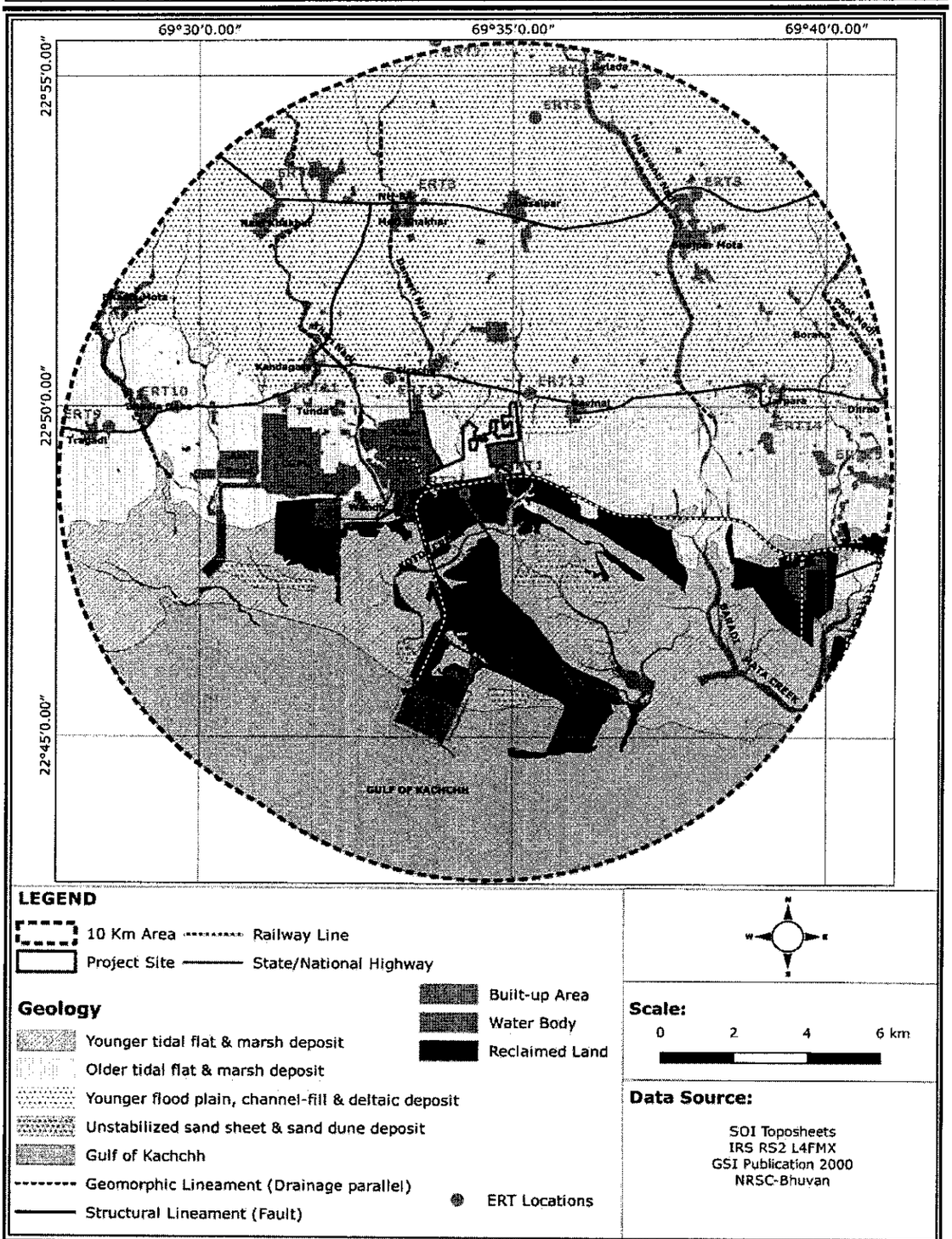
In order to provide a guiding framework to undertake mitigation investments and activities, Gujarat State Disaster Management Authority (GSDMA) initiated a study for preparation of a Composite Hazard Risk & Vulnerability Atlas for the state covering six natural and man-made hazards and the physical, social and economic vulnerability of its people, asses and economy at taluka level. The estimated mean taluka Peak Ground Acceleration (PGA in g) zonation with event magnitude for a 100 year return period is presented in **Figure-9**. This zonation would typically be used for the design of critical buildings that need to have a mean design service life of 100 years.

The cities of Ahmedabad, Baruch, Rajkot and Bhavnagar fall into the severe intensity zone, while Bhuj and Jamnagar fall in the very severe intensity zone over this time frame. The project site is located in unclassified zone covering Little and Great Rann of Kachchh including Mundra coastal area, but close to very severe intensity zone.

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Geology & Hydro-geology in 10 km radius area of Proposed Greenfield Copper Refinery Project at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat



Note: The older tidal flat deposits are currently inactive or no tidal activity at present in the older tidal flat deposits. Part of this area around Tragadi, Siracha, Navinal, Dhrab and Jarpara has been converted into agriculture and/plantations.

Figure-7. Geology of the Study Area

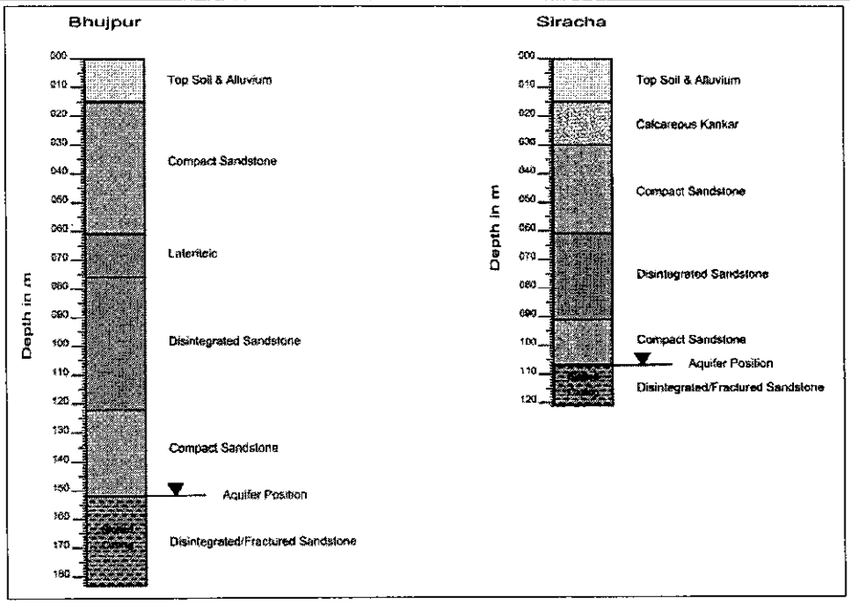


Figure-8.Tube Well Sections at Bhujpur and Siracha

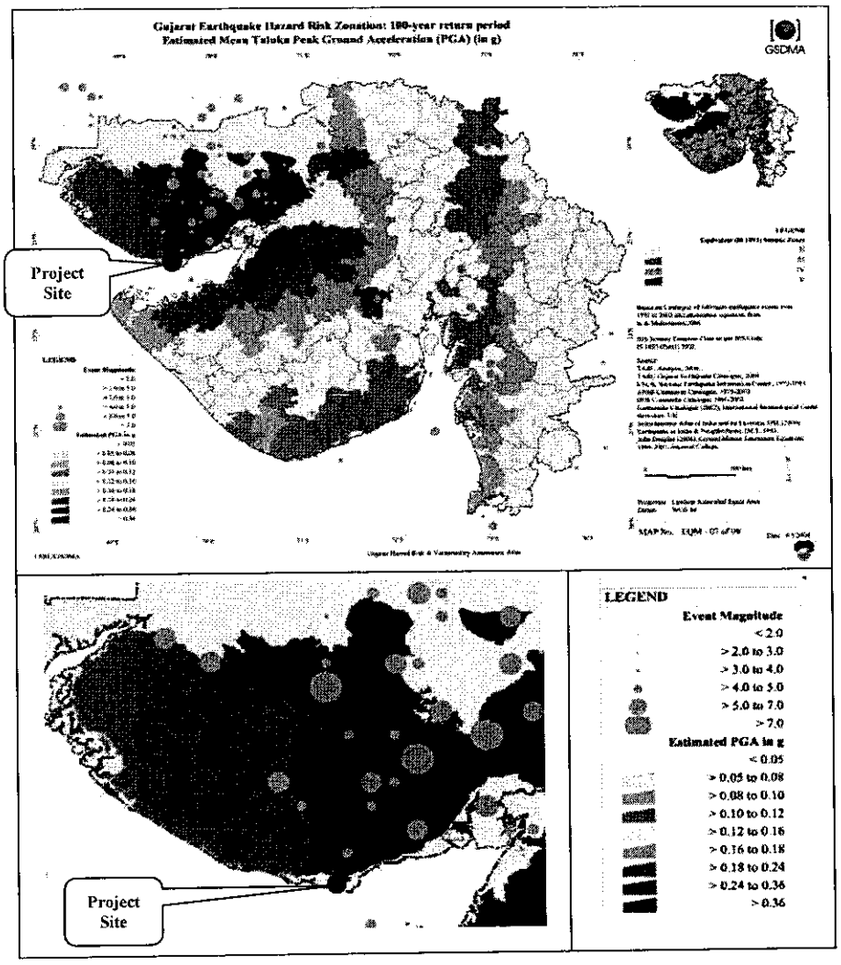


Figure-9. Gujarat Earthquake Zonation: 100 Year Return Period

4.0 HYDROGEOLOGY

Hydrogeology is the area of geology that deals with the distribution and movement of ground water in the soil and rocks of earth's crust commonly in aquifers. The hydrogeological studies have been carried out in the area to understand the local geology, geo-morphological features, drainage network, aquifer characteristics and yield of water. Accordingly various components controlling the hydrogeological regime of the study area have been studied. Hydrogeological investigations were carried out in the area between 06.02.2019 and 08.02.2019. Hydrogeology of the study area is presented in **Figure-10**.

4.1 Nature of Occurrence of Ground Water

Ground water systems are a result of the complex combination of different lithological and structural types within an area that together constitute an aquifer within which ground water accumulates and moves. Rather than describing individual lithologies and their tendencies to form aquifers or otherwise, it is useful to describe the ground water as **one continuous across** various lithological types (Kulkarni and Deolankar, 1995).

Of the total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/Quarternary sediments with surface lithological boundaries running almost parallel to coast line (E-W).

Holocene sediments of the study area comprises of younger and older tidal flat and marsh deposits of Mhuva and Rann Clay Formations respectively from sea towards inland and younger flood plain, channel-fill and deltaic deposits from tidal flats towards inland.

The thickness of alluvium is observed to be 2.0 m in the north to 18.0 m and tidal flat and marsh deposits are more than 20 m in thickness. The alluvium is underlain by sandstone of Sandhan Formation and laterite at places. Sandstone forms productive aquifer at places. The alluvium yields small quantities of brackish water to shallow wells.

4.2 Wells, Water Levels and Yields

Ground water in the study area is developed through shallow dug wells and tube wells for domestic, irrigation and industrial purpose. Dug wells are mainly seen along and in the stream courses and near water bodies/check dams. With the increase of tube wells in the area and lowering of water table, most of the dug wells are abandoned. Only a few dug wells near water bodies/check dams have water during the field visit. Depth of dug wells inventoried range from 7.58 m to 16.90 m below ground level (bgl) and of tube wells range from 54.86 m to 137.16 m bgl. Depth of tube wells in the study area range from 30.00 m to 180.00 m bgl with a diameter of 12". 46% of the dug wells inventoried are dry during the field visit. Of the total dug wells inventoried only two wells are being used for domestic purpose and rest of the wellsare not being used. Tube wells are used for both domestic in the villages and for agriculture in the fields installing 3.5 HP to 20 HP submersible pumps.

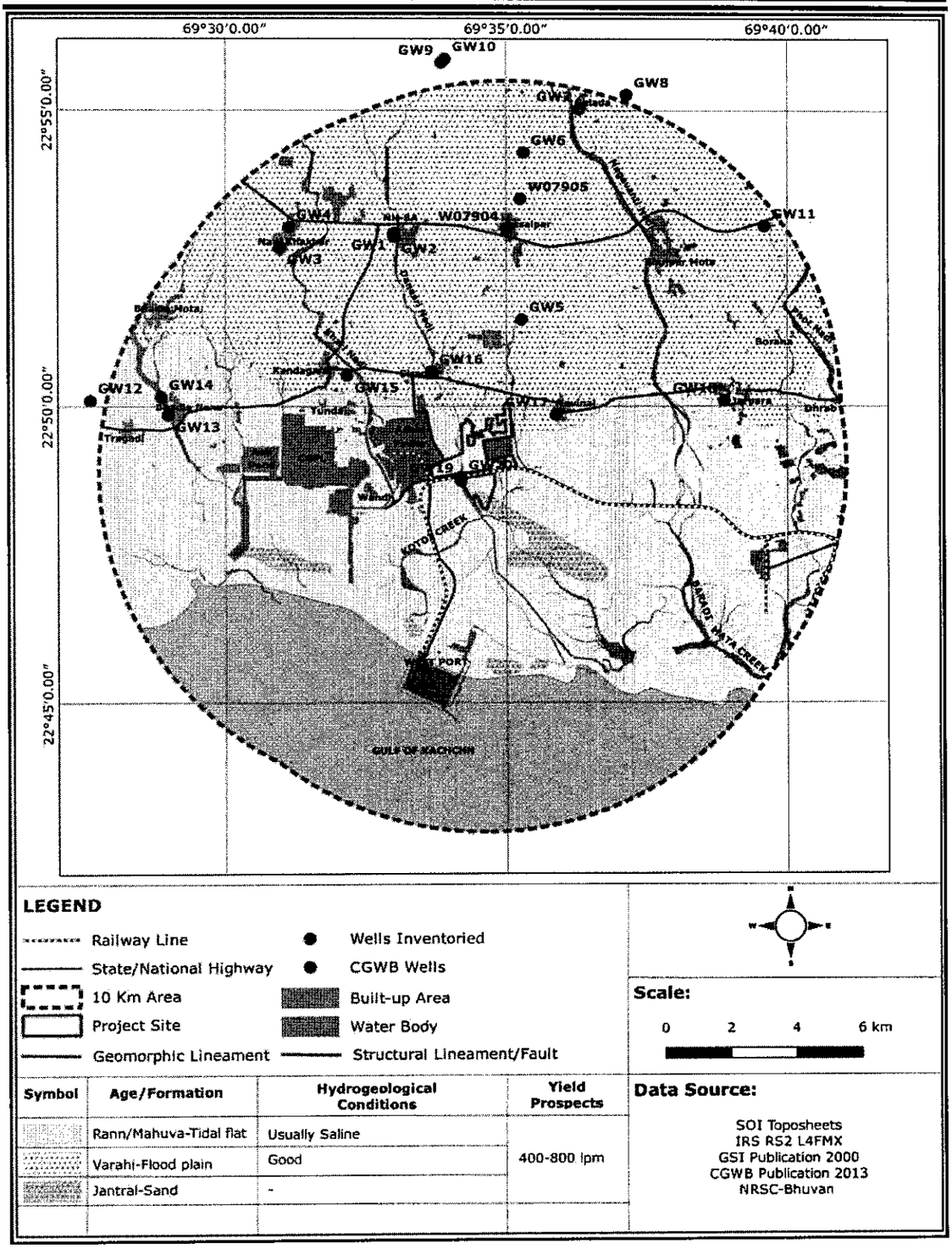
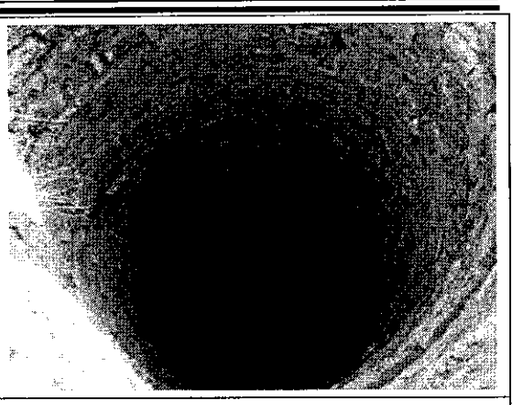


Figure-10. Hydrogeology of the Study Area

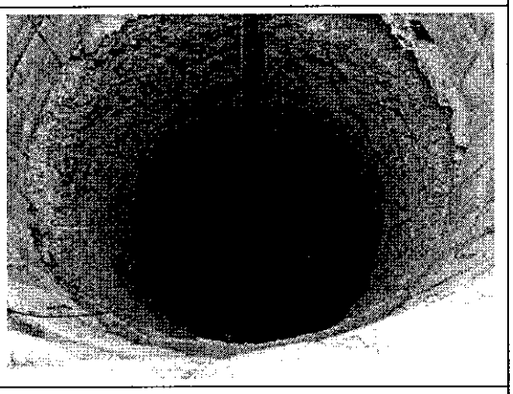
Note: The older tidal flat deposits are currently inactive or no tidal activity at present in the older tidal flat deposits. Major portion of this is turned to be waste land mainly with prosopis/thorny shrub and existing industrial set-ups in Adani SEZ are located in this area. Part of this area around Tragadi, Siracha, Navinal, Dhrab and Jarpara has been converted into agriculture land/plantations.





Dry Well in Stream Course, Nana Bhadiya





Well with Water near a Check dam, Depa



Tube well for Agriculture, Gelada



Village Water Supply Well, Nana Bhadiya

4.3 Movement of Ground Water

Ground water movement mainly takes place through the fractures and joints of the crystalline rocks and the ground water is transmitted through voids and interstitial openings in sedimentary rocks and unconsolidated formations. In other words, movement of ground water is controlled by the hydraulic conductivity of the aquifer and hydraulic gradient.

Based on the water level data during field visit, ground water level contour map has been prepared for February 2019 considering water levels reduced to mean sea level and presented in **Figure-11**. The reduced water levels in the study area range from 41.00 m

Water levels during field visit are recorded measuring depth to standing water and post monsoon water levels are recorded up to the moisture indication in the dug wells. Pre monsoon water levels are recorded through interaction with well owner or local person available at the site. The depth to water level in dug wells during field visit (2nd week of February 2019) ranges from 7.85 m to 16.12 m bglwhere as the depth to water level in tube wells ranges from 2.00 m bgl in Adani peizometers near project site to 44.38 m bgl in an agricultural well near Gelada. Of the total dug wells inventoried, all wells except three in Depa and Navinal are reported to go dry during summer. Pre monsoon water levels in the three wells range from 10.00 m to 14.20 m bgl. The depth to water level in dug wells during post monsoon ranges from 3.25 m bgl in Depa to 9.80 m bgl in NaniKhakhar. The average water levels in dug wells during field visit, pre and post monsoon are 12.42 m, 12.13 m and 6.23 m bgl respectively with a water level fluctuation of 7.15 m. Well inventory data is furnished in **Table-6**.

Two to 10 tube wells for domestic use and village water supply and 50 to 300 tube wells for agriculture purpose are reported to be drilled in each village depending on village size and about 30% of these were reported as low or no yielding. Yields from tube wells in the study area range from <75 m^3/day (<1 lps) to around 2000 m^3/day (around 20 lps).

There were two dug wells in Deshalpur under CGWB water level monitoring network (Well Code: W07904 & W07905) and these wells were monitored till 2001. Pre and post monsoon average water levels in these wells between 1996 and 2001 are17.13 m and 0.52 m respectively. Water level monitoring data of these wells is presented hereunder:

SITE_NAME	SITE_TYPE	WLCODE	YEAR_OBS	MONSOON	POMRB	POMKH	PREMON
Deshalpur m.-1	Dug Well	W07905	2001	-	11.52	-	-
Deshalpur m.-1	Dug Well	W07905	2000	-	-	9.85	10.98
Deshalpur m.-1	Dug Well	W07905	1999	17.13	-	-	17.13
Deshalpur m.-1	Dug Well	W07905	1998	6.09	8.32	-	17.13
Deshalpur m.-1	Dug Well	W07905	1997	17.13	-	17.13	17.13
Deshalpur m.-1	Dug Well	W07905	1996	-	17.13	-	17.13
Deshalpur m.-2	Dug Well	W07904	2000	9.57	-	-	-
Deshalpur m.-2	Dug Well	W07904	1999	11.65	8.42	-	10.91
Deshalpur m.-2	Dug Well	W07904	1998	14.69	14.69	0.52	14.69
Deshalpur m.-2	Dug Well	W07904	1997	-	-	0.7	-
Deshalpur m.-2	Dug Well	W07904	1996	8.99	14.69	9.85	10.1
				12.18	12.46	7.61	14.40

WLCODE: Well Code **YEAR_OBS:** Year of Observation **POMRB:** Post Monsoon Rabi
POMKH: Post Monsoon Kharif **PREMON:** Pre Monsoon

above mean sea level (amsl) in the north to -22.00 m below mean sea level (bmsl) between BhadiaMota and Bhadia Nana in the west. General ground water flow direction in major part of the study area is towards Gulf of Kachchh with depressions of deeper levels below mean sea level between BhadiaMota and Bhadia Nana, around Navinal and east of BhujparMota. These ground water depressions indicate either ground water pumping in these areas is heavy and/or piezometric head of the aquifer is not reaching the general water table.

Reduced water levels <0 around BhadiaMota, Bhadia Nana, Tragadi, CGPL and Wandh in the west and to the east of BhujparMota in the northeast indicate that ground water movement is towards inland encouraging sea water intrusion. The hydraulic gradient in the study area ranges from 3.33 m/km towards project site from upstream to 6.26 m/km in the northeast.

Table-6. Details of Well Inventory in Study Area

Sr No.	Well No	Village	Lat	Long	Well Type	Purpose	Total Depth (m)	Dia (m)	Lining (Dug Well) (m)	Static Water Level (m)			Fluctuation (m)	Aquifer
										Feb-19	Pre Monsoon (May)	Post-Monsoon		
1	GW1	Moti Khakhr	22°52'55.20"N	69°33'0.00"E	Dug well	Domestic	15.40	3.95	8.40	Dry	Dry	8.40	-	Alluvium - fluvial
2	GW2	Moti Khakhr	22°52'51.60"N	69°33'0.00"E	Dug well	Domestic	12.20	2.00	12.20	Dry	Dry	5.40	-	Alluvium - fluvial
3	GW3	NaniKhakhar	22°52'40.80"N	69°30'57.60"E	Dug well	Domestic	16.90	2.80	12.00	Dry	Dry	9.80	-	Alluvium - fluvial
4	GW4	NaniKhakhar	22°53'01.60"N	69°31'07.40"E	Dug well	Domestic	14.10	1.80	14.10	Dry	Dry	6.50	-	Alluvium - fluvial
5	GW5	Maheshwari Nagar	22°51'27.76"N	69°35'16.40"E	Dug well	Domestic	13.20	3.20	13.20	Dry	Dry	6.90	-	Alluvium - fluvial
6	GW6	Deshalpar	22°54'17.07"N	69°35'18.44"E	Tube well	Domestic	54.86	0.30	-	35.25	-	-	-	Sandstone
7	GW7	Gelada	22°55'1.20"N	69°36'18.00"E	Dug well	Domestic	16.85	2x2	7.22	16.12	Dry	7.22	-	Alluvium - fluvial
8	GW8	Gelada	22°55'15.60"N	69°37'8.40"E	Tube well	Agriculture	118.87	0.30	-	44.38	-	-	-	Sandstone
9	GW9	Depa	22°55'48.00"N	69°33'50.40"E	Dug well	Domestic	11.15	3.00	7.60	7.85	10.00	3.25	6.75	Alluvium - fluvial
10	GW10	Depa	22°55'51.60"N	69°33'54.00"E	Dug well	Domestic	12.85	6.00	4.20	11.70	12.20	4.20	8.00	Alluvium - fluvial
11	GW11	BhujaparMota	22°53'02.90"N	69°39'35.40"E	Tube well	Domestic	137.16	0.30	-	41.00	-	-	-	Sandstone
12	GW12	TragadiGham	22°50'6.00"N	69°27'36.00"E	Dug well	Domestic	13.82	1.85	12.82	13.75	Dry	7.13	-	Alluvium - marine
13	GW13	Nana Badhlya	22°49'51.60"N	69°28'58.80"E	Dug well	Domestic	11.35	2.50	6.68	10.90	Dry	5.49	-	Alluvium - marine
14	GW14	Nana Badhiya	22°50'9.60"N	69°28'51.60"E	Tube well	Domestic	106.68	0.30	-	34.00	-	-	-	Sandstone
15	GW15	Khandagara	22°50'31.20"N	69°32'9.60"E	Tube well	Domestic	-	-	-	-	-	-	-	Sandstone
16	GW16	Siracha	22°50'34.80"N	69°33'39.60"E	Dug well	Domestic	12.50	2.50	10.20	Dry	Dry	4.50	-	Alluvium - fluvial
17	GW17	Navinal	22°49'51.60"N	69°35'52.80"E	Dug well	Domestic	16.60	7.00	16.60	14.20	14.20	7.50	6.70	Alluvium - fluvial
18	GW18	Jarpara	22°50'6.00"N	69°38'52.80"E	Dug well	Not in use	7.58	3.00	7.58	Dry	Dry	4.65	-	Alluvium - fluvial
19	GW19	Adani Piezometer	22°48'45.08"N	69°34'11.01"E	Tube well	Adani Piezometer	30.00	0.15	-	2.00	2.80	1.80	-	Alluvium - marine
20	GW20	Adani Piezometer	22°48'48.15"N	69°34'11.12"E	Tube well	Adani Piezometer	30.00	0.15	-	2.20	3.00	2.10	-	Alluvium - marine
						Average	**34.32**	**2.28**	**10.22**	**18.25**	**12.13**	**6.23**	**7.15**	
						Dug well	**13.42**	**3.30**	**10.22**	**12.42**	**12.13**	**6.23**	**7.15**	
						Tube well	**79.60**	**0.25**	**-**	**26.47**	**-**	**-**	**-**	

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Geology & Hydro-geology in 10 km radius area of Proposed Greenfield Copper Refinery Project at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat

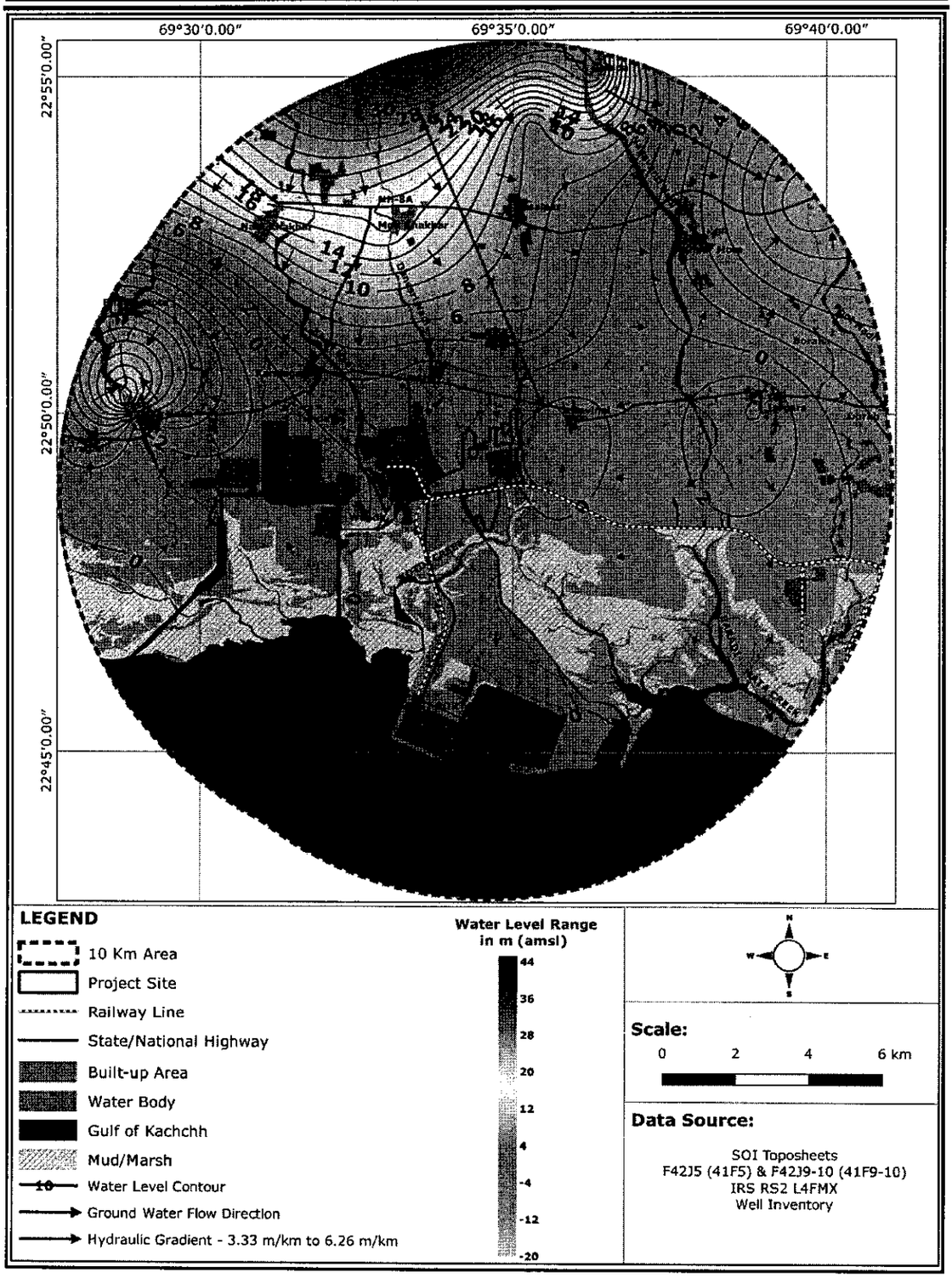


Figure-11. Water Level Contours – February 2019

4.4 Aquifer Characteristics

Ground water is stored in the open spaces and fractures within geologic material such as soil, sand and rock that occur beneath the land surface. Aquifers are the geologic layers that are filled with water and that can transmit enough water to supply a well under normal hydraulic gradients.

Pumping tests are conducted to determine the performance characteristics of a well and to determine the hydraulic properties of the aquifer such as permeability/hydraulic conductivity, transmissivity and storage coefficient. Permeability is the ease with which water can flow in a soil mass or a rock. These properties determine how easily water moves through the aquifer, how much water is stored, and how efficiently it produces water. During an aquifer test, the hydraulic head in the aquifer declines as the time of pumping increases. Analysis of hydraulic head decline, or drawdown, allows for the estimation of aquifer hydraulic properties. There are many pumping test solution methods but most commonly used for different aquifers and conditions have some general assumptions: a) aquifer extends radially and infinitely, b) single pumping well, c) fully penetrating well (except for Neuman method).

A medium duration test was conducted on a bore well in Navinal on 07.02.2019 and corresponding drawdown measurements were done on the pumping well. The bore well is 91.44 m deep with a discharge of 4.2 lps. The pump test was conducted for 300 minutes till steady state condition was achieved. After stopping the pump, recovery was continued for 100 minutes. In the absence of observation well, interpretation of single well tests with Cooper-Jacob straight line method remains more reasonable than most alternatives. The aquifer parameters were determined using Cooper-Jacob straight line method for pumping and Theis Recovery method for recovery data.

Pumping and recovery data are presented in **Table-7** and **Table-8** respectively and flows are shown in **Figure-12**. The results of pumping and recovery analysis are presented in **Table-9**.The average transmissivity is found as 54.75 m^2/day while storage coefficient is 8.93E-03 and hydraulic conductivity is found as 5.475 m/day. Aquifer characteristics in the region as summarized from different studies are presented in **Table-10**.

Table-7. Pumping Test Data

Project: Adani Copper Smelter		Well Type: Bore Well	
Location: Navinal		Well Dia: 0.3048 m	
Date: 07.02.2019		Well Depth: 91.44 m	
Time of Test Start: 06.15 AM		Static Water Level: 31.65 m	
Lat: 22°50'22.24"N		Long: 69°34'50.29"E	
Time Since Pump Started T in Min	**WI Below MP in M**	**Draw Down S in M**	**Discharge (Q) in Lps**
1	39.06	1.43	4.20
2	39.93	2.30	"
3	40.53	2.90	"
4	40.83	3.20	"
5	41.13	3.50	"
6	41.37	3.74	"
7	41.53	3.90	"
8	41.73	4.10	"
9	41.87	4.24	"
10	41.99	4.36	"
15	42.33	4.70	"
20	42.59	4.96	"
25	42.73	5.10	"
30	42.83	5.20	"
40	42.98	5.35	"
50	43.10	5.47	"
60	43.19	5.56	"
80	43.32	5.69	"
100	43.41	5.78	"
120	43.48	5.85	"
140	43.59	5.96	"
160	43.68	6.05	"
180	43.74	6.11	"
200	43.78	6.15	"
220	43.83	6.20	"
240	43.87	6.24	"
270	43.92	6.29	"
300	43.98	6.35	"

Table-8. Recovery Test Data

Time Since Pump Started T In Min	Time Since Pump Stopped T' In Min	T/T'	WI Below Mp In M	Residual Drawdown (S)
301	1	301.00	42.71	5.08
302	2	151.00	42.59	4.96
303	3	101.00	42.47	4.84
304	4	76.00	42.36	4.73
305	5	61.00	42.29	4.66
306	6	51.00	42.20	4.57
307	7	43.86	42.11	4.48
308	8	38.50	42.05	4.42
309	9	34.33	41.99	4.36
310	10	31.00	41.93	4.30
315	15	21.00	41.71	4.08
320	20	16.00	41.55	3.92
325	25	13.00	41.46	3.83
330	30	11.00	41.34	3.71
340	40	8.50	41.21	3.58
350	50	7.00	41.09	3.46
360	60	6.00	41.02	3.39
380	80	4.75	40.88	3.25
400	100	4.00	40.78	3.15

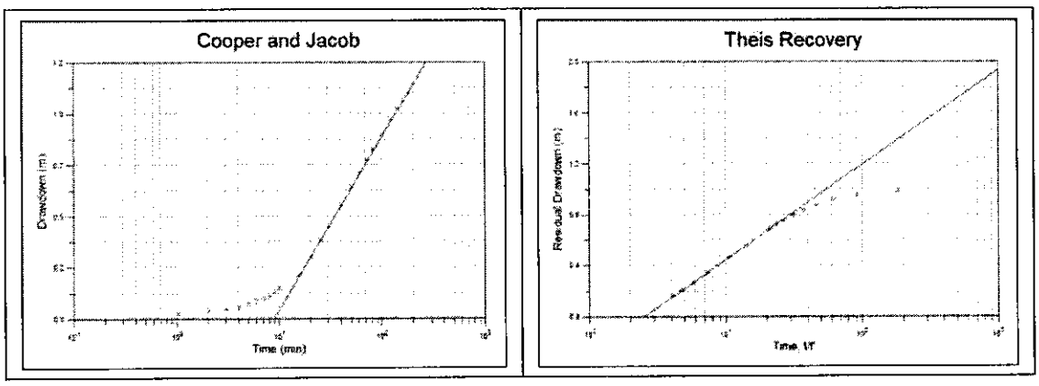


Figure-12. Pumping & Recovery Data Analysis

Table -9. Pumping and Recovery Analysis Results

Sr.No.	Aquifer Parameter	Pumping Test	Recovery	Average
1	Transmissivity (T) - m^2/day	57.16	52.34	54.75
2	Hydraulic Conductivity (K) - m/day	5.716	5.234	5.475
3	Storage Coefficient (S)	8.93E-03	-	8.93E-03

Table-10. Summary of Aquifer Characteristics in and around Study Area

Parameters	Alluvium	Sandstone	Laterite
Type	Unconfined	Semi confined	Unconfined
Characteristic	Sandy, mixture of clay, iron concretion	Red, Buff colored, coarse grain, Marine	Sorted in Iron concretion and variegated clays
Important Locality	Coastal track in southern side of Deshalpar to Hatadi village	South to Ramaniya to Karagogha village	About 2.5 km. wide belt between Bocha and Ramaniya village
SWL Fluctuation Range-M	2 to 10	(-) 6 to +20	3 to 8
Hydraulic Conductivity K	19.7 m/day	20.3 m/day	155 m/day
Transmissivity –T	82.9 m2/day	55.3 m2/day	535 m2/day
Discharge –Q	900-1100 lpm	800-1000 lpm	275-300 lpm

(Source: GWRDC, 1987, 2002 and Raju, 2003)

5.0 GROUND WATER RESOURCES

5.1 Ground Water Recharge

Ground water recharge or deep drainage or deep percolation is a hydraulic process where water moves downward from surface water to ground water. Recharge is the primary method through which water enters an aquifer. This process usually occurs in the vadose zone below plant roots and is often expressed as a flux to the water table surface. Recharge occurs both naturally through the water cycle (rainfall) and through anthropogenic processes (artificial ground water recharge), where rain water and or reclaimed water is routed to the sub-surface. Most of the rainfall flows downstream as run-off and the amount of rainfall reaching ground water naturally after meeting evaporation and evapo-transpiration losses is very limited. The anthropogenic processes of ground water recharge in the study area include return flow from irrigation, check dams etc.

Of the total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/Quarternary sediments with surface lithological boundaries running almost parallel to coast line (E-W).

Holocene sediments of the study area comprises of younger and older tidal flat and marsh deposits of Mhuva and Rann Clay Formations respectively from sea towards inland and younger flood plain, channel-fill and deltaic deposits from tidal flats towards inland.

Since most of the ground water abstraction is in alluvial deposits, only 161.48 sq km of flood plain area has been considered to estimate the ground water recharge. Recharge in the study area has been worked out by rainfall infiltration and increment in ground water storage methods as per the guidelines of Ground Water Estimation Committee (GEC), 1997 and details are presented in **Table-11** and **12**respectively. Recharge by rainfall infiltration is estimated considering average rainfall of IMD, Mundra and Mandvi and rainfall infiltration factors of geological units in the study area. The average ground water fluctuation in dug wells between pre and post monsoon in the study area has been considered to estimate recharge by increment in ground water storage.

Table-11. Recharge by Rainfall Infiltration

Sr.No.	Recharge Unit	Area (sq.km)	Rainfall Infiltration	Annual Rainfall (m)	Recharge (MCM)
1	Younger flood plain, channel-fill & deltaic deposit	161.48	0.10	0.43	6.98
2	Recharge from return flow (irrigated + aquaculture)	40.59	0.25	0.43	4.39
3	Water Body	11.57	0.20	0.43	1.00
	Total Ground water recharge				12.37

Table-12. Recharge by Increment in Ground Water Storage

Sr.No.	Recharge Unit	Area (sq.km)	Specific yield	Increment in groundwater storage (fluctuation) (m)	Recharge (MCM)
1	Younger flood plain, channel-fill & deltaic deposit	161.48	0.120	7.15	138.55
2	Recharge from return flow	40.59	0.250	0.43	4.39
3	Water Body	11.57	0.200	0.43	1.00
Total Ground water recharge					**143.94**

The average ground water recharge by rainfall infiltration and increment in ground water storage is 78.15 MCM. However, the huge difference in recharge by rainfall infiltration and increment in ground water storage indicate that the ground water draft is much more than ground water recharge.

5.2 Ground Water Discharge

The ground water discharge in the study area is mainly for domestic and irrigation purposes. The annual ground water draft has been estimated as per GEC 97 guidelines and is given in **Table-13**.

Wheat, bajra, millets and **pulses** are the major food crops, while **cotton, castor**and **groundnut** are the major commercial crops grown in the area. Mango,**papaya, Date Palm**, Sapota, Lemon and **Pomegranate** are the important horticultural crops. While wheat and cotton are most water intensive crops, water requirement for other crops and plantations is less. As the area receives very low rainfall, no canal irrigation facilities (Narmada Canal running across north central part of study area is under construction), deep water levels resulting in dry open wells, the local agriculture is dependent on only tube wells for irrigating the crops and plantations.

The total ground water draft for different purposes in the study area is 11.40 MCM.

Table-13. Annual Ground Water Draft/Discharge

Sr.No.	Purpose	Usage in Days	Requirement/Usage m^3/day	No. of Units	Ground water draft (MCM)
1	Domestic human population and livestock	365	0.075	60525	1.66
2	Irrigation	120	40 (per ha)	2030	9.74
4	Existing Industries	365	0	0	0.00
Total groundwater draft					**11.40**

5.3 Ground Water Balance

Ground water balance in respect of the study area has been estimated as per GEC 97 guidelines and is indicated in **Table-14**. Ground water balance flow diagram is placed as **Figure-13**. As per GEC 97 norms, areas where ground water resources assessment shows stage of ground water development at 70% or lower and there is no significant long term decline of pre or post monsoon ground water levels are categorized as "Safe" areas with potential for development; more than 70%, but less than 90% and either pre or post monsoon ground water level shows a significant long term decline are categorized as "Semi Critical" areas with cautious ground water development; more than 90% but less than 100% are categorized as "Critical"; more than 100% are categorized as "Over-exploited".

The study area forms part of Mundra and Mandvi blocks of Kachchh district. The average stage of ground water development in these blocks as per CGWB assessment is 82.26% and categorized as "Semi-critical" (Mundra at 63.28% as "Safe" and Mandvi at 101.23% as "Over-exploited").

The following factors of the study area make it difficult to arrive at a reasonable water balance:

- The study area has a complex geological setup with 59% of the under Gulf Of Kachchh and tidal flat and marsh deposits;
- Very low rainfall, meagre natural recharge and higher ground water draft
- The study area covers 10 km radius area from the project site and not defined as a hydrological unit (watershed or catchment);
- Non availability of exact information on ground water draft through tube wells or number of tube wells; etc.,

However, an attempt has been made to arrive at a water balance for the study area based on available information. The present stage of ground water development in the study area is estimated as 102.37% and can be categorized as "Over-exploited".

Table-14. Ground Water Balance

Sr.No.	Particulars	Quantity (MCM)
I	Gross groundwater recharge	12.37
ii	Natural discharge to drain and other losses – 10% of (i)	1.24
Iii	Net groundwater availability (i-ii)	11.13
iv	Annual groundwater draft for all uses	11.40
v	**Groundwater balance (iii-iv)**	**-0.26**
vi	Water requirement for the proposed project	0.00
Vii	Balance of groundwater left for development	-0.26
viii	Present stage of groundwater development in study area	102.37
iX	Present stage of groundwater development in Mundra&Mandvi blocks as per CGWB District Profiles	82.26% (Semi-critical)
X	**Stage of ground water development in the study area**	**102.37**

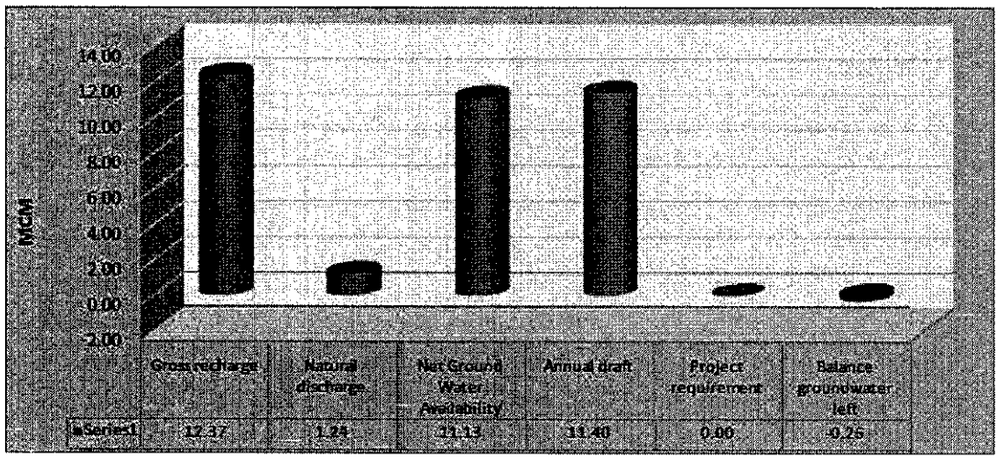


Figure-13. Ground water Balance in Study Area

6.0 WATER QUALITY

For any water body to function adequately in satisfying the desired use, it must have corresponding degree of purity. Drinking water should be of highest purity. As the magnitude of demand for water is fast approaching the availability supply, the concept of management of the quality of water is becoming as important as its quantity. Each water use has specific quality need. IS 2296 : 1992 specifies surface water quality standards based on the following designated best uses:

A. Drinking water source without conventional treatment but after disinfection
B. Outdoor bathing (organized)
C. Drinking water source after conventional treatment and disinfection
D. Propagation of wild life and fisheries
E. Irrigation, industrial cooling, controlled waste disposal

Drinking water is water intended for human consumption for drinking and cooking purposes from any source. It includes water (treated or untreated) supplied by any means for human consumption. IS 10500 : 2012, Indian Standard was formulated with the objective of assessing the quality of water resources, and specified the acceptable and the permissible limits in the absence of alternate source. It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under "acceptable" render the water not suitable. Such value may, however, be tolerated in the absence of an alternate source.

Since all surface water bodies and streams courses in the study area are dry during field visit, surface water quality of samples analyzed during previous monitoring period are discussed to present the surface water quality in the study area. Ground water sampling and analysis of physical, chemical & heavy metals have been undertaken during field investigation period (February, 2019). 8 ground water samples were collected from tube wells at different locations in the study area. These samples were collected as grab samples and were analyzed for 37 water quality parameters. The location details of ground water samples collected and results of the samples analyzed at VIMTA Labs Ltd., are presented in **Table-15, 16** and **17** respectively and locations are shown in **Figure-14**.

6.1 Surface Water

The analysis results indicate that pH is found to be 7.2 to 8.0, which is well within the specified standard 6.5-8.5. The TDS is observed to be 41,645 to 43,572 mg/l. Dissolved oxygen is observed to be 5.6 to 5.9 mg/l. The chlorides and sulphates are found to be 16,078.9 to 20,915.5 mg/l and 2,139.1 to 2,734.0 mg/l respectively. Bacteriological studies reveal the 5 MPN/100ML. The surface water is observed to be saline in nature.

6.2 Ground Water

The analysis of ground water samples indicate that these are mild alkaline with pH values ranging between 7.53 and 8.49 and found to be within drinking water standard (IS : 10500).

TDS of Navinal, BhujparMota, Jarpara, Kandagara and Nana Badia(955.60 mg/l to 1973.91 mg/l), Total Hardness of all samples except Jarpara (248.6 mg/l to 573.6 mg/l), Total Alkalinity of all samples, Calcium of Navinal, Moti Khakhar, Desalpar, Jarpara and Siracha (97.2 mg/l to 132.6 mg/l), Magnesium of all samples except Nana Badia (46.5 mg/l to 79.8 mg/l). Total Boron of Navinal, Desalpar and Siracha (0.52 mg/l to 0.62 mg/l), Chlorides of all samples except Nana Badia (472.6 mg/l to 996.8 mg/l), Sulphates of all samples except Moti Khakhar and Nana Badia (261.2 mg/l to 366.8 mg/l), Flourides of Moti Khakhar, Desalpar and Siracha (1.1 mg/l to 1.2 mg/l), Copper of BhujparMota and Jarpara (0.06 mg/l) and Manganese of all samples except BhujparMota and Jarpara (0.12 mg/l to 0.16 mg/l) samples shows slightly higher values than acceptable limits but are within permissible limits.

TDS of Moti Khakhar, Desalpar and Siracha (2660.7 mg/l to 3322.3 mg/l), Total Hardness of Siracha (659.9 mg/l), Chlorides of Siracha (1321.6 mg/l), Sulphates of Moti Khakhar (486.5 mg/l), Manganese of Siracha (0.36 mg/l) and Iron of Jarpara (0.31 mg/l) samples show higher values than permissible limits.

Cyanide, Cadmium, Arsenic, Lead, Chromium and Mercury, parameters concerning toxic substance and the all other parameters are well within acceptable limits.

Table-15. Water Sampling Locations

Sample Code	Location	Distance from Project Site (km)	Direction
Surface Water Samples			
SWS1	Kotdi Creek	4.5	SSW
SWS2	Baradi Mata Creek	0.4	ESE
SWS3	Sea water In take	5.0	S
SWS4	Near Wandh	2.0	SW
Ground Water Samples			
GWS1	Navinal	1.37	ENE
GWS2	BhujparMota	6.88	NE
GWS3	Moti Khakhar	6.07	NNW
GWS4	Desalpur	5.75	N
GWS5	Jarpara	6.56	ENE
GWS6	Siracha	1.83	NW
GWS7	Kandagara	3.79	WNW
GWS8	Nana Badia	8.18	WNW

Table-16. Surface Water Quality

Sr. No.	Parameters	UOM	SW1	SW2	SW3	SW4
1	pH	-	8	7.2	8	7.5
2	Temperature	°C	26.2	25.9	25.7	25.6
3	Conductivity	µs/cm	57900	52785	59800	58421
4	Salinity	gm/kg	29.6	29	37.7	32.3
5	Density	Kg/m^3	1018	1018	1024	1021
6	Dissolved oxygen	mg/l	5.6	5.8	5.7	5.9
7	Biochemical Oxygen Demand (BOD)	mg/l	<3*	<3*	<3*	<3*
8	Total Dissolved Solids	mg/l	42784	41645	43056	43572
9	Total Hardness	mg/l	6800	6962	7243	7637
10	Oil and Grease	mg/l	<1.0*	<1.0*	<1.0*	<1.0*
11	Sodium	mg/l	9640	9684	10120	10633
12	Potassium	mg/l	354	332	492	383
13	Nitrates	mg/l	2.1	3.5	1.4	2.7
14	Nitrites	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
15	Chlorides	mg/l	16421	16078	20915	17926
16	Sulphates	mg/l	2582	2543	2139.1	2734
17	Ammonia	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
18	Phosphates	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
19	Silicates	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
20	Reactive Silica	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
21	Total Phosphorous	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
22	Total Nitrogen	mg/l	<0.2*	<0.2*	<0.2*	<0.2*
23	Lead as Pb	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
24	Cadmium as Cd	mg/l	<0.001*	<0.001*	<0.001*	<0.001*
25	Zinc as Zn	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
26	Copper as Cu	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
27	Coli forms	MPN/100 ml	Absent	Absent	Absent	Absent
28	Fecal Coli forms	Per 100 ml	<2*	<2*	<2*	<2*

Table-17. Ground Water Quality

Sr.No.	Parameters	Units	IS:10500 Limits	GWS1	GWS2	GWS3	GWS4	GWS5	GWS6	GWS7	GWS8
1	pH	-	6.5-8.5 (NR)	7.96	8.09	7.81	7.63	8.49	7.53	8.19	8.27
2	Colour	Hazen	5 (15)	2	3	2	2	4	2	2	3
3	Taste	Ag	Ag	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Odour	Ag	Ag	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Conductivity	µS/cm	$	3150	2910	4960	4320	3190	5390	2500	1439
6	Turbidity	NTU	1(5)	1	<1	<1	<1	<1	1	<1	<1
7	Total Dissoved Solids	mg/l	500 (2000)	1973.91	1821.10	3082.22	2660.70	1966.68	3322.30	1606.40	955.60
8	Total Hardness as $CaCo_3$	mg/l	200 (600)	495.5	362.9	573.6	530.6	507.5	659.9	373.6	248.6
9	Total Alkalinity as CaCO3	mg/l	200 (600)	372.2	342.5	512.6	402.8	366.6	456.8	322.6	286.2
10	Calcium as Ca	mg/l	75 (200)	99.6	68.6	109.9	102.6	97.2	132.6	72.4	58.6
11	Magnesium as Mg	mg/l	30 (100)	59.9	46.5	72.6	66.6	64.3	79.8	46.8	24.8
12	Residual Free Chlorine	mg/l	0.2 (1)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
13	Total Boron as B	mg/l	0.5(1)	0.56	0.42	0.38	0.62	0.46	0.52	0.38	0.21
14	Chlorides as Cl	mg/l	250 (1000)	623.0	559.0	996.8	946.2	642.5	1321.6	472.6	189.6
15	Sulphates as SO_4	mg/l	200 (400)	302.60	282.60	486.50	366.50	274.20	366.80	261.20	162.50
16	Fluorides as F	mg/l	1.0 (1.5)	0.9	0.8	1.2	1.1	0.8	1.1	1	0.7
17	Nitrates as NO_3	mg/l	45 (NR)	5.6	6.2	10.4	8.5	8.1	12.2	9.8	5.2
18	Sodium as Na	mg/l	$	475.6	486.5	853.6	725.8	481.2	914.6	387.6	201.2
19	Pottassium as K	mg/l	$	34.5	28.4	38.6	40.6	31.8	36.8	32.4	26.8
20	Phenolic Compounds as C6H5OH	mg/l	0.001 (0.002)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
21	Cyanides as CN	mg/l	0.05 (NR)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
22	Anionic Detergents as MBAS	mg/l	0.2 (1.0)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
23	Mineral Oil	mg/l	0.5(NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
24	Cadmium as Cd	mg/l	0.003(NR)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Sr.No.	Parameters	Units	IS:10500 Limits	GWS1	GWS2	GWS3	GWS4	GWS5	GWS6	GWS7	GWS8
25	Total Arsenic as As	mg/l	0.01 (0.05)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Copper as Cu	mg/l	0.05 (1.5)	0.04	0.06	0.05	0.02	0.06	0.05	0.04	0.03
27	Lead as Pb	mg/l	0.01 (NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
28	Manganese as Mn	mg/l	0.1 (0.3)	0.12	0.08	0.16	0.12	0.1	0.36	0.16	0.14
29	Iron as Fe	mg/l	0.3 (NR)	0.12	0.16	0.21	0.23	0.31	0.26	0.14	0.08
30	Total Chromium as Cr^{6+}	mg/l	0.05 (NR)	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
31	Selenium as Se	mg/l	0.01 (NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Zinc as Zn	mg/l	5 (15)	0.08	0.12	0.06	0.09	0.08	0.07	0.06	0.11
33	Aluminium as Al	mg/l	0.03 (0.2)	0.22	1.21	1.36	2.46	2.16	2.11	1.62	1.02
34	Mercury as Hg	mg/l	0.001 (NR)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
35	Pesticides	mg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E-Coli	(MPN/100ml)	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
37	Total Coliform	(MPN/100ml)	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

†: Limits in parenthesis are permissible limits in absence of alternate source

$: Limits not specified

NR: No relaxation specified

UO: Un-Objectionable

Ag: Agreeable

NTU: Nephelometric Turbidity Unit

6.2.1 Ion Distribution and Water Types

Since the chemistry of water directly hints the quality of water for various purposes, its monitoring and assessment gained substantial importance in the century. Water type/hydro-chemical facies evaluation is extremely useful in providing a preliminary idea about the complex hydro-chemical processes in the sub-surface. Determination of hydro-chemical facies was extensively used in the chemical assessment of ground water and surface water of several decades. This method is able to provide sufficient information on the chemical quality of water, particularly the origin.

The first attempt in this direction was made by Hill (1940) and which is modified by Piper (1944), Duroy (1948) further improved the piper plot. Piper diagrams are made in such a way that the milli-equivalent percentages of the major cations and anions are plotted in separate triangle. These plotted points in the triangular fields are projected further into the central diamond field, which provides the overall character of the water. In general, the sample points in Piper diagram can be classified into 6 major fields. They are 1. Calcium Magnesium Chloride, 2.Calcium Bicarbonate, 3.Sodium Chloride, 4.Calcium Sodium Bicarbonate, 5.Calcium Chloride and 6.Sodium Bicarbonate types. Details of Ion distribution and water type classification based on major anion and cation variation are presented in **Table-18** and Piper diagram with Ion distribution of ground water samples is presented in **Figure-15**.

In the present study, water type of all ground water samples is Sodium Chloride indicating brackish/saline origin.

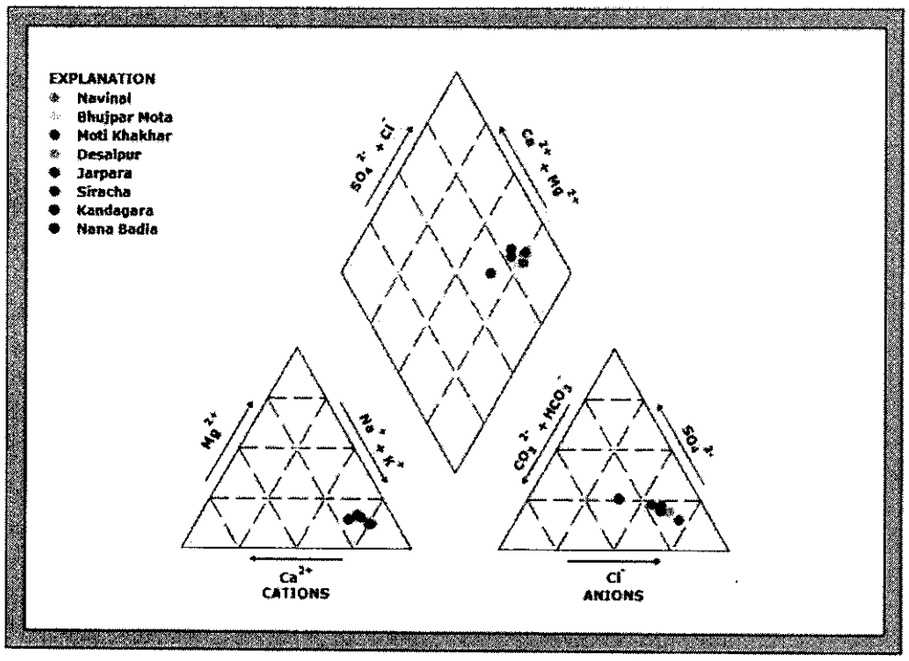


Figure-15.Piper Trilinear Diagram – Ground Water

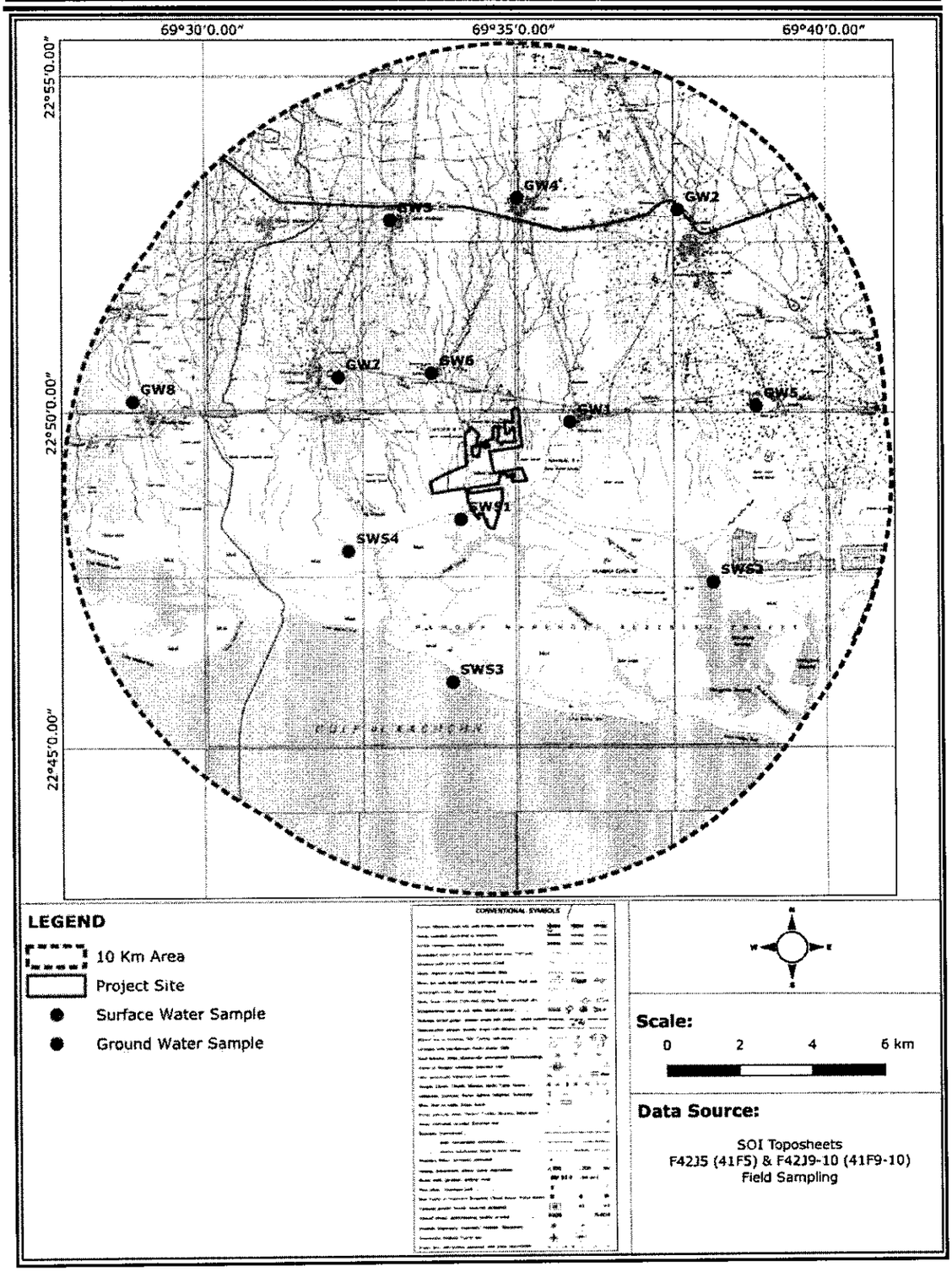


Figure-14. Locations of Water Samples

Table-18.Ion Distribution in Ground Water

Sample Code	Unit	Na^+	K^+	Ca^{2+}	Mg^{2+}	$HCO_3^- + CO3^-$	SO_4^{2-}	Cl^-	NO3	Water Type
GWS1	mg/l	475.60	34.50	99.62	59.89	372.20	302.60	623.00	5.60	Sodium Chloride
	meq/l	20.68	0.88	4.98	4.93	6.10	6.30	17.60	0.09	
	%	**65.70**	2.81	15.83	15.66	20.27	20.95	**58.48**	0.30	
GWS2	mg/l	486.50	28.40	68.60	46.50	342.50	282.60	559.00	6.20	Sodium Chloride
	meq/l	21.15	0.73	3.43	3.83	5.61	5.89	15.79	0.10	
	%	**72.59**	2.50	11.77	13.13	20.50	21.49	**57.65**	0.37	
GWS3	mg/l	853.60	38.60	109.90	72.62	512.60	486.50	996.80	10.40	Sodium Chloride
	meq/l	37.11	0.99	5.50	5.98	8.40	10.14	28.16	0.17	
	%	**74.86**	2.00	11.08	12.06	17.93	21.63	**60.08**	0.36	
GWS4	mg/l	725.80	40.60	102.60	66.60	402.80	366.50	946.20	8.50	Sodium Chloride
	meq/l	31.56	1.04	5.13	5.48	6.60	7.64	26.73	0.14	
	%	**73.03**	2.41	11.87	12.69	16.06	18.58	**65.03**	0.33	
GWS5	mg/l	481.20	31.80	97.20	64.28	366.60	274.20	642.50	8.10	Sodium Chloride
	meq/l	20.92	0.82	4.86	5.29	6.01	5.71	18.15	0.13	
	%	**65.61**	2.56	15.24	16.59	20.03	19.04	**60.49**	0.44	
GWS6	mg/l	914.60	36.80	132.60	79.80	456.80	366.80	1321.60	12.20	Sodium Chloride
	meq/l	39.77	0.94	6.63	6.57	7.49	7.64	37.33	0.20	
	%	**73.77**	1.75	12.30	12.18	14.22	14.51	**70.89**	0.37	
GWS7	mg/l	387.60	32.40	72.40	46.80	322.60	261.20	472.60	9.80	Sodium Chloride
	meq/l	16.85	0.83	3.62	3.85	5.29	5.44	13.35	0.16	
	%	**66.99**	3.30	14.39	15.31	21.82	22.45	**55.08**	0.65	
GWS8	mg/l	201.20	26.80	58.60	24.80	286.20	162.50	189.60	5.20	Sodium Chloride
	meq/l	8.75	0.69	2.93	2.04	4.69	3.39	5.36	0.08	
	%	**60.72**	4.77	20.34	14.17	34.71	25.05	**39.62**	0.62	

7.0 IMPACT OF PROPOSED PROJECT ON WATER REGIME AND MITIGATION MEASURES

The construction, commissioning and expansion of any type of developmental projects have significant influence on the existing physical, biological and social components of environment.

The impact of proposed Copper Refinery on water regime may be in different ways and on surface or ground water or both. Water environment may be affected by the proposed project in terms of disturbing natural water courses or change in drainage pattern of the area, quantity and quality – due to drawl of water, discharge of polluted/water water, by contaminated leachate from disposal/dumping of solid waste etc.

7.1 Natural Drainage and Water Bodies

Danesri Nadi , a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. There are no other drainage courses in the project site.

7.1.1 Danesri Nadi Conservation Plan

Danesri Nadi along the project boundary will not be disturbed and maintained with necessary bank stabilization will be done with compaction/stone pitching and raising the bund up to 2.0m. The Danesri Nadi conservation plan will include a 50 m corridor from HFL along the stream course for green belt development and another 50 m along the green belt where any storage is coming (total of 100 m from HFL along the stream course near the storage areas) as presented in plant layout hereunder. No effluent will be discharged into this stream from the plant. Storm water drains carrying excess storm water from the plant area will be provided sand filters to arrest any suspended particles and quality will be monitored periodically to ensure contaminant free storm water only reaches Danesri Nadi . Danesri Nadi conservation plan is presented in **Figure-16**.

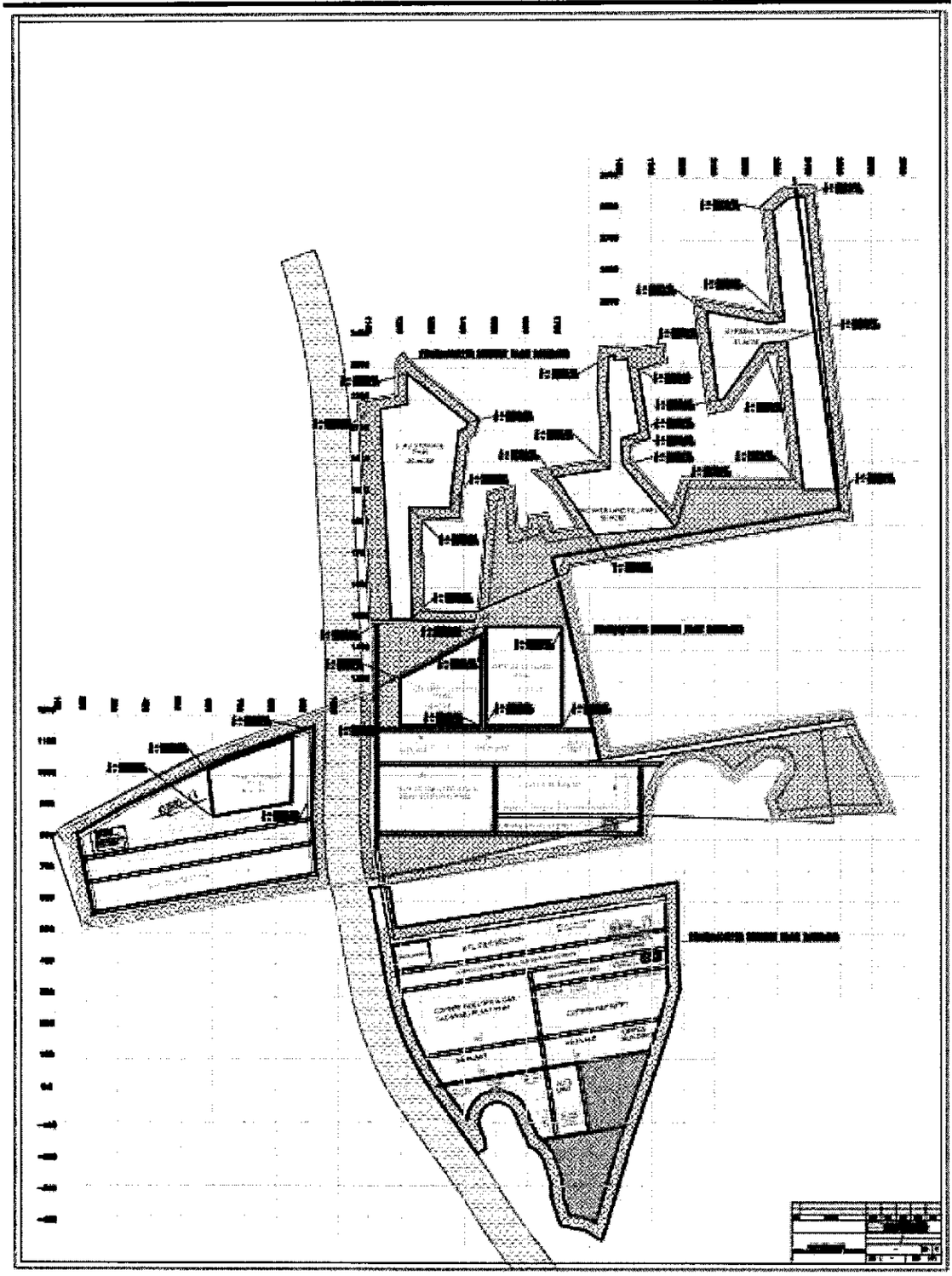


Figure-16.Danesri Nadi Conservation Plan

7.2 Drawing Surface/Ground Water

The total water requirement for the project (phase-I & phase-II) is about 35,496 KLD (35.5 MLD). 32,267 KLD (32.27 MLD) would be sourced from desalination plant of APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). Balance will be met from treated/blowdown recycled water for greenbelt/cover, lime slurry preparation and reverse osmosis plant and multi effect evaporator. The water allocation letter is enclosed as **Annexure-I**. The details of usage of water and water balance for Flash Smelter Furnace (FSF) and TSL Furnace technologies are presented in **Table-1** and **Figure-3** &**3b**.

No ground water is proposed to abstract for the proposed project.

7.2.1 Water Availability

Use of sea water is in favour of saving fresh water resources, easing tensions in industrial water, availability in abundant quantity, scope of economy, environment etc.

7.3 Water Quality

A review of water quality during field visit and analysis results during February 2019 indicates that surface and ground water quality in the study area in general is poor.

TDS of Moti Khakhar, Desalpar and Siracha (2660.7 mg/l to 3322.3 mg/l), Total Hardness of Siracha (659.9 mg/l), Chlorides of Siracha (1321.6 mg/l), Sulphates of Moti Khakhar (486.5 mg/l), Manganese of Siracha (0.36 mg/l) and Iron of Jarpara (0.31 mg/l) samples show higher values than permissible limits.

Impact on water quality during construction and operation of any industry may be due to sewage generated from the domestic facilities, waste water generated from different plant operations, waste and oil spillage from the workshop, ash or other waste disposal etc. It is important to ensure that the water discharged from the project meet the relevant disposal norms and water used in the project meets the relevant national standards.

7.3.1 Waste Water

An integrated water system is proposed, wherethe effluent from the process units will be treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEE) for further recovery and solids generated will be sent to Secured Land Fill (SLF). This water would be utilized to meet the DM water and plant/utility requirement of proposed project. The water system is highly integrated and is designed for Zero Liquid Discharge (ZLD).

313 m^3/day(in both FSF and TSL Furnace technologies)of sewage generated from service water will be treated in STP and used for greenbelt, gardening and horticulture.

2916 m^3/dayin the case of FSF technology and 5028 m^3/day in the case of TSL Furnace technology of waste water generated from different plant operations will be treated in 5 ETPsand reused within the plant for process, cooling and other purposes.

7.3.2 Solid Waste

The main solid wastes envisaged from the proposed project are:

- Copper slag from copper smelter plant;
- Phosphogypsum from phosphoric acid plant;
- Hazardous cake produced from effluent treatment plant; and
- Scrubber cake from fugitive gas handling scrubbers.

Hazardous cake, ETP waste sludge, scrubber cake, spent catalyst and spent resins (from DM, RO and refinery) will be stabilized and stored in secured land fill of 13.35 ha as per guidelines of MoEF& CC/CPCB/GPCB. Further, an area of 18.2 ha and 20.63 ha are identified for the intermediate/emergency storage of copper slag and phosphogypsum. Provision would be made to reclaim the disposed copper slag and phosphogypsum from gypsum pond at a later stage for various utilization ventures.

The ETP cake, because of its hazardous nature, will be stored in a Secured Land Fill (SLF)). The SFL will be constructed as per CPCB guidelines. The SLF will have impervious layers of clay liner and HDPE liner. This will ensure that the ground water will not be impacted by the storage of the ETP cake. In case of any rupture/breakage or failure of the SLF bottom liner, any contaminant reaching sub-surface strata and water table will move towards Gulf of Kachchh following the ground water flow direction in the project area. The SLF facility will be provided with monitoring piezometric bore wells around it and the samples will be collected periodically to have a check on the sub-soil water quality.

Spillage of hazardous material such as waste oil, used paints, colour material, used batteries from store, workshop etc., may reach surface and ground water causing deterioration of water quality. These hazardous wastes shall be disposed off as per Hazardous Waste Amendment Rules and it shall be sent to an authorized dealer.

8.0 WATER RESOURCE MANAGEMENT PLAN

8.1 Ground Water Development

Since the entire water requirement would be sourced from desalination plant of APSEZ Ltd and supply through M/s Mundra Utility Private Limited (MUPL), no ground water development is envisaged for the proposed project.

8.2 Rain Water Management

Considering the ground water scenario in and around the project site (<2.0 m during post monsoon) and ground water flow direction in major part of the project site towards Gulf of Kachchh, the water conservation and artificial recharge system in proposed project may be more on water harvesting and reuse to reduce the dependency on external water and less on artificial recharge.

8.2.1 Rain Water Potential

To understand the quantum of water available from the project area for rain water harvesting, reuse and ground water recharge, a tentative run-off estimation based on different land uses in the area is worked out and presented in **Table-19**. The annual volume of rain water available from the project site spread in 256.57 ha (634 acres) is estimated at 6,43,658 m^3 (0.64 MCM) and during SW and NE monsoon periods is 6,32,123 m^3 (0.63 MCM).

Rain water from the contamination potential areas like plant operations, storage areas, landfill shall be diverted to effluent treatment facilities for treatment and reuse and from contamination free areas like administration and other buildings, open areas and green belt shall be directed to rain water harvesting and use for non-domestic usage and recharge.

Table-19. Annual & Monsoon Run-Off from Project Site

Sr.No.	Land Use	Area (ha)	Run-off Coefficient	Annual Rainfall (m)	Annual Run-off (m^3)	Monsoon Rainfall (m)	Monsoon Run-off (m^3)
1	Buildings	2.30	0.7	0.432	6957.44	0.425	6832.75
2	Plant area	24.01	0.7	0.432	72668.66	0.425	71366.32
3	Roads & paved area	91.86	0.9	0.432	357529.93	0.425	351122.44
4	Green belt	85.79	0.25	0.432	92751.28	0.425	91089.03
5	Storage of Waste (Secured Landfill)	52.61	0.5	0.432	113751.57	0.425	111712.96
Total/average		**256.57**	**0.69**	**0.432**	**643658.88**	**0.425**	**632123.51**

8.2.2 Rain Water Management in Smelter, Production Plan, Storage and Landfill Areas

Rain water from Concentrate Storage, Smelter Area and Slag Storage will be collected in separate tank installed in the areas of feed stock storage and conveying, smelting system which are potentially pollute the collected rain water. 4000 m^3 of rain water is expected to collect from these areas. The water collected in these tanks will be treated in initial rain

water treatment station and then goes to the advanced treatment section of the production effluent treatment plant for treatment before it is reused for production. The process flow of collection and treatment is presented in **Figure-17**.

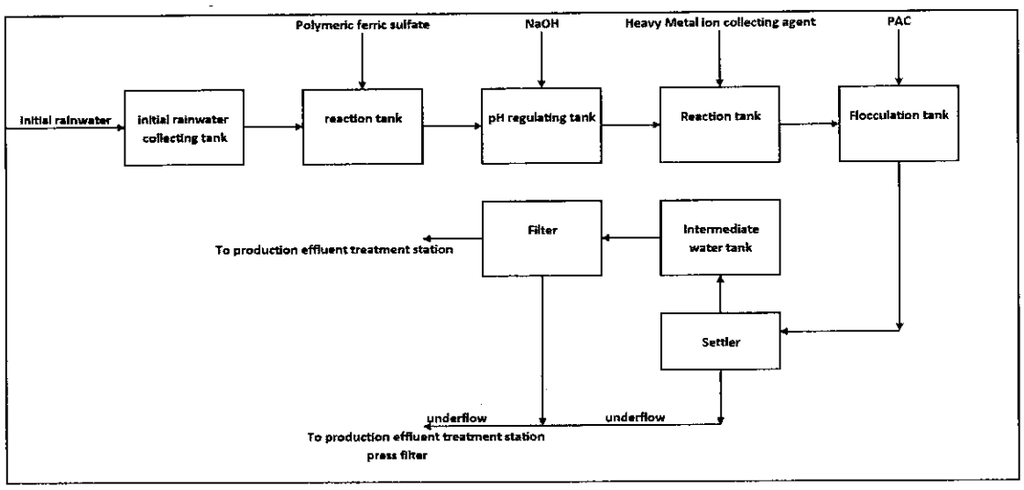


Figure-17.Process Flow of Treatment of Rain Water from Concentrate Storage, Smelter & Slag Storage

Rain water from the Gypsum Storage will be collected in a separate tank installed in Gypsum Storage area and about 4000 m^3 of rain water is expected to be collected from this area. The rain water collected in this tank will reused in the phosphoric acid manufacturing process and thereby reducing the fresh water consumption to that extent. Additional water if any will be used for spraying purpose in the Gypsum Storage area.

Rain water from Production Plant premises will be collected in a separate tank installed in the plant premises to collect rain water from all roofs. The collected rain water will be treated in initial rain water treatment station and then goes to the advanced treatment section of the production effluent treatment plant for treatment before it is reused for production. The process flow of collection and treatment is presented in **Figure-17.**

Rain Water from Secured Landfill (SLF)isrequired to minimize:

- ❖ Leachate generation by preventing ponding and the infiltration of water into the fill;
- ❖ Transport of contaminants from the landfill; and
- ❖ Erosion of the liner, solid waste or cover material.

The surface water drainage system performs the function of collecting and transporting run-off from the landfill and surrounding area to drains at the periphery of the landfill. Drainage channels should be located so that surface water run-off from the surrounding area is intercepted and diverted before it reaches the waste. Perimeter surface water control systems are usually designed to accommodate both off site run-off and onsite run-off.

Surface water run-off arising within the landfill area may be classified as that from cells under construction, operational areas and restored areas. Surface water can be controlled

using drainage blankets, ditches, french drains and garland drains. It is necessary to provide a settlement pond to remove solids from surface water running off restored areas. The surface water from these areas may be used for plantation, toilets etc., provided they meet the receiving water standards.

Water from cells under construction may need to be pumped to the drainage channels or retention pond. Surface water from the restored areas should be transported via drainage layers incorporated in the capping system to the perimeter drainage channels. Surface water in active cells should be directed into the leachate collection system.

Surface water run-off from paved areas and site access roads shall be directed to storm water retention ponds or if necessary to leachate storage facilities. Provision should be made for surface water from parking/fuelling/repair/maintenance/paved areas to pass through petrol/oil interceptors.

8.2.3 Rain Water Harvesting

Of the total project site, rain water from plant area, and secured landfill areas will be treated and used for plant and other purposes as described under 7.3. Admin building, canteen, SAP office building and engineering stores (shown as building area in **Table-19**) are found to be feasible for roof top water harvesting and use. An amount of 6,832 m^3 (0.007 MCM) of rain water will be available from these roof areas. Considering only 80% of the run-off as available volume after evaporation, spillage and first flush wastage, 5,566 m^3 (0.006 MCM) of rain water is available from the roof top areas for harvesting and use. A typical roof top rain water harvesting model is presented in **Figure-18**.

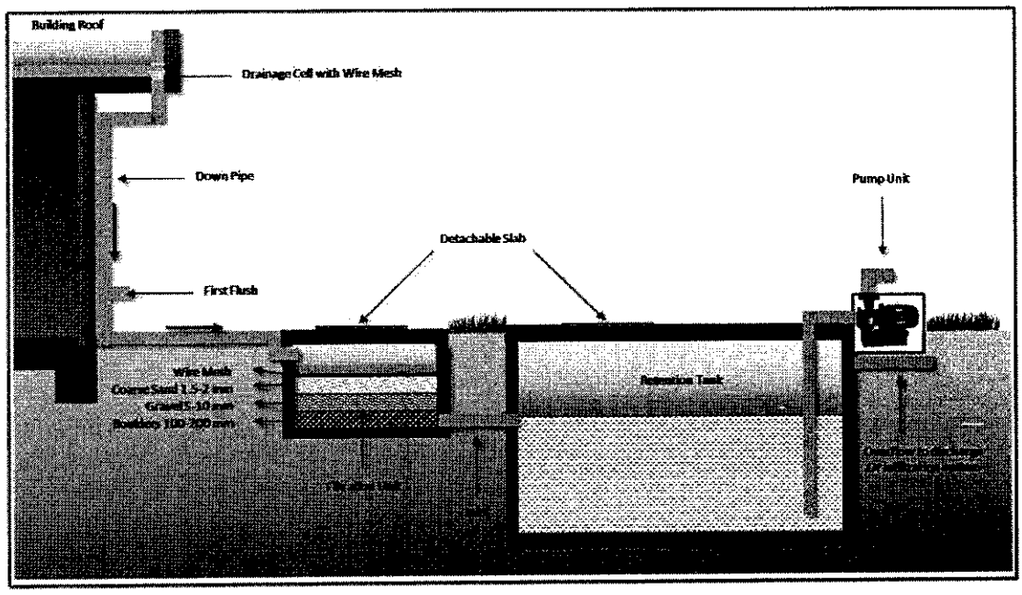


Figure-18. Typical Roof Top Rain Water Harvesting Model

To hold 80% of rainfall from these buildings during wettest months of July and August (308.1 mm) and use for the project during non monsoon period, the volume of storage structure(s)

shall be 4096 m^3. This storage may be spread in 3 locations with pit sizes of 32 m x 32 m x 4 m. For simultaneous use, the volume of storage structure may be reduced to 50%.

Considering 25% of the roads and paved area 50% of the green belt area free fromcontamination, 1,35,758 m^3 (0.136 MCM) of run-off from the rainfall collected in these areas is available for harvesting.

The amount of run-off available from the above areas if managed with at least 70% efficiency (70% of 0.142 MCM : 0.099 MCM) would meet 68% of proposed green belt water requirement.

8.3 Environmental Monitoring and Maintenance Plan

The objectives of an environmental monitoring plan in terms of water resources in the present scenario include:

- Water usage and its impact on water potential in the area
- Waste water generation, discharge and its impact on water quality
- Maintenance of storm water management system and its impact on natural water flow conditions

8.3.1 Water Usage for the Project

The total water requirement for the project (phase-I & phase-II) is about 35,496 KLD (35.5 MLD). 32,267 KLD (32.27 MLD) would be sourced from desalination plant of APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). Balance will be met from treated/blowdown recycled water for greenbelt/cover, lime slurry preparation and reverse osmosis plant and multi effect evaporator. The water allocation letter is enclosed as **Annexure-I**. The details of usage of water and water balance for Flash Smelter Furnace (FSF) and TSL Furnace technologies are presented in **Table-1** and **Figure-3** &**3b**.

The conveyance, storage and discharge system shall be monitored regularly for any leakage, spill or overflow and necessary preventive measures shall be taken up immediately.

No ground water is proposed to abstract for the project usage. However, a ground water level monitoring system shall be established by installing 5 piezometers within the plant premises and monitoring water levels at a monthly interval. Locations of piezometers are shown in **Figure-19**.

Piezometer is a bore/tube well used only for measuring the water level by lowering the tape/sounder or automatic water level measuring equipment. It is also used to take water sample for water quality testing whenever needed.

A permanent display board shall be installed at these piezometer sites providing the location, piezometer number, depth and zone tapped of piezometer for standard referencing and identification.

8.3.2 Waste Water Generation and Discharge

Waste water in the proposed project will be generated from plant facilities, plant operations, cooling system and landfill areas. Sewage generated from plant domestic facilities will be treated in STP and used for plantation, toilets etc. Waste water/reject water generated from plant operations and landfill will be treated in ETPs and will be recycled for horticulture and plantation.

Discharge water quality of STP and ETP outlets shall be monitored quarterly as per EPA-198 Schedule-VI Part-A, General Standards for Discharge of Effluents and necessary corrective measures shall be taken up immediately in the case of any contamination identification.

Ground water quality in the area shall be monitored quarterly collecting samples from piezometers installed.

8.3.3 Storm Water Management System

Storm water from plant operations, storage areas, landfill and other pollution prone areas shall be separated and diverted to ETP for treatment and reused for plantation and other non-potable uses.Provision should be made for surface water from parking/fuelling/repair/maintenance/paved areas to pass through petrol/oil interceptors. Necessary sand filters/gratings shall be arranged before storm water reaching rain water harvesting measures to arrest any suspended pollutants and silt from storm water diverted.

Storm water and garland drains, drains leading to rain water harvesting measures and filtration units shall be regularly monitored and maintained at least before monsoon.

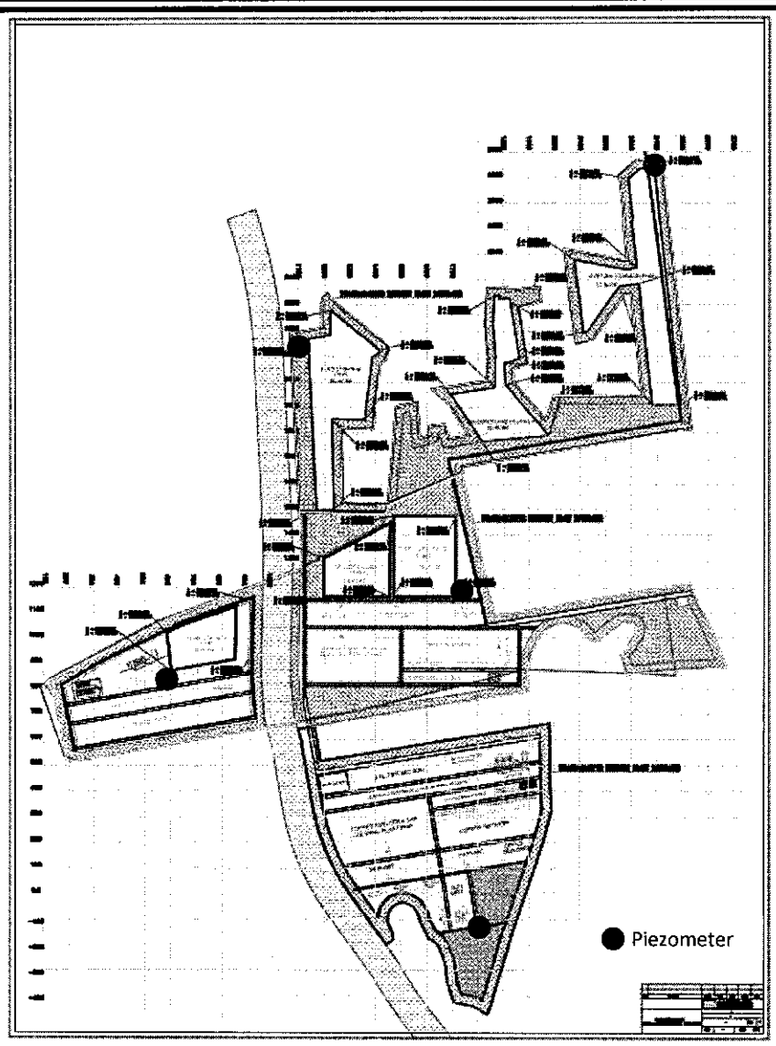


Figure-19.Layout Showing Piezometer Locations



Hydrogeology Team in front of Adani Power before Interaction



FAE-Mr. Rajendra Prasad at Project Site

9.0 CONCLUSIONS

Adani Enterprises Limited proposes to set up a Greenfield Copper Refinery project of 10 LTPA capacity in 256.57 ha (634 acres) of area in Siracha and Navinal villages at APSEZ, Mundra taluka, Kutch district, Gujarat.

The climate around Mundra and Mandvi area is called a desert climate. During the year, there is virtually no rainfall in this area. The average annual rainfall based on IMD data is 432.4 mm on 15 average rainy days.

Elevation in the project site ranges from 3.0 m amsl in the south 9.0 m amsl in the north with general slope towards south into Gulf of Kachchh. Danesri Nadi , a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. Stream flow only for a few hours after peak rainfall events is reported in this stream at Siracha, 1.5 km NW of project site. Danesri Nadi along the project boundary will not be disturbed and maintained with necessary bank stabilization will be done with compaction/stone pitching and raising the bund up to 2.0 m.

Of the total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/Quarternary sediments with surface lithological boundaries running almost parallel to coast line (E-W). Proposed project site, Adani Power & other industrial set-ups in APSEZ area are located on older coastal plain. Resistivities of different lighological units in the study area range from <1 Ωm to >300 Ωm. ERT1 and 2 are located in project site lying on older tidal flat and marsh deposit with resistivities ranging from <1.0 Ωm to 5.0 m. The resistivity at these locations decreases to <1.0 Ωm with depth indicating saline nature.

The study area form part of Kachchh Basin and does not show any major tectonic evidences except few geomorphic lineaments parallel to drainage courses and a minor fault of structural origin in the SE. The nearest major fault is North Kathiawar Fault (NPF) towards south. As per Composite Hazard Risk & Vulnerability Atlas, Gujarat State Disaster Management Authority (GSMDA), the project site is located in unclassified zone covering Little and Great Rann of Kachchh including Mundra coastal area, but close to very severe intensity zone.

The thickness of alluvium is observed to be 2.0 m in the north to 18.0 m and tidal flat and marsh deposits are more than 20 m in thickness. The alluvium is underlain by sandstone of Sandhan Formation and laterite at places. Sandstone forms productive aquifer at places. The alluvium yields small quantities of brackish water to shallow wells. The depth to water level in dug wells during field visit (2nd week of February 2019) ranges from 7.85 m to 16.12 m bglwhere as the depth to water level in tube wells ranges from 2.00 m bgl in Adani peizometers near project site to 44.38 m bgl in an agricultural well near Gelada. The average water levels in dug wells during field visit, pre and post monsoon are 12.42 m, 12.13 m and 6.23 m bgl respectively with a water level fluctuation of 7.15 m.

General ground water flow direction in major part of the study area is towards Gulf of Kachchh with depressions of deeper levels below mean sea level between BhadiaMota and Bhadia Nana, around Navinal and east of BhujparMota. Reduced water levels <0 around BhadiaMota, Bhadia Nana, Tragadi, CGPL and Wandh in the west and to the east of BhujparMota in the northeast indicate that ground water movement is towards inland encouraging sea water intrusion.

TDS of Moti Khakhar, Desalpar and Siracha (2660.7 mg/l to 3322.3 mg/l), Total Hardness of Siracha (659.9 mg/l), Chlorides of Siracha (1321.6 mg/l), Sulphates of Moti Khakhar (486.5 mg/l), Manganese of Siracha (0.36 mg/l) and Iron of Jarpara (0.31 mg/l) samples show higher values than permissible limits. In the present study, water type of all ground water samples is Sodium Chloride indicating brackish/saline origin.

The present stage of ground water development in the study area is estimated as 102.37% and can be categorized as "Over-exploited".

The total water requirement for the project (phase-I & phase-II) is about 35,496 KLD (35.5 MLD). 32,267 KLD (32.27 MLD) would be sourced from desalination plant of APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). Balance will be met from treated/blowdown recycled water for greenbelt/cover, lime slurry preparation and reverse osmosis plant and multi effect evaporator.

An integrated water system is proposed. The effluent from the process units is treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEE) for further recovery and solids generated will be sent to Secured Land Fill (SLF).

This water would be utilized to meet the DM water and plant/utility requirement of proposed project. The water system is highly integrated and is designed for Zero Liquid Discharge (ZLD).

The Secured Land Fill will have impervious layers of clay liner and HDPE liner. This will ensure that the ground water will not be impacted by the storage of the ETP cake. In case of any rupture/breakage or failure of the SLF bottom liner, any contaminant reaching sub-surface strata and water table will move towards Gulf of Kachchh following the ground water flow direction in the project area.

The annual volume of rain water available from the project site spread in 256.57 ha (634 acres) is estimated at 6,43,658 m^3 (0.64 MCM) and during SW and NE monsoon periods is 6,32,123 m^3 (0.63 MCM). Considering only 80% of the run-off as available volume after evaporation, spillage and first flush wastage, 5,566 m^3 (0.006 MCM) of rain water is available from the roof top areas for harvesting and use.

EAC OBSERVATION:

Occupational health assessment envisaged for the employees and workers has not been submitted.

REPLY:

A detailed study on Occupational health hazards assessment & monitoring plan was carried out by **M/s. Indian Council of Medical Research-National Institute of Occupational Health (ICMR-NIOH);** Department of Health Research, Ministry of Health & Family Welfare, Government of India; to protect and promote health of human resources employed at the Copper Refinery Project.

Report covers the following:

- Potential Health Hazards
- Health Effects and Prevention
- Summary of Occupational Health and work place monitoring unit-wise.
- Occupational Health Assessment/ Medical Evaluation

Unit-wise various tests and frequency of the test has been identified based on the comprehensive Occupational Health study. Adani Enterprises Ltd. has allocated **Rs. 2000/ person/ year as budget** for monitoring the health of the human resources engaged at the Copper Refinery Project.

A detail study report on Occupational Health Hazards Assessment and Monitoring Plan for proposed Copper Refinery project by ICMR- NIOH is attached as **Annexure-19.**

ANNEXURE-19

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Occupational Health Assessment and Monitoring Plan for the Proposed Copper Refinery Project

INDIAN COUNCIL OF MEDICAL RESEARCH
NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH

2413

OCCUPATIONAL HEALTH ASSESSMENT AND MONITORING PLAN FOR THE PROPOSED COPPER REFINERY PROJECT



icmr
INDIAN COUNCIL OF MEDICAL RESEARCH

NIOH
NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH

2418

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ICMR - National Institute of Occupational Health
Department of Health Research
Ministry of Health and Family Welfare, Government of India

Foreword

We are grateful to Adani Enterprises Ltd. (AEL) for having entrusted Indian Council of Medical Research- National Institute of Occupational Health (ICMR- NIOH), Ahmedabad for preparing Occupational Health Monitoring plan for the employees and workers for the proposed 1.0 MTPA Copper Refinery project at Adani Port Special Economic Zone Land in Village(s) Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat.

The purpose of this Occupational Health Monitoring plan is to protect and promote the health of human resource employed at proposed project. This plan is prepared, considering the possible hazards from the proposed copper refinery project. The objective of this plan is to bridge this gap, and give insight to all possible hazards involved in the activity of Copper Refinery project.

We express our sincere gratitude to the team of AEL for their continuous interaction with the core team members of ICMR- NIOH and extending support and guidance to complete the study on time.

We gratefully acknowledge the involvement and intellectual support provided by scientists from the division of "Clinical Epidemiology", "Occupational Hygiene" and "Regional Occupational Health Centre – Bengaluru" towards development and preparation of this report.

We greatly acknowledge the untiring efforts of ICMR- NIOH core team members and support staff for timely completion of the study.

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Preamble

The National Institute of Occupational Health (NIOH), is premier institute under the aegis of the Indian Council of Medical Research, Department of Health Research, Ministry of Health and Family Welfare, Govt. of India. The NIOH is India's specialist research organization engaged in research in the field of occupational health. The NIOH has a dedicated endeavour with the following purpose and function:

- To promote intensive research in the field of occupational and environmental health;
- To promote the highest quality of occupational health through fundamental and applied research.
- To use basic data towards devising of new technique(s) for the clinical or experimental purposes.

The research and training activities of the Institute are primarily focused on national priorities adopting a multi-disciplinary approach, encompassing epidemiological, experimental studies, ergonomics and intervention technologies, wherever necessary. The ICMR-NIOH and its regional centres are being constantly sought by judiciary and policy makers in decision-making regarding occupational health and its related activities.

Section 1: Introduction to occupational health

The purpose of this Occupational Health manual is to protect and promote the health of human resource employed at proposed Copper Refinery Project by M/s Adani Enterprises Limited (AEL) at villages Navinal and Siracha, Taluka Mundra, District Kutch, Gujarat.

It is the application of preventive medicine principles in all places of employment. The scope of occupational health is not limited to diagnosis of specific occupational diseases and their treatment alone, but its horizon goes far beyond, to the realms of promotion of health, prevention of illnesses, early diagnosis and rehabilitation. Its roots seek out the deep reaches of the psycho-social environment inside the work place thus meeting the definition of health as 'being a state of complete physical, social and mental wellbeing of a person, and not merely the absence of disease or infirmity' as defined by the World Health Organisation.

Occupational Health deals with:

- Prevention of exposure to occupational hazards / working conditions among the employees that might lead to departure from health;
- Protection of employees in their employment from risks factors that result adverse health;
- Placing and maintenance of the employees in an occupational environment adapted to his physiological requirement.
- Promotion and maintenance of the highest degree of physical, mental and social well-being of employees in all occupations

To summarize Occupational health services, facilitate "The adaptation of work to man and each man to his job."

The occupational health manual:

Occupational Health, is yet in a neonatal form in India, and is thus not understood by management and employees. Occupational Medicine is a branch of Preventive Medicine, which is not understood by doctors themselves. Yet, it is closely related to all three groups (management, employee and doctors / health care providers).

This manual is prepared considering the possible hazards from the proposed copper refinery project. The manual is based on the current understanding and literature, while a definite protocol should be prepared after precisely the weighing the hazards later to the establishment of copper refinery. The objective of this manual is to bridge this gap, and give insight to the employer of Copper Refinery project, so as to establish a safe place along with lucrative business.

The manual is meant to be a guideline for the development of uniform Occupational Health Practices, and to provide a healthy, happy and productive worker at the work place. The importance of such a worker is well known in international labour circles, for not only earn millions but also save billions.

A road map is hereby suggested, which should lead to the highway of established occupational health practices in the future.

The AEL has expressed to employ approximately 1000 on roll employees (regular employment) and 1000 off roll employees (on contractual basis), working in various units of the copper plant.

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Section 2: ADANI copper plant

Copper is a strategic metal for development of industry in India. It is considered to be the third most important industrial metal next only to iron and aluminium. Combination of its excellent properties such as high electrical and thermal conductivity, high strength, malleability, easy workability, corrosion resistance and its ability to produce alloys with other metals in an attractive range of colours has made copper a strategic metal for the engineering industry. Specific applications of copper include power cables and wires, jelly filled cables, building wires, air conditioning and refrigeration tubing, telecom, power, construction, transportation, handicrafts, engineering, consumer durable, defence etc.

Table 2.1: List of units in the ADANI group proposed copper refinery plant

	Plant (facilities) in the proposed Coper Refinery
1	Raw material handling area
2	Copper smelter
3	copper refinery
4	Copper rod plant
5	Precious metal recovery plant
6	Sulphuric acid plant
7	Effluent treatment plant
8	Phosphoric acid plant
9	Aluminium fluoride plant

Table 2.2: List of possible hazards in each of the units of proposed copper refinery plant.

Plant (facilities) in the proposed Coper Refinery	**Potential hazards**
Construction of the individual facilities / units	• Hand-arm vibration (grinders, cutters, etc.). • Whole-body vibration (Dozers and loaders, driving heavy vehicles etc.) • Dust • Noise
Raw material handling area	• Exposure to dust of Copper concentrate and Rock Phosphate • Noise • Moving equipment
Copper smelter	• Dust (Copper concentrate) * • Heat (Hot metal) • SO_2 gas • Noise • Work at height
Copper refinery	• Acid fumes (Copper sulphate) • Heat (Steam and hot electrolyte of Copper Sulphate) • Noise • Work at height

Copper rod plant	• Heat (Hot metal) • Noise • Work at height
Precious metal recovery plant	• Dust (Anode slime containing Pb, As, Se) • Heat (Hot metal) • SO_2 gas • Acid fumes • Noise • Work at height
Sulphuric acid plant	• SO_2 gas • sulphuric acid fumes • Vanadium Pentoxide • Heat (Steam and hot sulphuric acid) • Noise • Work at Height
Effluent treatment plan (ETP)	• Dust (ETP Sludge containing Arsenic, Cadmium, Chromium, Lead and other heavy metals) • Acid fumes • Noise • Work at Height
Phosphoric acid plant	• Dust (Rock Phosphate) ** • Acid Fumes (Phosphoric Acid with Fluorine) • Heat (Steam, hot water, hot Phosphoric Acid & slurry) • Phosphoric Acid • Hydro-Fluro-Silicic acid fumes • Noise • Work at Height
Aluminium fluoride plant	• Dust (Aluminium Hydrate) • Aluminium Fluoride Slurry Fumes • Heat (Steam, hot Hydro-Fluro-Silicic Acid, Aluminium Fluoride slurry) • Hydro-Fluro-Silicic acid fumes • Noise • Work at Height
Maintenance in various units of the Refinery	• Vibration (due to use of vibrating equipment such as grinders, cutters, drilling machine, etc.) • Dust • Noise • Heat • Light in metal unit area

*Copper concentrate consist of Copper, Lead, Arsenic, Selenium, Fluorine, Iron, sulphur, SiO_2, CaO, MgO, Al_2O_3, Zinc, Fe_3O_4, Bismuth, Antimony, Nickel, Cadmium, Chlorine, Mercury, Silver, Gold Moisture

**Rock Phosphate consist of P_2O_5, Fe_2O_3, Al_2O_3, CaO, MgO, SiO_2, SO_3, Chlorine, Fluorine, $CaCO_3$, CO_2, Na_2O, K_2O, TCP / BPL, organic matter as Carbon.

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Section 3: Potential health hazards

Employees of the proposed copper plant are exposed to all types of hazards. Broadly these hazards can be classified as:

3.1. Physical hazards

- Noise
- Heat
- Vibration
- Work at Height

3.2. Biological hazards

The biological hazards to which employees are exposed include:

3.2.a. Animal and snakebites

During exploration and preparation of the site for drilling operations, employees have to work in difficult and unfamiliar terrains. Chance encounters may result in animal and snakebites in those working at these sites.

3.2.b. Arthropod borne diseases

At times workers employed both at indoors as well outdoors are exposed to certain arthropod borne diseases such as malaria, dengue, etc.

3.2.c. Rodent and Insect borne diseases

Workplaces such as catering services, garbage disposal areas often attract rodents and vermin, which act as vectors for disease transmission. Thus, exposing these employees to rodent / insect borne diseases.

3.2.d. Food borne diseases

If proper hygienic conditions are not practiced for storage, handling and preparation of food, it will expose a large group of employees to food borne diseases. Food handlers themselves, who are either infected or carriers of disease agents may also be a source of such food borne diseases.

3.2.e. Water borne diseases

Water, which is not properly treated, poses a major hazard. If proper disinfection and storage of supplied water is not done, it may result in water borne diseases.

3.3. Psychological hazards

Stress can commonly result from

1. Constant fear of personal injury.
2. Inherent / personal psychological problems and phobias.
3. Loneliness / family separation due to working at remote and isolated locations.
4. Working at variable duty shifts for a very long time.
5. Increasing demands of the Job

3.4. Ergonomic hazards

Prolonged hours of physical strenuous work as well results in musculo-skeletal problems (viz. general body ache and low back pain).

Administrative and office staff, due to their sedentary nature of work over prolonged periods, using furniture that is not ergonomically designed are subjected to ergonomic hazards. Employees occupied in handling computer work stations at various locations (viz. control rooms and offices) are a major area of concern.

3.5. Injuries / accidents

Injuries / accidents may result from many causes, including slips and falls, lifting heavy weight and handling of heavy machinery / tools / equipment.

3.6. Burns

Burns may be caused by steam, fire, chemicals, corrosives, acids and alkalis.

3.7. Electric shock

Construction workers and labourers are exposed to electric shocks. The consequences of electric shock are transient muscle paralysis, burns, electrocution, arrhythmias and death depending on the voltage of the current.

3.8. Chemical hazards

- Heavy metals (Arsenic, lead, copper, aluminium, selenium, etc.)
- Sulphides
- Oxides
- Nitrites
- Sulphuric oxide
- Sulphuric acid
- Phosphoric acid
- Fluorides
- Hydro-Fluro-Silicic acid
- Other chemicals

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Section 4: Health effects and prevention:

Effects of hazards on the health of employees could be attributed to one or multiple hazards they are exposed, as described earlier. This chapter elaborates these effects.

There are usually four methods of prevention of health effects of Occupational Hazards. They are:

1. Engineering control
2. Administrative control
3. Use of Personal Protective Equipment (PPE)
4. Medical control

4.1. Physical hazards

4.1.a. Noise

Employees exposed to high level of noise at risk for

- Hearing loss (Temporary or Permanent)
- Psychological effects
- Cardiovascular effects

Preventive steps

Noise in industry can be controlled by various means.

Engineering control

The first attempt to reduce noise is engineering control, starting from procurement of machinery to its installation. In some cases, the noise can be reduced in the sound transmission path.

Administrative control

- Pre-employment audiometric examinations are a must for selecting incumbents who are to be placed in potentially high noise areas.
- Noise level meter for octave band analysis & octave frequency analysis, to be measured monthly at minimum of 10 locations as recommended by Central Pollution Control Board (CPCB)
- Equipment Procurement Procedures should have clear equipment specification guidelines on noise and vibration parameters that are tolerable.
- Minimizing exposure duration through reduction in exposure time or by job rotation.
- Organizing for high-risk operation to be conducted out of hours when few employees will be exposed.
- Employees should strictly incline to the work hours as per the Threshold limit values (TLV) to prevent the hazards of exposure to noise

Table 4.1: Threshold limit values for employees exposed to continuous noise.

Hours of exposure / employment	Decibels
≤ 8 hours	90 dBA
≤ 4 hours	95 dBA
≤ 2 hours	100 dBA
≤ 1 hour	105 dBA

Medical control

- Pre-placement & periodic audiometric examinations of employees engaged in high noise areas should be evaluated. If deterioration is noticed, withdrawal of the employee from the source of exposure should be done.
- Periodical Audiometric testing. The periodicity of testing is Six monthly
- A drop in 20-30 db of hearing loss as assessed by pure tone audiometry (in all frequencies) should indicate SNHL and suggest a change in workplace of the employee

Personal protection equipment (PPE)

- Noise transmission from source to the human ear can be reduced with the wearing of hearing protectors like earmuffs & earplugs. Hearing protectors have shown to provide attenuation from 15 to 30 dB.

4.1.b. Heat

Heat exposure can produce effects like:

- Heat Syncope
- Prickly Heat
- Heat Hyper pyrexia
- Water and Electrolyte Depletion and Heat Exhaustion
- Heat Cramps
- Heat Stroke

Preventive steps

Engineering control

- Engineering control to minimize exposure to heat will depend upon the nature of the work place.
- Insulation, altering the path of transmission of heat, exhaust ventilation systems are some of the methods employed to reduce heat exposure.

Administrative control

- Persons that are to be placed in such areas should be properly selected. A young, healthy, short, robust, relatively darker complexion individual is more suitable for 'hot work', as compared to his taller, fairer counterpart of comparable health.
- Lightweight cotton clothing should be prescribed as safety gear in workplaces that have a heat hazard.
- Acclimatization & adaptation with the work process will allow employees to become used to heat. When employees are away from hot conditions for more than several days, a re-acclimatization schedule should be adopted.
- Employee's diet should be of proper caloric value depending on their workload requirements in hot conditions, and in addition, contain adequate electrolytes.
- There should be frequent short breaks during shift hours (Table 4.2).

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Table 4.2 Permissible heat exposure & threshold limit values (Values are given in Celsius / Fahrenheit as measured using Wet Bulb Globe Thermometer)

	Work Load		
Work – Rest Regimen	Light	Moderate	Heavy
Continuous work	30.0°C / 86°F	26.7°C / 80°F	25.0°C / 77°F
75% Work – 25% Rest, each hour	30.6°C / 87°F	28.0°C / 82°F	25.9°C / 78°F
50% Work – 50% Rest, each hour	31.4°C / 89°F	29.4°C / 85°F	27.9°C / 82°F
25% Work – 75% Rest, each hour	32.2°C / 90°F	31.1°C / 88°F	30.0°C / 86°F

Medical control

- Pre-placement / pre-employment medical examination: The individual's medical data is to be re assessed before he is placed in a heat hazard area. A particular attention towards renal and cardiovascular system should be exercised.
- Periodic medical examinations must be carried out six monthly.
- If the workplace is outdoors, it may be difficult to eliminate the hazard, in which case, plenty of potable water & salt tablets (where excessive sweating occurs) should be provided to employees.
- Employees with frequent pyrexia (fever) / history of recent fever should be avoided.
- Training and awareness of hazards due to heat, should be provided to employees/supervisors and first aiders
- An outline of thermoregulation, symptoms of heat illness, acclimatization, work demand and clothing
- First -aid measures for each heat related disorders to be made available at the site.
- Emphasis on the hygiene practices, such as adequate hydration, individual responsibility and self-pacing of work.

4.1.c. Vibration

Generalized vibration may give rise to Musculo-skeletal (osteo-arthrosis) and neurological sequelae, whereas localized body part vibrations can result in conditions such as Vibration induced White Finger.

Preventive steps

Engineering control

- Elimination or Reduction of vibration at the design stage.
- Proper & timely maintenance of Engineering control
- Isolation of disturbance from the vibrating surface.
- Reducing the mechanical disturbance causing the vibration
- Anti-vibration devices should be used on vibrating tools and holding tongs.

Administrative control

- Adapting procedures to purchase tools or equipment with minimal vibration.
- Reducing exposure time by breaks and shorter working hours.

Table 4.3: Threshold limit values for exposure of hand to vibration in Xh, Yh or Zh directions

Total daily exposure (Duration in hours)	Values of the Dominant Frequency – Weighted, rms, Component Acceleration, Which Shall not be Exceeded ^{a}K ($^{a}K_{eq}$)	
	m/s^2	g^{Δ}
4 - 8	4	0.40
2 - 4	6	0.61
1 - 2	8	0.81
< 1	12	1.22

Medical control

Pre-employment medical examination to assess employees who may be susceptible to the effects of exposure to whole body and segmental vibration

The following advice could be given regarding risk associated with exposure to vibration:

- Keep the hands warm and do not allow to become wet & cold
- Employees using vibrating hand Tools must not smoke, as smoking predisposes them to vaso-constrictive disorders.
- Awareness regarding seeking early medical advice at the signs of numbness, tingling or white or blue fingers.

PPE

- Use Anti –Vibration gloves with full fingers.

4.1.d. Working at height:

Physical injuries are common among employees employed at height. It is necessary the employees have adequate control over their balance to work at height and prevent hazard of injuries

Preventive steps

Administrative & Engineering control

- Provision for safety / protective measures (whole body harness, safety net / ropes for sky folding. Extra precautions to be taken to prevent electric shocks.

Medical control

- Pre-employment medical examination should be directed at the detection of neurologic, visual, cardiovascular and general health.
- Individuals with above mentioned disorders should be avoided from engaging in work at height.

PPE

This includes use of helmets, ropes for sky folding.

4.1.e. Illumination

Proper illumination of the work place is of prime importance. Improper illumination is detrimental to the health of the worker. Its effects include – Eyestrain, excessive (general) fatigue, reduced efficiency and accuracy of the worker.

Preventive steps

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Engineering control

- Replace light sources as soon as they get fused.

Administrative control

- Ensure proper illumination from the planning stage of the work place.

Table 4.4: Recommended Values of Illumination are given below:

Areas	Illumination LUX
Canteens	150
Entrances, Corridors & Stairs	100
Stockyard, Main entrances, Roads	20
Bathrooms	100
Stairs	100

4.2. Biological hazards

The hazards vary as per the geographical location. General preventive measures are listed below. Specific strategies should be prepared during the project implementing phase.

- Elimination of the hazardous biological agent.
- Adequate ventilation
- Isolation of the persons with infection
- Immunization and health surveillance
- Personal protective equipment like aprons, gloves, eyewear, face shields, respirators, gowns etc.
- Good hygienic and sanitary facilities.
- Periodic examination of food handlers and isolation of food handlers found to be infected
- Providing adequate and quick treatment facilities for animal bites and snakebites

4.3. Psychological hazards

- Psychological effects on the employees are very subtle, and have to be 'looked for' very meticulously by the Occupational Health Physician. They may manifest as obsessive-compulsive behaviour, paranoia, hypochondriac behaviour and absenteeism from work.
- Psychological effects may also manifest as Medical complaints like respiratory infection, fatigue, backache, insomnia, headache, irritability, etc. It is important to differentiate these symptoms from the organic diseases producing them.
- The occupational physician in charge must have proper knowledge of stress related factors and be trained and equipped to advise regarding – proper job placement, counselling and medications to alleviate these problems.

4.4. Ergonomic hazards

Their ergonomic problems should be solved by work place modification and/or mechanization of the processes if possible. Periodic examination of these employees should include radiography of the lumbo-sacral region once a year and employees with chronic symptoms or bony changes should not be further exposed to this type of job. Proper posture and exercise may be taught to these employees to minimize the problem of backache. Administrative staffs also need health education for their ergonomic problems.

4.5. Injuries/ accidents

Injuries are common events in the different operations. Accidents should be prevented by proper maintenance of the machinery, good housekeeping, safety training and use of personal protective devices. First aid treatment must be available for trivial injuries and employees must be trained in first aid.

4.6. Burns

The sites where burns can occur should be identified. Employees should be provided with personal protective devices like fire – proof clothing. There should be also provision of continuous water in case of emergency events.

4.7. Electric shock

Electrical accidents are caused by a combination of unsafe factors including: Equipment and/or installation, environment, and work practices.

- Enclose all the exposed electrical parts
- Isolate electrical parts: Use guards or barriers, replace covers. All conductors must be protected and unused openings to be closed
- Junction boxes, pull boxes and fittings must have approved covers
- Unused openings in cabinets, boxes and fittings must be closed
- Use proper wire for extension cord while using the power tools. If wire is too small the tool will draw more current than the cord can handle, causing overheating & possible fire.
- Avoid usage of damaged extension cords & tools. Cords can be damaged by aging, contact with door / window edges, staples or fastenings, Abrasion from materials and activity in the area.
- Frequent inspection of the ground power supply, electric equipment and electrical circuits to ensure path to ground is continuous
- Inspect electrical equipment every time before usage
- Use Ground Fault Circuit Interrupter (GFCI)
- Worker should use appropriate PPEs as per electrical load

4.8. Chemical hazards

Employees at the proposed copper refinery plant are possibly exposed to many hazardous chemicals; every precaution should be taken to prevent these hazards. Chemicals used vary from region to region, from workplace to workplace. Hence it is beyond the scope of this manual to enumerate all chemicals hazards the employees are exposed to.

However, few hazardous chemicals are being mentioned as a guideline:

1. Copper Concentrate (dust)
2. SO_2 Gas
3. Copper Sulphate Acid fumes
4. Lead, arsenic, selenium dust
5. Sulphuric Acid fumes
6. Phosphoric acid fumes
7. Acid fumes of fluorine
8. Phosphoric Acid
9. Hydro-fluro-silicic acid fumes
10. Aluminium hydrate dust

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11. Aluminium Fluoride Fumes
12. Chlorine Gas
13. HCL Acid
14. Iso Propyl Alcohol
15. Sodium Sulphide
16. Ferric Sulphate

General preventive measure for all chemical hazards:

Chemical burns, irritation / inflammation of respiratory tract / pulmonary system and irritation / inflammation of the anterior chamber of eye (conjunctivitis, keratitis, etc.) are the common injuries encountered in employees exposed to dust / irritants / acid fumes. The general toxic action of acid causes alkaline depletion of the body i.e. an acidosis that affects the nervous system and produces agitation, hesitant gait and generalized weakness.

Preventive steps

Engineering control

- Total enclosure of the process using acid / acid fumes / dust.
- Mechanization of handling procedures to prevent all personal contact with hazards.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages

Administrative control

- Acids should be stored in separated well-ventilated cool, dry premises with an acid resistant cement floor, sheltered from direct sunlight and away from all sources of ignition.
- Empty containers should always be drained and rinsed clean with water.
- Spilt acid should be covered with sand or ashes and never with organic material.
- Showers, baths and washing fountains should be available and eye fountains and emergency showers should be provided.

Medical control

- Pre-employment Medical Examination should be directed at the detection of chronic respiratory, gastrointestinal, hepatic, cardiovascular, nervous disease and any eye & skin disease.
- Periodic Medical Examination of employees

PPE

This includes use of chemical goggles, face screens, mask (Dust/gas), gloves, neoprene or PVC boots and acid resistant clothing.

4.9. Hazards from individual units:

4.9.a. Raw material handling area:

Hazards expected:

- Dust containing Coper Concentrate* and Rock Phosphate**
- Noise (Refer section 4.1.a. "Noise" for details)
- Handling heavy machines / moving equipment

*Copper Concentrate consist of Copper, Lead, Arsenic, Selenium, Fluorine, Iron, sulphur, SiO_2, CaO, MgO, Al_2O_3, Zinc, Fe_3O_4, Bismuth, Antimony, Nickel, Cadmium, Chlorine, Mercury, Silver, Gold Moisture

**Rock Phosphate consist of P_2O_5, Fe_2O_3, Al_2O_3, CaO, MgO, SiO_2, SO_3, Chlorine, Fluorine, $CaCO_3$, CO_2, Na_2O, K_2O, TCP / BPL, organic matter as Carbon.

4.9. a.1. Dust containing copper concentrate and rock phosphate:

Possible harmful effects due to dust containing copper concentrate:

The dust particles can affect eyes, skin, respiratory system, liver, nervous system and kidney due to inhalation, oral ingestion and dermal absorption.

Preventive steps

Engineering control

- Total enclosure of the process using dust.
- Mechanization of handling procedures to prevent all personal contact with the dust.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages

Administrative control

- Monthly evaluation of the metal and metalloid particulates (Cu, Pb, As, Se, Ni, Cd, Hg, Bi, Sb) in workplace atmosphere, using air sampling and inductive coupled plasma (ICP) analysis, as recommended by the occupation safety and health administration (OSHA) method (ID-125G) or Central Pollution Control Board (CPCB) or Bureau of Indian standards methods for monitoring metals at the workplace.
- The occupational exposure limit of Copper, Lead, Arsenic, Selenium, Fluorine, Iron, sulphur, SiO_2, CaO, MgO, Al_2O_3, Zinc, Fe_3O_4, Bismuth, Antimony, Nickel, Cadmium, Chlorine, Mercury, Silver, Gold for 8-hour time weighted average (TWA) for inhalable dust should be limited as per Indian Factories act / NIOSH / OSHA guidelines.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, hepatic, renal disease as well eye & skin disease.
- Serum copper & ceruloplasmin feroxidase, urinary copper should be measured (the difference in urinary copper levels before and after work / shift hours is essential)
- Screen for heavy metals (e.g. mercury, lead, copper, arsenic, cadmium, Bismuth, Antimony and Nickel) in blood and urine. Delta aminolevulinate dehydratase levels should be checked to identify lead toxicity.
- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days
- Frequency of medical examination should be increased when the work place copper / heavy metal levels are higher than threshold limit value.
- An increase in the values of heavy metal/s in the biological samples (blood / urine) as compared to baseline during follow-up is an indication of accumulation of the respective metal/s, necessitating immediate mobilization (replacement) of the worker from further exposure to hazard (metal/s).

PPE

This includes use of chemical goggles, face screens, mask (Dust/gas), gloves, neoprene or PVC boots and acid resistant clothing.

Dust containing Rock phosphate

Possible harmful effects due to containing rock phosphate:

The dust particles can affect eyes, skin, respiratory system, liver, kidneys, blood and skeletal system due to inhalation, oral ingestion and dermal absorption.

Preventive steps

Engineering control

- Total enclosure of the process using dust.
- Mechanization of handling procedures to prevent all personal contact with the dust.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages
- Provide shower at nearby location

Administrative control

- Monthly evaluation by air samplers to collect particulate matter (PM) 2.5 & PM10 with respirable suspended particulate matter (RSPM) analyser as recommended by CPCB guidelines.
- The occupational exposure limit of P_2O_5, Fe_2O_3, Al_2O_3, CaO, MgO, SiO_2, SO_3, Chlorine, Fluorine, $CaCO_3$, CO_2, Na_2O, K_2O, TCP / BPL, organic matter as Carbon for 8-hour time weighted average (TWA) for inhalable dust should be limited as per NIOSH / OSHA guidelines.
- Phosphoric acid fumes and fluorine (as fluoride) has to be evaluated in the work place and the concentration of phosphorous acid should not exceed 1 ppm or 1mg/m^3 and, fluoride (as F) should not exceed 2.5 mg/m^3, while fluorine should be limited < 1 ppm or 2 mg/m^3.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, hepatic, renal disease, blood and gingival tissue as well eye & skin disease.
- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days
- Frequency of medical examination should be increased when the work place PM2.5 / PM 10 levels are higher than threshold limit value.

PPE

This includes use of chemical goggles, face screens, mask (dust/ gas), gloves, neoprene or PVC boots and acid resistant clothing.

4.9. a.2. Handling heavy machines / Moving equipment

Injuries are common events among employees handling heavy machines / moving equipment. Accidents should be prevented by proper maintenance of the machinery, safety training and use of personal protective devices. First aid treatment must be available for trivial injuries and employees must be trained in first aid.

Their ergonomic problems should be solved by workplace modification and/or mechanization of the processes where applicable. Periodic examination, corrective posture training and exercise may be taught to these employees to minimize Musculo-skeletal problems.

It is necessary the employees are attentive and have adequate control over the heavy machines to prevent accident / injuries

Preventive steps

Administrative & Engineering control as per the recommendations of Indian Factories Act

- Provision for safety / protective measures
- Extra precautions to be taken to prevent electric shocks.
- Adequate training and education regarding the usage of machines

Medical control

- Pre-employment medical examination should be directed at the detection of neurologic, visual, cardiovascular and general health.
- Individuals with above mentioned disorders should be avoided from engaging in heavy machine operation.

PPE

This includes use of helmets, goggles, steel toe boots and other specific recommendations as mentioned in the safety manual of the heavy machines.

4.9.b. Copper smelter:

Hazards expected:

- Dust containing copper concentrate
- Heat due to hot metals (Refer section 4.1.b. "Heat" for details)
- Sulphur dioxide
- Noise (Refer section 4.1.a. "Noise" for details)
- Working at height (Refer section 4.1.d. "Working at height" for details)

4.9. b.1. Dust containing copper concentrate:

Possible harmful effects:

The dust particles can affect eyes, skin, respiratory system, liver and kidney due to inhalation, oral ingestion and dermal absorption.

Preventive steps

Engineering control

- Total enclosure of the process using dust.
- Mechanization of handling procedures to prevent all personal contact with the dust.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages

Administrative control

- Monthly evaluation of the metal and metalloid particulates (Cu, Pb, As, Se, Ni, Cd, Hg, Bi, Sb) in workplace atmosphere, using air sampling and inductive coupled plasma (ICP) analysis, as recommended by the occupation safety and health administration (OSHA)

method (ID-125G) or Central Pollution Control Board (CPCB) or Bureau of Indian standards methods for monitoring metals at the workplace.

- The occupational exposure limit of Copper, Lead, Arsenic, Selenium, Fluorine, Iron, sulphur, SiO_2, CaO, MgO, Al_2O_3, Zinc, Fe_3O_4, Bismuth, Antimony, Nickel, Cadmium, Chlorine, Mercury, Silver, Gold Moisture for 8-hour time weighted average (TWA) for inhalable dust should be limited as per Indian Factories act / NIOSH / OSHA guidelines.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, hepatic, renal disease as well eye & skin disease.
- Serum copper & ceruloplasmin feroxidase, urinary copper should be measured (the difference in urinary copper levels before and after work / shift hours is essential)
- Screen for heavy metals (e.g. mercury, lead, copper, arsenic, cadmium, mercury, selenium, bismuth, antimony) in blood and urine. Delta aminolevulinate dehydratase levels should be checked to identify lead toxicity.
- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days
- Frequency of medical examination should be increased when the work place copper / heavy metal levels are higher than threshold limit value.
- An increase in the values of heavy metal/s in the biological samples (blood / urine) as compared to baseline during follow-up is an indication of accumulation of the respective metal/s, necessitating immediate mobilization (replacement) of the worker from further exposure to hazard (metal/s).

PPE

This includes use of chemical goggles, face screens, mask (dust/gas), gloves, neoprene or PVC boots and acid resistant clothing.

4.9. b.2. Sulphur dioxide:

Possible harmful effects:

The SO_2 gas can affect eyes, skin, respiratory system and occasionally kidneys due to inhalation, oral ingestion and dermal absorption.

Preventive steps

Engineering control

- Total enclosure of the process using SO_2 gas.
- Mechanization of handling procedures to prevent all personal contact with the gas.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages
- Provide shower at proximity location

Administrative control

Monthly evaluation of air quality monitoring by air samplers, to measure gaseous samples like SO_2 and NO_x as per the recommendations of CPCB / Indian factories Act.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, renal disease as well eye & skin disease.

- To be vigilant to detect acidosis among the employees.

PPE

This includes use of chemical goggles, face screens, mask (dust/gas), gloves, neoprene or PVC boots and acid resistant clothing.

4.9.c. Copper refinery:

Hazard expected:

- Acid Fumes of copper sulphate
- Extreme high temperature due to the steam & hot electrolyte (Copper Sulphate) (Refer section 4.1.b. "Heat" for details)
- Noise (Refer section 4.1.a. "Noise" for details)
- Working at Height (Refer section 4.1.d. "Working at height" for details)

4.9. c.1. Acid fumes of copper sulphate

Burns, irritation / inflammation of respiratory tract / pulmonary system and irritation / inflammation of the anterior chamber of eye (conjunctivitis, keratitis, etc.) are the common injuries encountered in employees exposed to acid fumes. Acid fumes can be absorbed systemically (surface absorption, oral ingestion and inhalation) causing alkaline depletion i.e. acidosis affecting nervous system would lead to agitation, hesitant gait and generalized weakness.

Preventive steps

Engineering control

- Total enclosure of the process using acid fumes.
- Mechanization of handling procedures to prevent all personal contact with hazards.
- Installation of local exhaust ventilation and warning devices for leakages
- Provide shower at nearby location

Administrative control

- Monthly evaluation of the metal and metalloid particulates in workplace atmosphere, including copper dust and copper fume levels using air sampling and ICP analysis, as recommended by the OSHA method (ID-125G) or CPCB.
- Air samplers to collect gaseous samples like SO_2 and Arsine as per the recommendations from CPCB / OSHA / BIS

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, hepatic, renal disease as well eye & skin disease.
- Serum copper & ceruloplasmin feroxidase, urinary copper should be measured (the difference in urinary copper levels before and after work / shift hours is essential)
- Frequency of medical examination should be increased when the work place copper levels are higher than threshold limit value.

PPE

This includes use of chemical goggles, face screens, mask (dust/ gas), gloves, neoprene or PVC boots and acid resistant clothing.

4.9.d. Copper rod plant

Expected hazards:

- Heat (Hot Metal) (Refer section 4.1.b. "Heat" under "Physical hazards", page 7)
- Noise (Refer section 4.1.a. "Noise" under "Physical hazards", page 6)
- Work at Height (Refer section 4.1.d. "Working at height", page 10)

4.9.e. Precious recovery plant:

- Dust from the anode slime containing heavy metals such as lead, arsenic, selenium
- Heat (hot metal) (Refer section 4.1.b. "Heat" for details)
- SO_2 gas (Refer section 4.9. b.2. "Sulphur dioxide" for details)
- Acid fumes (Refer section 4.9. c.1. "Acid fumes of copper sulphate" for details)
- Noise (Refer section 4.1.a. "Noise" for details)
- Work at Height (Refer section 4.1.d. "Working at height" for details)

4.9. e.1. Dust from anode slim

Anode slime contains heavy metals such as lead, arsenic, selenium.

Dust of heavy metals can be absorbed systemically by inhalation, oral ingestion and surface absorption leading to systemic effects. Irritation / inflammation of respiratory tract / pulmonary system and irritation / inflammation of the anterior chamber of eye (conjunctivitis, keratitis, etc.) and rarely dermatitis can be caused in these employees. Systemic absorption can cause chronic kidney, hepatic, bone, gastrointestinal, blood, neurological diseases.

Preventive steps

Engineering control

- Total enclosure of the process using heavy metal dust.
- Mechanization of handling procedures to prevent all personal contact with dust.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages
- Provide shower at nearby location

Administrative control

- Monthly evaluation of the metal and metalloid particulates in workplace atmosphere including lead, arsenic, selenium levels using air sampling and ICP analysis, as recommended by OSHA method (ID-125G) or CPCB or Indian Factories Act or American Conference of Governmental Industrial Hygienists (ACGIH) or National Institute of Occupational Safety and Health (NIOSH)
- The occupational exposure limit of lead, arsenic, selenium for 8-hour time weighted average (TWA) for inhalable dust should be limited as per Indian Factories act / NIOSH / OSHA guidelines.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of chronic kidney, hepatic, bone, gastrointestinal, blood, cardiovascular, neurological diseases in addition to chronic respiratory, eye & skin disease.
- Serum & urinary levels of arsenic, lead, selenium should be measured. Delta aminolevulinate dehydratase levels should be checked to identify lead toxicity.

- Frequency of medical examination should be increased when the work place heavy metal levels are higher than threshold limit value.

PPE

This includes use of chemical goggles, face screens, gloves, neoprene or Steel Toe boots and acid resistant clothing.

4.9.f. Sulphuric acid plant

- SO_2 Gas (Refer section 4.9. b.2. "sulphur dioxide" for details)
- Sulphuric Acid fumes
- Heat due to steam and hot sulphuric acid (Refer section 4.1.b. "Heat" for details)
- Noise (Refer section 4.1.a. "Noise" for details)
- Work at Height (Refer section 4.1.d. "Working at height" for details)
- Vanadium Pentoxide

4.9. f.1. Sulphuric acid fumes:

Burns, irritation / inflammation of respiratory tract / pulmonary system and irritation / inflammation of the anterior chamber of eye (conjunctivitis, keratitis, etc.) are the common injuries anticipated in employees exposed to sulphuric acid fumes. Sulphuric acid fumes can be absorbed systemically (oral ingestion, surface absorption and inhalation) and lead to alkaline depletion i.e. acidosis affecting the nervous system and produces agitation, hesitant gait and generalized weakness.

Preventive steps

Engineering control

- Total enclosure of the process using sulphuric acid fumes.
- Mechanization of handling procedures to prevent all personal contact with sulphuric acid fumes.
- Installation of local exhaust ventilation and warning devices for leakages
- Provide shower at proximity location to wash accidental exposure

Administrative control

- Monthly monitoring for 4 – 8 hours for SO_2, SO_3 & acid mist levels by air sampling using silica gel sorbent tubes with personal sampling pump (with calibrated flow in line with silica get tube) followed by analysis with ion exchange chromatograph & electrical conductivity detector / using field monitoring stations as recommended by the OSHA method (ID-113/165SG) or CPCB / Indian factories act.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, renal disease as well eye & skin disease.

PPE

This includes use of chemical goggles, face screens, mask (dust/ gas), gloves, neoprene or PVC boots and acid resistant clothing.

4.9. f.2. Vanadium pentoxide:

Occupational exposure can affect eyes, respiratory system and skin. Irritation / inflammation of respiratory tract / pulmonary system and irritation / inflammation of the anterior chamber

of eye (conjunctivitis, keratitis, etc.) are possible injuries among employees exposed to vanadium pentoxide. Vanadium pentoxide can be absorbed systemically (inhalation, surface absorption and oral ingestion) and lead dysfunction in reproductive system, suspected carcinogenesis and foetal malformation (exposure to pregnant woman).

Preventive steps

Engineering control

- Total enclosure of the process using Vanadium pentoxide.
- Mechanization of handling procedures to prevent all personal contact with Vanadium pentoxide.
- Ensure adequate ventilation, especially in confined areas.
- Provide shower / washing facilities at proximity location to wash accidental exposure

Administrative control

- Monthly monitoring of respirable dust (as vanadium pentoxide) and fumes (as vanadium pentoxide) by ICP analysis as per OSHA guidelines.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, eye & skin disease.
- Caution while employing woman of reproductive age group (risk of foetal malformations).

PPE

This includes use of chemical goggles, face screens, mask (dust/ gas), gloves, neoprene or PVC boots and protective clothing.

4.9.g. Effluent treatment plant

- Dust of the ETP Sludge containing Arsenic, Bismuth, Cadmium, Chromium, Cobalt, Nickel, Lead, Antimony, Selenium, iron, copper, zinc CaO, Sulphates, Silica, etc.)
- Acid fumes (Refer section 4.9. f.1. "sulphuric acid fumes" for details)
- Noise (Refer section 4.1.a. "Noise" under "Physical hazards" for details)
- Work at Height (Refer section 4.1.d. "Working at height" for details)

4.9. g.1. Dust containing heavy metals

Dust of heavy metals can be absorbed systemically by inhalation and dermal absorption and lead to systemic effects. Irritation / inflammation of respiratory tract / pulmonary system and irritation / inflammation of the anterior chamber of eye (conjunctivitis, keratitis, etc.) and rarely dermatitis can be caused in employees exposed to dust. Systemic absorption can cause chronic kidney, hepatic, and bone diseases.

Preventive steps

Engineering control

- Total enclosure of the process using heavy metal dust.
- Mechanization of handling procedures to prevent all personal contact with dust.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages

- Provide shower at nearby location

Administrative control

- Monthly evaluation of the metal and metalloid particulates in workplace atmosphere including lead, arsenic, selenium, cadmium, bismuth, chromium, cobalt, nickel, antimony and zinc levels using air sampling and ICP analysis, as recommended by OSHA method (ID-125G) or CPCB or Indian Factories Act or ACGIH or NIOSH.
- The occupational exposure limit of Arsenic, Bismuth, Cadmium, Chromium, Cobalt, Nickel, Lead, Antimony, Selenium, iron, copper, zinc CaO, Sulphates, Silica for 8-hour time weighted average (TWA) for inhalable dust should be limited as per Indian Factories act / NIOSH / OSHA guidelines.
- Hand or foot swab samples of workers involved in collection, transportation and disposal of ETP sludge should be analysed for heavy metals using ICP-MS methods

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of chronic kidney, hepatic, bone, gastrointestinal, blood, cardiovascular, neurological diseases in addition to chronic respiratory, eye & skin disease.
- Blood & urinary levels of lead, arsenic, selenium, cadmium, bismuth, chromium, cobalt, nickel, antimony and zinc should be measured. Delta aminolevulinate dehydratase levels should be checked to identify lead toxicity.
- Frequency of medical examination should be increased when the work place heavy metal levels are higher than threshold limit value.
- An increase in the values of heavy metal/s in the biological samples (blood / urine) as compared to baseline during follow-up is an indication of accumulation of the respective metal/s, necessitating immediate mobilization (replacement) of the worker from further exposure to hazard (metal/s).

PPE

This includes use of chemical goggles, face screens, mask (dust/ gas), gloves, neoprene or PVC boots and acid resistant clothing.

4.9.h. Phosphoric acid plant

- Dust containing rock phosphate
- Acid fumes of phosphoric acid and fluorine
- Heat due to steam, hot water, hot phosphoric acid & slurry (Refer section 4.1.b. "Heat" for details)
- Phosphoric acid
- Hydro-fluro-silicic acid fumes
- Noise (Refer section 4.1.a. "Noise" for details)
- Work at Height (Refer section 4.1.d. "Working at height" for details)

4.9. h.1. Dust containing Rock phosphate:

Possible harmful effects:

The dust particles can affect eyes, skin, respiratory system, liver, kidneys, blood, spleen, GIT, CNS, gingival tissue due to inhalation, oral ingestion and dermal absorption.

Preventive steps

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Engineering control

- Total enclosure of the process using dust.
- Mechanization of handling procedures to prevent all personal contact with the dust.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages
- Provide shower at nearby location

Administrative control

- Monthly evaluation by air samplers to collect particulate matter (PM) 2.5 & PM10 with respirable suspended particulate matter (RSPM) analyser as recommended by CPCB guidelines.
- The occupational exposure limit of P_2O_5, Fe_2O_3, Al_2O_3, CaO, MgO, SiO_2, SO_3, Chlorine, Fluorine, $CaCO_3$, CO_2, Na_2O, K_2O, TCP / BPL, organic matter as Carbon for 8-hour time weighted average (TWA) for inhalable dust should be limited as per NIOSH / OSHA guidelines.
- Phosphoric acid fumes and fluorine as fluoride has to be evaluated in the work place and the concentration of phosphorous acid should not exceed 1 ppm or 1mg/m^3, fluoride (as F) should not exceed 2.5 mg/m^3 and Fluorine should not exceed 1 ppm or 2 mg/m^3.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, hepatic, renal disease, blood and gingival tissue as well eye & skin disease.
- Screen for heavy metals (e.g. mercury, lead, copper, arsenic, cadmium) in blood and urine.
- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days
- Frequency of medical examination should be increased when the work place PM2.5 / PM 10 levels are higher than threshold limit value.

PPE

This includes use of chemical goggles, face screens, mask (dust/ gas), gloves, neoprene or PVC boots and acid resistant clothing.

Acid fumes of phosphoric acid and fluorine

Common hazards incited include dermal burns, inflammation of respiratory system & eyes. Prolonged exposure to acid fumes of phosphoric acid & fluorine can have immediate fatal effects (acidosis) and rarely chronic effects (osteoflurosis, osteoporosis, hepatitis, periostitis, skeletal deformity)

Preventive steps

Engineering control

- Total enclosure of the process using acid fumes.
- Mechanization of handling procedures to prevent all personal contact with hazards.
- Installation of local exhaust ventilation and warning devices for leakages

Administrative control

- Daily evaluation of the air samples as recommended by OSHA method ID-111 / Bureau of Indian standards (BIS).

- The occupational exposure of Phosphoric acid fumes and fluorine as fluoride has to be evaluated in the work place and the concentration of phosphorous acid should not exceed 1 ppm, fluoride (as F) should not exceed 2.5 mg/m^3 and Fluorine should not exceed 1 ppm or 2 mg/m^3.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, hepatic, renal disease as well eye & skin disease.
- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days

PPE

This includes use of chemical goggles, face screens, gloves, neoprene or PVC boots and acid resistant clothing.

4.9. h.2. Phosphoric acid

Accidental contact with phosphoric acid can lead to dermal burns, inflammation to anterior chamber of eyes (accidental spurting). At high temperatures, phosphoric acid might be present as acid fumes which can cause inflammation of respiratory tract leading to acidosis (affecting nervous system leading to agitation, altered sensorium, etc.) Occasional chronic effects include hepatitis, periostitis, skeletal deformity (commonly mandible & maxilla)

Preventive steps

Engineering control

- Total enclosure of the process using phosphoric acid.
- Mechanization of handling procedures to prevent all personal contact with phosphoric acid.
- Provide shower at nearby location for washing out accidental exposure

Administrative control

- Daily evaluation of the air samples as recommended by OSHA method ID-111 / Bureau of Indian standards (BIS) / Indian factories Act.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, renal disease as well eye & skin disease.

PPE

This includes use of chemical goggles, face screens, gloves, neoprene or PVC boots and acid resistant clothing.

4.9. h.3. Acid fumes of hydro-fluro-silicic acid

Employees exposed to acid fumes of hydro-fluro-silicic acid are prone for accidental dermal burns, inflammation of anterior chamber of eyes (conjunctivitis, keratitis, etc.). Additionally, inhalation of acid fumes can lead to inflammation of respiratory system. Systemic absorption of acid fumes could deplete alkali causing systemic acidosis. Long term systemic absorption could cause osteoflurosis.

Preventive steps

Engineering control

- Total enclosure of the process using acid fumes of hydro-fluro-silicic acid.
- Mechanization of handling procedures to prevent all personal contact with acid fumes.
- Installation of local exhaust ventilation and warning devices for leakages
- Provide shower at nearby location

Administrative control

- 6 monthly airborne fluoride levels through personal air monitoring for both particulate and gaseous phase fluorides.
- Exposure to hydro-fluro-silicic acid should be restricted to below the threshold limit values as per OSHA/NIOSH guidelines. The occupational exposure of fluoride has to be evaluated in the work place and the concentration of fluoride (as F) should not exceed 2.5 mg/m^3 and Fluorine should not exceed 1 ppm or 2 mg/m^3.
- Biological monitoring for fluorides to be undertaken

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, renal disease as well eye & skin disease.
- Contact lens should be avoided in the workplace.
- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days.
- Fluoride levels in urine should not exceed 4 mg/ gm creatinine (indicate over exposure).

PPE

This includes use of chemical goggles, face screens, gloves, neoprene or PVC boots and acid resistant clothing.

4.9.i. Aluminium fluoride plant

- Dust (Aluminium Hydrate)
- Aluminium Fluoride Slurry Fumes
- Heat (Steam, Hot hydro-fluro-silicic acid, Aluminium Fluoride Slurry) (Refer section 4.1.b. "Heat" for details)
- Hydro-Fluro-Silicic acid fumes (Refer section 4.9. h.3. "Acid fumes of hydro-fluro-silicic acid" for details)
- Noise (Refer section 4.1.a. "Noise" for details)
- Work at Height (Refer section 4.1.d. "Working at height" for details)

4.9. i.1. Dust containing Aluminium Hydrate

Possible harmful effects:

The dust particles can affect eyes, skin, respiratory system due to surface irritation and systemically via inhalation, oral ingestion and dermal absorption.

Preventive steps

Engineering control

- Total enclosure of the process using dust.
- Mechanization of handling procedures to prevent all personal contact with the dust.
- Installation of local exhaust ventilation fitted with bag filters and warning devices for leakages

- Provide shower at nearby location

Administrative control

- Monthly evaluation by air samplers to collect PM2.5 & PM10 with respirable suspended particulate matter analyser for Aluminium hydrate, aluminium fluoride & other fluoride dust levels as recommended by CPCB guidelines.
- The occupational exposure limit of Aluminium hydrate (raw material) for 8-hour time weighted average (TWA) for inhalable dust should be limited as per NIOSH / OSHA guidelines, Additionally, fluoride (as F) levels should be monitored and kept below 2.5 mg/m^3 and Fluorine should not exceed 1 ppm or 2 mg/m^3.

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, eye & skin disease.
- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days
- Frequency of medical examination should be increased when the work place PM2.5 / PM 10 levels are higher than threshold limit value.

PPE

This includes use of chemical goggles, face screens, gloves, neoprene or PVC boots and acid resistant clothing.

4.9. i.2. Fumes of Aluminium Fluoride Slurry

Burns, irritation / inflammation of respiratory tract / pulmonary system and irritation / inflammation of the anterior chamber of eye (conjunctivitis, keratitis, etc.) are the common injuries anticipated in employees exposed to the acid fumes. Systemic absorption of the acid can lead to alkaline depletion i.e. acidosis affecting the nervous system and produces agitation, hesitant gait and generalized weakness. Long term systemic absorption could cause osteoflurosis.

Preventive steps

Engineering control

- Total enclosure of the process using Acid fumes of Aluminium fluoride slurry.
- Mechanization of handling procedures to prevent all personal contact with acid fumes.
- Provide shower at nearby location

Administrative control

- 6 monthly air Quality monitoring by air samplers to collect PM 2.5 and PM 10 with RSPM sampler, fluoride analysis, assessment of metals and metalloid particulates in workplace atmosphere (air sampling and ICP analysis) as per CPCB guidelines
- Fluoride (as F) should not exceed 2.5 mg/m3 and Fluorine should not exceed 1 ppm or 2 mg/m3.
- Biological monitoring for fluorides to be undertaken

Medical control

- Pre-employment and 6 monthly medical examinations should be directed at the detection of respiratory, eye & skin disease.
- Contact lens should be avoided in the workplace.

- Measure fluoride levels in blood and urine before and after working for 5 – 6 consecutive days
- Fluoride levels in urine should not exceed 4 mg/ gm creatinine (indicative of over exposure).

PPE

This includes use of chemical goggles, face screens, gloves, neoprene or PVC boots and acid resistant clothing

4.9.j. Maintenance in various units of the Refinery

- Vibration (due to use of vibrating equipment such as Grinder, Cutter, Drilling machine, etc.) (Refer section 4.1.c. "Vibration" for details)
- Noise (Refer section 4.1.a. "Noise" for details)
- Heat (Refer section 4.1.b. "Heat" for details)
- Light in metal unit area (Refer section 4.1.e. "illumination" for details)

Summary of the occupational health and work place monitoring for each of the units (for detailed description, refer the respective text)

Project construction phase

Hazards	**Possible routes of entry / hazard**	**Common target organ damage**	**Screening of hazard event / compound**	**Frequency**	**Test (Section 5)**
Vibration (use of vibrating equipment such as Grinder, Cutter, Drilling machine, etc.).	Physical	Neurological (peripheral), musckulo-skeletal, circulatory	Peripheral circulation, peripheral nerves, locomotor	Annual	Sensory assessments for peripheral nerves (clinical assessment)
Dust	Inhalation, surface absorption	Eyes, Skin, Respiratory system	Respiratory system evaluation	Annual	Eyes, Skin, Respiratory system evaluation recommended
Noise	physical	Auditory, Circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, circulatory system

Hazards	**Workplace monitoring**	**Frequency of monitoring**	**Test protocol/Method**
Vibration (due to use of vibrating equipment such as Grinder, Cutter, Drilling machine, etc.).	As indicated in the text	As indicated in the text	As indicated in the text
Dust	Air samplers sampling PM 2.5 and PM 10 with respirable suspended particulate matter (RSPM) sampler.	Monthly	As per bureau of Indian standards (BIS)/ central pollution control board (CPCB) /Indian factories act
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines

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Raw material handling
(for detailed description refer Section 4.9.a.)

Hazards	**Possible routes of entry / hazard**	**Common target organ damage**	**Screening of hazard event / compound**	**Frequency**	**Test (Section 5)**
Dust (Copper Concentrate & rock phosphate)	Inhalation, surface absorption, oral ingestion	Eyes, skin, respiratory system, liver, kidney blood, nervous system and skeletal system	Respiratory system evaluation, Serum copper & ceruloplasmin feroxidase, urinary copper (measured before and after work / shift hours), serum & urine fluoride levels before and after 5 – 6 consecutive working days, blood & urinary levels of heavy metals (mercury, lead, copper, arsenic, cadmium, mercury),	6 monthly, more frequent monitoring is recommended if the workplace copper, heavy metal levels are higher than TLV	Tests to evaluate eyes, skin, respiratory system, liver, kidney, blood, skeletal system (X-ray) & nervous system
Handling heavy machines / moving equipment	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (
Noise	physical	Auditory, Circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, Circulatory system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Dust (Copper Concentrate & rock phosphate)	Metal and metalloid particulates (Cu, Pb, As, Se, Ni, Cd, Hg, Bi, Sb) in workplace atmosphere, (by Air sampling and inductive coupled plasma (ICP) analysis). Evaluation by air samplers to collect particulate matter (PM) 2.5 & PM10 with respirable suspended particulate matter (RSPM) analyser for rock phosphate and fluoride levels. Phosphoric acid fumes and fluorine (as fluoride) has to be evaluated in the work place	Monthly	As per occupation safety and health administration (OSHA) method ID-125G or CPCB guideline
Handling heavy machines / moving equipment	Provision for safety / protective measures. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines.	Daily	Indian factories act
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations), octave band analyser, octave frequency analysis	Monthly	As per CPCB guidelines

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Copper smelter
(for detailed description refer Section 4.9.b.)

Hazards	**Possible routes of entry / hazard**	**Common target organ damage**	**Screening of hazard event / compound**	**Frequency**	**Test (Section 5)**
Dust (Copper Concentrate)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidney blood, nervous system and skeletal system	Respiratory system evaluation, Serum copper & ceruloplasmin feroxidase, urinary copper (measured before and after work / shift hours), serum & urine fluoride levels before and after 5 – 6 consecutive working days, blood & urinary levels of heavy metals (mercury, lead, copper, arsenic, cadmium, mercury),	6 monthly, more frequent monitoring is recommended if the workplace copper, heavy metal levels are higher than TLV	Tests to evaluate eyes, skin, respiratory system, liver, kidney, blood, & nervous system
Heat (Hot Metal)	physical	Circulatory system, renal system	Renal system	Annual	Tests to evaluate cardiovascular system and kidney
SO_2 Gas	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin respiratory system	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking test)
Noise	physical	Auditory, Circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, Circulatory system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Dust (Copper Concentrate)	Metal and metalloid Particulates (Cu, Pb, As, Se, Ni, Cd, Hg) in workplace atmosphere, copper dust and copper fumes levels to be measured (by Air sampling and ICP analysis)	Monthly	As per OSHA method ID-125G or CPCB guideline / BIS method – monitoring of metals at workplace
Heat (Hot Metal)	Heat stress monitoring , wet bulb globe temperature (WBGT) index	Monthly	Indian factories act
SO2 Gas	Air Quality monitoring by Air samplers to collect gaseous samples like SO_2 and NO_x	Monthly	As per CPCB / Indian factories act guidelines
Work at Height	Provision for safety / protective measures: Such as whole body harness, elevated working platforms, safety net to prevent fall should be practiced. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines when working at heights more than 6 feet from the ground	Daily	Indian factories act & National Safety Council Guidelines for work at heights to be followed if available. If not "Working at Height: A Brief Guide" to be followed (http://www.hse.gov.uk/pubns/indg401.pdf)
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations), octave band analyser, octave frequency analysis	Monthly	As per CPCB guidelines

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Copper refinery
(for detailed description refer Section 4.9.c.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
Acid Fumes (Copper Sulphate)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidney	Respiratory system evaluation, Serum copper & ceruloplasmin feroxidase, urinary copper (measured before and after work / shift hours)	6 monthly, more frequent monitoring is recommended if the workplace copper levels are higher than TLV	Target organ evaluation recommended
Heat (Steam and Hot Electrolyte of Copper Sulphate)	physical	Circulatory system, renal system	Renal system	Annual	Target organ evaluation recommended
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking)
Noise	physical	Auditory, circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, circulatory system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Acid Fumes (Copper Sulphate)	Air quality monitoring by air samplers to collect gaseous samples like SO_2 and Arsine, followed by metal and metalloid analysis	Monthly	As per BIS / CPCB / OSHA
Heat (Steam and Hot Electrolyte of Copper Sulphate)	Heat stress monitoring , WBGT index	Monthly	Indian factories act
Work at Height	Provision for safety / protective measures (such as net / ropes for sky folding)	Daily	Visual inspection as per Indian factories act
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines

Copper rod plant
(for detailed description refer Section 4.9.d.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
Heat (Hot Metal)	physical	Circulatory system, renal system	Renal system	Annual	Tests to evaluate circulatory system & renal system
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking test)
Noise	physical	Auditory, circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, circulatory system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Heat (Hot Metal)	Heat stress monitoring , WBGT index	Monthly	Indian factories act
Work at Height	Provision for safety / protective measures: such as whole body harness, elevated working platforms, safety net to prevent fall should be practiced. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines when working at heights more than 6 feet from the ground	Daily	Indian factories act & National Safety Council Guidelines for work at heights to be followed if available. If not "Working at Height: A Brief Guide" to be followed (http://www.hse.gov.uk/pubns/indg401.pdf)
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines

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Precious metal recovery
(for detailed description refer Section 4.9.e.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
Dust (As)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys, bone	Arsenic levels urine (preferred) / blood	6 monthly	ICP-MS method
Dust (Pb)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, kidneys, blood, GIT, CNS	Blood Lead & Delta-aminolevulinate dehydratase levels, urine lead levels	6 monthly	ICP-MS method
Dust (Se)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver,	Selenium levels in blood	6 monthly	ICP-MS method
Heat (hot metal)	NA	Circulatory system, renal system	Renal system	Annual	Tests to evaluate circulatory system & renal system
SO_2 Gas	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin respiratory system	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking)
Noise	physical	Auditory, Circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, Circulatory system
Acid Fumes	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, Liver, kidney	Respiratory system evaluation	6 monthly	Tests to evaluate eyes, skin, respiratory system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Dust (As)	Metal and metalloid Particulates in workplace atmosphere (Air sampling and ICP analysis)	Monthly	As per American Conference of Governmental Industrial Hygienists (ACGIH) / NIOSH / OSHA method ID-125 or CPCB guideline / Indian factories act
Dust (Pb)	Metal and metalloid Particulates in workplace atmosphere (Air sampling and ICP analysis)	Monthly	As per ACGIH / NIOSH / OSHA method ID-125 or CPCB guideline / Indian factories act
Dust (Se)	Metal and metalloid Particulates in workplace atmosphere (Air sampling and ICP analysis)	Monthly	As per ACGIH / NIOSH / OSHA method ID-125 or CPCB guideline / Indian factories act
Heat (hot metal)	Heat stress monitoring, WBGT index	Monthly	Indian factories act
SO_2 Gas	Air Quality monitoring by Air samplers to collect gaseous samples like SO_2 and NO_x	Monthly	As per CPCB / Indian factories act guidelines
Work at Height	Provision for safety / protective measures: Such as whole body harness, elevated working platforms, safety net to prevent fall should be practiced. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines when working at heights more than 6 feet from the ground	Daily	Indian factories act & National Safety Council Guidelines for work at heights to be followed if available. If not "Working at Height: A Brief Guide" to be followed (http://www.hse.gov.uk/pubns/indg401.pdf)
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines
Acid Fumes	Air Quality monitoring by Air samplers to collect gaseous samples like SO_2, ozone , oxygen and NO_x	Monthly	As per CPCB guidelines or OSHA method ID-200 / Indian factories act

2454

Sulphuric acid plant
(for detailed description refer Section 4.9.f.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
SO_2 Gas	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin respiratory system	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking test)
Noise	physical	Auditory, circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, circulatory system
Sulphuric Acid fumes	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, renal	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system, kidney
Vanadium pentoxide	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system, kidney
Heat (Steam and Hot Sulphuric Acid)	Inhalation, surface absorption, oral ingestion, local hazard	Circulatory system, renal system	Renal system	Annual	Tests to evaluate kidney, cardiovascular system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
SO2 Gas	Air Quality monitoring by Air samplers to collect gaseous samples like SO_2 and NO_x	Monthly	As per CPCB / Indian factories act guidelines
Work at Height	Provision for safety / protective measures: Such as whole body harness, working platforms, safety net to prevent fall should be practiced. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines when working at heights	Daily	Visual inspection as per Indian factories act
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines
Sulphuric Acid fumes	Air sampling by Silica gel sorbent tubes with personal sampling pump (with calibrated flow in line with silica gel tube) followed by analysis with Ion exchange chromatograph with electrical conductivity detector or field monitoring stations (monitoring of SO_2, SO_3 & acid mist levels)	4/8 hourly	As per OSHA method ID-113/165SG OR CPCB Guideline / Indian factories act
Heat (Steam and Hot Sulphuric Acid)	Heat stress monitoring , WBGT index	Monthly	Indian factories act

2456

Effluent treatment plant
(for detailed description refer Section 4.9.g.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
Dust (ETP Sludge containing heavy metals)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys, bone	screen for key heavy metals in blood and urine e.g. Hg, Pb, Cu, Ar, Cd, fluoride	6 monthly (Measure fluoride levels before and after 5 - 6 consecutive days of work)	ICP-MS method
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking test)
Noise	Physical	Auditory, circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, circulatory system
Acid Fumes	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, Liver, kidney	Respiratory system evaluation	Annual	Tests to evaluate eyes, skin, respiratory system, liver and kidney

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Dust (ETP Sludge containing heavy metals)	Air Quality monitoring by Air samplers to collect PM 2.5 and PM 10 with RSPM sampler. Metal and Metalloid Particulates in workplace atmosphere to be measured as well (Air sampling and ICP analysis). Swab samples from foot & hand of employees should be evaluated for heavy metals	Monthly	As per CPCB guideline
Work at Height	Provision for safety / protective measures: Such as whole body harness, elevated working platforms, safety net to prevent fall should be practiced. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines when working at heights more than 6 feet from the ground	Daily	Indian factories act & National Safety Council Guidelines for work at heights to be followed if available. If not "Working at Height: A Brief Guide" to be followed (http://www.hse.gov.uk/pubns/indg401.pdf)
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines
Acid Fumes	Air sampling by Silica gel sorbent tubes with personal sampling pump (with calibrated flow in line with silica gel tube) followed by analysis with Ion exchange chromatograph with electrical conductivity detector or field monitoring stations (monitoring of SO_2, SO_3 & acid mist levels)	4/8 hourly	As per OSHA method ID-113/165SG OR CPCB Guideline / BIS

2458

Phosphoric acid plant
(for detailed description refer Section 4.9.h.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
Dust (Rock Phosphate)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys, blood, spleen, GIT, CNS, Kidneys, Blood, gingival tissue	Respiratory system evaluation screen for key heavy metals in blood and urine e.g. Hg, Pb, Cu, Ar, Cd,	Annual	Tests to evaluate Eyes, skin, respiratory system, liver, kidneys, blood, spleen, GIT, CNS.
Acid Fumes (Phosphoric Acid with Fluorine)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys	Respiratory system evaluation & urinary fluoride by ICP-MS	Annual (Measure fluoride levels before and after 5 - 6 consecutive days of work)	Tests to evaluate eyes, skin, respiratory system, liver and kidney
Heat (Steam, Hot Water, Hot Phosphoric Acid & Slurry)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys, circulatory	Respiratory system	6 monthly	Tests to evaluate eyes, skin respiratory system, liver, kidney and circulatory system
Phosphoric Acid	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system, and liver
Hydro-Fluro-Silicic Acid fumes	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system, liver and kidney
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking test)
Noise	physical	Auditory, Circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, circulatory system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Dust (Rock Phosphate)	Personal air monitoring to collect respirable dust PM10 & 2.5 dust for rock phosphate and fluoride exposures to be undertaken. phosphoric acid fumes and fluorine as fluoride has to be evaluated in the work place and the concentration of phosphorous acid should not exceed 1 ppm or 1 mg/m^3, fluoride (as F) should not exceed 2.5 mg/m3 and Fluorine should not exceed 1 ppm or 2 mg/m^3. Additionally Co, K, Mg, Mn, Na, Cd, Cu, Cr, Ni, Pb, Zn levels should be monitored	Monthly	As per CPCB guideline NIOSH guidelines
Acid Fumes (Phosphoric Acid with Fluorine)	Phosphorous acid should not exceed 1 ppm, fluoride (as F) should not exceed 2.5 mg/m^3 and Fluorine should not exceed 1 ppm or 2 mg/m^3. Collection by air sampling followed by analysis as per OSHA method ID 111, fluoride analysis	Half hourly and 24 hourly	As per OSHA method ID-111 /BIS
Heat	Heat stress monitoring , WBGT index	Monthly	Indian factories act
Phosphoric Acid	Collection by air sampling followed by analysis as per OSHA method ID 111	Half hourly and 24 hourly	As per OSHA method ID-111 or CPCB guidelines / BIS
Hydro-Fluro-Silicic Acid fumes	Airborne Fluoride estimation through personal air monitoring for both particulate and gaseous phase fluorides. Exposure to hydro-fluor-silici acid should not exceed 2.5 mg/m^3 as per US OSHA/ACGIH/NIOSH guidelines. Contact lens should be avoided in the workplace. Fluoride levels in urine should not exceed 4 mg/L, indicate over exposure. Biological monitoring for fluorides to be undertaken	Once in 6 Months	As per OSHA/NIOSH methods
Work at Height	Provision for safety / protective measures: Such as whole body harness, elevated working platforms, safety net to prevent fall should be practiced. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines when working at heights more than 6 feet from the ground	Daily	Indian factories act & National Safety Council Guidelines for work at heights to be followed if available. If not "Working at Height: A Brief Guide" to be followed (http://www.hse.gov.uk/pubns/indg401.pdf)
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines

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Aluminium fluoride plant
(for detailed description refer Section 4.9.i.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
Dust (Aluminium Hydrate)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system	Respiratory system evaluation urinary fluoride by ICP-MS method	Annual (Measure fluoride levels before and after 5 - 6 consecutive days of work)	Tests to evaluate eyes, skin, respiratory system
Aluminium Fluoride Slurry Fumes	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system	Respiratory system evaluation & urinary fluoride by ICP-MS method	Annual (Measure fluoride levels before and after 5 - 6 consecutive days of work)	Tests to evaluate eyes, skin, respiratory system
Heat (Steam, Hot Hydro-Fluro-Silicic Acid, Aluminium Fluoride Slurry)	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys, circulatory	Respiratory system	6 monthly	Tests to evaluate eyes, skin, respiratory system, liver, kidneys, circulatory system
Hydro-Fluro-Silicic Acid fumes	Inhalation, surface absorption, oral ingestion, local hazard	Eyes, skin, respiratory system, liver, kidneys	Respiratory system evaluation urinary fluoride by ICP-MS method	Annual (Measure fluoride levels before and after 5 - 6 consecutive days of work)	Tests to evaluate eyes, skin, respiratory system, liver, kidneys
Work at Height	NA	General	General health, circulatory system, vision, neurological evaluation	Annual	Circulatory system, vision, neurological evaluation (vertigo test, tandem walking test)
Noise	physical	Auditory, circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, circulatory system

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Dust (Aluminium Hydrate)	Air Quality monitoring by Air samplers to collect PM 2.5 and PM 10 with RSPM sampler, fluoride analysis	Monthly	As per CPCB guideline
Aluminium Fluoride Slurry Fumes	fluoride (as F) should not exceed 2.5 mg/m3 and Fluorine should not exceed 1 ppm or 2 mg/m3. Air Quality monitoring by Air samplers to collect PM 2.5 and PM 10 with RSPM sampler, fluoride analysis, assessment of metals and metalloid particulates in workplace atmosphere (Air sampling and ICP analysis)	Monthly	As per CPCB guidelines
Heat (Steam, Hot Hydro-Fluro-Silicic Acid, Aluminium Fluoride Slurry)	Heat stress monitoring , wet bulb globe temperature (WBGT) index	Monthly	Indian factories act
Hydro-Fluro-Silicic Acid fumes	Airborne Fluoride estimation through personal air monitoring for both particulate and gaseous phase fluorides. Contact lens should be avoided in the workplace. Fluoride levels in urine should not exceed 4 mg/L, indicate over exposure. Biological monitoring for fluorides to be undertaken	at least once in 6 months	As per NIOSH/OSHA/ACGIH methods
Work at Height	Provision for safety / protective measures: Such as whole body harness, elevated working platforms, safety net to prevent fall should be practiced. Extra precautions to be taken to prevent contact electric shocks with HT/LT lines when working at heights more than 6 feet from the ground	Daily	Indian factories act & National Safety Council Guidelines for work at heights to be followed if available. If not "Working at Height: A Brief Guide" to be followed (http://www.hse.gov.uk/pubns/indg401.pdf)
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations) to evaluate octave band octave frequency	Monthly	As per CPCB guidelines

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Maintenance of other units in the refinery
(for detailed description refer Section 4.9.j.)

Hazards	Possible routes of entry / hazard	Common target organ damage	Screening of hazard event / compound	Frequency	Test (section 5)
Vibration (due to use of vibrating equipment's).	Mechanical	Neurological (peripheral), musckulo skeletal, circulatory	Peripheral circulation, peripheral nerves, locomotor	Annual	Sensory assessments for peripheral,
Dust	Inhalation, surface absorption,	Eyes, Skin, Respiratory system	Respiratory system	Annual	Target organ evaluation recommended
Noise	physical	Auditory, Circulatory	Screen for sensory neural hearing loss	Annual	Pure - tone audiometry, Circulatory system
Heat	NA	Circulatory system, renal system	Renal system	Annual	Target organ evaluation recommended
Light in metal unit area	NA	Eyes, skin	ophthalmic evaluation	Annual	Target organ evaluation recommended

Hazards	Workplace monitoring	Frequency of monitoring	Test protocol/method
Vibration	As indicated in the text	Refer text	As indicated in the text
Dust	Work place air quality monitoring using Personal and low volume (area) air samplers to collect PM 2.5 and PM 10. The dust concentrations to be compared with permissible exposure limits (PELs) of Indian Factories Act 1948.	Monthly	As per CPCB guideline / Indian factories act 1948
Noise	Noise level meter equivalent noise level-dB (A) (minimum 10 locations), octave band analyser, octave frequency analysis	Monthly	As per CPCB guidelines
Heat	Heat stress monitoring , WBGT index	Monthly	Indian factories act
Light in metal unit area	Intensity of light in lumens or lux to be measured by Lux meter to be compared with IS:6665:1972 (Reaffirmed in 2005)	Once in 6 Months	National Lighting Standards 2010 applicable for industrial lighting (BIS) or updated version. Or "Code of Practice for Industrial Lighting" IS: 6665:1972 (Reaffirmed in 2005) or ISO 8995-1:2002 to be followed

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Table: Reference permissible limit of exposure values for individual hazards

Hazards identified	Permissible limits of exposure (TWA - 8 Hours) @
Copper dust *, (raw)[3]	$(0.2)^3$ mg/m^3
Copper fume *	0.2 mg/m^3
Lead*	0.15 mg/m^3
Arsenic*	0.002 mg/m^3
Selenium^	0.2 mg/m^3
Fluorine *	2 mg/m^3
Iron *	5 mg/m^3
Silicon dioxide *	(30mg/m^3) or (% of SiO_2 + 2)
MgO ^	5 mg/m^3
CaO *	2 mg/m^3
Al_2O_3 ^	5 mg/m^3
Zinc *	5 mg/m^3
Fe_2O_3 *	5 mg/m^3
Bismuth ^	5mg/m^3
Antimony ^	0.5mg/m^3
Nickel *	0.05 ppm or 0.35 mg/m^3
Cadmium *	0.05 mg/m^3
Chlorine *	1 ppm or 3 mg/m^3
Mercury (alkyl compounds) *	0.01 mg/m^3
Mercury (non-alkyl compounds) *	0.05 mg/m^3
Mercury (aryl & inorganic compounds) *	0.1 mg/m^3
Silver ^	0.01mg/m^3
gold	Data NA
P_2O_5 $^{\Psi}$	1 mg/m3
SO_3 ^	1 mg/m^3 / Sulphuric Acid
$CaCO_3$ ^	5mg/m^3
CO_2 ^	9000mg/m^3
SO_2 Gas *	5 mg /m^3
Acid Fumes (Copper Sulphate) ^	0.1 mg/m^3
Sulphuric Acid fumes *	1 mg/m^3
Chromic acid / chromates *	0.05 mg/m^3
Chromous salts *	0.05 mg/m^3
Cobalt ^	0.1mg/m^3
Phosphoric acid *	1 mg/m^3
Fluorides *	2.5 mg/m^3
Hydro Fluro Silicic Acid fumes as fluoride ^	2.5 mg/m^3
Dust (Aluminium Hydrate) ^	5 mg/m^3
Aluminium Fluoride Slurry Fumes as fluoride ^	2.5 mg/m^3
Vanadium pentoxide @	0.5 mg / m^3 (as respirable dust) & 0.1 mg / m^3 (as fumes)

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* Data as per Indian factories act

^ Data as per OSHA

ψ Data as per American Industrial hygiene association

@ The exposure values of vanadium pentoxide is ceiling levels unlike the other hazards that TWA measurement for permissible exposure limit.

Section 5: Occupational health assessment / medical evaluation:

Pre-placement and periodic clinical evaluation is the key towards early identification of occupational illness / disease. All employees should be educated regarding the hazards exposed, as well preventive measures to reduce the hazard. The employees should be trained with first aid measures.

Following clinical evaluation is recommended for the early identification of illness.

Pre-placement & periodic clinical evaluation:

Following details are to be extracted during the clinical examination

1. Socio-demographic details: including age, sex, education, tobacco usage, alcohol usage pattern (habits & addiction)
2. Occupational history (past & present employment): Details of previous employment, exposure risk, type of industry, duration of employment, work hours, etc.
3. Details of previous and present medical illness / diseases or symptoms or reasons for long term medications.
4. Family history of diseases and illnesses
5. For female employees:
    a. Menstrual & obstetric history
6. Clinical assessments:
    a. General physical examination: Temperature, pulse, respiratory rate, blood pressure, anthropometry (height, weight, hip circumference, waist circumference) pallor, icterus, lymphadenopathy (swelling of lymph nodes), oedema, clubbing, cyanosis, thyroid swelling, prominent veins (neck, lower limbs)
    b. System specific examination: should include detailed history of signs and symptoms (if any) of the particular system
        i. Respiratory system
        ii. Cardiovascular system
        iii. Central nervous system
        iv. Gastrointestinal system
        v. Dermatological assessment
        vi. Musculoskeletal system
7. Respiratory system evaluation:
    a. Clinical evaluation should include detailed history of respiratory symptoms, dyspnoea, exertional dyspnoea, cough, cough with expectoration, haemoptysis, pharyngitis, laryngitis, sore throat, respiratory tract infections etc.
    b. Pulmonary function tests (spirometry) as per American Thoracic Society (ATS) / European Respiratory Society (ERS) criteria
    c. Chest X-ray Posterio-Anterior as recommended by the "Guidelines for the use of the ILO international classification of radiographs of pneumoconiosis" (contraindicated in case of pregnant women)

8. Cardiovascular system: Electrocardiogram (ECG) for persons aged > 45 years.
9. Blood investigations:
    a. Complete hemogram: Hemoglobin, cell count (TC, DC), blood grouping, platelet, RBC count, peripheral blood smear (PBS), bleeding time (BT), clotting time (CT), erythrocyte sedimentation rate (ESR),
    b. Random blood sugar (RBS)
10. Liver function test:
    a. Clinical examination: change in appetite, jaundice, nausea, vomiting, dyspepsia etc.
    b. Laboratory investigation: Albumin, globulin, AG ratio, SGOT, SGPT, ALP, serum bilirubin, GGT
11. Renal function test:
    a. Blood: Serum urea & creatinine, uric acid,
    b. Urine examination: Protein, sugar
12. Audiometry: Persons exposed to noise / sound level > 90 db time weighed average, are required to undergo 6 monthly periodic screening for noise induced hearing loss (NIHL) using pure tone average (PTA) audiometry.
13. Ophthalmic evaluation:
    a. History such as burning, dryness, redness, water of eyes etc. should be inquired along with clinical evaluation of conjunctiva, cornea, sclera, lens etc.
    b. Screen for refractory errors, colour vision, binocular Vision, peripheral vision etc. (preferably using Titmus vision tester).
14. Dermatological evaluation: clinical evaluation and recording for blisters, keratosis, infection, wound, hyperpigmentation etc. (if any found, these lesions to be recorded and monitored every 3 months)
15. Neurological evaluation (in addition to routine clinical neurological evaluation)
    a. Peripheral: clinical evaluation including detection of paraesthesia, tingling and sensory abnormalities
    b. Balance: clinical vertigo test & tandem walking test
    c. Higher mental (cognitive) functions such as attention, orientation, comprehension and memory should be evaluated.
16. Biological monitoring programme (to be performed periodically post-employment):
    a. Blood, urine, hair, nail samples of representative groups of workers to be evaluated for heavy metal such as arsenic, lead, copper, cadmium, mercury, chromium, nickel, aluminium, iron and zinc

Clinical assessments, at the described frequency should include detailed clinical assessment i.e. "6. Clinical assessments" as well the target organ evaluation tests (described above 7 – 14) mentioned in the list.

If workplace monitoring reveal additional hazards such as arsenic / other heavy metals, the employees will undergo additionally screened accordingly.

- The screening tests described in the document are meant to early detection of the anticipated chronic illness / harmful effects of the particular hazard, however the factory

medical officer is expected to watch for other possible acute illnesses and report the notifiable occupational diseases to the local DISH authorities.

- The individuals are expected to be in their best possible health, individuals identified with compromised clinical parameters should not be employed in the particular work place /industry / unit as the occupational exposure could aggravate the aforementioned clinical parameter / illness
- The frequency of evaluation indicated is for individuals with all parameters within normal range and all recommended hazard control measures have been employed.
- A particular individual employed in a particular unit, has the risk of being exposed to all the hazards mentioned, therefore has to be evaluated for the entire hazards described (e.g. individual employed in copper smelter is expected to be screened for all the identified hazards such as noise, dust of copper concentrate, heat, sulphur dioxide, noise and working at height).
- Clinical assessments described under the hazards of "dust", "heat" and "working at heights" are to prevent accidents / ill effects, due to the particular hazards.
- Re-assessment of the employee, confirming the fitness is mandatory at the time of joining back to duty post illness / injury
- Exit examinations of employees are mandatory at the time leaving / discontinuing services at the industry.

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EAC OBSERVATION:

As per the Public hearing proceedings, it is noted that there are strong oppositions from the stake holders against the installation of copper smelter unit. Consolidated list of point-wise issues raised and response provided along with action plan for implementation has not been submitted.

REPLY:

The consolidated point-wise issues raised and responses along with action plan for implementation has been provided in Chapter-7 of final EIA Report.

The following issues were raised by the public and the following actions plan has been prepared,

Sr. No.	Issue Raised	Action Plan
1	Skill development and employment opportunity	A budget of Rs. 4.8 Crore under CER project has been kept for Skill development and employment opportunity
2	Drinking Water facility	The infrastructure facility for drinking water, construction of overhead water tanks and piped water supply have been proposed as part of the CER. A budget of Rs. 12.42 Crore has been kept for the same.
3	Budget Allocation for Environmental protection.	Rs 1,044 Crore has been allocated and details of the same is available in the EIA Chapter-6, Table No- 6.5.
4	CSR activities to be undertaken and budget allocation	Adani Foundation, CSR wing of Adani Enterprises Limited is carrying out the CSR activities in the vicinity of the project area. The CSR amounts will be allocated and spend as per the prevailing guidelines of Company's Act.
5	NABET Accreditation for EIA consultant.	M/s VIMTA Labs was engaged as EIA consultant, which is NABET Accredited consultant. The NABET Certificate No- NABET/ EIA/ 1720/ SA 088 valid till 19th November 2020.
6	Survey Numbers of land for said project.	Survey numbers are provided as part of EIA Report, Chapter- 1, Table-1.1 and Form-1.
7	Arrangement of raw materials and fuel.	The comfort letters from the various raw material (Copper Concentrate) suppliers has been provided as **Annexure- 3 of ADS Reply.**
8	Utilization of Copper slag and Phosho- gypsum	Details have been provided as **Annexure- 8 &9 of ADS reply.**

EAC OBSERVATION NO.-20

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9	ETP Details and Handling of rejects from RO and ETP sludge.	State of art ETP will be constructed and waste generated from the ETP will be stored as per the CPCB guidelines. ETP details has already been provided in EIA Report, Chapter-2, and Section: 2.4.2 along with schematic diagram.
10	Details of Secured Land Fill.	Secured land fill will be developed strictly as per CPCB Guidelines for Criteria for Hazardous Waste Landfills series: HAZWAMS/17/2000-01. The thickness of the HDPE liner shall be 2.0 mm thick (min) made through flat cast extrusion technology to keep the thickness variation across the rolls to less than 5% and the minimum width of the membrane shall not be less than 7.5 m and length shall not be less than 120 m to reduce the number of joints. A detail study note is provided as **Annexure- 11 (b) of ADS Reply**.
11	Air Emission and Solid Waste Management	High efficiency pollution abatement equipment shall be installed for controlling the pollution. Mitigation measures for the pollution has been already provided in the EIA Chapter-6, section: 6.4. A budgetary provision of Rs. 1, 044 Crore has been kept for pollution control devices. Air modelling for the worst case scenario including Hg has been carried out and the predicted GLC has found to be well within the NAAQ standards. The detail report is available in **Annexure- 31 of ADS Reply**.
12	Incremental $PM_{2.5}$ pollution.	The predicted maximum GLC for $PM_{2.5}$ for worst case scenario has been modelled. The GLC during night time were observed to on higher side when compared to day time. The incremental GLC was 0.85 $\mu g/m^3$. However, the night time GLC's were found to be within the NAAQ limits.
13	Mangrove Conservation	Mangrove Conservation Plan study for Proposed Greenfield Copper Refinery Project has been conducted by Dr. Bharat Jethva, NABET Accredited FAE Cat-I, Ecology & Biodiversity. Detail Report is attached as **Annexure-5 of ADS Reply.** Budget of Rs 2.5 Crores has been allocated for plantation and third party monitoring.
14	Impact on agriculture	The predicted maximum GLC for worst case scenario has been modelled and found to be well within the limits as per NAAQ

		standards, 2009. Hence no impact on the agriculture is envisaged.
15	Impact on Public Health	The predicted maximum GLC for worst case scenario has been modelled and found to be well within the limits as per NAAQ standards, 2009. Hence no significant adverse impact on the community health is envisaged. Study of Community Health Baseline as at present has also been conducted by M/s TALEEM Foundation (**Annexure- 12) of ADS Reply**. A budgetary provision of Rs. 12.25 Crore has also been kept for community health and infrastructure development under CER.

The action plan for addressing the issues have been prepared. A budgetary provision of Rs 1044 Cr for Environmental protection and provision of Rs. 58 Cr has been allocated as Corporate Environment Responsibility (CER). The allocation of fund in CER has been arrived on the basis of issues raised in public hearing and findings of Social Impact Assessment (SIA) study.

The budgetary provision of Rs 1044 Cr for Environmental protection has been detailed in the **chapter-6 of EIA in table-6.5**. The details about CER is provided in **Annexure-33 of ADS Reply.**

Details of PH proceedings along with action plan is attached as **Annexure-20 of ADS Reply.**

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ANNEXURE-20

PUBLIC HEARING PROCEEDINGS AND RESPONSE ALONG WITH THE ACTION PLAN

Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
1	Shri Punshibhai Gadhavi Member of Taluka Panchayat, Mandvi Village: Mota Bhadiya Taluka: Mandvi	He represented that: • How many villages of the Mandvi and Mundra taluka are affected in this project? Provide the details about distance. I was a Sarpanch for a period of ten years and I made submissions during that time also but the company did not provide a proper reply. • At the time of making this report, how many numbers of villages have been visited by the company and were the local people present at that relevant point of time? • How does police behave with ladies of our village? The people of Nana Bhadiya, Mota Bhadiya and Kandagra village are sent back.	The representative of project proponent informed about his designation and qualification and then replied that: • The area of this project includes Siracha and Navinal villages. As per the guidelines under EIA Notification of Ministry of Environment, Forests and Climate Change, Government of India 16 villages within the 10 km radius are included. Out of this, the monitoring is done in 8 villages.	• The proposed project is located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat. • The environmental baseline monitoring location have been decided based on the predominant upwind and down wind direction and other environmental sensitive locations and based on EIA guidelines. • The study area of 10 km radial distance from the boundary of the proposed project consists of 16 villages. This includes 12 villages from Mundra Taluka (Tunda, Siracha, Navinal, Deshalpar, Khakhar Moti, Kandagara Mota, Nani Bhujpur, Jarpara, Moti Bhujpar, Borana, Pratappar and Dhrab), 4 villages from Mandvi Taluka (Nani Khakhar, Nana Bhadiya, Mota Bhadiya, and Tragadi). The list of Number and locations of monitoring stations (as per CPCB guidelines) are decided based on the nature of project, meteorological conditions, Topography, selected pollution pockets in the area and likely impact areas. • The list of villages with demographic details are enclosed as Annexure-X in the EIA report.
2	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra Shri Rambhai Kanani Village: Zarpara, Taluka: Mundra	He represented that: • All our questions shall be replied to in Gujarati language. The project representative does not reply in Gujarati language and therefore this means that the local public will not receive employment. The project officer should provide his qualification and identification	The regional officer asked the project representative to translate the replies from Hindi to Gujarati language. Representation of project Proponent replied that: • As per the guidelines under EIA Notification	• The baseline ambient air quality, noise and soil monitoring was carried out at 8 location. The monitoring locations were selected based on the nature of project, meteorological conditions, topography, land use conditions, existing pollution pockets in the area and the likely impact areas.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		before giving reply in Gujarati. • How many villages are affected? What is the radius of affected area? How many people were met? How many villages were visited? • At the time of presentation the list of only 8 villages is shown. Why other villages are not included? Why is monitoring done in only 8 villages? Show us the list of 16 villages. Give the proof of 08 villages visited.	of Ministry of Environment, Forests and Climate Change, Government of India, 16 villages within 10 km radius are included. Names of villages where monitoring is carried out are mentioned in the EIA report. All the villages falling within the 10 km radius are covered as per the EIA notification. The date of lab testing report is also provided in the EIA report. The company has prepared the EIA report as per the guidelines. The EIA report was made available at five places.	• The study area of 10 km radial distance from the boundary of the proposed project consists of 16 villages. This includes 12 villages from Mundra Taluka (Tunda, Siracha, Navinal, Deshalpar, Khakhar Moti, Kandagara Mota, Nani Bhujpur, Jarpara, Moti Bhujpar, Borana, Pratappar and Dhrab), 4 villages from Mandvi Taluka (Nani Khakhar, Nana Bhadiya, Mota Bhadiya, and Tragadi). • The list of villages with demographic details are enclosed as Annexure-X in the EIA report. • Monitoring photographs along with the respective sampling locations are given Annexure-VIII in the EIA report.
		• The laboratory reports should be provided. How old are these reports? At which five places were the sampling done? Which organization has conducted the study? We should be provided with the analysis report of the company. Which laboratory has conducted the monitoring? Provide certificate of the same. • At which five places were the EIA reports placed? We have objection to the hearing and proposed project. We have objection as there will be impacts on environment.	• With the due permission of chairman, the regional officer informed that the person is asking for monitoring reports and requested the representative of the project proponent to provide the same. Representation of project Proponent replied that: • The Chapter-3 (page no. 43) of the EIA report provides the entire information as to the analysis of air at 8 (eight) places. The monitoring was carried out by Government of India, NABET Accredited M/s. VIMTA Labs Ltd., Hyderabad. The certificate is provided in the report. • As per the EIA notification of the Government of India, the draft EIA report is made available at following offices: 1. District Collector office, Kutch-Bhuj 2. Office of District Development officer, Kutch-Bhuj	• The baseline ambient air quality, noise and soil monitoring was carried out at 8 location. The monitoring locations were selected based on the nature of project, meteorological conditions, topography, land use conditions, existing pollution pockets in the area and the likely impact areas. • **M/s. Adani Enterprises Limited (AEL)** has retained the services of NABL/ISO 17025 Certified Laboratory, MOEF&CC and NABET accredited EIA Consultant **M/s. Vimta Labs Limited (VLL)**, Hyderabad to prepare EIA report and Environment Management Plan (EMP) for mitigating possible adverse impacts. • The Consultant details (like certification and list of team member involved in the proposed project) are given as Chapter-11. The QCI issued certificate no. NABET/EIA/1720/SA 0088, Valid upto 19th November 2020. The details of consultant

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
			3. District Industrial Center, Bhuj-Kutch, 4. Office of the Taluka Development officer, Mundra 5. Office of the Taluka Development officer, Mandvi • The executive summary of EIA report is provided in 14 gram panchayats. The monitoring is done in 8 villages. The monitoring has been carried out as per the EIA guidelines. We have come here to provide the replies to the objections related to the information provided under the EIA report. You will be heard and a proper reply will be provided. This will be included as part of public hearing proceedings and the final EIA report will be submitted to MoEF. • Analysis report will be provided after public hearing is completed.	along with certificaties are given in Chapter-12 in the EIA report. • The analysis results are already included in the EIA Report (Chapter-3).
3	Shri Punsibhai Gadhavi, Taluka Panchayat Member – Mandvi Village: Mota Bhadiya Taluka: Mandvi	He represented that, when was the report submitted to Mandvi Taluka Panchayat? Is the report provided to community leaders? We oppose this public hearing.	The regional officer has informed that the copy of report and CD is provided to Mandvi Taluka Panchayat office on 27.03.2017.	-
4	Shri Vishrambhai Gadhavi, Village: Zarpara Taluka: Mundra	He represented that, • The photographs of place and equipment used shall be shown from where the samples were collected. • You are showing the photographs of your proposed project, show the photographs of the monitoring carried out.	The representative of the project proponent replied that, we have photographs of 8 locations and these will be provided.	• The photographs of monitoring had been shown during the public hearing. • Monitoring photographs along with the respective sampling locations are given Annexure-VIII in the EIA report.
5	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that the person providing the reply on behalf of the company must provide the company photo ID card, only then he will be allowed to reply. Our boys are not permitted to enter the company without an ID-card.	The representative of the project proponent showed the photo ID-card on LED screen.	-
6	Shri Gopalbhai Gilwa Village: Zarpara	He represented that,	The representative of the project proponent replied that:	This question is not directly connected to the proposed project. However, in the proposed

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
	Taluka: Mundra	• Give the information about how much carbon dioxide is emitted from the thermal power plant at Mundra? Provide the figure of carbon dioxide that is emitted in 24 hours. • At the time when I went to Mr. Mukesh Saxena for job, he stated that the recruitment of job is done from Ahmedabad. I was kept as apprentice, after a period of 4 months, for duration of 12 months. Thereafter I was given the job as supervisor at the Power Mech Company. I have not been taken on roll in the company. I was shown my social category. The people coming from outside are given direct jobs while I was not kept on permanent job at any place. Therefore I left the job after 6 months and at present I run a shop. • I did not get the job as per my studies and thus provide job. Will I be given job at the new plant? • What is the duty time and salary of on roll employees?	• The amount of carbon dioxide is 870 gram/kilowatt hour. 67,525 tonnes of CO_2 equivalent is emitted per day. • The representative of the project proponent replied that, you came directly to me and there was no recommendation for you. We kept you on training for a period of 12 months on apprentice. For this you were given a stipend of Rs. 12000 per month. During the apprentice required training is provided. The company provides you further training when you become an employee from apprentice. You were in a list wherein there were 60 persons and out of which 15 were engineers. We gave you job on contract after the apprentice. You will be provided the list of the resident of Zarpara who have been given employment. • One should not expect that he shall get a job as per his wish. Intention of learning is important for any job. • The employee on contract has a service of 8 hours but the employee has to stay for longer hours when there is additional work load. No discrimination is done in the company. • The local hearing video copy may be provided by presiding officer.	project employment about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
7	Shri Dayabhai Viram Gadhavi, Village: Mota Kandagara, Taluka: Mundra	• He represented that; provide video copy of local hearing.	The local hearing video copy may be provided by presiding officer.	-
8	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that a person becomes an engineer by spending lacs of rupees and you give such replies to him!	-	Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
9	Shri Gopalbhai Gilwa	He represented that,	The regional officer stated that,	The proposed project is an independent

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
	Village: Zarpara Taluka: Mundra	• Adani Power has obtained the permission for Phase-IV. Why have you installed FGD? The pollution load had increased in Mundra. • At Mundra one tonne Carbon Dioxide is produced per Megawatt. Adani Power and TATA Power emit CO_2 that is much more than the capacity of Mundra. Then, why do you wish to bring this new plant?	• This public hearing is for the Copper Refinery project and therefore the questions related to that issue only shall be asked. Your representations shall be noted down. Your representations and objections will be included as part of the proceedings. The CD will be submitted along with the proceedings to Ministry of Environment, Forests and Climate change of Govt. of India. • The representative of the project proponent replied that, 0.87 Ton carbon dioxide is produced for 1 Mega Watt. The FGD system is installed as per the clearance provided by Ministry of Environment, Forests and Climate change. This is installed for sulphur dioxide scrubbing. There is no statutory limit for carbon dioxide emissions.	greenfield copper refinery plant. The anticipated potential impacts analysis, cumulative impacts due to increase of pollutant and its mitigation measure are provided in Section-4.2.2 of Chapter-4 in the EIA report. The cumulative impacts of exiting power plants of Adani and Tata power have been considered and incorporated in the Section-4.2.2 of EIA Report. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
10	Shri Dayabhai Gadhavi Village: Mota Kadagra Taluka: Mundra	He represented that, why are you not listening to us? Why don't you reply? Are the questions raised by us relevant or not?	-	-
11	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that the company conducted the public hearing for power plant also in this manner. The promises that were made at that time have not been fulfilled and now you wish to establish a new project.		-
12	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra	He represented that we have been informed to ask questions related to environment only. Should we not be provided with the platform to make representations on other questions?	-	-
13	Shri Gajendrasinh Jadeja Sarpanch Navinal Village: Navinal Taluka: Mundra	He represented that, • You were complained through email for cancellation of the public hearing on 11.04.2017 and a meeting was held with Mr. D R Patel. But no reply was given for the	The representative of the project proponent replied that: • As per the circular of MoEF&CC dated 31.03.2011, if the forest land cannot be avoided, the application shall be filed by	MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. Stage-I FC has been

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		same. The project proponent has not complied with the terms of reference as per my complaint. How can the public hearing be conducted for this project when the process of forest clearance is still going on? • The project proponent has concealed the information in Form-1. As per the S.No. 16 and 26 of Basic Information of Form-1, with reference to the Gochar land, PIL no. 17/2011 judgment, the project proponent has mentioned that there is no pending PIL for this land. This information is not mentioned in Form-1. • In the S.No. 2 and 10 of Form-1, it is not mentioned that the Daneshwari river passes through the forest land.	project proponent to obtain forest clearance. After this stage-I application, the project proponent can apply for TOR. • The TOR application is filed after the Stage-I application for forest clearance is applied. Thereafter the MOEF&CC provides the TOR to project proponent. Afterwards EIA can be made. After the entire process of EIA, the MOEF&CC checks the status of the application for forest clearance and the project is approved on that basis. • We have not concealed any information. The PIL has been disposed. The judgment is under review. The application is filed for the acquisition of forest land. Under the Form-1, it is stated that the non-forest land is of APSEZ and the application for forest land is under process. • In the EIA report, maps are provided and Daneshwari river is shown in it.	obtained as given in Annexure-V in the EIA report. The PFR submitted along with the Form-I application clearly shows the water stream passing through proposed project site. The same is available in the Annexure-VII of the PFR submitted along with the Form-I. Dhaneshwari river also refered as Danesri Nadi (as per Topo sheet no: F42 J9 & 10) stream passing within site (west side). Dhaneshwari, a seasonal river which flows in the western part of the proposed site. The river will not be diverted but suitably trained along the boundary. The flow of the river will be maintained, as shown in the plant layout on Figure-2.1 of EIA report.
14	Shri Pravinsinh Bhurubha Chauhan Village: Siracha Taluka: Mundra	He represented that, • As per the EIA report, you state that no perennial river is present within the project land. There is no perennial river in whole of Kutch. From the 2011, 2013 and the present Satellite image, it is clear that you have diverted the river. • Your hospital is also constructed on the river. It is clear from the Satellite image of year 1991. Show the CD of Satellite image to all. • I wish to show Figure No. 1 from the EIA report. The river is tampered with in the Figure.	-	Dhaneshwari, a seasonal river flows in the western part of the proposed site. The flow of the river will be maintained, as shown in the plant layout on Figure-2.1 of Chapter-1 in the EIA report.
15	Shri Punshi Gadhavi Taluka Panchayat member, Mandvi,	He represented that: • What will Adani do for the education, health	The representative of the project proponent replied that Adani Foundation is already carrying out development works in areas of	A budget of Rs. 58 ,07,83,796 for the period of 5 years (From day 1 of the project construction) has been allotted toards

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
	Village: Mota Bhadiya Taluka: Mandvi	and fodder for cattle? A written submission is also done for this. • You have not given the reply to the previously asked question of Punshibhai Gadhavi. Provide reply to it.	education, health and other social sectors on the basis of the written representation of Punshi bhai. This will also be done for this project. A budget of 8 crores rupees per year is allotted for CSR activities. Particular focus shall be given to the villages that are affected.	Corporate Environmental Responsibility-CER activities (1st May, 2018 Office Memorandum of MoEF & CC). Based on the needs identified during SIA study in the study area. The CER fund is distributed in the following development initiatives: • Education Initiatives – Rs. 7,92,57,390 • Community Health Initiatives – Rs. 12,25,04,434 • Sustainable livelihoods and womenempowerment - Rs. 27,59,09,755 • Community Rural Infrastructure Development – Rs. 9,76,12,217 • Independent monitoring sudit snd ipact assessments of CSR activities – Rs. 55,00,000
16	Shri Asariya Lakha Gilwa Village: Zarpara Taluka: Mundra	He represented that the company officers should make submissions in the local Gujarati language.	It is noted down and replied in Guajarati language only	-
17	Shri Bharat Kalyan Sheda Village: Zarpara Taluka: Mundra	He represented that the people residing here want clean environment and we don't need any project. Why do you want to establish this project here?	-	The proposed project is an independent greenfield copper refinery plant. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. About Rs.1044 crores will be spent for environmental pollution control measures in this project. For establishment of this project, three alternative sites have been studied. These three sites include: Site-I: near Gundala & Mokha villages; Site-II: near east side of Adani power plant; and Site-III: near near Mundra village.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
				Among three above sites, the site-II near east side of the Adani Power Plant has been chosen based on the comparative merits and demerits of the three sites. The comparison of salient features of alternative sites done and details are presented in Table-5.1 and shown in Figure-5.1 of the EIA report.
18	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that; • A total 12 crore ton of CO_2 is generated daily. Why is the FGD for phase-IV installed? • This plant will emit 30 lakh tons of Sulphuric acid so why do you want to establish this plant?	The representative of the project proponent replied that: • Adani Power produces 25 million ton of CO_2 per year and around 25 million ton is produced by TATA Power. In this manner the total CO2 produced is around 50 million ton. • In the Adani Power Phase-IV, MoEF had stipulated a condition based on which the FGD system is fixed. • Sulphur Dioxide will be produced from Copper Smelter. In the sulphuric acid plant, the sulphur dioxide will be absorbed and sulphuric acid will be produced. The residual amount of sulphur dioxide from the proposed project will be within the limits stipulated by CPCB, Government of India.	• The SO_2 generation is a continuous process during smelting activity. Primary gas stream will be routed to sulphuric acid plant (SAP) plant and the fugitive gas stream will be routed through scrubber. Further, there is no provision in the plant/process for storage of SO_2 gases and will be processed immediately to produce sulphuric acid. • Sulphuric acid plant (SAP) will be installed with highly efficient (Double Conversion Double Absorption) DCDA process to control the SO_2 emission to less than 1 kg/t of sulphuric acid produced. • The residual amount of sulphur dioxide from the proposed project will be within the limits stipulated by CPCB, Government of India. • The process of extraction of copper metal, sulphuric acid is recovered as a by-product from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for phosphoric acid production and rest will be sold in the market based on market requirement.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
				• About Rs. 1700 crores will be invested to install sulphuric acid plant. • Regular stack emission monitoring shall be carried out at all stacks for particulate matter, HF, SO_2 and NOx for checking the compliance to emission standards by respective plant. • The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. • About Rs. 639 Crores will be spent on air pollution control system installation.
19	Shri Gopalbhai Gilwa Village: Zarpara Taluka: Mundra	He represented that, in one day, a total of 1,25,988 ton of CO_2 is emitted in the atmosphere. The average temperature of emitted CO_2 is 150 degree Celsius. Why should the new plant be approved even thereafter?	The representative of the project proponent replied that: • The average temperature is 120 to 130 degree Celsius. World level efforts are made to stop global warming. The power plant is based on super critical technology and produces lesser amount of CO_2 in the atmosphere. Till date it is not found that the level of CO_2 would have decreased on world level. The government of India has targeted to reduce CO_2 emissions by 30 to 35% in comparison with the year 2005. The power plant that is based on old technology produces 1 to 1.5 Ton CO_2 per Megawatts hour, while the plant based on new Super Critical technology produces a total of 0.8 ton CO_2 per Megawatt hour.	• The emissions of carbon dioxide from the proposed copper refinery project will 490 tonnes per day. Further, the project will have 85.79 ha (33% of the project area) of greenbelt/green cover to absorb any gaseous emissions in the proposed project. • Further, regular post project monitoring will be carried out for the gaseous emissions and the test reports will be submitted to GPCB and MoEF&CC. Regular monitoring will help to keep a check on the gaseous emissions.
20	Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	He represented that, • Our agriculture is adversely impacted. The characteristics of the Male Date Seeds	-	The proposed project will implement all the control measures at the source level, which are incorporated in the Draft and Final EIA report.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		seem to be transforming to that of Female Date Seeds. • We do not want this project. EIA report states that there is no living organism and only wild plants are present. No information is provided about river, vegetation and other living organisms. No ground reality is provided. 80% people of this area are dependent on agriculture. We do not want this project.		Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project. A budget of Rs. 58,07,83,796 have been allotted for CER activities for five years. In which the support for effective utilization of available water through dripping systems will be implemented.
21	Shri Vishrambhai Gadhavi, Village: Zarpara Taluka: Mundra Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	He represented that, • Our agriculture is adversely impacted. The characteristics of the Male Date Seeds seem to be transforming to that of Female Date Seeds. • We do not want this project. EIA report states that there is no living organism and only wild plants are present. No information is provided about river, vegetation and other living organisms. No ground reality is provided. 80% people of this area are dependent on agriculture. We do not want this project.	-	The proposed project will implement all the control measures at the source level, which are incorporated in the Draft and Final EIA report. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project. A budget of Rs. 58,07,83,796 have been allotted for CER activities for five years. In which the support for effective utilization of available water through dripping systems will be implemented.
22	Shri Vishrambhai Gadhavi, Village: Zarpara Taluka: Mundra	He represented that; • Why is the chimney of Adani Power tilted? What is the height of Chimney? • It rains less due to this. A large amount of difference in rain is seen in Bhadiya and Zarpara village due to this.	The representative of the project proponent replied that: • The height of chimney of power plant of Adani Power having a capacity of more than 500 megawatts is 275 m. The height of chimney is kept for the dispersion of gases in the air. There are no norms on limit of carbon dioxide emissions. • The pollution is diluted around 2000 times due to the height of chimney. There is no study done which suggests that due to	The proposed project is a greenfield copper refinery project. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures under this project.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		• Crores of tons of CO_2 is emitted daily. Is there any limit to it?	power plant it would have rained less at any place. Rain is almost found same in both villages. • The estimate of CO_2 in atmosphere at world level is around 350 to 400 ppm. There is no statutory limit for this. As per the NAAQ standard for sulphur dioxide, the 24 hour average limit is 80 microgram/m^3.	
23	Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	• He represented that the wind direction is shown wrong.	• The representative of the project proponent replied that the wind direction is shown as per the winter season data. It is shown from South South West (SSW) to North North East (NNE).	The wind directions given in the wind roses indicate from direction. During the study period (October-December, 2016), the predominant wind direction is from SSW to NNE. This is generally in agreement with the nearest IMD data at Kandla and represent coastal conditions.
24	Shri Bharat Kalyan Seda Village: Zarpara Taluka: Mundra	• He represented that It is submitted that the reply be given in Gujarati	Point noted and agreed.	-
25	Shri Nanji Mithubhai Maheshwari Village: Mota Kandagra Taluka: Mundra	He represented that; • Show on LED screen the letter with signatures and stamp of Sarpanch and Talati for the 8 affected villages that have been surveyed. • How will employment be provided in this plant?	-	It may be noted that the project area falls in two villages namely Siracha and Navinal. The proposed project will provide employment to about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available. A budget of Rs. 58,07,83,796 have been allotted for CER activities for five years.
26	Shri Bahrat Kalyan Seda Village: Zarpara Taluka: Mundra	He represented that; Thousands of people are objecting. Show us the photographs of your visit in 16 villages.	-	The monitoring photographs and name of sampling locations are enclosed as Annexure-VIII in the EIA report.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
27	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that; • In the executive summary of page no. 2.1 the nearest village is shown as Mundra. Provide the list of all the affected 16 villages. Why is village Mundra included in affected villages? • What would be the time limit of this public hearing?	The representative of the project proponent replied that: • Through this public hearing, all your representations will be provided to the MoEF. The company will work in a transparent way. Mundra is the closest town to the Project area. The land of Siracha and Navinal villages are covered in this project. • In the EIA report, the Annexure-X contains demographic report. It contains list of 16 villages. This includes Siracha, Tunda, Mota Kandagra, Moti Khakhar, Nani Khakhar, Moti Bhujpur, Nani Bhujpur, Desalpar, Bharora, Zarpara, Pratapur, Mota Bhadiya, Dhrub, Tragadi, Nana Bhadiya and Navinal. • In chapter-3 of the EIA report, details of all the villages are provided. The EIA report is made as per the MOEF guideline. • The presentation contains the details of the impacts on environment. Moreover these details are also included in the EIA report. EIA covers study of all the aspects and its management plan is also shown. • The regional officer stated that, the public hearing will be completed after all the representations are heard.	Mundra is the closest town (22 km – road distance) to the project area. The land of Siracha and Navinal villages are only covered in this project. The demographic details of the entire study area is given in Section-3.10 of Chapter-3 in the EIA report.
28	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that when any company comes, it is required that 33% green belt shall be provided and as part of the same when Sunita Narayan committee visited, the plants were grown on both sides of the road. These plants do not exist at present.	The representative of the project proponent replied that Respectable Sunita Narayan came in the year 2013. The green belt at present is much more than what was at the time of her visit. Even further plantation will be done.	About 85.79 ha of the proposed copper refinery complex (33%) will be reserved for greenbelt / green cover development as per prevailing guidelines from GPCB/CPCB/MoEF&CC. Native species with rich canopy will be planted. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report.
29	Shri Gadhavi Kalyan Asariya	He represented that in the past, I came for	The representative of the project proponent	About 85.79 ha of the proposed copper smelter

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
	Village: Zarpara Taluka: Mundra	training in Adani Foundation on behalf of the KSKV University. At that time in the river and other places, around 60 thousand trees were planted but these are not found at present.	replied that you both have asked different questions. One relates to village and the other relates to APSEZ.	complex (33%) will be reserved for greenbelt / green cover development as per prevailing guidelines from GPCB/CPCB/MoEF&CC. Native species with rich canopy will be planted. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report.
30	Shri Gajendrasinh Jadeja, Sarpanch Navinal Gram Panchayat Village: Navinal Taluka: Mundra	He represented that; • The sr. no. 10 on page C1-4 of the draft EIA report states that, there is no archaeological place at this site. However, at a distance of around 500 to 1000 meters from the proposed project site, the site of Navinal Archaeological site is present. I have the report of the MS University which states that it relates to the Harappa civilization. • The fisheries harbour is not developed at Bhadreshwar. The access roads for the fishermen were closed and are not opened again.	The representative of the project proponent replied that: • There is no mention of such a site on the Archaeological Survey of India Website. You shall be provided the list of notified site. • There was no permission to go to the Randh bunder (Bhadreshwar) at the time of Sunita Narayan committee visit. At present Foundation provides various facilities like water, electricity, etc. at that place. • After the visit of Sunita Narayan committee, the fishermen access roads were developed which are open even as on date.	There is no notified archaeological site within 10 km from the proposed project site.
31	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that: • The road to Bharadi Mata has been opened after a lot of troubles. You did not spare any effort to close down the road.	The representative of the project proponent replied that the road leading to Bharadi Mata has been kept open. As on date, not just one but two approach roads are available.	-
32	Shri Valji Bhai Tapariya Village: Zarpara Taluka: Mundra	He represented that; • In the production of copper plant, Sulphur is to be used and this will have acidic processes. • Environment will be impacted due to this. The effect of this sulphuric acid is shown in radius of around 10 km. This is around 20 to 25 km as per the opinion of experts. • At a humanitarian level, the GPCB should also take interest in this considering its personal responsibility for longer terms. No one is against development. The effect of copper refinery is even more than power plant. The plant should be taken away from	The representative of the project proponent replied that: • No addition in the capacity of the copper smelter is envisaged for the refinery after the project approval. • The copper concentrate is processed in the copper smelter. Sulphur dioxide is generated from it. It is captured and sulphuric acid is produced. This sulphuric acid is converted into phosphoric acid. • The sulphuric acid will be converted to phosphoric acid in the phosphoric acid plant. It will used in fertilizer plants. • Other than this, a by-product, fluoro-silicic	The process of extraction of copper metal, sulphuric acid will be recovered as a by-product from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced will be utilized for phosphoric acid production and rest will be sold in the market based on market requirement. The impacts and mitigation measures are given in Section-4.2.2.3 of Chapter-4. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels.

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		human population if its place can be moved. In the past, electricity was generated with atoms and this eradicated the entire lineage of people. The fishermen should also not be affected. The government should take proper care and consider that no negative effect is found.	acid will be made which will be used in the making of toothpaste.	Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
33	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that; • Will you make a residential place near the plant and reside at that place? If that is the situation, we do not object. We reside in the farms outside. • Is there any power plant, at any other place, with such big capacity?	The representative of the project proponent replied that: • Many a times our high ranking officers reside at the guest house of power plant. Many copper plants in the entire world are present beside cities. We will also make guest house in our copper plant. • Yes, there are power plants of total 20 thousand Megawatt capacities at Singroli. Angul, Andhra Pradesh has 16 thousand Megawatts capacity power plants. Tuticorin at Tamilnadu has 12 thousand Megawatt capacity of power plants. These all are coal based power plants. Now the government of India approves all big power plants with FGD only.	The employees of the proposed copper plant will be staying in the existing township of Adani at Mundra. The copper plant will have guest houses in its premises.
34	Shri Naran Gadhavi Village: Zarpara Taluka: Mundra	He represented that • The highest officer of the district was addressed and a letter was written on 27/4/17 and it was mentioned that the land on which the copper plant is proposed is subjudice matter. The collector has not taken any decision till date. • It is mentioned under it that after the Honorable sitting principal judge and Sunita Narayan committee, two other committees also visited. First of all the committee of the Honorable sitting judge visited. The visit report was submitted to	The representative of the project proponent replied that: • I give an elaborate reply to your question. With respect to the PIL no 12/2011, the committee visited APSEZ and its report was kept on record of the Honourable High Court. The matter was disposed by the Honourable Gujarat High Court on 17.04.2015. • As per previous proceedings the contempt petition (no. 9124) dated 12.07.2011 was filed. Thereafter on 15.10.2015, the order was passed. The matter with reference to	The proposed project area is not under the disputed land as claimed. All the show cause notices have been disposed. This proposed copper refinery project does not have any connection with this case pending before the Honourable Gujarat High court.

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		the high court. The report of this committee is subjudice. The second report (dated 05.11.2015 and 01.04.2016) one expert was called from Goa and another from Calcutta on the basis of the order passed by the Honourable Gujarat High Court. • The committee recommended that the 6 thousand acres of land should be returned to the government. No decision till date has been taken in this regard. • As for this the contempt of court proceedings shall be held against the competent officer. The map is also shown in the EIA report. Why is the public hearing been done, even if the matter is subjudice? • GPCB is also a party in this matter. On the basis of our complaint, the Sunita Narayan committee provided a report on 17.09.2015 to MoEF&CC, government of India. • Two maps have been submitted to the Gujarat High Court committee. These are on the record of the high court. You submitted the map with topo sheet. These were for entire land. This includes your project. • As mentioned by you, the forest area is to come under the project. The High court committee has stated that, the land should be taken away from Adani and provided to the government. The 5,333 ha of forest area should be restored. • This matter is under consideration at the	the Sunita Narayan committee report, was disposed of in the year 2015. As per the order passed by the Honourable Gujarat High Court there is no contempt order. The report was submitted by the committee including expert from Goa and Calcutta on 08.06.2016. That particular matter is pending before the Honourable High Court of Gujarat. The committee recommended that 100 ha or more mangroves plantation should be undertaken. The project area is not part of the disputed land. All the show cause notices have been disposed. The recommendation is done in the survey by the committee. It is not an order. The company will accept the final order passed by the Honourable High Court. The land of the proposed project does not have any relation with this matter. The land under notified SEZ shall be used for this land. The MOEF will consider the matter that is pending before the High Court. The proposed project does not have any connection with this matter. • The MOEF has provided the direction to the company and the company is working on it. The report for this is submitted to the MOEF every 6 months. The matter you have stated is about the survey of the report of the committee. It is a recommendation and not a decision. The Gujarat High Court will consider the submissions of the company along with the committee report and the company will comply to the guidelines provided by the court thereafter. • The government of India will decide	

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		Gujarat High Court. Why is this case not mentioned in your EIA report?	further course of action on your matter and our reply. • The representative of the project proponent replied that this proposed project does not have any connection with this case pending before the Honourable Gujarat High court. This is our submission.	
35	Shri Bharubhai Ranshibhai Shankra Secretary, Kehti Vikas Seva Trust, Village: Zarpara Taluka: Mundra	• He represented that: Do thing that would be favourable for the people. Do not leave after taking money. I do not have any objection for the company to either come or not. Do all that is in the interest of people.	-	A budget of Rs. 58 ,07,83,796 for the period of 5 years (From day 1 of the project construction) has been allotted toards Corporate Environmental Responsibility-CER activities (1st May, 2018 Office Memorandum of MoEF & CC). Based on the needs identified during SIA study in the study area. The CER fund is distributed in the following development initiatives: • Education Initiatives – Rs. 7,92,57,390 • Community Health Initiatives - Rs. 12,25,04,434 • Sustainable livelihoods and womenempowerment - Rs. 27,59,09,755 • Community Rural Infrastructure Development – Rs. 9,76,12,217 • Independent monitoring sudit snd ipact assessments of CSR activities – Rs. 55,00,000 The CSR details (like CSR policy, initiatives & activities, CSR budget expenditure data from 2010 to 2016, and CSR implemented photographs) is given in Section-8.5 of Chapter-8 in the EIA Report.
36	Shri Dayabhai Viram Gadhavi Village: Mota Kandagra Taluka: Mundra	He represented that, we will not let the permission be granted for a new plant. The regulations laid down by the GPCB, CPCB,	-	There is no violation with respective to GPCB, CPCB, MOEF&CC by the proposed project.

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		MOEF&CC are violated by the company and the officers present at this place should inspect the matter. We do not want a new project.		The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
37	Shri Bharat Kalyan Shetha Village: Zarpara Taluka: Mundra	He represented that, the people here do not want this project to come. The people here want clean environment. The people do not want this progress; the people do not want the long term destruction, Kindly take note of this.	-	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
38	Shri Anwarbhai Ibrahimbhai Vagher, Village: Navinal Taluka: Mundra	He represented that, no damage has been done to the fishermen access roads or any other things. Our access roads are not closed. The people from Patel community and our villagers do not have any objection for the plant to be established.	-	There will be no damage to fisherman due to the proposed project. A budget of Rs. 58 ,07,83,796 for the period of 5 years (From day 1 of the project construction) has been allotted toards Corporate Environmental Responsibility-CER activities (1st May, 2018 Office Memorandum of MoEF & CC). Based on the needs identified during SIA study in the study area. The CER fund is distributed in the following development initiatives: • Education Initiatives – Rs. 7,92,57,390 • Community Health Initiatives - Rs. 12,25,04,434 • Sustainable livelihoods and womenempowerment - Rs. 27,59,09,755

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
				• Community Rural Infrastructure Development – Rs. 9,76,12,217 • Independent monitoring sudit snd ipact assessments of CSR activities – Rs. 55,00,000
39	Shri Kadar Ismail Village: Navinal Taluka: Mundra	He represented that our roads are open and we do not have any objection.	-	-
40	Shri Gajendrasinh Jadeja Sarpanch, Navinal Gram panchayat Village: Navinal Taluka: Mundra	He represented that, • The fishermen of my village do not have proper knowledge. I can show the maps of forest department and other maps to confirm which access roads are closed down. The access road which is shown in the map belongs to forest dept. The fishermen access road to the sea passes through the project site. • This is government road. It is not owned by you. I am talking about the road that has been made by the government for the fishermen.	-	There will be no damage to fisherman due to the proposed project. The roads used by fishermen will not be disturbed due to the proposed copper smelter project. Further, a total budget of Rs. 58 crores will be spent on CER activities in which fishermen welfare will also be included.
41	Shri Anwarbhai Ibrahimbhai Vagher/ Shri Kadar Ismail, Village: Navinal Taluka: Mundra	He represented that our roads are open. Kotdi Bandar and Sodawadi Creek are open. We do not have any kind of objection.	-	-
42	Shri Pravinsinh Bhurubha Chauhan Village: Siracha Taluka: Mundra	He represented that information be provided if the road from Navinal to Daneshwar, which existed, is closed down or not?	-	The existing roads will not be disturbed due to the proposed copper smelter project.
43	Shri Asariya Lakha, Village: Zarpara Taluka: Mundra	He represented that, it is the responsibility of the chairman to ascertain that no one comes for the purpose of praising someone. The proceeding should be as per instruction from chair. The purpose of this public hearing is to hear the representations of the affected people.	-	-
44	Shri Gandrasinh Jadeja Sarpanch, Navinal Gram Panchayat, Village: Navinal	He represented that first of all compliance of existing environmental clearance for power and SEZ should be met and then this project should come.	-	The proposed project is an independent greenfield copper refinery plant. The proposed project will implement all the

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	Taluka: Mundra			control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
45	Shri Rambhai Kanani Village: Zarpara Taluka: Mundra	He represented that the company has a strategy to bring some hired people after two hours of hearing and these people will take the entire hearing out of track.	-	-
46	Shri Gandrasinh Jadeja Sarpanch, Navinal Gram Panchayat, Village: Navinal Taluka: Mundra	He represented that • 102 ha of land of the forest department will be used in this project. Adani had in the year 2004 made a demand of 1576.81 ha of land but the forest department has not approved it till date. Navinal and Shiracha, both villages have claimed their rights under the Forests Rules. The people of Navinal and Shiracha graze their cattle and obtain livelihood. If this forest is given, where will the wild animals and grazing domestic animals go? And lastly when, the remaining forest land, government land and Gochar land is given, where will the people, animals and birds go? • This is the last reserve forest of this area. Bharadi Mata is sand dunes. This is coastal and mangrove forest. This area is under the CRZ-1 area. There is no provision for approval of such land.	The representative of the project proponent replied that: • You know very well what is the land use of the 102 ha of forest land and as per the report of the forest department, no major displacement would be required. The 33% green belt will be developed at the time when plant comes. As per the report of the forest department, no major displacement would be required. The land of this area will be used by the company for the development of green belt and specific care will be taken for the animals and birds. The animals shall be provided fodder through CSR activities. • The forest department will take all these aspects into consideration while providing clearance. • Other than this, the Bharadi Mata reserve and coastal forest is situated near the project site. The animals obtain fodder from that place. The project will utilize 111 ha of Navinal land. While 102 ha of land of Shiracha will be used for	The total land required for the proposed project is about 256.58 Ha (634 acres), out of which 154.19 ha (381 acres) of identified land for this project belongs to the APSEZ (an Adani Group Company) and is already designated for industrial purpose as per the local land use plan. Memorandum of Understanding (MoU) is in place between Adani Ports & Special Economic Zone Limited (APSEZL) and Adani Enterprises Ltd (AEL) for 154.19 ha (381 acres). MoEF&CC (forest conservation division) has granted Stage-1 approval for diversion of 1576.81 ha of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018. Stage-I FC has been obtained as given in Annexure-V in the EIA report. The conditions stipulated in the Forest Clearance and Environmental Clearance will be strictly adhered to and complied with. It is also committed that the fodder to cattle in the nearby villages such Siracha and Navinal will be provided through CER initiatives.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
			development of green belt.	About 85.79 ha of the proposed copper refinery complex (33%) will be reserved for greenbelt/green cover development as per prevailing guidelines from GPCB/CPCB & MoEF&CC. Native species with rich canopy will be planted. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report. About Rs. 40 lakhs is allocted for tentative budget for peacock conservation plan. Further, the proposed project is outside the CRZ area, the approved CRZ map with proposed project is shown in Figure-1.5 of Chapter-1 in the EIA report.
47	Shri Pravinsinh Bhurubha Chauhan, Village: Siracha Taluka: Mundra	He represented that, • The Dates, Deshi Babool, etc. trees present on the forest department land and located adjacent to the power plant have dried out due to smoke from stack and cooling tower. • Where will the animals like Nilgai, Jackal, fox and others go? They will come at our farms.	The representative of the project proponent replied that: • Even at present the land is under the forest department and the plants that you state are alive. No such thing has occurred. • This is not true and the forest department would have informed us if such a thing would have occurred.	The plants are existing in the study area. The proposed green belt/green cover will also have native plants. The proposed plant area does not have the presence of Nilgai, Jackal. However, they are present in the buffer area and all the precautions will be implemented as suggested under Forest Clearance and Environmental Clearance.
48	Shri Rambhai Kanani, Village: Zarpara Taluka: Mundra	He represented that there is a difference between the EIA report and the presentation. The details mentioned in the Gujarati report are not actually true. There is difference in the description of environment. Under the project area, only Babool and peacock are shown. But the actual situation is different. There are medicinal plants also at this place. The description of the nature is given but it is not ground reality.	The representative of the project proponent replied that, the summary of the EIA report is shown as part of the presentation. The entire EIA report is not to be shown in the public hearing. In case if you have found any discrepancy in the EIA report, you may draw attention as to the same in writing and this will be included under the public hearing proceedings and it will also be submitted to MoEF&CC, Government of India. Moreover EIA report is prepared based on the information obtained at that relevant point of time.	As per primary ecology and biodiversity survey the details are given Section-3.9 of Chapter-3 in the EIA report. The faunal species were categorized as per conservation status of Wildlife Protection Act, 1972 and reveals that peacock is the only Sch-I species in the study area. However, it has been assessed as Least Concern bird as per the International Union for Conservation of Nature (IUCN). Further, the conservation plan and measures for Peacock are recommended in

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
				Section-3.9.9 of Chapter-3 in the EIA Report.
49	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that the company has shown its video during the hearing. All good things are being projected. No information is provided about the side effects, risk, etc. from the project. The video of the person submitting representation shall be shown.	The chairman stated that, • Please submit your CD we will be include the same in proceedings. Note: It was tried to show the video of representation by mobile on LED screen however it could not be run due to any reasons.	-
50	Shri Pravinsinh Bhurubha Chauhan Village: Siracha Taluka: Mundra	He represented that, I wish to show the CD related to the scams committed by the Adani Power and SEZ. It is mentioned under the Form-1 that there is no mangrove at this site but as per my view there are mangroves presents.	-	There is no mangrove planation within the proposed project site.
51	Shri Rambhai Kanani Village: Zarpara Taluka: Mundra	He represented that the people are facing problems from your existing plants and therefore people do not welcome your project.	-	-
52	Shri Usman Gani H Sheraseeya Village: Vakaner Taluka: Morbi	He represented that • How much water will be obtained for this project and from which place will it be taken? • Will you discharge salty water after desalination in the sea?	The representative of the project proponent replied that, 32800 cubic meters of water will be required for this project which will be used after desalination of the sea water by APSEZ.	The total water requirement for the project is about 32,267 KLD which will be sourced from desalination plant of APSEZ Ltd, through M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD). The water requirement details are given in Section-2.2.3 of Chapter-2 of the EIA Report.
53	Shri Devendrasinh Jadeja Village: Mota Kardagra Taluka: Mundra	He represented that, we are in favour for the company to establish this plant. But what is the percentage of local public that will get employment? Provide in writing.	The representative of the project proponent replied that the company will require around 3000 persons at the time of construction. We will try that maximum unskilled labour is employed from local people.	The proposed project will employment about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employments will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
54	Shri Lakhubhai Rabari Village: Tunda Wandh Taluka: Mundra	He represented that: • The officer present at the time of construction of the project are transferred	The representative of the project proponent replied that: • The feeling of the local public will be	The proposed project will employment about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		after the starting of operation of the project and therefore proper solution to our problems are not provided. • What kind of employment will be given to the unskilled people?	considered and problems will be properly solved. Efforts will be made to ensure that local public is provided employment to an extent possible. • Efforts will be made to ensure that unskilled people also get employment.	5000 indirect employments will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
55	Shri Vishrambhai Gadhavi Village: Zarpara Taluka: Mundra	He represented that the company wishes to bring project at this place for its own benefit not for the development of the local public.	The representative of the project proponent replied that the company can establish industry at other place also but the decision to establish project at this place is for the development of Mundra.	A budget of Rs. 58 ,07,83,796 for the period of 5 years (From day 1 of the project construction) has been allotted toards Corporate Environmental Responsibility-CER activities (1st May, 2018 Office Memorandum of MoEF & CC). Based on the needs identified during SIA study in the study area. The CER fund is distributed in the following development initiatives: • Education Initiatives – Rs. 7,92,57,390 • Community Health Initiatives - Rs. 12,25,04,434 • Sustainable livelihoods and womenempowerment - Rs. 27,59,09,755 • Community Rural Infrastructure Development – Rs. 9,76,12,217 • Independent monitoring sudit snd ipact assessments of CSR activities – Rs. 55,00,000 The CSR details (like CSR policy, initiatives & activities, CSR budget expenditure data from 2010 to 2016 and CSR implemented photographs) is given in Section-8.5 of Chapter-8 in the EIA Report. Further, Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.

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56	Shri Valjibhai Tapariya Village: Zarpara Taluka: Mundra	He represented that in the forthcoming projects and the existing projects, Adani and other voluntarily organizations should make an exchange centre, the record of qualified persons should be prepared and the people should be taken on service as per the requirement of the company and their qualifications.	The representative of the project proponent replied that, we are in process of making Adani Skill development centre. Efforts will be made in future to create employment opportunities. Moreover linkages will be established with the employment exchange and the registered persons having appropriate qualification shall be given priority.	As promised, Adani skill development centre will be developed at the project site. Necessary budgetary allocation will be done.
57	Shri Hussain Vasu Luhar Village: Tunda Taluka: Mundra	He represented that how many people of Tunda village serve at Adani? I was also provided employment but was terminated without providing any reason.	The representative of the project proponent replied that more than 100 persons of the Tunda village serve at Adani company. In the year 2012, a total of 35 persons were given employment on the basis of the representation of the Gram Panchayat. You were given much better salary increments as you were the resident of village. You are not terminated from service as on date.	Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
58	Shri Gulabsinh Babubha Jadeja Village – Mota Kandagara Taluka: Mundra	He represented that we do not have any objection towards this project. Due to company we have progressed.	-	-
59	Shri Viram Naran Shekhara On behalf of Bharatiya Kisan Sangh Village: Zarpara Taluka: Mundra	He represented that • A large number of objections are represented during public hearing. If the company comes and if there are any chances of environmental degradation, then the government authority should consider it seriously. The work should not remain only on paper. • It should be considered that the local public are not receiving employment. • If the NGT can issue notice to even Shri Ravishankar, then no one is over and above the environment. • Even in the past, before the establishment of the solar plant, the number of jobs were promised but the same is not observed.	The representative of the project proponent replied that: We undertake all kinds of work in a transparent manner. We are making efforts so that at least ten persons from each village receive employment. The suggestion of tissue culture laboratory for the development of agriculture is welcome and the relevant process will be considered for the same. We are ready to consider the requirements of the farmers through meeting with their committee, we shall do work on required issues, a 5 year plan will be undertaken with you and such opportunities will be undertaken that the employment opportunities are created through employment exchange. The company will work towards satisfaction of local people. Efforts will be made to provide the Drip Irrigation system for Date farming.	The proposed project will generate employment about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employments will be provided. Locals people will be given preference in employment based on skill set & eligibility requirement as per the job and the vacancies available. The total water requirement for the project is about 32,267 KLD which will be sourced from desalination plant of APSEZ Ltd, through M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		• The company should work for developing new sources of water. • By ignoring agriculture and developing industries, how many days will we survive? Agriculture development should also take place. • Moreover development of education is also necessary. Also, the Adani Company should establish a laboratory at Mundra for Tissue culture development of date farming. So farmers concerns can be addressed.	As part of CSR activities, provision of eight crores rupees every year has been done separately for this project.	designed for Zero Liquid Discharge (ZLD). Pollution Control: The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project. CER Initiatives: A budget of Rs.58,07,83,796 have been allotted for CER activities for five years. The Tissue Culture Laboratory development will be taken up. Further, drip irrigation system for date farming will be included in the CER initiatives.
60	Shri Dayabhai Gadhavi Village: Mota Kandagara Taluka: Mundra	He represented that • As per the page no. 8 of the EIA report, the impact of sulphur dioxide on environment is negligible. How is it possible? • Why do you not operate the ESP at night in the Adani Power?	The representative of the project proponent replied that, • In order to avoid harmful impacts to environment, concentration of sulphur dioxide emissions is regulated by stipulated norms. The emissions of sulphur dioxide will be within the prescribed limits after the erection of copper plant. • At the Adani Power, the ESP is always in operation when the plant is in operation.	The SO_2 generation is a continuous process during smelting activity. Primary gas stream will be routed to sulphuric acid plant (SAP) plant and the fugitive gas stream will be routed through scrubber. Further, there is no provision in the plant/process for storage of SO_2 gases and will be processed immediately to produce sulphuric acid. Sulphuric acid plant (SAP) will be installed with highly efficient (Double Conversion Double Absorption) DCDA process to control the SO_2 emission to less than 1 kg/t of sulphuric acid produced.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
				About Rs. 1700 crores will be invested to install sulphuric acid plant. The details of episodal SO_2 stack emissions are addressed in Section-4.2.2.3 of Chapter-4 of the EIA Report. The process of extraction of copper metal, sulphuric acid is recovered as a by-product from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for phosphoric acid production and rest will be sold in the market based on market requirement. • Regular stack emission monitoring shall be carried out at all stacks for particulate matter, HF, SO_2 and NOx for checking the compliance to emissionstandards by respective plant. About Rs. 639 Crores will be spent on air pollution control system installation.
61	Shri Ranjitsinh Jadeja President, Taluka Panchayat Mundra Taluka: Mundra	He represented that, I hereby submit as a political leader that due to the establishment of the company, employment opportunities will be increased and the local people, taluka, state and entire country will develop.	-	The employment of local people in primary and secondary sectors of project shall upgrade the prosperity of the region. This in-turn will improve the socio-economic and infrastructure conditions of the area. Further, a total budget of Rs.58,07,83,796 will be spent towards CER nitiatives in the five year period, which will help the socio-economic development of the region.
62	Mrs. Devalben Gadhavi Village: Shekhadiya Taluka: Mundra	She represented that, it is submitted that by way of this project, care should be taken that the local ladies and other local public is given employment.	The representative of the project proponent replied that, as for the employment of ladies, arrangement has been made so that 120 ladies will get employment. Moreover, we will sign an MOU with Welspun Company in order to provide proper training and employment to ladies so that their condition will improve.	Locals will be given preference in employment in the proposed copper refinery project. As promised, about 120 ladies will get employment. Further, proper training will be imparted to the ladies so that their employability will increase.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
63	Shri Ibrahim Turk Village: Dhurb Taluka: Mundra	He represented that you are portraying this project as a green field project. But around 103 ha of land of forest department is taken in this project. How can this project be termed as green field project?	The representative of the project proponent replied that, any new project is stated to be green field project. There is no relation of word 'green field' with vegetation. It is only an English word.	About 85.79 ha of project area (33% of the project area) will be developed with greenbelt / green cover as per prevailing guidelines from GPCB/CPCB/MoEF&CC. The proposed greenbelt is already earmarked in the Layout given in Figure-2.1 of the EIA report.
64	Shri Hirabhai Patariya Sarpanch, Deshalpar Kanthi Gram Panchayat, Village: Deshalpar Kanthi Taluka: Mundra	He represented that this project is only 5 km away from our village. Therefore it is submitted that our village should also be given priority in the manner that Navinal and Shiracha are given priority.	The representative of the project proponent replied that, as discussed earlier, attempts will be made to employ 10 persons from each village.	As promised by the project proponent, about 10 persons from each village in the study area will be employed. Necessary skills will be developed through the Skill Development Centre as proposed.
65	Shri Ibrahim Turk Village: Dhurb, Taluka – Mundra	He represented that • You are to take sea water for this project and therefore what would be the impacts of this activity on the marine ecology? Have you conducted any study in this regard? • What will be the impact of salinity ingress on agriculture? • There is increase in salinity and loss to agriculture in the Tunda, Kandagra and other such areas due to cutting of mangroves.	The representative of the project proponent replied that: • The NIO organization has conducted study for the Intake and Outfall channels per the rules and regulations of MoEF&CC. The 11 km long outfall channel will meet the sea near West port and will dilute the quality of outfall. Moreover it is always ensured that the water temperature does not exceed more than 5 degree higher than the sea water ambient temperature and the salinity does not exceed 57 PPT. • We had undertaken a study through M/s Gujarat Institute of Desert Ecology (GUIDE) for assessment salinity of underground water. The salinity in the underground water has increased not only in the project surrounding area but also in the entire Kutch area. This is due to lack of rain and over-drawl of ground water. • The industries of this area are not dependable on ground water.	The total water requirement for the project is about 32,267 KLD which will be sourced from desalination plant of APSEZ Ltd, through M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).
66	Shri Natubha Jadeja Village: Shiracha, Taluka: Mundra	He represented that 100 people of my village were employed by Adani Power Company. Hence, my village has received employment.	-	As promised by the project proponent, about 10 persons from each village in the study area will be employed. Thus local people will be

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		Thus it is our submission that this plant should be established so that the employment is increased and the problem of unemployment of rest of our villagers is resolved.		given preference. Necessary skills will be developed through the Skill Development Centre as proposed. The employment of local people in primary and secondary sectors of project shall upgrade the prosperity of the region. This in-turn will improve the socio-economic and infrastructure conditions of the area.
67	Shri Bharat Kalyan Seda Village: Zarpara Taluka: Mundra	He represented that • The water to be sourced from sea will be through pipeline of open canal? In case if you dig a canal, the farmers will be impacted. • He represented that a charge of Rs. 200 is levied on trucks at entry gate by Adani Company.	The representative of the project proponent replied that • The water to be used in this project will be obtained from existing intake channel. Thereafter, the desalinated water from APSEZ will be transferred through pipeline to proposed project. • The contractor that works in the area of the company or APSEZ are provided with zero amount gate pass for their trucks and therefore no charge is levied from them.	The total water requirement for the project is about 32,267 KLD (32.3 MLD). The total desalinated water requirement for the project would be sourced from APSEZ Ltd, through M/s. Mundra Utility Pvt Ltd (MUPL). The desalinated water from the APSEZ will be transferred through the pipeline only. There will not be any open channel flow. Further, an integrated water system is proposed, the effluent from the process units is treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEF) for further recovery and solids generated will be sent to Secured Land Fill (SLF). This water would be utilized to meet the DM water and plant/utility water requirement of proposed project. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).
68	Shri Valji Sumar Gadhavi Village: Zarpara Taluka: Mundra	He represented that, I have been working with the Adani Company since the last 15 years. My 50 trucks are working for this company. Rs. 200 charge is not charged for my trucks.	-	-
69	Shri Kirtibhai Gor Village: Tunda,	He represented that there was no such public hearing conducted for the solar project. Certain	The representative of the project proponent replied that for the protection of the	Pollution Control:

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
	Taluka: Mundra	boys have received employment in this project. Around 50% of people from the bio-data sent by me have received employment. The persons that have completed B.E. should receive employment after the completion of apprenticeship and thus what are the plans of the company to employ such persons? Such projects are welcome. We are 100% in favour of the development but not at the cost of environment. I had written to the GPCB officer that large amount of emission is emitted from the chimney. If the emission that is emitted today comes out regularly, then it is acceptable. The letter is written to GPCB for emission. Also received reply from GPCB. The development should be such that no one suffers due to impacts on environment.	environment, latest technology and equipment will be installed and operated in this project. Treatment plants for air and water both will be installed. The entire process will be as per the rules and regulations stipulated by the government so that environment will not be damaged due to this.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project. CER Initiatives: A budget of Rs.58,07,83,796 has been allotted for CER activities for five years.
70	Shri Dayabhai Gadhavi Village: Mota Kandagra, Taluka: Mundra	He represented that the project is entirely chemical based, which will be spread in water, air, noise, land, etc. and it will affect the agricultural land. I feel that such kind of project should be around 20 to 25 km away from the residential area. What are the measures for protection from such kind of project?	The representative of the project proponent replied that as part of this project, manufacturing of copper from copper concentrate will be through smelting and electrochemical process, the polluted water that comes out from this project will be sent to the RO plant after treatment in ETP. Therefore, no polluted water will be released outside. Thereafter, this water will be used again in the process. The rejects will be treated through multi effect evaporation and thus the water will be removed from it. Flue gases released from the process will be captured and converted to intermediate products through chemical process. It shall be ensured that no storage leakage is possible by performing the risk analysis and hazard identification. Thus, there will be minimal chances of water and air pollution.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.
71	Shri Lakhdirbhai Gilwa	He represented that the farming of Chickoo and	The representative of the project proponent	There is no ground water withdrawal

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
	Village: Zarpara, Taluka: Mundra	Dates have suffered a lot due to existing projects. The ground water levels have gone down after establishment of these projects. It has impacted production of Chickoo and Dates and thus the farmers have strong objection against this project.	replied that: Adani Port and Adani Power do not use ground water. The new project will also not use ground water. Both these projects use sea water.	(consumption/ utilization) for proposed project and project operates on zero discharge concept. Hence, due to proposed project there is no scope of ground water levels reduction and contamination.
72	Shri Khengar Gilva Village: Zarpara, Taluka: Mundra	He represented that the plantation from Bhadreshwar to Tunda Vandh was removed after establishment of projects. Due to this reason, the wild animals like pigs and Nilgai enter our farms. Therefore, it is our submission that please do something for the protection of the crops.	The representative of the project proponent replied that prior to this also, support for drip irrigation is provided to the farmers from many villages since last three years. Special attention will be given to provide support for drip irrigation as and when required.	As part of the CER program, drip irrigation facilities will be provided in the nearby villages. The total budget of Rs. 58,07,83,796 will be spent on CER activities in five-years period.
73	Ms. Shital Rajgor Village: Mota Kandagra, Taluka: Mundra	She represented that we do not have any objection for the establishment of company. Ladies like us get employment. We are in favour of the company.	-	-
74	Shri Dayabhai Gadhavi Village: Mota Kandagra, Taluka: Mundra	He represented that • What would be the concentration of Sulphur Dioxide and at what height it will be released? • How sludge will be disposed? • How much quantity of Sulphur Dioxide will	The representative of the project proponent replied that: • Sulphur dioxide will enter the sulphuric acid plant directly from the copper smelter. Acid will be made in this plant. After making acid, it will be scrubbed in tail gas scrubber and after that the gas will be released in air which will mainly contain oxygen and nitrogen. Concentration of sulphur dioxide will be below the prescribed limits by the Government of India. • Gypsum will be manufactured from gas scrubber using lime. This will be used in the cement industry. The flue gases will be released in atmosphere at a height of 100 m. • As per CPCB norms, 1 kilogram sulphur	• The SO_2 generation is a continuous process during smelting activity. Primary gas stream will be routed to sulphuric acid plant (SAP) plant and the fugitive gas stream will be routed through scrubber. Further, there is no provision in the plant/process for storage of SO_2 gases and will be processed immediately to produce sulphuric acid. • Sulphuric acid plant (SAP) will be installed with highly efficient (Double Conversion Double Absorption) DCDA process to control the SO_2 emission to less than 1 kg/t of sulphuric acid produced. About Rs. 1700 crores will be invested to install sulphuric acid plant. The process of extraction of copper metal, sulphuric acid is recovered as a by-product from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		be released in air? What will be the density of Sulphur Dioxide?	dioxide will be released per ton of sulphuric acid produced. The density of the flue gas will be same as the air. It will contain very less amount of sulphur dioxide. The same will be around 150 to 200 ppm. We will establish a plant that would be one of the best plants in the world.	phosphoric acid production and rest will be sold in the market based on market requirement. • Secured Land Fill (SLF) is proposed over 30 acres within the project premises for disposal of ETP waste sludge and spent catalyst. Other hazardous waste will be disposed through the approved recyclers.
75	Shri Ashariya Lakha Gilwa, Village: Zarpara, Taluka: Mundra	He represented that the average temperate keeps on increasing every year. In copper project 300 Megawatt power will be required and you will generate steam that would be capable to produce 40 Megawatt of electricity and thus will this increase the temperate?	The representative of the project proponent replied that there will be no increase in temperature due to this project. It would be preferable to use steam for production of electricity instead of releasing it in air. Fuel consumption can be reduced. The electricity will be produced using steam as per rules and regulations. Thus the temperature outside the plant will not increase.	The electricity will be produced using steam as per rules and regulations. Thus the temperature outside the plant will not increase. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project
76	Shri Naran Gadhavi, Village: Zarpara, Taluka: Mundra	He represented that the objection is done because the effect of pollution will be same for all. We are talking about the impacts that are found on the environment, ground water, human health, mangroves, fishermen, cattle rearers, Dates crop, children, etc. should be discussed. We do not object to the development. We would welcome the development if proper environmental measures are taken care of. The objection is only against pollution and randomly placed electric lines. CRZ rules have been violated. Water has turned saline and its TDS has become more than 4500.	The representative of the project proponent replied that • Proper attention will be given to your representations. You have raised important points as an NGO and we have undertaken the appropriate actions as well. One should always talk as a responsible citizen. • We will undertake all kinds of development by following the rules and regulations and we hereby give assurance for the same. The guidelines will be considered while development of new plant.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. The budget allotted for environmental protection will be about Rs. 1044 Crores, out of which for air pollution control systems is Rs. 639 Crores, water pollution control system is Rs. 360 Crores and other environmental management systems (like solid waste, greenbelt, post project monitoring, gas collection and energy conservation) is Rs. 45 crores. Further, a total budget of Rs. 58,07,83,796 will

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
				be spent on CER activities in five year period.
77	Shri Paresh Rajgour Village: Tunda, Taluka: Mundra	He represented that it is our expectation that the plant will be established by considering the rules framed by the Government of Gujarat and Central Government as well as considering the public interest.	The representative of the project proponent replied that the company is responsible for maintaining public interest and environment. The company will operate the plant by considering the public interest and environment.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC.
78	Shri Pravinsinh Bhurubha Chauhan Village: Siracha, Taluka: Mundra	He represented that TATA Power plant took Gochar land. They have entered into agreement to provide either green or dry fodder. Why you do not enter into such kind of written agreement?	The representative of the project proponent replied that: • In your case the Gujarat High Court has ordered to provide fodder for a particular duration and this duration is even now in effect. Thus, there is no question of entering into any kind of agreement or contract as the order is passed by the High Court. • We are providing the dry and wet fodder to the villages having requirement on the basis of the order passed by the Honourable High Court. We are also providing fodder voluntarily to the villages from which the people have not gone to the courts.	A budget of Rs. 58,07,83,796 has been allotted for CER activities for five years. The provision of fodder to the needy villages will be covered under CER initiatives.
79	Shri Viram Naran Sankhra (Member of Kishan Sangh) Village: Zarpara, Taluka: Mundra	He represented that the issue is not limited to fodder, it is a request to maintain positive attitude from your side on permanent basis. So that such a public hearing would not even be required in the years to come. Such kind of submission is done.	-	-
80	Shri Vishram Gadhavi, Village: Zarpara, Taluka: Mundra	He represented that, I am worried about my existence, the existence of my village, the existence of agriculture and therefore I have come to object. It is expected that you undertake your role in an unbiased manner.	-	-
81	Shri Naran Gadhavi, Village: Zarpara, Taluka: Mundra	He represented that • Three reports have been found for the production of copper plant. Out of this 1) Regional Institute of technology,	The representative of the project proponent replied that: • The reports that you are mentioning are	The proposed project will be designed as per the latest technology with all in built pollution control measures.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		Jamshedpur, 2) Energy Laboratory and department of biology science Cambridge University, London and 3) Public Health report. Which reports contains the details of serious side effects of production of copper. Therefore provide the information that what diseases are possible due to the dust of copper? • As per the report, hair falls, stomach ache, cancer and other inhalation related diseases, etc. occur due to dust. How you will control the dust? How many teams will you have? How many doctors will be available? • The second question is that, how will you control the air emissions that will be released in the atmosphere? What is the facility that is done by you as for this? • The sulphur dioxide that is released in air will damage health and so what steps have been taken by the company?	related to plants that are very old. The plants with latest technology are even present in developed countries. The dust from the plant is collected and used in furnace. Moreover, the dust on the road is also collected by vacuum truck. At the places where the workers are required to work in dusty area, they will be provided personal protective equipment (PPE). • Copper concentrate material contains 8 to 10% moisture and therefore there is very less chance of dust emissions. Even thereafter, if this dust goes into breathing, the material is inert and therefore there would not be any specific effect. The effect is just like the diseases that are caused by normal dust. • The sulphur dioxide will be used as intermediate product, its chemical process will be undertaken and sulphuric acid will be made from it. Therefore, there is no question of the toxic gases releasing in the atmosphere. • The chemical process of these gases will be done and intermediate product will be developed. It shall be ascertained that no leakage is possible by performing the risk analysis and hazard identification. Thus, there will be minimal chances of air pollution. • After making sulphuric acid, it will be scrubbed in tail gas scrubber and the gas will be released in air. The lime will be used during the gas scrubbing process and gypsum will be made. This will be used in cement industry.	The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC. About Rs.1044 crores will be spent for environmental pollution control measures in this project.

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82	Shri Dayabhai Gadhavi, Village: Mota Kandgara, Taluka: Mundra	He represented that what kind of storage would be done by the company for raw material and how raw material will be transferred?	The representative of the project proponent replied that the company's copper concentrate storage will be entirely covered. The pipe conveyor will be used to transfer material from port to plant.	-
83	Shri Valjibhai Tapariya, Village: Zarpara, Taluka: Mundra	He represented that with bottom of their hearts, everyone wishes that industries should come. Industries should take corrective actions when there are objections. Industries are welcome with the conservation of environment.	The representative of the project proponent replied that all points that are represented here will be taken care of. We will also consider the benefits of common public on behalf of the company. We are 100% responsible for the common public as a developer. We will consider that properly.	-
84	Shri Mayur Aatu Maheswari Village: Tunda, Taluka: Mundra	He represented that • What is number of the employment opportunities provided to the local public by the existing industries? Why are the local people sacked from their jobs? A committee should be constituted so that the local public gets employment and an open discussion / meeting should be held between the company officers and committee for the purpose of providing employment to local public. This discussion should be done openly not behind closed doors. As per the rules of the government, the local public should receive 85% of employment. • Provide the list showing how many local persons have received employment / work in the existing industries.	The representative of the project proponent replied that the list of the local persons working in the company will be provided. We undertake the process of employing the local people in consultation with the Sarpanch and Gram panchayat. Even this process will be made further transparent. The main reason for termination of job is that the workers are irregular.	The proposed project will give employment to about 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
85	Shri Mithu Jakhu Maheshwari Village: Mota Kandagara, Taluka: Mundra	He represented that • The preservation of water and environment should be made for farming. Farming gets affected due to sea water, Dates do not grow up. Water is not fit for drinking within the radius of 3 KM. Therefore the company should think about this loss. • The work for 3 storage area for Cowsheds is stopped in Kandagara. The	The representative of the project proponent replied that Considering your representation, without any pressure, the work will be done and efforts will be made to finish incomplete works.	The total water requirement for the project is about 32,267 KLD which will be sourced from desalination plant of APSEZ Ltd, through M/s Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the construction and operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		representation has been made to restart the construction work of storage area. • The representation has been made for fair work.		The work for 3 storage area for Cowsheds will be completed in a time bound schedule. Required fund will be allocated for these works.
86	Shri Salu Kumbhar, Village: Tunda, Taluka: Mundra	He represented that three Fishermen access roads towards sea have been closed, due to which we have to take 5 km long route, we do not have vehicles, therefore, the demand has been made to open three routes.	The representative of the project proponent replied that we will fully cooperate with fishermen and will make sure that no hindrance is made in the route of fishermen, if there is any obstacle, they can approach us any time.	As committed, the fishermen routes will not be disturbed during the construction and operation of the proposed green field copper plant.
87	Shri Kirtibhai Gor, Village: Tunda, Taluka: Mundra	He represented that which water will be used in the upcoming plant?	The representative of the project proponent replied that in the proposed plant, seawater will be used after removing salt (desalination).	The total water requirement for the project is about 32,267 KLD (32.3 MLD). The total desalinated water requirement for the project would be sourced from APSEZ Ltd, through M/s. Mundra Utility Pvt Ltd (MUPL).
88	Shri Dayabhai Gadhavi Village: Mota Kandagara, Taluka: Mundra	He represented that • As per the notification of Government of Gujarat / Government of India, 85% of people shall be employed from local areas, how many have you employed? • What steps have been taken to develop the unskilled people to give them the right opportunity?	The representative of the project proponent replied that we are trying to provide employment to the local people to a great extent, but in the initial stage, due to the lack of requisite qualification, the company was facing problem to provide the employment. After the ITI has started and after the training of RTG is provided, the proportion of local employment has increased and will continue to increase.	The proposed project will give employment about to 2000-3000 persons on average per day during construction phase and during operation phase, about 2000 direct employment and 5000 indirect employment will be provided. Locals will be given preference to employment based on skill set & eligibility requirement as per the job and the vacancies available.
89	Shri Hamir Rabari Village: Wandh, Taluka: Mundra	He represented that one of my two handicapped children who cannot hear and the other one cannot speak. The representation had been made for their job.	The representative of the project proponent replied that we had employed their children, but they said that one of their boys is working in the Tata Company; and they do not want to join here now.	-
90	Shri Dosabhai Gadhavi Bhurubha Chauhan, Village: Siracha Taluka: Mundra	He represented that if the industry comes then damage will be done. We are not against the plant. You will fill the vacancy on contract basis. But, what will you do for farmers like us and our children? TDS analysis been carried out by me in the 2007 and 2012, the TDS was reached up to 2200, which is not fit for drinking. We used to get drinking water from bore well, now we have to buy water bottle. In the last 5 years 800 to	The representative of the project proponent replied that, we will work towards solving problems of farmers. Efforts will be made to open the Kishan School for the children of the farmers. The planning as to how the ground water level can be increased, has been made by Adani Foundation, along with Mr. Yogesh Jadeja to improve the water supply in 10 villages and for the purpose of employment,	The issues raised will be covered under CER/CSR development program. Under this project a total budget of Rs. 58,07,83,796 will be spent on CER activities in five year period. Out of Rs. 58,07,83,796 crores, Rs. 9,76,12,217 is allocated for Community Rural Infrastructure Development, which includes safe drinking water facilties.

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Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		900 TDS has been increased. In fact, nothing has been done for the farmers; we demand that something is done for the farmer and farming. The fruits from our farm are not worth eating.	the children of farmer will be given priority for this purpose.	
91	Shri Pravin Singh Bhurubha Chauhan, Village: Siracha Taluka: Mundra	He represented that the power plant's intake channel, the outfall channel, and the water reservoir are *Kuchcha* or *Pucca*?	The representative of the project proponent replied that, Outfall channel is Stone Masonry Lined, while the Reservoir is Clay Lined and Sheet Piling is done. This question is not about the proposed project.	-
92	Shri Khimraj Gadhavi Village: Zarpara Taluka: Mundra	He represented that the people from village used to drink the water with high TDS and the company uses Narmada water for sprinkling on coal piles.	-	The total water requirement for the project is about 32,267 KLD which will be sourced from desalination plant of APSEZ Ltd, through M/s. Mundra Utility Pvt Ltd (MUPL). No ground water will be abstracted during the operation phase. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD).
93	Shri Pravin Singh Bhurubha Chauhan Village: Siracha, Taluka: Mundra	He represented that • What does High water line, Low water line in the figure No. 1 in the E.I.A. report indicate? • Different CRZ maps are submitted in the Public Hearing for the years 1991, 2008, 2010 and 2017, which is the correct map out of those? If one map is correct out of four then this shows that the other three are false which indicates the Company has violated the rules of CRZ. • The tidal waters were reaching at a place in Siracha, now waters are not reaching there which shows that the company has violated the CRZ Act. • There is no clarification in the report about from where the Conveyor belt, Road, Railway line will pass and how they will be	The representative of the project proponent replied that • CRZ maps are prepared by the institution recognized by the Government of India. Project proponent has no authority over it. Projects are approved on the basis of maps prepared by the authorized institution. • The map of proposed project is superimposed on CRZ map of the area prepared by an institution recognized by Government of India in 2011. • CZMP plans are prepared by the Government of India which are not public domain. When any approval is required for CRZ by any project then the CRZ map is submitted to compare with CZMP and on that basis only approval is accorded.	As informed, the proposed project is outside the CRZ boundary. The map of proposed project is superimposed on CRZ map of the area prepared in 2011 by Centre for Earth Science Studies (CESS) Thiruvanantapuram, an institution recognized by Government of India. The proposed project site is outside CRZ and doesn't attract CRZ clearance. The approved CRZ layout is shown in Figure-1.5 of Chapter-1 in the EIA report.

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ANNEXURE-20

Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		used in the plant. • Three sites in total were selected for the project, site number 2 is selected from that. What is your purpose behind it? • When you already own the site No. 1, why you have selected site No. 2? You have selected site No. 2 to get forest land.	We do not agree with your opinion in this matter. • The project is proposed in notified SEZ area and part of the forest land. So the Roads, Railway line falling under APSEZ will be used. Conveyer belt will pass through the existing conveyor corridor; this matter is mentioned on Page No. C 2/6 Point No. 2.2.7 of EIA report. • Detailed information regarding this matter is mentioned in Chapter-5. • For analysis of three alternative sites for project, about 18 factors were examined. The site No. 2 was found to be more suitable, so it is selected. • We have submitted our reasons in EIA report. We do not agree with your view.	
94	Shri Dayabhai Gadhavi Village - Mota Kandagara Taluka: Mundra	He represented that we have received report of VIMTA. This VIMTA is a Private organization which is favouring the company. We don't accept VIMTA's report.	The representative of the project proponent replied that VIMTA is a NABET accredited agency.	M/s. Vimta Labs Limited (VLL), Hyderabad is a QCI/NABET accredited and MoEF&CC recognized and NABL accredited Laboratory. The credentials of M/s. Vimta Labs Limited are given in Chapter-11 of the EIA Report.
95	Shri Vajjibhai Taparya Village – Zarpara Taluka: Mundra	He represented that what area of land will be affected during Acidic Process in the plant? Where the Acidic Water and Chemicals will be released?	The representative of the project proponent replied that the process of this copper plant is not acidic, but along with production of copper, sulphur dioxide will also be produced which will be used for making sulphuric acid. And, it will be transported through pipeline of suitable material and there is no possibility of leakage. The tail gas will be scrubbed in the scrubber by lime stone.	The proposed project will be designed as per the latest technology with all in built pollution control measures. The proposed project will implement all the control measures at the source level to keep the emissions under permissible levels. The plant will be operated on zero liquid discharge principle. Further, it will comply with all the conditions stipulated by GPCB and MoEF&CC.

ANNEXURE-20

Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
				About Rs.1044 crores will be spent for environmental pollution control measures in this project.
96	Shri Dayabhai Gadhavi Village - Mota Kandagara Taluka: Mundra	He represented that • Will waste material be generated from the plant? • What is the arrangement for waste material? • Is there any chance of any kind of blast? • In what manner will the finished product be taken out?	The representative of the project proponent replied that: • Lime will be used in the scrubber process and Gypsum will be made. This will be used in the cement industry. • Certain part of the waste material coming out of the plant will be sent to the CPCB authorized processor and other non-recyclable hazardous waste will stored in secured land field constructed as per guidelines of CPCB. • The finished goods in the form of copper plate will be transported in truck or container. Sulphuric acid will be transported in tanker. Chances of blast are not possible.	The details of solid waste generation and their disposal is addressed in Section-2.4.3 of the EIA Report. A total budget of Rs.1044 crores will be spent for environment pollution control and management.
97	Shri Pravinsinh Bhurubha Chauhan, Village: Shiracha, Taluka: Mundra	He represented that, • You have mentioned that you will make road from the waste. So what will do for making road from this waste? • What would be the constituents in raw material that would be stored? • Which chemicals will be contained in the waste that comes out from the plant and will mercury come out from this waste?	The representative of the project proponent replied that: • We will not make roads from waste. • The waste material coming out of the plant will contain calcium, silica and arsenic. This waste material will be stored in secure land fill sites. • Mercury product is made from the waste material that contains mercury and material named calomel is produced. This material will be exported. No process for mercury will be done in this plant.	Secured Land Fill (SLF) is proposed over 13.35 ha within the project premises for disposal of ETP waste sludge and spent catalyst. Other hazardous waste will be disposed through the approved recyclers.
98	Shri Naran Gadhavi Village: Zarpara, Taluka: Mundra	He represented that, • What steps have been taken for reducing	The representative of the project proponent replied that: • This question does not relate to this	A total of 32,267 m^3/d of water will be used in the plant and out of that 3,925 m^3/d of polluted water will be produced. This will be

2504

ANNEXURE-20

Sr. No.	Name and Address of the Representative	Issuses Raised/Represented	Chronological Response given by Representative of Project Proponent	Action Plan
		emissions and water conservation as per the gazette notification dated 07.12.2015 of MoEF&CC, Government of India? • What effect will this project produce on sea creatures that have direct connection with fishermen?	project. • No liquid will be discharged from this plant. • A total of 32,800 m^3/d of water will be used in the plant and out of that 6,448 m^3/d of polluted water will be produced. This will be treated in ETP, the water will be purified by process in RO plant and it will be again used in the plant. The rejects will be treated through the multi effect evaporation process. Therefore there is no question of discharge of any kind of liquid from this project	treated in ETP, the water will be purified by process in RO plant and it will be again used in the plant. The rejects will be treated through the multi effect evaporation process. Therefore there is no question of discharge of any kind of liquid from this project. The water system, is highly integrated and is designed for Zero Liquid Discharge (ZLD). About Rs. 360 crores will be spent for ETP design and wastewater management

EAC OBSERVATION NO.-21

2505

EAC OBSERVATION:

The Chapter-5 consists of only listing of alternative technologies. The committee opined that the PP shall select out of alternative technologies available, based on the selection of the technology, the impact prediction shall be made and mitigation measures shall be proposed.

REPLY:

Adani Enterprises Ltd has shortlisted Outotec Flash Smelting followed with Pierce smith Converting and Anode furnace as its process technology for Copper Smelter Plant.

Outotec Flash Smelting: In Outotec flash smelting process copper concentrate and flux additives need to have moisture content to the level of < 0.3% moisture. Moisture in the feed mix is around 8%, which is reduced to <0.3% with the help of rotary steam dryer; which is fitted with bag filter to collect the dried dust particles. Dried feed mix is conveyed with the help of pneumatic conveying system to the smelting furnace through day bin system. Day bins are also equipped with bag filters.

Smelting furnace is thoroughly sealed and is under negative draft for evacuating the generated process gases with the help of ID Fan through waste heat recovery boiler and hot gas electrostatic precipitator through closed gas ducting to Sulphuric Acid plant for production of the Sulphuric Acid.

Flash furnace is having settler to segregate the Matte and Slag. Copper Matte is tapped from the settler of flash furnace to the ladles and copper slag is tapped to electric furnace for further treatment of the copper slag to reduce the copper content < 1%. Fugitive gases from the Furnace Tapping are collected by hood system with the help of ID Fan. Fugitive gases will be treated first in the bag filter to collect the dust in the gases and later will be scrubbed in the scrubber, before releasing to atmosphere through stack.

Matte from the Flash furnace settler and electric furnace will be transported with the help of ladles to pierce smith converter for production of Blister Copper (> 98% Cu) and Slag produced will be returned back to electric furnace & slag cleaning furnace for recovery of the Copper. PS Converter furnace is under negative draft for evacuating the generated process gases with the help of ID Fan through waste heat recovery boiler and hot gas electrostatic precipitator through closed gas ducting to Sulphuric Acid plant for production of the Sulphuric Acid.

Blister Copper from PS Converter will be transported with the help of ladles to Anode Furnace for production of Anode Copper (> 99% Cu) and onwards to anode casting wheel for production of Copper anodes. Copper Anodes is the input material for Copper Refinery for production of Copper Cathode (> 99.99% Cu).

Fugitive emissions from all the furnaces are collected and treated in the flue gas desulfurization system. Residual gases post desulphurisation are released to atmosphere through well designed stack meeting the statutory standards.

Equipment such as Electric Furnace, waste heat recovery boiler, hot gas electrostatic precipitator, ID Fan, gas cleaning plant of the sulphuric acid plant, effluent treatment plant and fugitive gas handling system inclusive of flue gas desulphurisation system will be designed and sized to meet the regulatory norms.

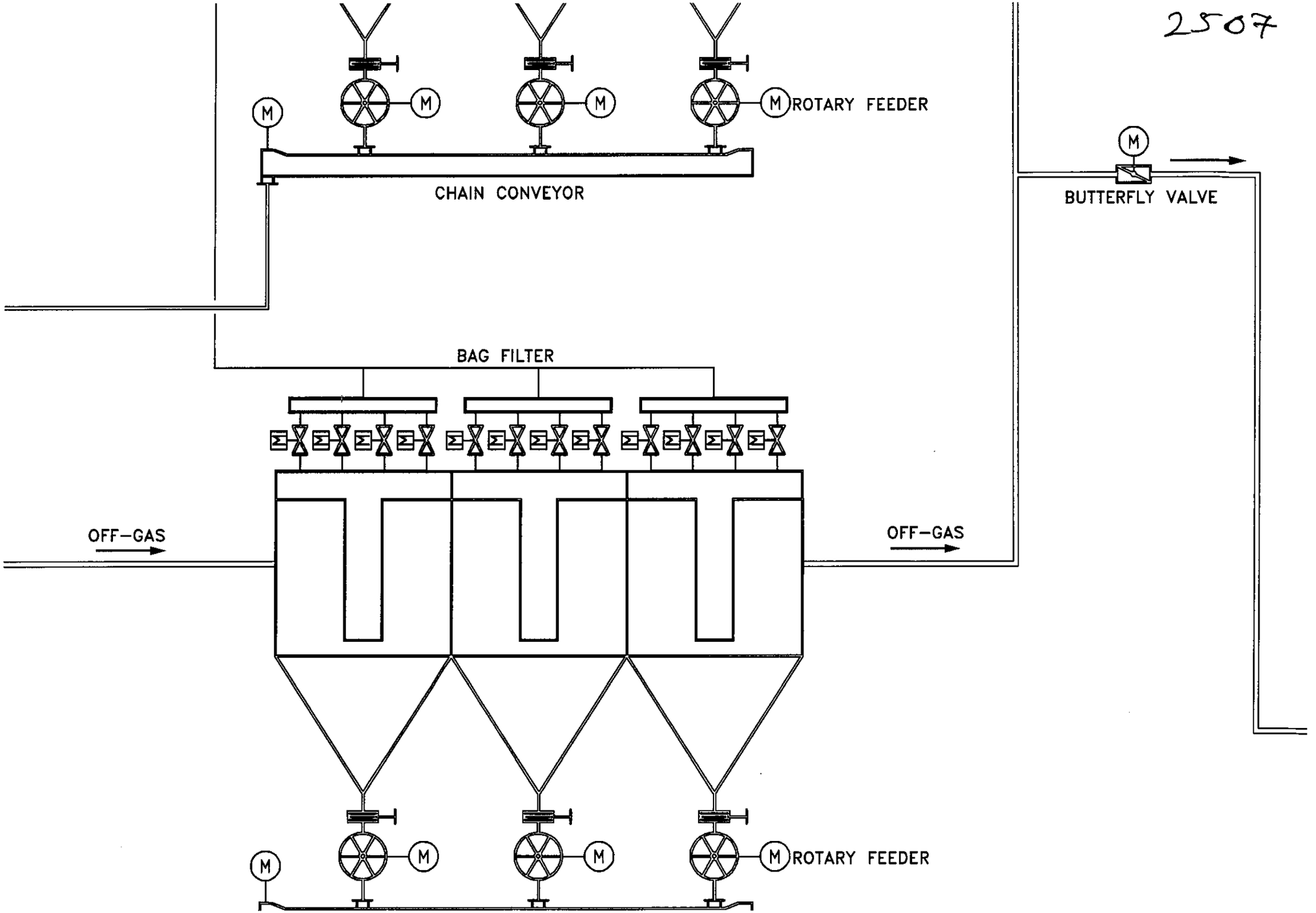
The drawing of the various mitigation measures provided in **Annexure-21(Drawing 1 to 7)**.

2506

EAC OBSERVATION NO.-21

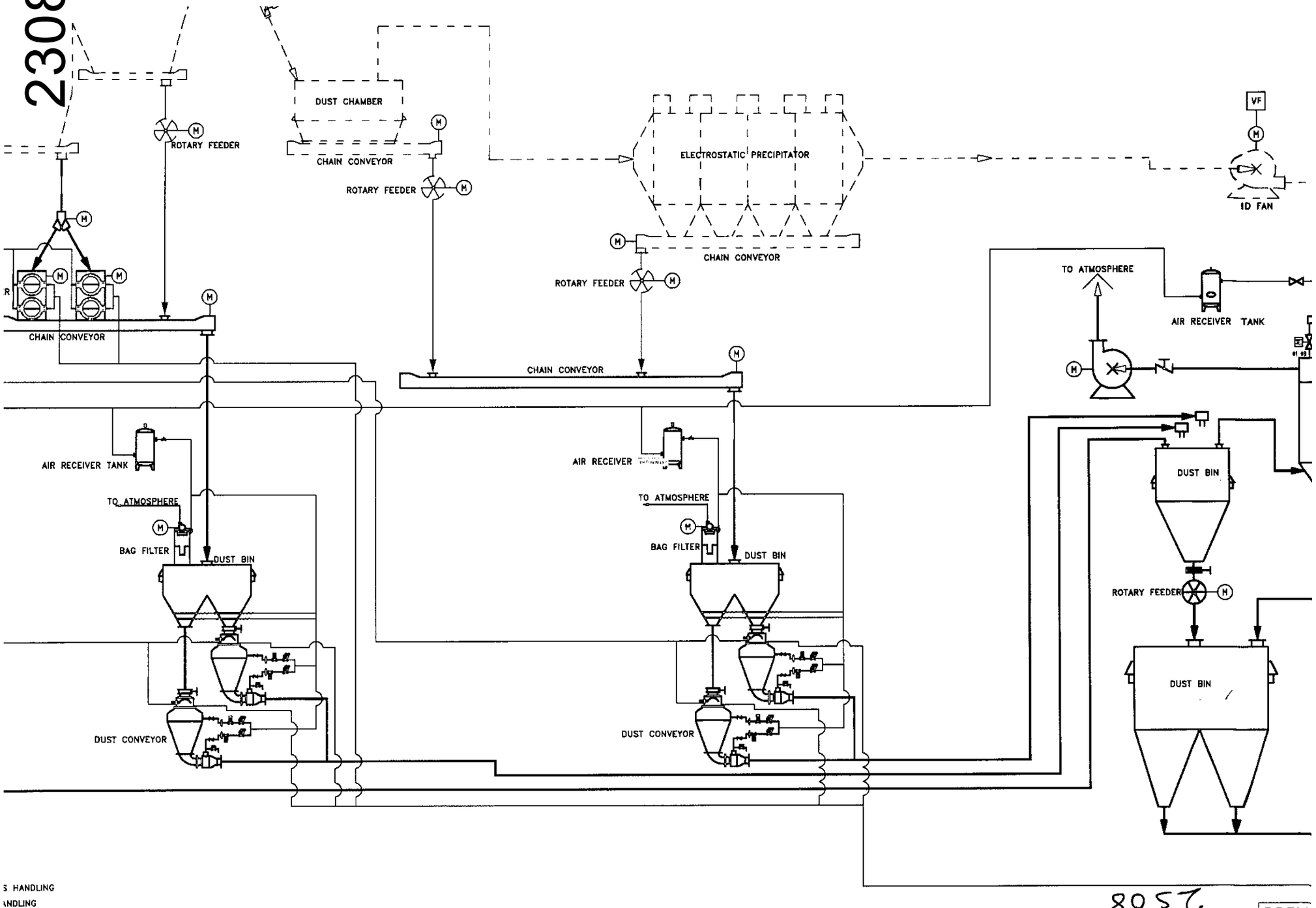
Sr. No.	Parameter	Flash Technology	Mitigation Measure	Support Document
1	Concentrate Feed Mix	Dry – Moisture < 0.3% Q: ~ 62,150 Nm3/Hr	Bag Filter and pneumatic Conveying for recycling within the process	Drawing No. 1
2	Smelting Furnace Off Gas Handling	ID Fan is used to evacuate through WHRB and Hot gas electrostatic precipitator to Sulphuric Acid Plant Q: ~111,994 Nm3/Hr	Sizing of the equipment (WHRB, HESP, ID Fan and Effluent Treatment Plant) based on the Gas Volume. Dust in the gas is recovered and pneumatic Conveying system is used for recycling.	Drawing No. 2
3	Fugitive emissions from Smelting furnace and electric furnace metal tapping and ladles	Fugitive Emission No of Metal Tap Hole: 8 (3 Operating at a time) Q: ~300,000 Nm3/Hr	Collection hood, Bag Filter and Flue gas Desulfurization Equipment sizing will be based on the total fugitive gas flow to the desulfurization.	Drawing No. 3
4	Pierce Smith Converter off gas Handling	ID Fan is used to evacuate through WHRB and Hot gas electrostatic precipitator to Sulphuric Acid Plant Q: ~2,05,618 Nm3/Hr	Sizing of the equipment (WHRB, HESP, ID Fan and Effluent Treatment Plant) based on the Gas Volume. Dust in the gas is recovered and pneumatic Conveying system is used for recycling.	Drawing No. 4
5	Pierce Smith Converter Fugitive Gas Handling and Dust Handling System	ID Fan is used to evacuate through Collection hood, Bag Filter and Flue gas Desulfurization system to process stack Q: ~3,26,400 Nm3/Hr	Sizing of the equipment in Collection hood, Bag Filter and Flue gas Desulfurization system shall be based on the Gas Volume and gas characteristics. Dust in the gas is recovered and pneumatic Conveying system is used for recycling.	Drawing No. 5
6	Anode Furnace Off Gas Handling	ID Fan is used to evacuate through desulfurization system to process stack Q: ~87,183 Nm3/Hr	Sizing of the equipment in flue gas desulfurization including Bag Filter shall be based on the Gas Volume and gas characteristics. Dust in the gas is recovered and recycled through closed bins.	Drawing No. 6
7	Anode Furnace Fugitive Gas Handling	ID Fan is used to evacuate through Collection hood, Bag Filter and Flue gas Desulfurization system to process stack system to process stack Q: ~144,000 Nm3/Hr	S Sizing of the equipment in Collection hood, Bag Filter and Flue gas Desulfurization system shall be based on the Gas Volume and gas characteristics. Dust in the gas is recovered and recycled through closed bins.	Drawing No. 7

2507


M
M
M
M
ROTARY FEEDER
CHAIN CONVEYOR
M
BUTTERFLY VALVE
BAG FILTER
OFF-GAS
OFF-GAS
M
M
M
M
ROTARY FEEDER

2307

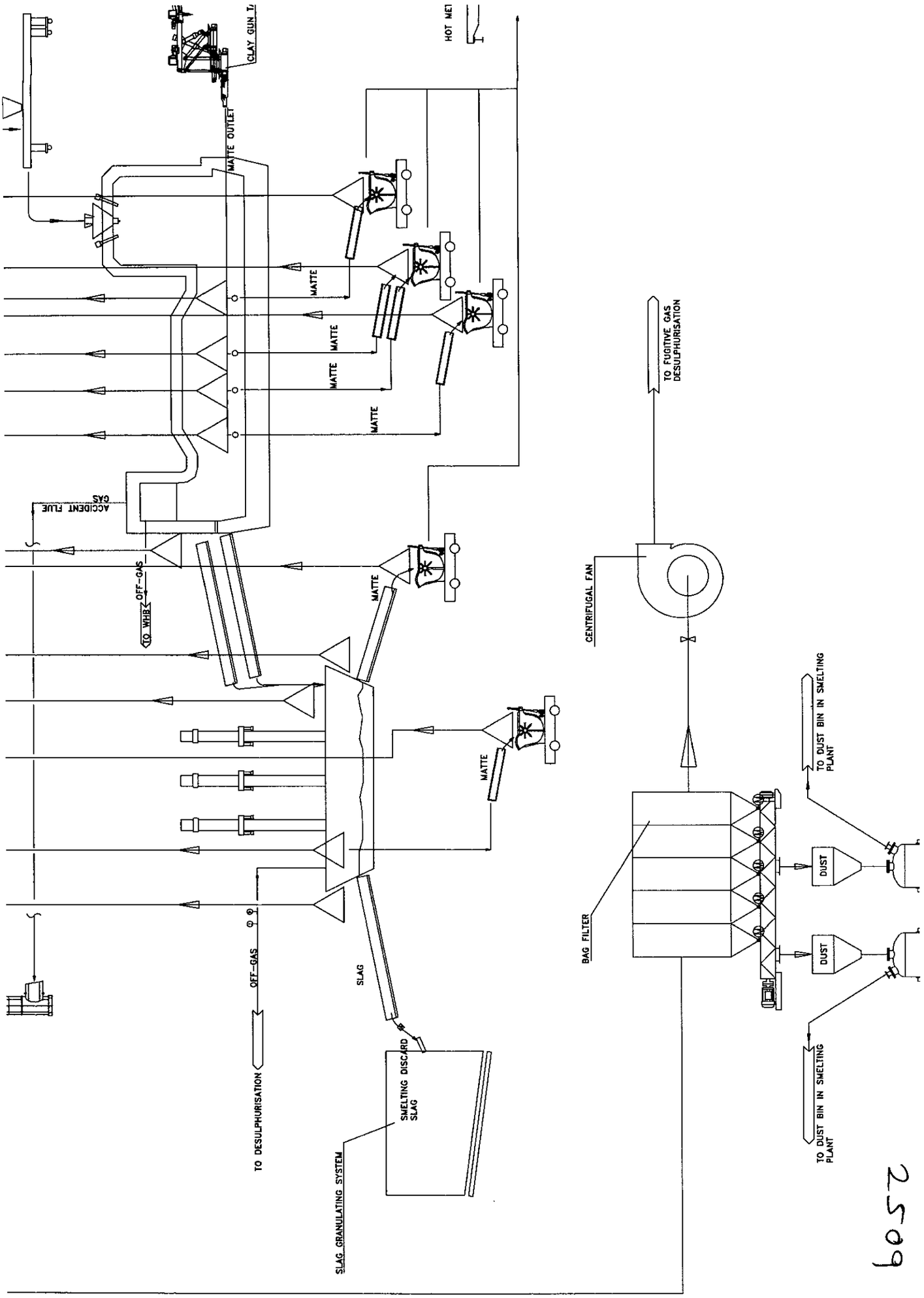
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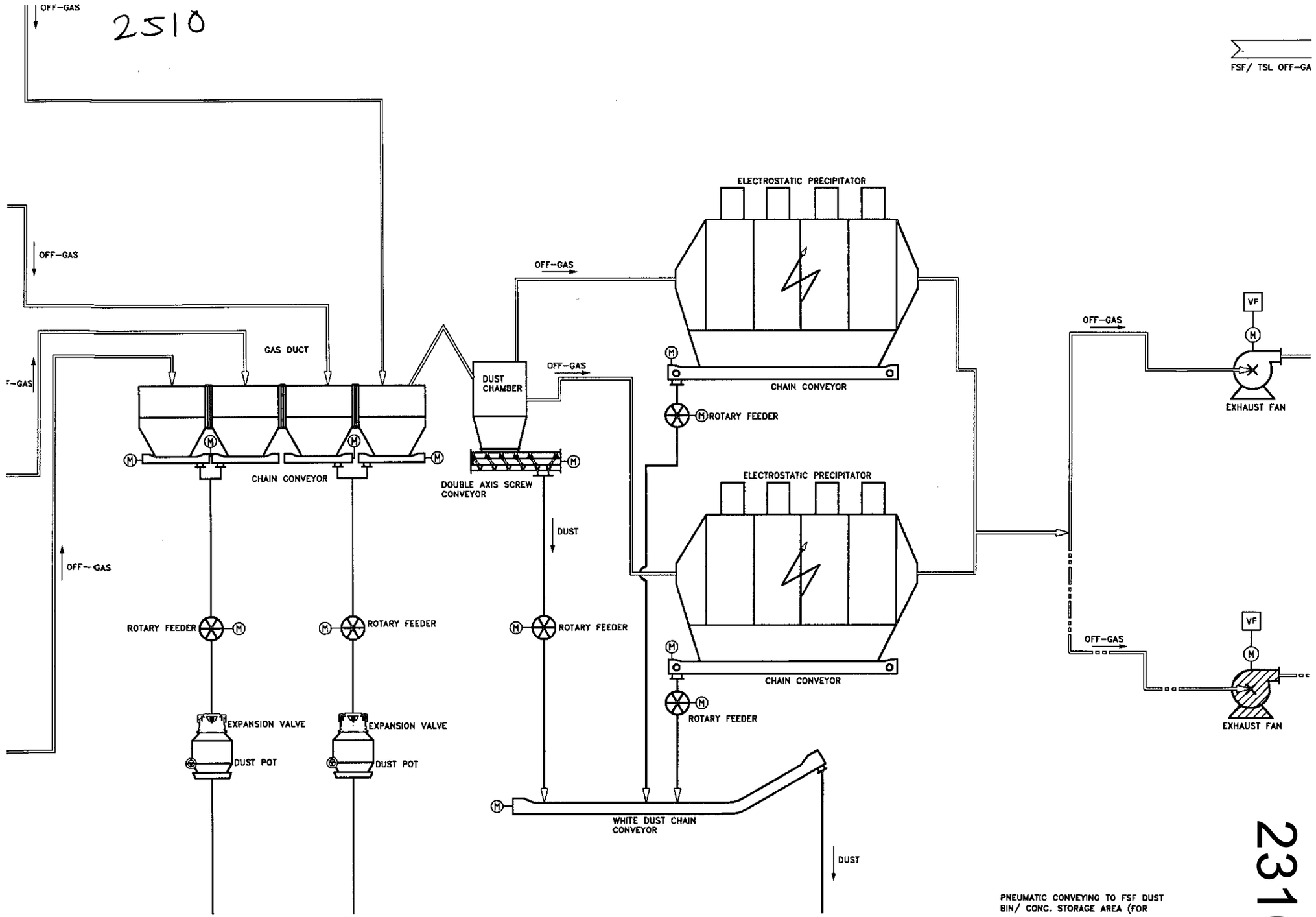


S HANDLING
NDLING

8052

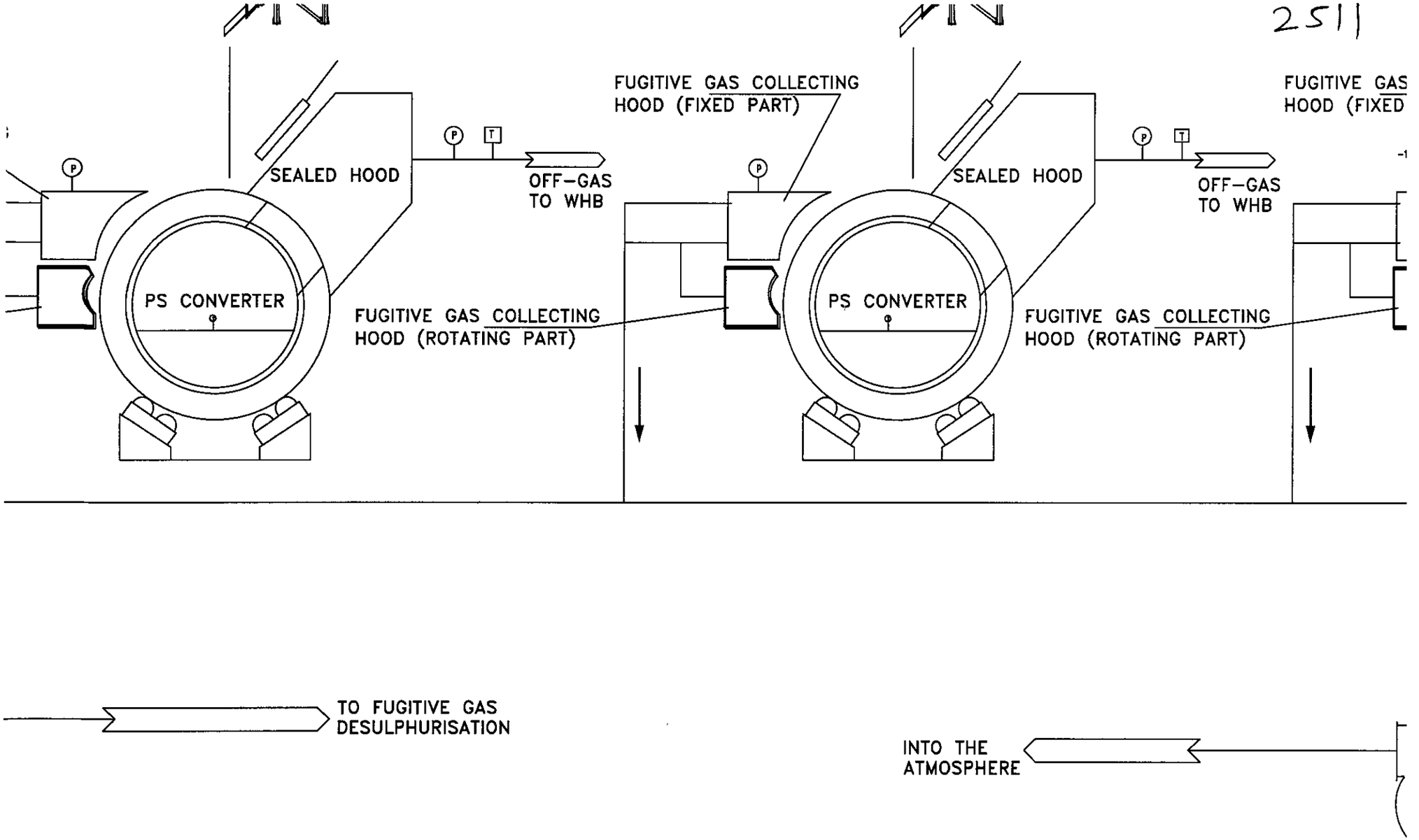
PRFII


CLAY GUN
MATTE OUTLET
HOT METAL
MATTE
MATTE
MATTE
MATTE
MATTE
MATTE
ACCIDENT FLUE GAS
OFF-GAS
TO WHB
TO FUGITIVE GAS DESULPHURISATION
CENTRIFUGAL FAN
BAG FILTER
DUST
DUST
TO DUST BIN IN SMELTING PLANT
TO DUST BIN IN SMELTING PLANT
OFF-GAS
TO DESULPHURISATION
SLAG
SMELTING DISCARD SLAG
SLAG GRANULATING SYSTEM

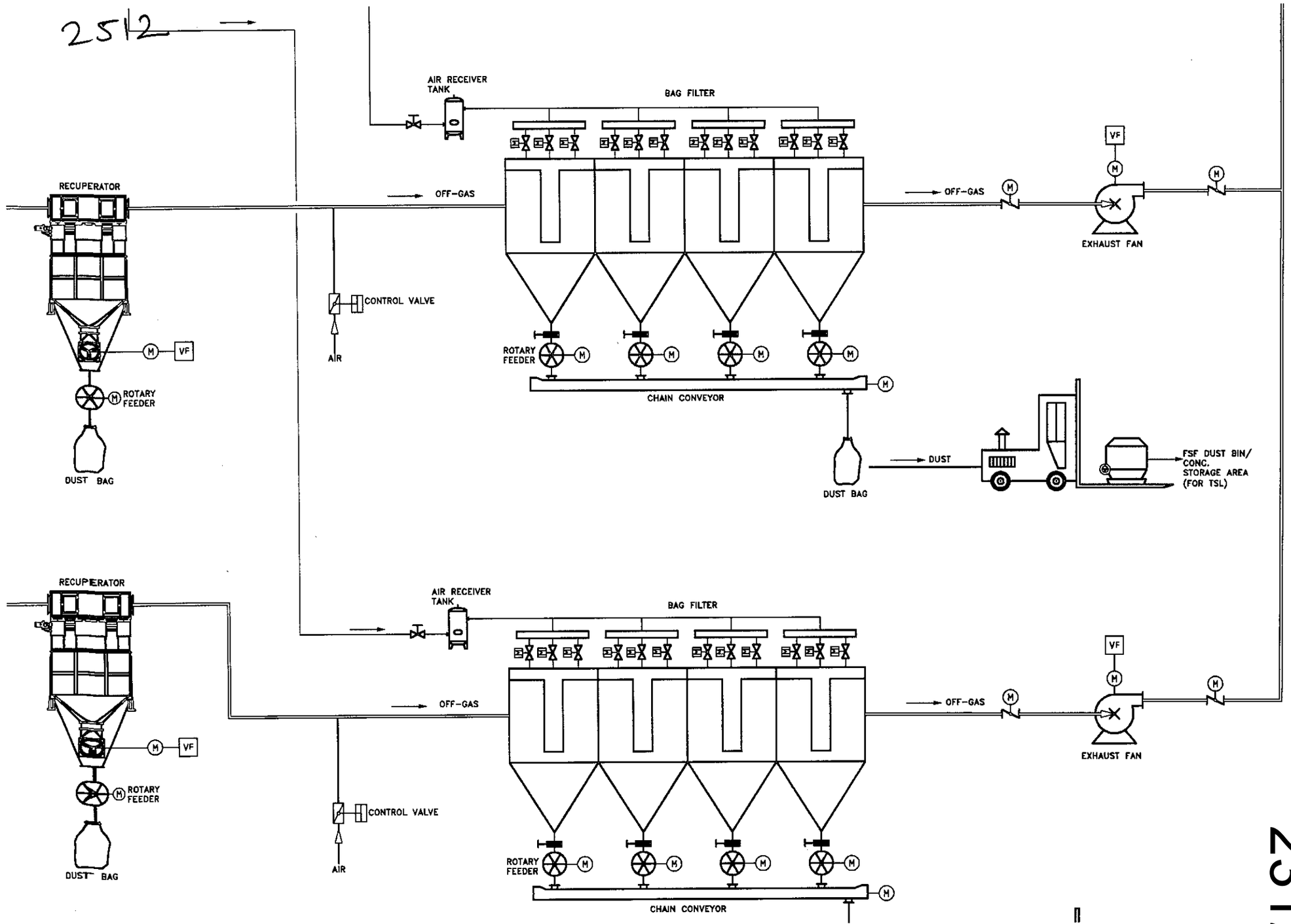

OFF-GAS
2510
FSF/ TSL OFF-GA
OFF-GAS
GAS DUCT
OFF-GAS
CHAIN CONVEYOR
DUST CHAMBER
OFF-GAS
DOUBLE AXIS SCREW CONVEYOR
ELECTROSTATIC PRECIPITATOR
CHAIN CONVEYOR
ROTARY FEEDER
OFF-GAS
VF
EXHAUST FAN
ELECTROSTATIC PRECIPITATOR
OFF-GAS
DUST
ROTARY FEEDER
ROTARY FEEDER
ROTARY FEEDER
ROTARY FEEDER
CHAIN CONVEYOR
ROTARY FEEDER
OFF-GAS
VF
EXHAUST FAN
EXPANSION VALVE
EXPANSION VALVE
DUST POT
DUST POT
WHITE DUST CHAIN CONVEYOR
DUST
PNEUMATIC CONVEYING TO FSF DUST BIN/ CONC. STORAGE AREA (FOR
2310

2311

2511

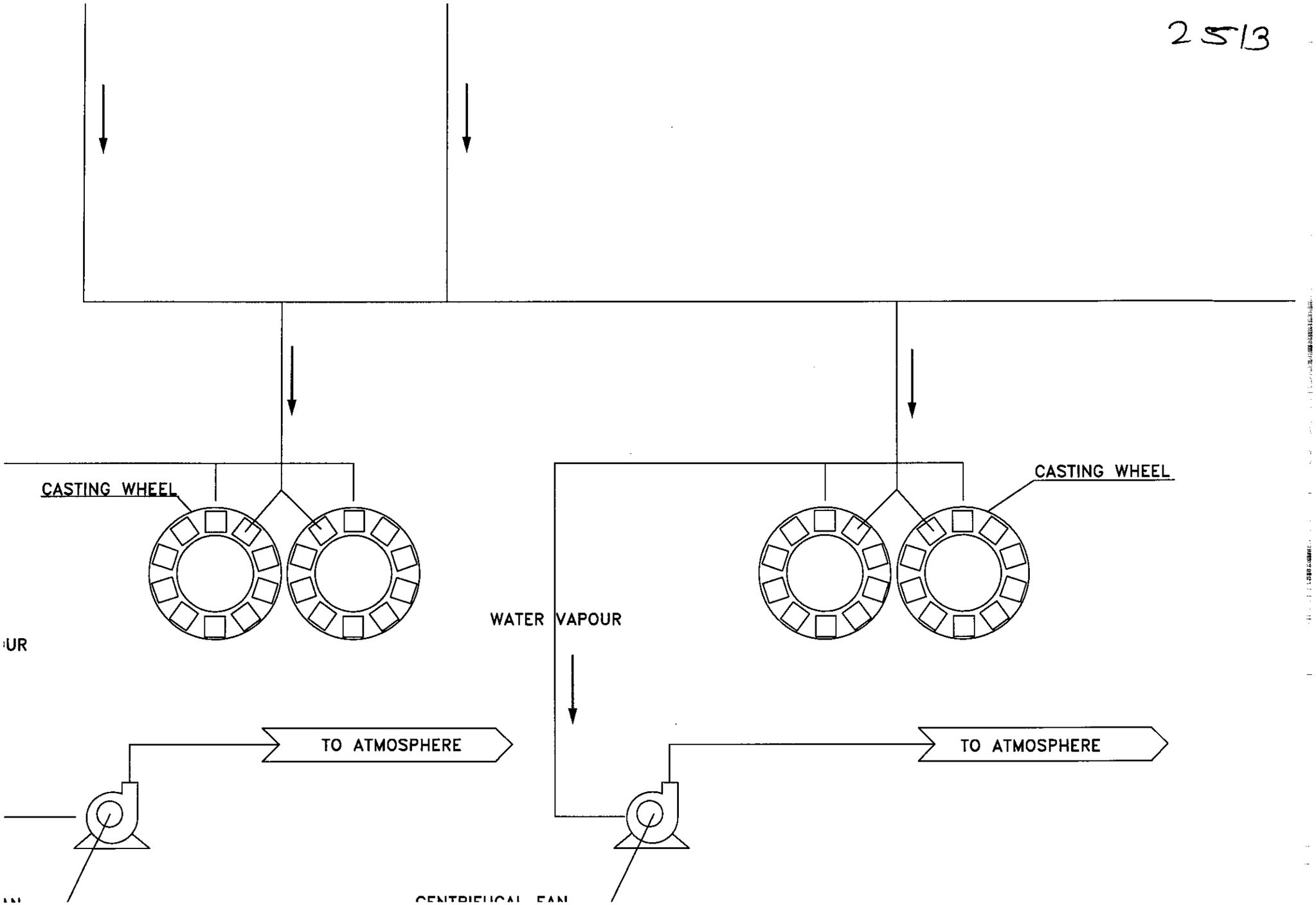

SEALED HOOD
OFF-GAS TO WHB
PS CONVERTER
FUGITIVE GAS COLLECTING HOOD (ROTATING PART)
FUGITIVE GAS COLLECTING HOOD (FIXED PART)
SEALED HOOD
OFF-GAS TO WHB
PS CONVERTER
FUGITIVE GAS COLLECTING HOOD (ROTATING PART)
FUGITIVE GAS HOOD (FIXED
TO FUGITIVE GAS DESULPHURISATION
INTO THE ATMOSPHERE

2512


AIR RECEIVER TANK
BAG FILTER
RECUPERATOR
OFF-GAS
OFF-GAS
VF
M
EXHAUST FAN
CONTROL VALVE
AIR
ROTARY FEEDER
CHAIN CONVEYOR
DUST BAG
DUST
FSF DUST BIN/ CONC. STORAGE AREA (FOR TSL)
RECUPERATOR
AIR RECEIVER TANK
BAG FILTER
OFF-GAS
OFF-GAS
EXHAUST FAN
CONTROL VALVE
AIR
ROTARY FEEDER
CHAIN CONVEYOR
DUST BAG

2312

2513


CASTING WHEEL
CASTING WHEEL
WATER VAPOUR
TO ATMOSPHERE
TO ATMOSPHERE

2313

EAC OBSERVATION:

Quantitative representation of mitigation measures was not presented.

REPLY:

Following is the preliminary list of the pollution abutment equipment has been envisaged and environmental mitigation measures for the proposed project;

Quantification of environment mitigation measures considered for 1.0 MTPA Copper Project					
SNO	**Plant**	**Area**	**Description of Equipment**	**Quantity for 1MTPA**	**% Efficiency**
1	Copper Smelter	Concentrate Feed Area	Dust Suppression System	2	
			Bag Filter	2	90 - 95
		Steam Drying	Bag Filter	4	90 - 95
		Feed Bin	Bag Filter	2	90 - 95
		Smelting Furnace	Hot Gas ESP	2	99 - 99.9
		Pierce Smith Converter	Water Cooled Double Hood	8	> 99
			Hot Gas ESP	4	99 - 99.9
		Electric Furnace	Bag Filter	2	90 - 95
			Wet Scrubber	2	85 - 92.5
		Anode Furnace	Bag Filter	2	90 - 95
			Wet Scrubber	2	85 - 92.5
		Slag Cleaning Furnace Fugitive Gas	Bag Filter	2	90 - 95
			Wet Scrubber	2	85 - 92.5
		PSC Fugitive Gas	Bag Filter	2	90 - 95
			Wet Scrubber	2	85 - 92.5
		Revert Crushing System	Bag Filter	2	90 - 95
2	Sulphuric Acid Plant	Gas Cleaning System	Wet ESP	20	99 - 99.9
			Effluent Treatment Plant	2	
			RO Plant for treated effluent	2	75 - 80
			Evaporation System	2	60 - 65
		Conversion Section	Tail Gas Scrubber	4	90 - 95
3	Refinery Plant	Electro winning System	Wet Scrubber	2	85 - 92.5
			Effluent Treatment Plant	2	
4	PMR Plant	Smelting Furnace	Wet Scrubber	2	85 - 92.5
			Wet ESP	4	99 - 99.9
5	Phosphoric Acid Plant	Rock Phosphate Handling area	Bag Filter	2	90 - 95
		Reaction System	Wet Scrubber	8	85 - 92.5
			Cyclone	2	
		Flash cooling System	Wet Scrubber	8	85 - 92.5
			Cyclone	2	
		Filtration Area	Wet Scrubber	2	85 - 92.5
		Concentration System	Fluorine Recovery System	6	75 - 80
6	Aluminum Flouride Plant	Filtration Area	Cyclone	2	
			Wet Scrubber	2	85 - 92.5
			Bag Filter	2	90 - 95

2516

EAC OBSERVATION No.-22

Following are the preliminary process vents/stacks and chimney details for the proposed copper project:-

Sr. No.	Stacks Attached to	Height m	Dia m	Temp °C	Velocity m/s	Volume Nm^3/hr	Material of Construction
	Unit –I						
	Flue Emission Through Stack attached to Boiler/Furnace/Heater						
1	Waste Heat Recovery Super heater - I*	70	1.5	150	16	70,000	Carbon Steel
2	Sulphuric Acid Pre Heater-I (Only for plant startup)	45	1.5	250	17	60,000	Carbon Steel
3	Sulphuric Acid Pre Heater-II (Only for plant startup)	45	1.5	250	17	60,000	Carbon Steel
4	DG Set – I (4 MVA Standby)	30					Carbon Steel
5	DG Set – II (4 MVA Standby)	30					Carbon Steel
6	Boiler – I (operational only when steam is not available from smelter)	70	1.5	150	16	70,000	Carbon Steel
7	Shaft Furnace of CCR Plant-I*	36	1.5	200	9	37000	Carbon Steel
8	Anode Casting – I	20	0.75	100	17	21,000	Carbon Steel
9	Anode Casting – II	20	0.75	100	17	21,000	Carbon Steel
10	Main Stack Secondary Gas Scrubber- I & II (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)*	150	2.5	60	16	250,000	Carbon Steel with Glass Flake/ FRP Lining
			2.0	60	15	150,000	Carbon Steel with Glass Flake/ FRP Lining
11	Electric Furnace and Secondary gases from Smelting – I (Bi Flue)*	100	2.2	150	16	150,000	Carbon Steel
			2.5	150	18	225,000	Carbon Steel
12	Main Stack Sulphuric Acid Plant-I & II (Bi flue)*	150	2	75	16	150,760	Carbon Steel with Glass Flake/ FRP Lining
			2	75	16	150,760	Carbon Steel with Glass Flake/ FRP Lining
13	Cathode Stripping M C – I*	30	0.3	50	6	1,500	FRP
14	Cathode Stripping M C – II*	30	0.3	50	6	1,500	FRP
15	Anode Scrap Washing MC– I*	30	0.3	40	6	1,500	FRP
16	Electro winning Stack – I*	45	0.3	40	19	4,500	FRP
17	Slag Granulation – I*	45	1.4	100	18	80,000	Carbon Steel
18	Steam Dryer for Copper concentrate – I*	60	1.6	120	18	100,000	Carbon Steel
19	Smelting Furnace Area (Emergency Vent-I only during process tripping)	45	1.8	300	18	86,000	Carbon Steel
20	PS Convertor Area (Emergency Vent – I (only during process tripping)	45	1.8	300	18	86,000	Carbon Steel
21	Dust Extraction – I (Rock Phosphate Handling Area)*	45	0.6	40	15	15,000	Carbon Steel
22	Precious Metal Recovery Plant – I*	45	0.35	60	16	5,000	Carbon Steel with Glass Flake/ FRP Lining

Sr. No.	Stacks Attached to	Height m	Dia m	Temp °C	Velocity m/s	Volume Nm^3/hr	Material of Construction
	Unit-II						
23	Waste Heat Recovery Super heater - II*	70	1.5	150	16	70,000	Carbon Steel
24	Sulphuric Acid Pre Heater-III (Only for plant startup)	45	1.5	250	17	60,000	Carbon Steel
25	Sulphuric Acid Pre Heater-IV (Only for plant startup)	45	1.5	250	17	60,000	Carbon Steel
26	DG Set - III (4 MVA Standby)	30					Carbon Steel
27	DG Set - IV (4 MVA Standby)	30					Carbon Steel
28	Boiler - II (operational only when steam is not available from smelter)	70	1.5	150	16	70,000	Carbon Steel
29	Shaft Furnace of CCR Plant-II*	36	1.5	200	9	37,000	Carbon Steel
30	Anode Casting - III	20	0.75	100	17	21,000	Carbon Steel
31	Anode Casting - IV	20	0.75	100	17	21,000	Carbon Steel
32	Main Stack Secondary Gas Scrubber- III & IV (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)*	150	2.5	60	16	250,000	Carbon Steel with Glass Flake/ FRP Lining
			2.0	60	15	150,000	Carbon Steel with Glass Flake/ FRP Lining
33	Electric Furnace and Secondary gases from Smelting - II (Bi Flue)*	100	2.2	150	16	150,000	Carbon Steel
			2.5	150	18	225,000	Carbon Steel
34	Main Stack Sulphuric Acid Plant-III & IV (Bi-flue)*	150	2	75	16	150,760	Carbon Steel with Glass Flake/ FRP Lining
			2	75	16	150,760	Carbon Steel with Glass Flake/ FRP Lining
35	Cathode Stripping M C - III*	30	0.3	50	6	1,500	FRP
36	Cathode Stripping M C - IV*	30	0.3	50	6	1,500	FRP
37	Anode Scrap Washing MC-II*	30	0.3	40	6	1,500	FRP
38	Electro winning Stack - II*	45	0.3	40	19	4,500	FRP
39	Slag Granulation - II*	45	1.4	100	18	80,000	Carbon Steel
40	Steam Dryer for Copper concentrate - II*	60	1.6	120	18	100,000	Carbon Steel
41	Smelting Furnace Area (Emergency Vent-II -only during process tripping)	45	1.8	300	18	86,000	Carbon Steel
42	PS Convertor Area (Emergency Vent - II-only during process tripping)	45	1.8	300	18	86,000	Carbon Steel
43	Dust Extraction - II (Rock Phosphate Handling Area)*	45	0.6	40	15	15,000	Carbon Steel
44	Precious Metal Recovery Plant - II*	45	0.35	60	16	5,000	Carbon Steel with Glass Flake/ FRP Lining
	Phosphoric Acid Plant*						
45	Phosphoric Acid Plant - I	100	1.5	50	17	100,000	Carbon Steel with Rubber/ FRP Lining
46	Phosphoric Acid Plant - II	100	1.5	50	17	100,000	Carbon Steel with Rubber/ FRP Lining

EAC OBSERVATION NO.-23

2518

EAC OBSERVATION:

Revised water balance shall be submitted.

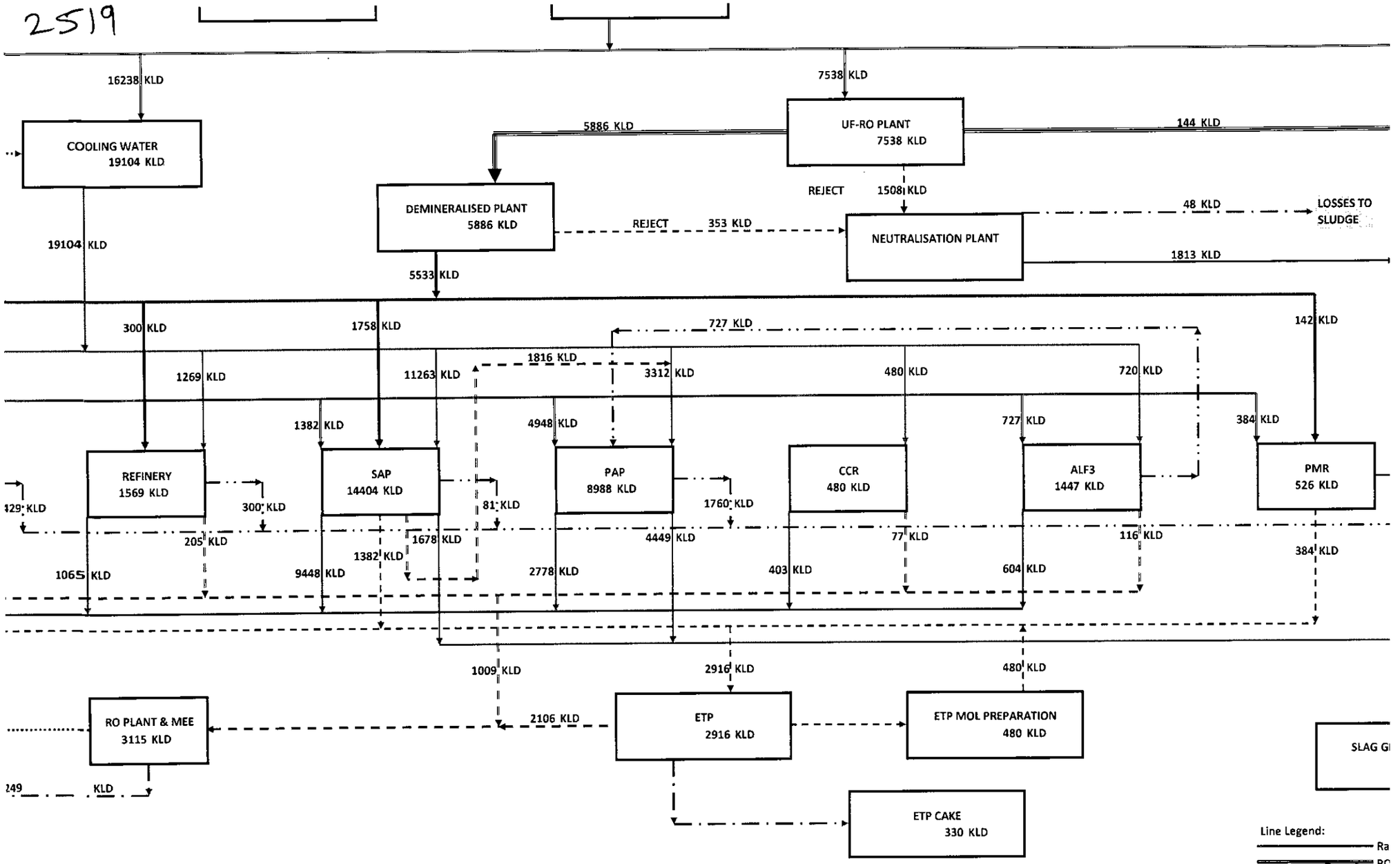
REPLY:

The water consumption for the proposed copper plant has been prepared based on the information submitted by various technology licensers.

The revised water balance is prepared facility wise providing details of fresh water requirement, recycled water, effluent generation, DM water and cooling water requirement along with the evaporation and system losses.

Revised Water Balance is presented in **Annexure-23.**

2519


16238 KLD
COOLING WATER
19104 KLD
19104 KLD
7538 KLD
UF-RO PLANT
7538 KLD
5886 KLD
144 KLD
DEMINERALISED PLANT
5886 KLD
REJECT
1508 KLD
REJECT
353 KLD
48 KLD
LOSSES TO SLUDGE
NEUTRALISATION PLANT
1813 KLD
5533 KLD
300 KLD
1758 KLD
727 KLD
142 KLD
1816 KLD
1269 KLD
11263 KLD
3312 KLD
480 KLD
720 KLD
1382 KLD
4948 KLD
727 KLD
384 KLD
REFINERY
1569 KLD
SAP
14404 KLD
PAP
8988 KLD
CCR
480 KLD
ALF3
1447 KLD
PMR
526 KLD
129 KLD
300 KLD
81 KLD
1760 KLD
205 KLD
1678 KLD
4449 KLD
77 KLD
116 KLD
384 KLD
1382 KLD
1065 KLD
9448 KLD
2778 KLD
403 KLD
604 KLD
1009 KLD
2916 KLD
480 KLD
RO PLANT & MEE
3115 KLD
2106 KLD
ETP
2916 KLD
ETP MOL PREPARATION
480 KLD
249 KLD
ETP CAKE
330 KLD
SLAG GI
Line Legend:
Ra
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EAC OBSERVATION NO.-24

EAC OBSERVATION:

HIRA shall be prepared for worst case scenario

REPLY:

The HIRA study has been prepared based on the methodology using a comprehensive checklist of hazards guidelines provided by the ISO 17776: 2002.

Considering the details of the various units and storage systems, the Nodes of Copper Smelter Plant including converter and anode furnace, Sulphuric acid plant and LPG storage bullets were taken up for the HIRA study for the worst case scenarios.

- Metal leak from furnace
- Failure of Sulphuric Acid Tank
- Fire in LPG bullet

Detailed report on worst case scenario for proposed Copper Refinery project with recommendations is presented as **Annexure-24.**

ADANI ENTERPRISES LIMITED

COPPER REFINERY - MUNDRA

Hazard Identification & Risk Assessment Study
for
Worst Case Scenarios

2522

1. INTRODUCTION

Adani Enterprises Limited have taken up a project for installation of Copper Refiney with 9,00,000 TPA capacity at Mundra in Gujarat State.

In the process of granting Environmental Clearance for the Project, the Expert Appraisal Committee recommend to carry out a Hazard Identification & Risk Assessment (HIRA) study for the Worst Case Scenarios.

Accordingly this document presents the HIRA study report for the worst case scenarios in the process plants and storage units in the Copper Refinery facility.

2. FACILITY DESCRIPTION

The Copper Refinery facility of Adani Enterprises Limited at Mundra consists of the following major units.

S. No.	Plant	Units	Phase-I	Phase-II	Overall Plant Configuration
1	Copper Smelter Plant	TPA	4,50,000	4,50,000	**9,00,000**
2	Copper Refinery Plant	TPA	5,00,000	5,00,000	**10,00,000**
3	Continuous Cast Copper Rod Plant	TPA	2,50,000	2,50,000	**5,00,000**
4	Copper Scrap & E-Scrap Melting Facility	TPA	50,000	50,000	**1,00,000**
5	Sulphuric Acid Plant	TPA	15,00,000	15,00,000	**30,00,000**
6	Phosphoric Acid Plant (as100% P2O5)	TPA	2,50,000	2,50,000	**5,00,000**
7	Aluminum Fluoride Plant	TPA	15,000	15,000	**30,000**
8	Oxygen (Industrial) Plant	TPM	48,000	48,000	**96,000**
9	Precious Metal Recovery Plant				
a	Gold	TPA	25	25	**50**
b	Silver	TPA	250	250	**500**
10	Selenium Recovery Plant	TPA	144	144	**288**
11	Waste Heat recovery boiler based power plant	MW	20	20	**40**

The following major storage tanks are provided in the Copper Refinery facility.

Sr. No.	Chemical Stored	No. of Tanks	Capacity of Each Tank	Total Capacity	Type of tank
1	Sulphuric acid (98%)	15	5500 KL	**1,50,000 T**	Vertical cone roof tanks. Carbon steel
2	Phosphoric acid	8	4500 KL	**30,000 T**	Vertical cone roof tanks. Carbon steel with rubber lining
3	LPG	4	100 T	**400 T**	Above ground horizontal cylindrical tanks (bullets)
4	Furnace oil	4	1000 T	**4000 T**	Vertical cone roof tanks. Carbon steel
5	HSD	2	500 KL	**1000 KL**	Vertical cone roof tanks. Carbon steel

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3. OBJECTIVE AND METHODOLOGY OF HAZID STUDY

The objective of this HIRA review is to identify all significant hazards associated with the proposed facility which have potential consequences with high severity level to harm people, environment or property, with a view to eliminating or reducing the hazards through the application of inherent safety at an early stage of the design.

The stated objectives of a HIRA review are to:

a) Identify potential hazardous events which can cause large impacts on impact/s on people, property, or the environment.
b) Identify existing safeguards;
c) If existing safeguards are considered inadequate, propose additional risk reduction measures by eliminating hazards, minimizing their effect or controlling the consequences of events as required.

HIRA Study Methodology

The HIRA study follows a structured, systematic methodology using a comprehensive checklist of hazards prepared on the basis of guideline provided by the standard ISO 17776: 2002.

The HIRA study proceeds as follows:

1. Select the system / section (or the activity) for review
2. Describe the main features of the system (layout, safety measures, operating conditions, etc.) or activity.
3. Select the first (or next) guideword category from the selected list
4. Consider the hazard and discuss its applicability in relation to the system / section under review
5. For each applicable hazard, consider if the hazard can be removed or reduced. If a hazard cannot be removed, note the main existing or planned safeguards and review their adequacy.
6. Perform risk rating.
7. Identify safeguards, as applicable
8. Make recommendations for further action, as required
9. Repeat steps 3 - 8 for all guidewords in the selected list
10. Repeat steps 1-9 for all systems / sections of the plant under review (or activities described in the procedure under review)

The following Risk Assessment Matrix prepared as per the guideline provided by Energy Institute (formerly known as Institute of Petroleum) UK.

Risk Assessment Matrix		Likelihood of Occurrence				
		A	B	C	D	E
Severity of Consequence	1	Low Risk				
	2					
	3					
	4		Moderate Risk			

Severity of Consequence			
Severity Level	Description		
	People	Environment	Asset
1	Slight injury or health effect	Slight effect	Slight damage
2	Minor/ reportable injury or health effect	Minor effect	Minor damage
3	Moderate/ lost time injury of health effect	Moderate effect	Moderate damage
4	Major injury or health effect/ Single fatality	Major effect	Major damage
5	Multiple fatalities	Massive effect	Massive damage

Likelihood of Occurrence	
A	Never heard of it in the industry
B	Heard of it in the industry
C	Happened more than once per year in the industry
D	Happened more than once per year in the organization/ group
E	Happened more than once per year in the location

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4. LIST OF NODES & DOCUMENTS

This HIRA study covers the Copper Refinery Facility of Adani Enterprises Limited at Mundra.

Considering the details of the various units and storage systems, the following Nodes were taken up for the HIRA study of the worst case scenarios.

Node No.	Node Description
1.	Copper smelter plant including converter and anode furnace
2.	Sulphuric acid plant & storage
3.	LPG storage bullets

Derailed HIRA work sheets for the above plants/ units are provided at Attachment-I.

The wort case scenarios emerging from the HIRA study are described below.

Copper Smelter Plant

Worst Case Scenarios:

1. Spill of Molten Metal
   Large quantity of molten copper and slag are contained in the process equipment and ladle used for transfer.
   Spillage of molten metal may cause damage as follows:
   - Serious burn injury to personnel in the area
   - Steam explosion if the molten metal comes into contact with water, which may cause local damage and splatter of molten metal.

   The damage is expected to be limited.

   The following safeguards are provided:
   - Refractory lining for the smelter process equipment
   - Interlocks with limit switches to prevent excess tilting of equipment holding molten metal
   - Periodic inspection and testing of ladles, EOT cranes and other lifting equipment
   - Good housekeeping to prevent water accumulation in the smelter area

2. Release of sulphur dioxide (SO2) gas from smelter/ converter.
   SO_2 gas evolved during smelting on copper sulphide ore is evacuated by SO_2 gas blower in sulphuric acid plant. Thus the smelter is always under negative pressure to prevent release of SO_2 gas in the work area.

   In case the SO_2 gas blower stops on power failure, the SO_2 gas from smelter will escape into the surrounding work area resulting in toxic gas exposure of plant personnel.

   The following safeguards are provided:
   - Safety instrument interlock to stop the smelter unit automatically in the event of stoppage of SO_2 gas blowers or excess gas pressure in smelter. Being a gas at

atmospheric pressure, the hold up inventory of SO_2 in the system is limited in quantity.

- Automatic starting of Bypass fan installed after electrostatic precipitator (ESP) to evacuate the SO_2 gas from the system and divert it to flue gas desulphurisation (FGD) unit for safe disposal.

Sulphuric Acid Plant & Storage

There are 6 tanks for storage of concentrated Sulphuric Acid with a capacity of 5,500 M^3 each for Plant #1 and Plant #2.

Worst Case Scenarios:

1. Spill of Sulphuric Acid from Storage Tanks
   Considering the large inventory of sulphuric acid in storage tanks, spillage of s acid may cause damage as follows:
   - Serious acid burn injury to personnel in the vicinity
   - Contamination of soil and surface/ sub-soil water
   - Damage of concrete on prolonged contact.

   The following safeguards are provided:
   - RCC dyke containment with internal acid-resistant tile lining and sump pump for transfer of collected acid
   - Tank overfill protection with multiple level instruments of high reliability
   - Adequate free space in each tank to facilitate emergency transfer from the tank under distress
   - Periodic inspection and maintenance of equipment & piping in acid service

2. Earthquake event
   In the event of an earthquake, there is potential for damage of tank and dyke structures which may result in release of sulphuric acid and cause the following damages.
   - Serious acid burn injury to personnel in the vicinity
   - Contamination of soil and surface/ sub-soil water
   - Damage of concrete on prolonged contact.

   The following safeguards are provided:
   - RCC dyke containment with internal acid-resistant tile lining and sump pump for transfer of collected acid
   - The acid storage tanks, their foundations and RCC dyke structures shall be designed for seismic zone – V representing the highest seismic activity.
   - Sizing of foundations and dyke (length, width & height) will ensure adequate space inside the dyke to prevent spillage of acid outside.

There are 4 tanks of the Phosphoric Acid with a capacity of about 5,500 m^3 each and 4 clarifier with a capacity of about 1800 m^3 each for plant 1 and plant 2. and 4. Tanks and clarifier will be made of carbon steel with natural Rubber lining for the shell, carbon steel material of construction with additionally carbon brick lining at the bottom of the tank as well as 1 meter height along the circumference. The hazards and safeguards are similar to those mentioned for sulphuric acid storage tanks.

LPG Storage

There are 2 Nos. of above-ground horizontal cylindrical vessels (bullets) for storage of LPG.

Worst Case Scenarios:

1. LPG leak from storage tanks or associated piping resulting in jet fir, pool fire or vapour cloud explosion
2. Engulfment of above-ground LPG bullet in jet fire or pool fire resulting from leakage of LPG or spillage of fuel oil or HSD from tanks located in the nearby area leading to rupture of the LPG bullet and BLEVE/ fire ball.

The damage distances for the worst case scenario of catastrophic failure of LPG bullet estimated using DNV Phast software are as follows.

Worst Case Scenario: Catastrophic Failure of LPG Bullet		
Damage Effect	Parameter	Damage Distance (metres)
Vapour Cloud Explosion Overpressure9	0.02 barg (0.3 psig)	470
	0.07 barg (1 psig)	290
	0.2 barg (3 psig)	Not reached
Fire Ball Thermal Radiation Intensity	4 kW/m^2	380
	12.5 kW/m^2	190
	37.5 kW/m^2	Not reached

It is seen that the effect distances for light injury/ damage may extend outside the plant boundary.

The following safeguards are provided:

- Dyke containment is provided for FO and HSD tanks to prevent oil spreading to LPG bullet area.
- Water spray system is provided for the LPG bullets to prevent overheating of the shells exposed to external fire, thus preventing failure of the vessel.

5. RECOMMENDATIONS

The recommendations emerging from this HIRA study of the Worst Case Scenarios at Mundra Copper Refinery Facility of Adani Enterprises Limited are listed below.

Copper Smelter & Related Units

1. Ensure installation of LPG header and connecting pipes away from possible dropped object and impact by crane.
2. SO_2 gas piping should be covered under the condition monitoring system (NDT).
3. Provide redundancy for safety critical limit switches for tilting of equipment containing molten metal and other such service.
4. Provide emergency power supply to the Bypass fan installed after electrostatic precipitator (ESP) so that it is available when SO_2 gas blower stops on main power failure.

Sulphuric Acid Plant & Storage

1. Keep flange joints in sulphuric acid piping to the minimum required

   Provide flange guards for flange joints in sulphuric acid piping.
2. Provide overfill protection for acid storage tanks with independent level transmitters, one for high level alarm and another to close shut-off valve in tank inlet.

LPG Storage

1. Provide spiral wound metallic gasket or ring joint in LPG service as per OISD standard 144.
2. The flange joint in liquid outlet pipe should be located 3 m away from shadow of the bullet.
3. Provide remote operated shut off valve in LPG liquid outlet line from bullet.
4. Provide emergency power supply for the pump supplying water for the spray system around LPG bullets.

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EAC OBSERVATION NO.-25

EAC OBSERVATION:

Management of white ash shall be spelled out.

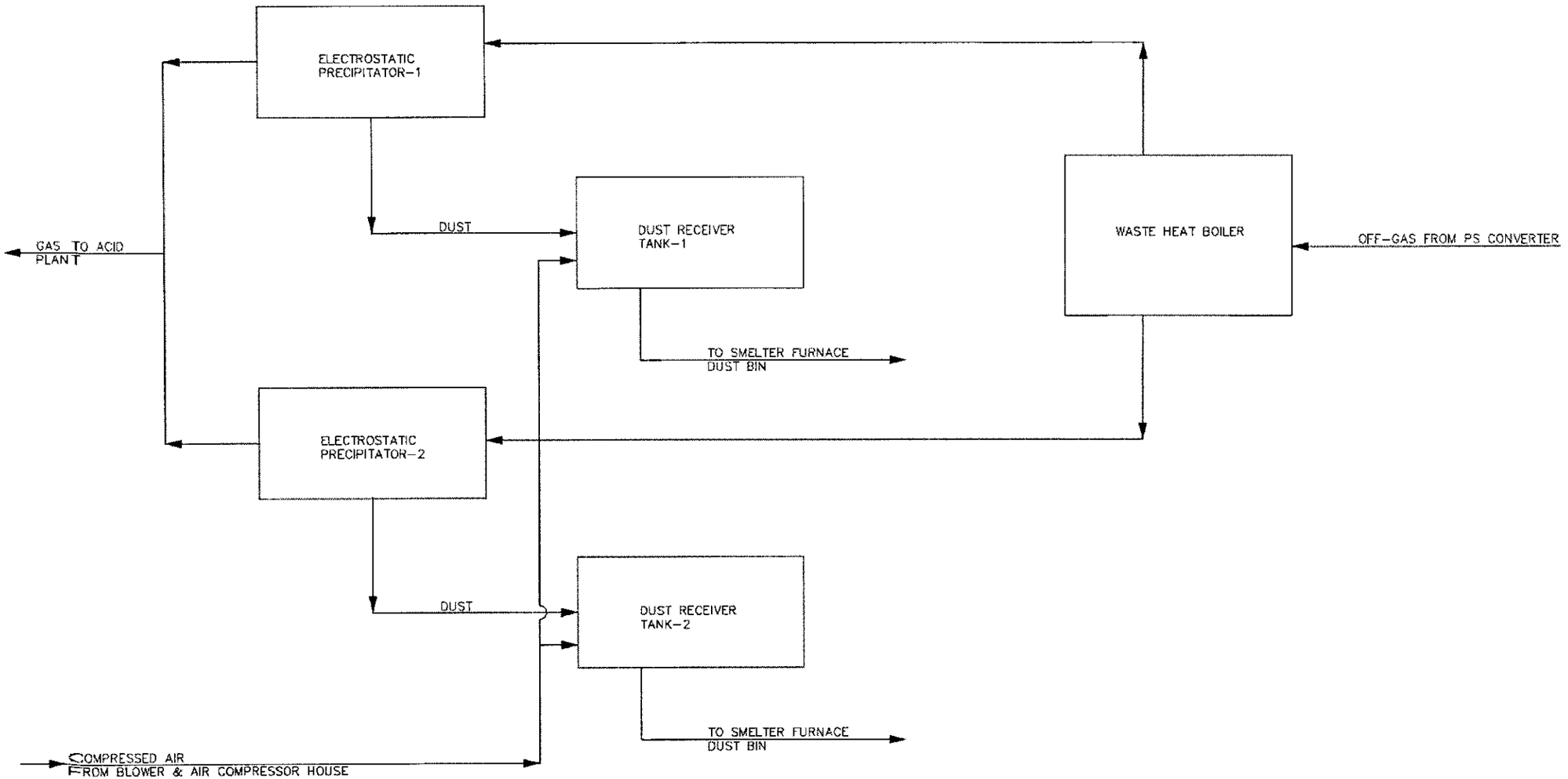
REPLY:

White Ash (Dust) Management:

High temperature dust-laden gas ~1200^{0}C from Peirce Smith Converter (PSC) goes to the waste heat boiler to recover waste heat and produce steam and cool itself down to about 360^{0}C; while allowing much of the dust entrained in the gas to settle down at the same time; the dust-laden gas from all waste heat boilers reports in the balloon gas duct before it goes to the dust chamber for precipitation and then the ESP for dust removal. Dust-removed gas is sent by high temperature exhaust fan to the Sulphuric Acid Plant. The dust captured in the ESP is also called as white dust. This dust contains copper along-with impurities. Dust captured in the PSC ESP is delivered by chain conveyor to the white dust bin from which it is sent to smelting furnace dust bin to get blended with the feed concentrate mix by pneumatic conveying system.

EAC OBSERVATION NO.-25

BLOCK FLOW DIAGRAM: WHITE DUST (ASH) MANAGEMENT



2532

EAC OBSERVATION NO.-26

EAC OBSERVATION:

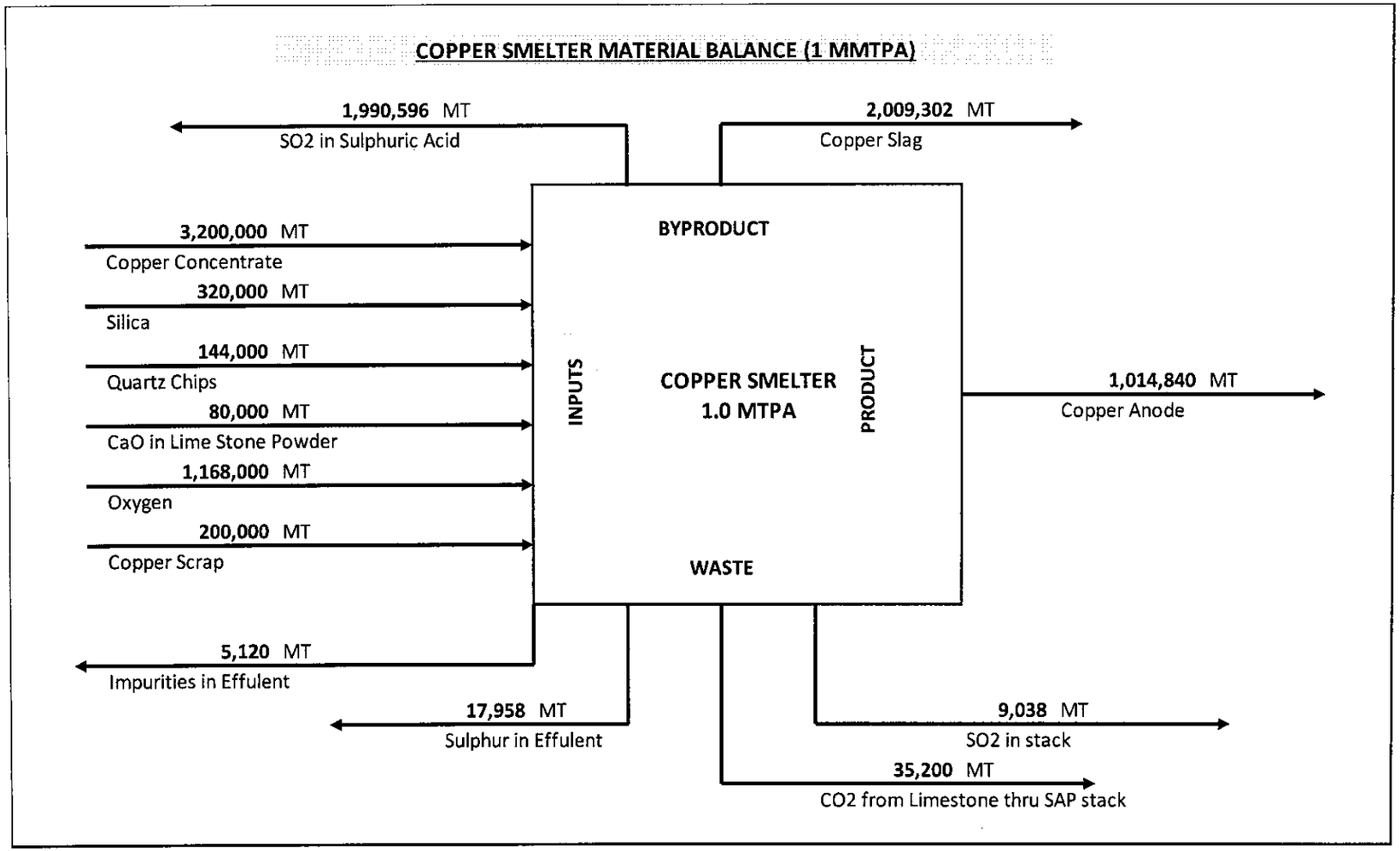
Material balance shall be revised.

REPLY:

Revise material balance for Copper Refinery Project has been prepared facility-wise providing the details of input material, finished product, by product and waste generation. The revised material balance facility-wise is presented below.

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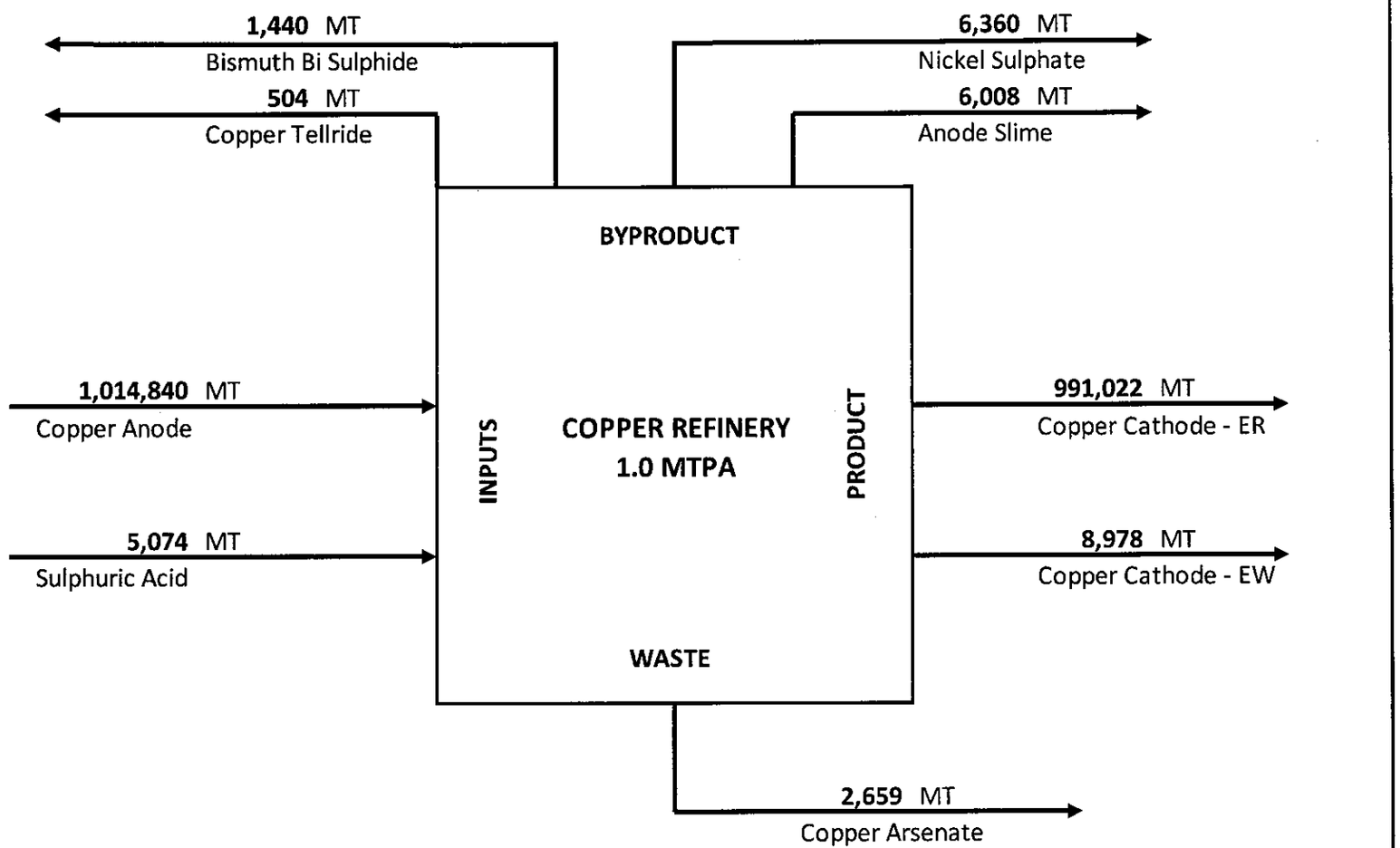
EAC OBSERVATION NO.-26



EAC OBSERVATION NO.-26

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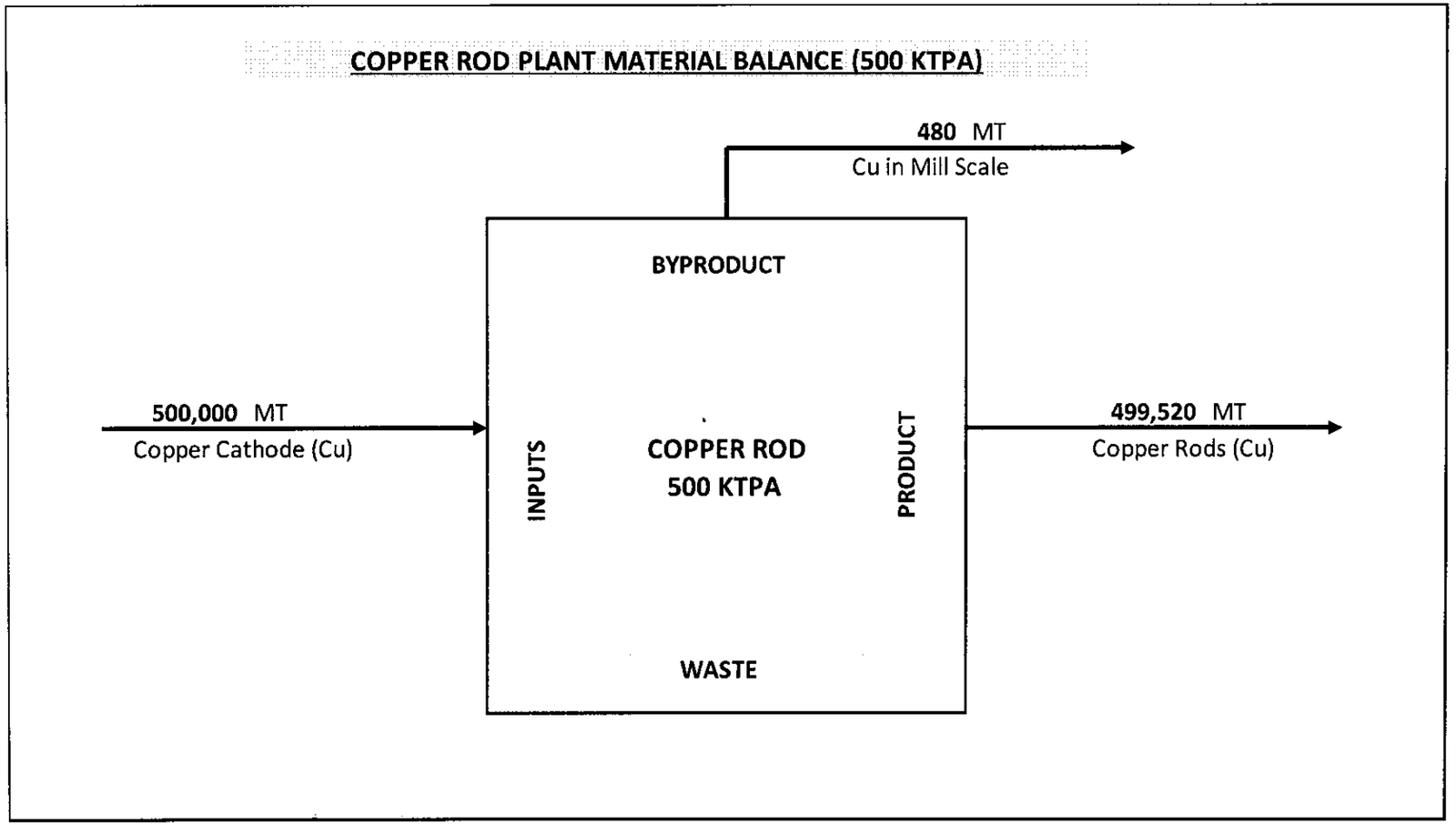
COPPER REFINERY MATERIAL BALANCE (1 MMTPA)



2333

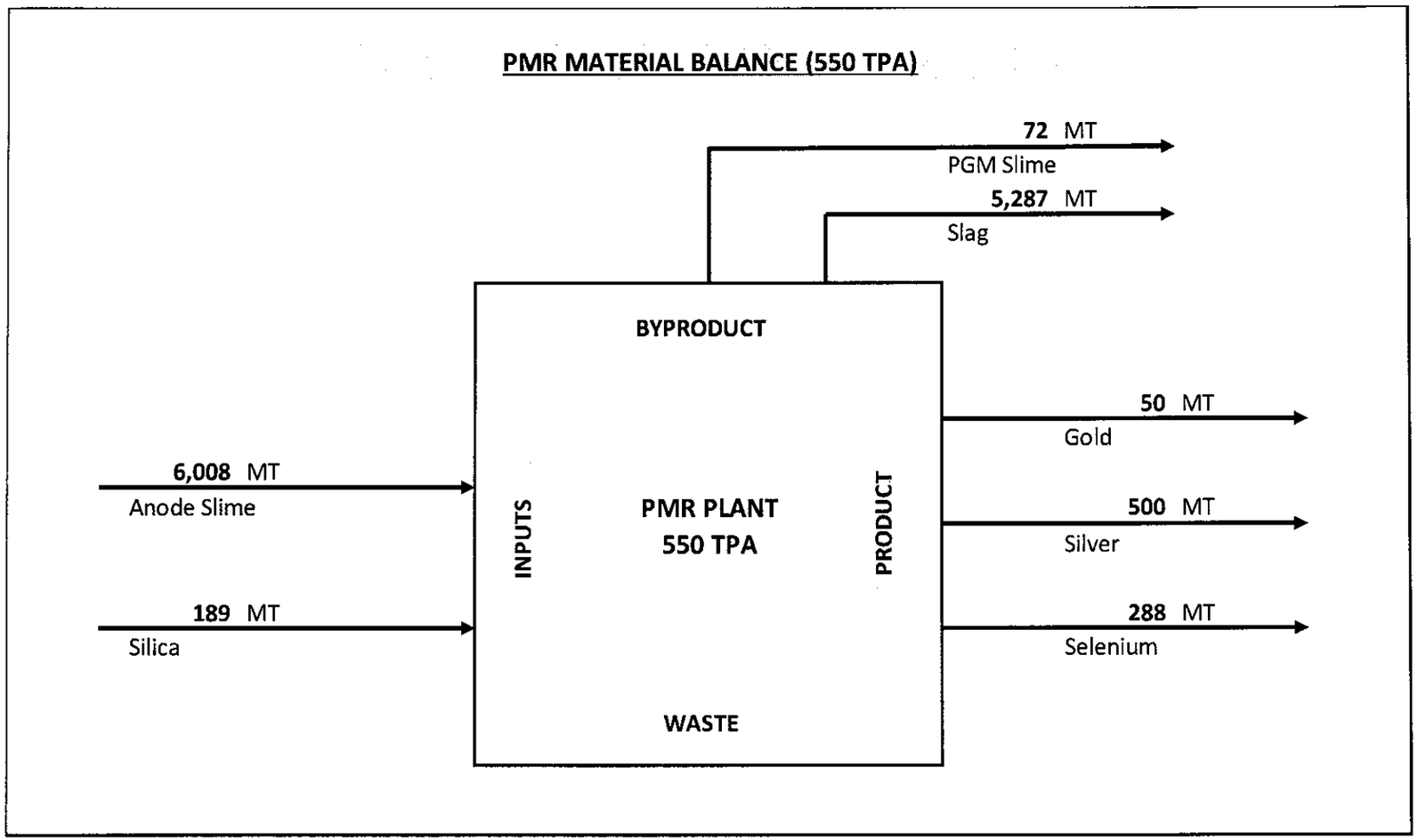
2535

EAC OBSERVATION NO.-26



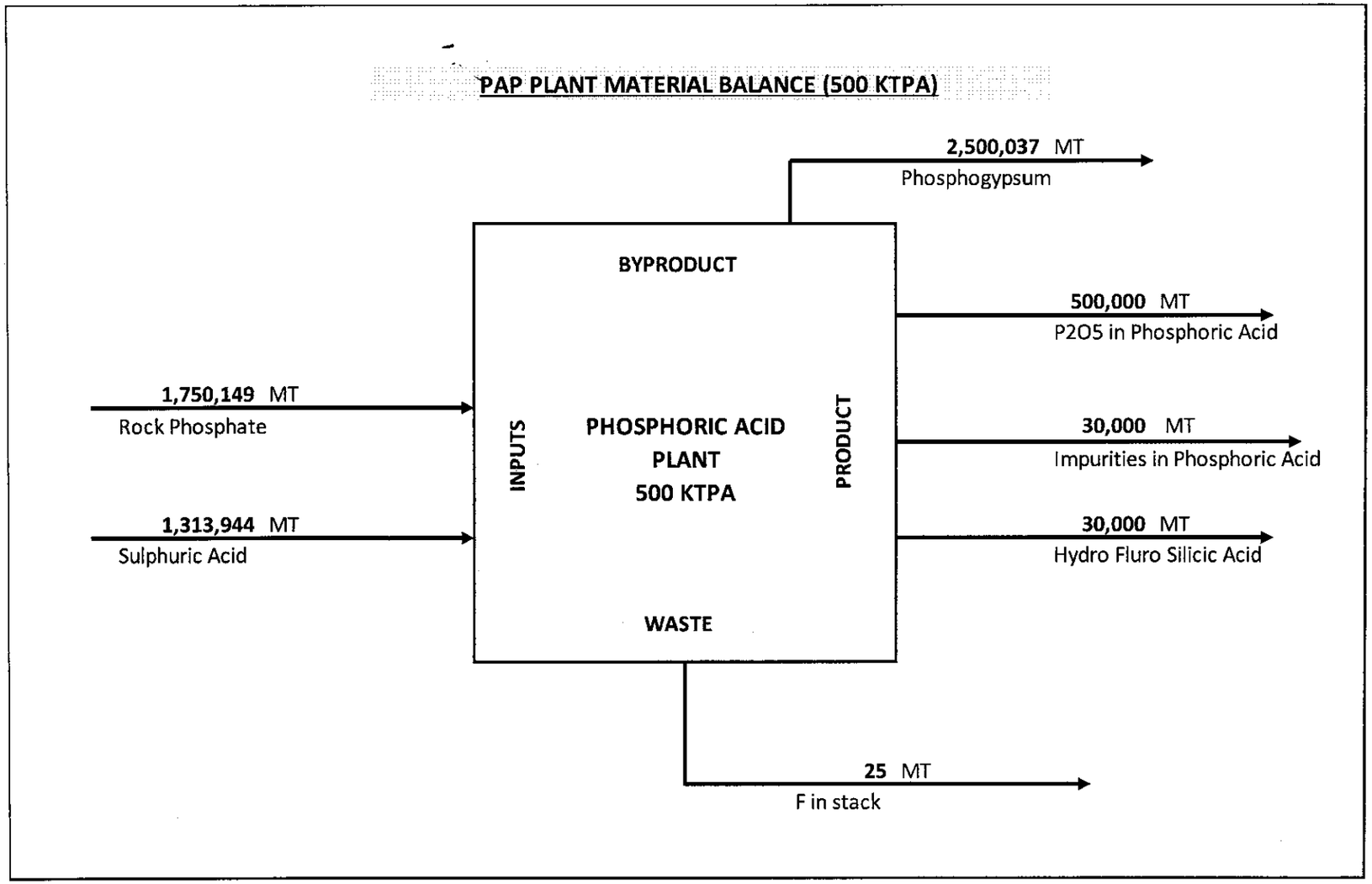
2334

EAC OBSERVATION NO.-26



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EAC OBSERVATION NO.-26



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EAC OBSERVATION NO.-27

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EAC OBSERVATION:

The involvement of geological expert shall be provided.

REPLY:

Mr. J Rajendra Prasad, Functional Area Expert (FAE) is QCI- NABET empanelled consultant.

EAC OBSERVATION:

The compliance of specific conditions of the Environmental Clearance of the SEZ shall be provided.

REPLY:

A copy of the Environmental Clearance of Adani Ports & SEZ Limited (APSEZ) is attached as **Annexure-28(a)** and Certified EC Compliance of APSEZ is also attached as **Annexure-28(b)** for ready reference.

Half yearly Compliance report of Environment Clearance under CRZ notification for the period October– 2018 to March– 2019 for "Port expansion project including dry/break bulk cargo container terminal, railway link and related ancillary and back-up facilities at Mundra Port, Dist. Kutch in Gujarat by M/s. Adani Ports & SEZ Limited has been submitted to Ministry of Environment, Forest and Climate Change, Regional Office (WZ), Bhopal dated 23.11.2018 and the same is attached as **Annexure-28(c).**

ANNEXURE-28(a)

354.0

F. No. 10-138/2008-IA.III
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003.

Dated: July 15, 2014

To
M/s Adani Port and SEZ Ltd
Adani House, Near Mithakhali Six Roads,
Navarangpura, Ahmedabad,
Gujarat- 380 009.

Subject: EC for proposed Multi- Product SEZ and CRZ clearance for Desalination, sea water intake, outfall facility and pipeline, at Mundra by M/s Adani Port and SEZ Ltd. – Reg.

This has reference to letter No. ENV-10-2010-1601-E dated 27.03.2012 of the Director (Environment) & Additional Secretary, Govt. of Gujarat and your subsequent letters dated 10.05.2012, 14.05.2012, 26.05.2012 and 29.04.2013 seeking prior Environmental and CRZ Clearance for the above project under the EIA Notification, 2006 and Coastal Regulation Zone Notification, 2011. The proposal has been appraised as per prescribed procedure in the light of provisions under the EIA Notification, 2006 and the Coastal Regulation Zone Notification, 2011 on the basis of the mandatory documents enclosed with the application viz., the Questionnaire, EIA, EMP, recommendations of the State Coastal Zone Management Authority and the additional clarifications furnished in response to the observations of the Expert Appraisal Committee constituted by the competent authority in its meetings held on 16th –17th April, 2012, 4th –5th June, 2012 and 9th -10th July, 2012.

2. It is, interalia, noted that the project involves development of multi product SEZ on a plot area of 18,000 ha. of which 6641.2784 ha. is presently notified under Special Economic Zone (SEZ). As per the proponent, the Multi product SEZ at Mundra comprising of various processing zones, non-processing zones, warehousing zones, Road Network (trunk as well as internal), Bridges or culverts over natural drains, Rail Network, IT-Telecommunication network, Electrical Network, Water supply, conservation & drainage Network, Effluent collection network, Desalination Plant with proposed intake & outfall locations, Common Effluent Treatment Plants & Sewage Treatment Plants, Natural Gas line network, Social Infrastructure, Existing Airstrip, Municipal Solid Waste Disposal site, utilities & supporting infrastructure etc. For the first phase of development total water requirement will be 150 MLD. Power requirement will be approx. 360 MW. Desalination plant of 150 MLD output capacity is proposed. 11 MLD water will be sourced through Narmada water pipeline. Two CETP each of capacity 50 MLD and 17 MLD as well as STP of 62 MLD is proposed. This will require 375 MLD of seawater intake and 241 MLD of treated waste water outfall into the sea. For final phase of development total water requirement will be 450 MLD and power requirement will be approx. 1000 MW.

3. A suitable seawater intake point has been identified on the eastern end of the approved East Port Basin at Latitude 22°48'30.76"N; Longitude 69°46'34.06"E where a depth of 6 m below CD would be available after the port development. As per modelling study the combined discharge of 241MLD which includes 16MLD from CETP and 225 MLD from desalination plant as RO reject is expected having 57.57ppt of salinity, 14.41 mg / l of BOD and 94.39 mg/l of COD. After careful consideration of many aspects a suitable outfall location is identified on the west of the Eastern basin at Latitude 22°46'44.04"N; Longitude 69°45'5.51"E taking advantage of the expected 7.5m below CD basin depth. The outfall pipe line length is approximately 5.7 km and diffuser designed to attain a minimum dilution of 40-50 times.

4. The Centre for Earth Science Studies demarcated HTL, LTL and CRZ area. As per the CESS report and GCZMA, out of 6641.2784 ha of SEZ area, 1473.39 ha area falls within CRZ area. No SEZ industrial activity is proposed in the CRZ area. Only the Desalination plant pipeline for intake and outfall is proposed in CRZ areas. The Gujarat SCZMA in their 14th meeting held on 27-02-2012 considered the proposal of intake, outfall facilities, Desalination plant and laying pipeline and recommended the same vide their letter no.ENV-10-2010-1601-E dated 27th March 2012. Gujarat Pollution Control Board has granted Consent to Establishment of Marine outfall (NOC) vide letter dated 10.11.2011. The length of the intake will be approximately 5 Kms. As the sea water intake demand is 15000m3/h, drawal by pipe system is suitable by incorporating a wet well structure at the location. The intake point proposed is within the proposed East Port basin with a depth of 6 m below CD. The projected quantity of water can be transported through a single pipe of 1.3 m dia with a flow velocity of 3 m/ s or with a 1.6 m pipe with flow velocity of 2m/s.

5. The Expert Appraisal Committee, after due consideration of the relevant documents submitted by the project proponent and additional clarifications furnished in response to its observations, have recommended for the grant of Environment and CRZ Clearance for the SEZ in an area of 8481.2784 ha. However, SEZ for 1840 ha has been approved in principle by Ministry of Commerce and Industries.

6. Hon'ble High Court of Gujarat in WP No. 21 of 2013 vide order dated 13.01.2014 has directed that the Ministry to take a decision of its own so far as the issue of grant of environmental clearance is concerned considering the position prevailing as on date and also the aspects which have been highlighted by us in this judgment, within a period of thirty days from the date of this judgment without fail. Further, vide order dated 27.01.2014 Hon'ble Supreme Court in SLP No. 1526 of 2014 which was filed against the Order of High Court by the Respondent-1 has passed order that in case, the MOEF is unable to complete the process within the time stipulated by the High Court, it will be open for them to approach this Court for extension of time. Accordingly, Ministry has filed a petition before the Hon'ble Supreme Court seeking extension of two months time.

7. It is noted from the Judgement dated 13.01.2014 of Hon'ble High Court of Gujarat in PIL 21 of 2013 the Hon'ble Court has construed the grant of lease to units prior to

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(viii) *"Consent for Establishment" for the SEZ shall be obtained from Gujarat Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.*

(ix) *PP shall get detailed bathymetry done for all the creeks and rivers within Port and SEZ areas along with mapping of co-ordinates, running length, HTL, CRZ boundary, mangrove areas including buffer zone through NCSCM / NIOT. PP shall also get prepared a detailed action plan for conservation and protection of creeks/ mangrove area etc through NCSCM / NIOT and submit the same to GCZMA for their examination and recommendation. GCZMA will submit its recommendations to MoEF for approval.*

(x) *PP shall demarcate the CRZ area on land with GPS coordinates in consultation with GCZMA/ the agency which has done the HTL/LTL demarcation for the area. There shall be no allotment of plot/s in CRZ area to industries. No industrial activity within CRZ area except the port and harbor & the foreshore facilities shall be allowed as committed*

(xi) *Till the approval of action plan for conservation and protection of creeks/ mangrove area, the CRZ area within SEZ shall be demarcated as "No Development Zone". PP shall not allow/ undertake any development in CRZ area of SEZ.*

(xii) *The implementation of action plan approved by the MoEF shall be monitored by the NCSCM/ NIOT. Compliance with action plan shall be submitted to GCZMA and to MoEF, RO. at Bhopal along with six monthly monitoring report.*

(xiii) *PP shall earmark separate budget for the implementation of the above action plan. The details of the expenditure shall be submitted to GCZMA and to MoEF, RO. at Bhopal along with six monthly monitoring report.*

(xiv) *All the industry in SEZ shall be connected through impervious drainage lines to the STP/ CETP for the discharge of their sewage or industrial effluent. There shall not be any discharge to creeks / rivers. PP shall be accountable for implementing this condition and necessary clause shall be incorporated in the MoU while allotting the plot to the individual industries*

(xv) *PP shall not carry out any river course modification.*

(xvi) *The individual industrial units shall obtain prior EC under EIA Notification, 2006 as applicable.*

(xvii) *Proponent shall identify 200 ha of land for mangrove plantation as per the condition laid by SEAC.*

(xviii) *50 meter buffer from the existing mangrove area should be provided for any developmental activity,*

obtaining EC by M/s APSEZL as violation of EIA, Notification, 2006. Therefore, according to the OMs dated 12.12.2012 and 27.06.2013, PP was addressed for Board Resolution and the State Government was addressed to take credible action against the PP for the violation. Direction under Section 5 of E(P)Act, 1986 was also issued to APSEZ not to take up and allow any further construction activity within SEZ till the grant of clearance.

8. Further, Hon'ble Supreme Court video order dated 02.05.2014 in SLP 1526 of 2013 had ordered for stay of Ministry's letter dated 3.04.2014 addressed to Government of Gujarat to initiate legal action for the violation, also directed that the Ministry to complete the process of EC within eight weeks.

9. M/s APSEZ Ltd. has stated that the Board resolved that since the matter is sub-judice before the Hon'ble Supreme Court of India, will fully abide by the out come of the decision of the Hon'ble Supreme Court.

10. In view of the above and to comply with the orders of Hon'ble Courts, Ministry hereby accords necessary Environment Clearance for proposed Multi- Product SEZ in an area of 6641.2784 ha and CRZ clearance for desalination, seawater intake, outfall facility and pipeline for as per the provisions of Environmental Impact Assessment Notification – 2006 and its subsequent amendments and Coastal Regulation Zone Notification, 2011, subject to strict compliance of the terms and conditions as follows:

11. PART A - SPECIFIC CONDITIONS

(i) PP shall abide by the final order/decision of Hon'ble Supreme Court in SLP (Civil) no. 1526/2014 and connected matters.

(ii) Properly conserve the creeks, river and the mangroves area in the area.

(iii) Ensure that mouths of all the creeks are kept open to ensure flushing of the creeks.

(iv) Bring the creeks to the condition as was seen in the satellite map of 2005 which will be a "reference" satellite map and a copy of which shall be sent to you separately.

(v) Submit once in a year latest satellite map which can be compared with the reference satellite map of 2005 to ensure that no modification in the creeks, rivers, mangroves and mouth of creeks have taken place.

(vi) Any direction issued by the MoEF with respect to the report submitted by Ms Sunita Narain Committee shall be complied with by the Proponent as applicable.

(vii) At its cost get Inspection study done once in a year by the organizations like NEERI or any organization approved by this Ministry to - (i) ensure compliance of all the EC conditions (ii) development of SEZ meeting of the environment norms, and (iii) advise any mid-term correction that can be introduced depending on the recommendation of the independent Third Party.

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(xix) Proponent shell develop the green belt with 3 layers of canopy all along the periphery.

(xx) All the recommendation of the EMP shall be complied with in letter and spirit. All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the compliance for each mitigation plan shall be submitted to MoEF along with half yearly compliance report to MoEF-RO.

(xxi) There shall be no disturbance to the sand dunes. The pipelines shall be laid using advanced method viz. Horizontal Directional Drilling (HDD) so as to avoid disturbance to the sand dunes/ creeks/ mangroves.

PART – B. GENERAL CONDITIONS

Construction Phase.

(i) Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

(ii) A First Aid Room will be provided in the project both during construction and operation of the project.

(iii) All the topsoil excavated during construction activities should be stored for use in horticulture/landscape development within the project site.

(iv) Disposal of muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed, taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.

(v) Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.

(vi) Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.

(vii) Any hazardous waste generated during construction phase should be disposed off as per applicable rules and norms with necessary approvals of the Gujarat Pollution Control Board.

(viii) The diesel generator sets to be used during construction phase should be low sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.

(ix) *The diesel required for operating DG sets shall be stored in underground tanks and if required, clearance from Chief Controller of Explosives shall be taken.*

(x) *Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.*

(xi) *Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/GPCB.*

(xii) *Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003. (The above condition is applicable only if the project site is located within 100 Kms of Thermal Power Stations).*

(xiii) *Ready mixed concrete must be used in building construction.*

(xiv) *Storm water control and its re-use should be regulated as per CGWB and BIS standards for various applications.*

(xv) *Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other referred best practices.*

(xvi) *Permission to draw ground water shall be obtained from the competent Authority prior to construction/operation of the project.*

(xvii) *Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.*

(xviii) *Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.*

(xix) *Use of glass may be reduced by upto 40% to reduce the electricity consumption and load on air-conditioning. If necessary, use high quality double glass with special reflective coating in windows.*

(xx) *Roof should meet prescriptive requirements as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirements.*

(xxi) *Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all airconditioned spaces while it is aspirational for non-airconditioned spaces by use of appropriate thermal insulation material to fulfil these requirement.*

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(xxii) The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of fire fighting equipments, etc. as per National Building Code including protection measures from lightning etc.

(xxiii) Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.

(xxiv) Under the provisions of Environment (Protection) Act, 1986, legal action shall be initiated against the project proponent if it is found that construction of the project has been started without obtaining environmental clearance.

Operation Phase

(i) The PP while issuing the allotment letter to individual member units shall specifically mention the allowable maximum quantity of water usage and effluent generated by each member unit.

(ii) The PP shall establish an environmental monitoring cell with all the potential polluting units as members to review the environmental monitoring data and suggest improvements.

(iii) Treated affluent emanating from STP shall be recycled/reused to the maximum extent possible. Treatment of 100% grey water by decentralised treatment should be done. Discharge of unused treated affluent shall conform to the norms and standards of the Pollution Control Board. Necessary measures should be made to mitigate the odour problem from STP.

(iv) The solid waste generated should be properly collected and segregated. Wet garbage should be composted and dry / inert solid waste should be disposed off to the approved sites for land filling after recovering recyclable material.

(v) Diesel power generating sets proposed as source of back up power for elevators and common area illumination during operational phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Low sulphur diesel should be used. The location of the DG sets may be decided in consultation with the Gujarat Pollution Control Board.

(vi) Noise should be controlled to ensure that it does not exceed the prescribed standards. During night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.

(vii) Green belt of adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise.

(viii) Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.

(ix) Rain water harvesting for roof run- off and surface run- off, as plan submitted should be implemented.

(x) The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.

(xi) Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.

(xii) A Report on the energy conservation measures conforming to energy conservation norms finalised by Bureau of Energy Efficiency should be prepared incorporating details about building materials & technology, R & D Factors etc and submitted to the Ministry along with six monthly monitoring report.

(xiii) Energy conservation measures like installation of CFLs/TFLs for the lighting the areas outside the building should be an integral part of the project design and should be in place before project commissioning. Used CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines/ rules of the regulatory authority to avoid mercury contamination. Solar panels may be used to the extent possible.

(xiv) Adequate measures should be taken to prevent odour problems from solid waste processing plant and STP.

(xv) The buildings should have adequate distance between them to allow movement of fresh air and passage of natural light, air and ventilation.

(xvi) The environmental safeguards contained in the EIA Report should be implemented in letter and spirit.

(xvii) Adequate drinking water facility be provided.

(xviii) Incremental pollution loads on the ambient air quality, noise and water quality should be periodically monitored after commissioning of the project.

(xix) Application of solar energy should be incorporated for illumination of common areas, lighting for gardens and street lighting in addition to provision for solar water heating. A hybrid system or fully solar system for portion of the apartments should be provided.

(xx) Ozone depleting substance (Regulation & Control) Rules should be followed while designing the air conditioning system of the project.

12. Officials from the Regional Office of MOEF, Bhopal who would be monitoring the implementation of environmental safeguards should be given full cooperation, facilities and documents / data by the project proponents during their inspection. A complete set of all the

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documents submitted to MoEF should be forwarded to the CCF, Regional office of MOEF, Bhopal

13. In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Ministry.

14. The Ministry reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.

15. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

16. These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.

17. The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Clearance and copies of clearance letters are available with the Gujarat Pollution Control Board and may also be seen on the website of the Ministry of Environment and Forests at http://www.envfor.nic.in. The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bhopal.

18. Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

19. "Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010".

20. A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.

21. The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

22. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

23. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF by e-mail.

(Lalit Kapur)
Director (IA-III)

Copy to:

1. The Principal Secretary, Forest and Environment Department, Block no. 14/ 8 floor Sachivalaya, Gandhinagar – 382 010 Gujarat.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, Delhi – 110 032.
3. The Member Secretary, Gujarat Coastal Zone Management Authority & Director,(Environment) Forests & Environment Department, Block No. 14, 8th Floor, Sachivalaya, GandhiNagar-382.
4. The Chief Conservator of Forests, Ministry of Environment and Forests, Regional Office, Western Region, Kendriya Paryavaran Bhavan, Link Road No. 3, Ravishankar Nagar, Bhopal – 462016 (M.P.)
5. The Member Secretary, Gujarat State Pollution Control Board, Paryavaran Bhawan , Sector 10-A, Gandhi Nagar 382043, Gujarat
6. Director (EI), Ministry of Environment and Forests.
7. Guard File.
8. Monitoring File.

(Lalit Kapur)
Director (IA-III)

ANNEXURE-28(b)

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SPEED POST



सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन
मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE

क्षेत्रीय कार्यालय, पश्चिम क्षेत्र,
Regional Office, Western Region,
"केन्द्रीय पर्यावरण भवन"
"Kendriya Paryavaran Bhavan"
लिन्क रोड नं0-3/Link Road No. 3
E-5, रविशंकर नगर/Ravi Shankar Nagar,
भोपाल (म0प्र0)/Bhopal-462016 (M.P.)
Telefax: 0755-2465054
E-mail: rowz.bpl-mef@nic.in

File No: 6-7/2009(ENV)/1172

Dated: 07/06/2018

प्रति,

श्री ज्ञानेश भारती,
संयुक्त सचिव,
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय,
इंदिरा पर्यावरण भवन,
जोर बाग रोड, अलीगंज,
नई दिल्ली – 110003

To,

Shri Gyanesh Bharti ,
Joint Secretary,
Ministry of Environment, Forest and Climate Change
Indira Paryavaran Bhawan,
Jorbagh Road, Aliganj,
NewDelhi-110003

विषय : i. मेसर्स अडानी पोर्ट्स एण्ड स्पेशल इकोनॉमिक जोन लि. द्वारा मुंद्रा, कच्छ, में वाटरफ्रंट विकास परियोजना के लिए पर्यावरण और तटीय विनियमन क्षेत्र निकासी प्रदान के लिए स्वीकृति।
ii. मेसर्स अडानी पोर्ट्स एण्ड स्पेशल इकोनॉमिक जोन लि. द्वारा मुंद्रा, कच्छ, में मल्टी–प्रोडक्ट सेज परियोजना के लिए पर्यावरण और तटीय विनियमन क्षेत्र निकासी प्रदान के लिए स्वीकृति।

Sub. : i. Environmental and Coastal Regulation Zone clearance granted to the waterfront development project (WFDP) at Mundra, Katch, being developed by Adani Ports and Special Economic Zone Ltd. (APSEZL).
ii. Environmental and Coastal Regulation Zone clearance granted to Multi-product SEZ (MSEZ) Project at Mundra, Katch, being developed by Adani Ports and Special Economic Zone Ltd. (APSEZL).

Ref. : i. Ministry's Letter No. 10-47/2008-IA-III dated 12.01.2009, its addendum dated 19.01.2009 and extension dated 07.10.2015
ii. Ministry's Letter No. 10-138/2008-IA.III, dated 15.07.2014

महोदय,

मंत्रालय के उपरोक्त संदर्भित पत्र के संदर्भ में उक्त परियोजनाओं को पर्यावरणीय दृष्टिकोण से अनुमति देते समय अनुबद्ध शर्तों के अनुपालन एवं certification of compliance के निर्देशानुसार, पर्यावरणीय अनुमति दिनांक 12.01.2009 व 15.07.2014 का अनुवीक्षण प्रतिवेदन (मॉनिटरिंग रिपोर्ट) एतद् द्वारा संलग्न कर प्रेषित है।

2.0 यह सक्षम प्राधिकारी द्वारा अनुमोदित है।

संलग्नः उपरोक्तानुसार

भवदीय

GHwary

(डॉ. एच.वी.सी. चारी गून्दुपल्ली)
वैज्ञानिक 'डी'

Cont.....2

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प्रतिलिपि:

1. श्री रघु कुमार, वैज्ञानिक 'एफ', पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, इंदिरा पर्यावरण भवन, जोर बाग रोड, अलीगंज, नई दिल्ली – 110 003 की ओर सूचनार्थ हेतु।
Shri Raghu Kumar, Scientist 'F', Ministry of Environment, Forest and Climate Change Indira Paryavaran Bhawan, Jorbagh Road, Aliganj, NewDelhi-110003 for kind information please.

2. डॉ. सुधीर चिन्तलपति, वैज्ञानिक 'डी', (मॉनीटरिंग सैल), पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, इंदिरा पर्यावरण भवन, जोर बाग रोड, अलीगंज,नई दिल्ली–110 003 की ओर सूचनार्थ हेतु।
Dr. Sudheer Chintalapati, Scientist 'D', Monitoring Cell, Ministry of Environment, Forest and Climate Change Indira Paryavaran Bhawan, Jorbagh Road, Aliganj, New Delhi-110003 for kind information please.

3. मेसर्स अडानी पोर्ट्स एण्ड स्पेशल इकोनॉमिक जोन लि., अडानी हाउस, पीओ बाक्स नं. 1, मुंद्रा, कच्छ– 370 421 गुजरात, की ओर सूचनार्थ हेतु।
M/s Adani Ports and Special Economic Zone Limited, Adani House, PO Box No. 1, Mundra, Kutch- 370 421 Gujarat, for kind information please.

(डॉ. एच.वी.सी. चारी गून्दुपल्ली)
वैज्ञानिक 'डी'

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Monitoring the Implementation of Environmental Safeguards
Ministry of Environment, Forest & Climate Change
Western Region, Regional Office, Bhopal
MONITORING REPORT
PART – I
DATA SHEET

1.	Project type: River- valley/ Mining/ Industry / Thermal / Nuclear/Other (specify)	:	Other (CRZ Port & Harbour)
2.	Name of the project	:	Waterfront Development Project at Mundra, District Kutchh, Gujarat
3.	Clearance letter (s)/OM No. & date	:	F. No. 10-47/2008-IA-III dated 12.01.2009 F. No. 10-47/2008-IA-III dated 19.01.2009 F. No. 10-47/2008-IA-III dated 18.09.2015 F. No. 10-47/2008-IA-III dated 07.10.2015
4.	Location: a) District (s) b) State (s) c) Latitude/Longitude	: : : :	 Kutchh Gujarat 69°41'37.58" E 22°44'15.95 N (South port) 69°34'11.88" E 22°45'20.12 N (West port)
5.	Address for correspondence a. Address of the Concerned Project Chief Engineer (with Pin Code & telephone/ telex/ fax numbers) b. Address of the Executive Project Engineer / Manager (with Pin Code & telephone/ telex/ fax numbers).	 : :	 Chief Operating Officer, Mundra and Tuna port, Adani Ports and SEZ Ltd., Adani House, Navinal Island, Mundra Kutchh, Gujarat Pin – 370 421, Tel: 02838 – 255 000 Head, Environment dept., APSEZL, Infrastructure House, Nr. Adani House, Nr. Mithakhali circle, Navrangpura, Ahmedabad, Gujarat Pin – 380 009, Tel: 079 – 2555 5362
6.	Salient features a. Of the project	:	**Salient Feature of the Project are as under** 1. West Port 2. South Port 3. East Port 4. North Port 5. Two Shipyards (near West port and East port) 6. Sea water Intake channel 7. Desalination plant 8. Combined outfall for safe disposal of power plant and desalination reject 9. Dredging and Reclamation 10. Backup facilities like rail sidings, rail and truck loading facilities, open paved areas and associated buildings, utilities and other amenities

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	b. Of the Environment Management Plan	:	**Salient Feature of the EMP are as under** 1. Strategy should be to prevent spillages of petroleum through proper design and dependable construction materials and components. 2. The basin structures, jetty structures, bunds, breakwaters, intake water channel, navigational channels, should be designed and oriented in a manner that it does not restrict the prevailing tidal ingress in the creek and mangroves habitats in the vicinity to ensure their health. 3. It should be insured that reclamation, dredging, widening and slope stabilization measures do not significantly alter the stabilized erosional-accretion regime of the intricate creek system as well as the free flow of tidal water, to protect the mangroves 4. Temporary colonies of workforce should be established sufficiently away from the HTL and proper sanitation including toilets and bathrooms should be provided to the inhabitants to prevent abuse of the intertidal area. 5. Wastewater such as generated during cleaning of jetties, floor washings, domestic use etc should be collected in a settling pond and released to marine environment only after ascertaining that it is free from oil and SS. 6. Corrective measures such as water sprinkling should be practiced if the SS increases beyond permissible limits. 7. It should be ensured that the effluent released into the Gulf meets the prescribed GPCB criteria at all times.
7.	Breakup of the project area a. Submergence area: forest & non-Forest b. Others	: :	No forest land involved. Reclaimed land - 2193 ha.
8.	Breakup of the project affected population with enumeration of those losing houses/dwelling units only agricultural land only, both dwelling units & agricultural land & landless laborers/artisans. a) SC, ST, Adivasi b) Others (please include weather these figures are based on any scientific and systematic survey carried out. Give details and year of survey)	:	Nil
9.	Financial details: a) Project cost as originally planned and subsequent revised estimates and the year of price reference b) Allocation made for EMP with item wise and year wise break-up c) Benefic Cost ratio/Internal Rate of Return and the year of assessment (if applicable) d) Whether (c) includes the cost of Environment Management as shown in the above	: : : :	a) Rs. 5000 crores (block estimate) b) Please Refer Annexure – 1 c) -- d) Yes

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	e) Actual expenditure incurred on project so far f) Actual expenditure incurred on EMP so far	: :	e) Rs. 12,947 crores Approx. (as on 30.09.2017) f) Please Refer Annexure – 1
10.	Forest land requirement a. The status of approval for diversion of forest land for non-forestry use b. The status of cleaning felling c. Comments on the viability & sustainability of compensatory afforestation programmer in the light of actual field experience so far	: : :	Forest land not involved Nil 200 ha mangrove afforestation is completed at Jakhau village, Kutchh and 50 ha gap filling is also completed during the year 2012 – 15. It may be noted that in totality, APSEZ has completed mangrove afforestation in over 2800 ha area to enhance the biodiversity of coastal stretches of Gujarat. Please Refer Annexure – 2 for further details.
11.	The status of clear felling in non-forest areas (Such as submergence area or reservoir, approach Roads.), if any with quantitative information required.	:	Not Applicable (No clearing/felling trees is involved in the project).
12.	Status of construction (Actual &/or planned) a. Date of commencement b. Date of completion	: : :	Construction activities as per the Environmental & CRZ clearance are ongoing. Please refer Annexure - 3 for the status of the same. January 2009 Ongoing
13.	Reason for the delay if the project is yet to start.	:	Not Applicable
14.	Dates of site visits a. The dates on which the project was monitored by the MoEF&CC, RO on previous occasions, if applicable b. Date of site visits for this monitoring report	: :	21- 23, Jan 2013 21 – 22, December, 2016 02 – 03, May, 2018
	Details of correspondence with project authorities for obtaining act on plans/ information on status of compliance to safeguards other than the routine letters for logistic support for site visits. (The first monitoring report may contain the details of all the letters issued so far, but the later reports may cover only the letter issued subsequently)		
	Date **Letter from RO**		**Date** **Letter from PA**
	10.05.2018: PAs have been directed to submit comprehensive compliance report vide letter dated 10.05.2018		14.05.2018 Comprehensive CR received vide letter dated 11.05.2018 received in MoEFCC, RO Bhopal on 14.05.2018

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Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2015 – 16	2016 – 17	2017 – 18	2017 – 18
1.	Environmental Study / Audit and Consultancy	45.45	36.78	9.0	21.00
2.	Legal & Statutory Expenses	3.30	4.76	5.07	16.00
3.	Environmental Monitoring Services	26.80	27.95	27.02	36.00
4.	Hazardous / Non Hazardous Waste Management & Disposal	34.56	12.52	65.62	90.84
5.	Environment Day Celebration	7.18	6.71	2.85	10.00
6.	Treatment and Disposal of Bio-Medical Waste	1.22	1.27	1.13	1.44
7.	Mangrove Plantation, Monitoring & Conservation	73.64	72.38	60.0	60.0
8.	Other Horticulture Expenses	434.72	555.00	547.0	547.0
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	18.18	61.50	70.02	69.35
10.	Expenditure of Environment Dept. (Apart from above head)	135.90	131.83	102.15	104.91
	Total	837.73	910.70	889.86	956.54

Further year wise breakup of the cost is mentioned in table below:

Year	Environment	Horticulture	Total
2013-2014	250.00	433.75	683.75
2014-2015	462.87	380.27	843.14
2015-2016	346.23	434.72	780.95
2016-2017	355.70	555.00	910.7
2017-2018	342.86	547.00	889.86
Total	1757.66	2350.74	4108.4

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	b. Of the Environment Management Plan	:	**Salient Feature of the EMP are as under** • Water sprinkling in vulnerable areas • Enforce proper maintenance of vehicles and construction equipment. Allowing only PUC approved vehicles in the site. • Enforce usage of covered trucks for transport of construction material. • Enforce use of earmuffs / earplugs to workers in high noise level areas. • Good quality non-corrosive type pipeline should be used. Regular checking of the pipelines for early detection of any possible leakage and damage. Regular ground water monitoring should be done within the SEZ. • The waste should be transported in covered trucks. Vermi-composting is highly recommended for treatment and disposal of biodegradable and kitchen wastes. • Other domestic solid waste (garbage) shall be disposed through MSW facility or as per prevailing norms.
7.	Breakup of the project area a, Submergence area: forest & non-Forest b; Others	: :	No forest land involved.
8.	Breakup of the project affected population with enumeration of those losing houses/dwelling units only agricultural land only, both dwelling units & agricultural land & landless laborers/artisans. a) SC, ST, Adivasi b) Others (please include weather these figures are based on any scientific and systematic survey carried out. Give details and year of survey)	:	Nil
9.	Financial details: a) Project cost as originally planned and subsequent revised estimates and the year of price reference b) Allocation made for EMP with item wise and year wise break-up c) Benefic Cost ratio/Internal Rate of Return and the year of assessment (if applicable) d) Whether (c) includes the cost of Environment Management as shown in the above e) Actual expenditure incurred on project so far f) Actual expenditure incurred on EMP so far	: : : : : :	a) Rs. 9000 crores (block estimate) b) Please Refer Annexure – I c) Details not mentioned by the PP d) Yes e) Rs. 806 crores Approx. (as on 30.09.2017) f) Please Refer Annexure – I
10.	Forest land requirement a. The status of approval for diversion of forest land for non-forestry use b. The status of cleaning felling c. Comments on the viability & sustainability of compensatory afforestation programmer in the light of actual field experience so far	: : :	Forest land not involved Nil 100 Ha. Mangrove plantation is carried out by SAVE at Tala Tadav village of Khambhat Taluka of Anand district. 100 Ha. Mangrove plantation is being carried out

Monitoring the Implementation of Environmental Safeguards
Ministry of Environment, Forest & Climate Change
Western Region, Regional Office, Bhopal
MONITORING REPORT
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DATA SHEET

1.	Project type: River- valley/ Mining/ Industry / Thermal / Nuclear/Other (specify)	:	Other (Infrastructure and miscellaneous projects + CRZ)
2.	Name of the project	:	Multi-product SEZ and sea intake and outfall pipelines for desalination plant
3.	Clearance letter (s)/OM No. & date	:	F. No. 10-138/2008-IA-III dated 15.07.2014 F. No. 10-47/2008-IA-III dated 18.09.2015
4.	Location: a) District (s) b) State (s) c) Latitude/Longitude	: : : :	 Kutchh Gujarat 22^0 47' 56.12 N 69^0 40' 38.02" E (one random co-ordinate within SEZ)
5.	Address for correspondence a. Address of the Concerned Project Chief Engineer (with Pin Code & telephone/ telex/ fax numbers) b. Address of the Executive Project Engineer / Manager (with Pin Code & telephone/ telex/ fax numbers).	: :	 Chief Operating Officer, SEZ, Adani Ports and SEZ Ltd., Adani House, Navinal Island, Mundra Kutchh, Gujarat Pin – 370 421. Tel: 02838 – 255 000 Head, Environment dept., APSEZL, Infrastructure House, Nr. Adani House, Nr. Mithakhali circle, Navrangpura, Ahmedabad, Gujarat Pin – 380 009, Tel: 079 – 2555 5362 Shalinm.shah@adani.com
6.	Salient features a. Of the project	:	**Salient Features of the Project are as under** • Rail and Road Network (Trunk as well as Internal) having Bridges or Culverts over natural drains, • IT-Telecommunication Network and Electric Network, • Municipal Solid Waste Disposal Site • Water and Power Supply • Storm Water Drainage Network, • Effluent Collection Network • Common Effluent Treatment Plant • Sewage Treatment Plant • Other Utilities & Supporting Infrastructure within SEZ area. • Social infrastructure facilities • Air strip • Desalination plant • Sea water Intake channel • Combined outfall for disposal of treated effluent and desalination reject • Level raising of the SEZ developable areas

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			by GEC. Out of 100 ha., 38 ha. Plantation is completed at Tala Tadav village of Khambhat Taluka of Anand district. Remaining 62 ha. Plantation is being carried out at Aliya Bet of Bharuch district. It may be noted that in totality, APSEZ has completed mangrove afforestation in over 2800 ha area to enhance the biodiversity of coastal stretches of Gujarat. Please Refer Annexure – 2 for further details.
11.	The status of clear felling in non-forest areas (Such as submergence area or reservoir, approach Roads.), if any with quantitative information required.	:	Not Applicable (No clearing/felling trees is involved in the project).
12.	Status of construction (Actual &/or planned) a. Date of commencement b. Date of completion	: : :	Construction activities as per the Environmental & CRZ clearance are ongoing. Please refer Annexure - 3 for the status of the same. July 2014 Ongoing
13.	Reason for the delay if the project is yet to start.	:	Not Applicable
14.	Dates of site visits a. The dates on which the project was monitored by the MoEF&CC, RO on previous occasions, if applicable b. Date of site visits for this monitoring report	: :	21- 23, Jan 2013 02 – 03, May, 2018
	Details of correspondence with project authorities for obtaining act on plans/ information on status of compliance to safeguards other than the routine letters for logistic support for site visits. (The first monitoring report may contain the details of all the letters issued so far, but the later reports may cover only the letter issued subsequently)		
	Date **Letter from RO**		**Date** **Letter from PA**
	10.05.2018: PAs have been directed to submit comprehensive compliance report vide letter dated 10.05.2018		**14.05.2018** Comprehensive CR received vide letter dated 11.05.2018 received in MoEFCC, RO Bhopal on 14.05.2018

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Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2015 – 16	2016 – 17	2017 – 18	2017 – 18
1.	Environmental Study / Audit and Consultancy	45.45	36.78	9.0	21.00
2.	Legal & Statutory Expenses	3.30	4.76	5.07	16.00
3.	Environmental Monitoring Services	26.80	27.95	27.02	36.00
4.	Hazardous / Non Hazardous Waste Management & Disposal	34.56	12.52	65.62	90.84
5.	Environment Day Celebration	7.18	6.71	2.85	10.00
6.	Treatment and Disposal of Bio-Medical Waste	1.22	1.27	1.13	1.44
7.	Mangrove Plantation, Monitoring & Conservation	73.64	72.38	60.0	60.0
8.	Other Horticulture Expenses	434.72	555.00	547.0	547.0
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	18.18	61.50	70.02	69.35
10.	Expenditure of Environment Dept. (Apart from above head)	135.90	131.83	102.15	104.91
	Total	837.73	910.70	889.86	956.54

Further year wise breakup of the cost is mentioned in table below:

Year	Environment	Horticulture	Total
2013-2014	250.00	433.75	683.75
2014-2015	462.87	380.27	843.14
2015-2016	346.23	434.72	780.95
2016-2017	355.70	555.00	910.7
2017-2018	342.86	547.00	889.86
Total	**1757.66**	**2350.74**	**4108.4**

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PART - II & III

DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE AND ENVIRONMENTAL MANAGEMENT

i. Compliance Status of Environmental Clearance for the period October 2017 to March 2018 issued by MoEF&CC, New Delhi vide letter No.: 10-47/2008-IA-III dated 12.01.2009

(Details of the project: Environmental and CRZ clearance granted to the Waterfront Development Project (WFDP) at Mundra, Kutch being developed by Adani Ports and Special Economic Zone Ltd. (APSEZL) (Formerly, M/s. Mudra Port and SEZ Ltd.))

As per the information furnished by the PP, the details of Activities/facilities approved, major components completed and proposed future activities as per Environment and CRZ Clearance are as below:

Description (Type of Facility or Berth*)	Approved Berths or Length as per Environmental & CRZ Clearance	So far Developed and In Operation	To be Developed as per Environmental & CRZ Clearance
	Nos. of Berths or Length	Nos. of Berths	Nos. of Berths/Facilities
Multipurpose	4 (550 m + 2 Berths)	4	-
Container	16 (2680 m + 2000 m)	7 (2110 m)	9
Ro-Ro	2	-	1
Coal	6	4	2
Dry-Bulk Cargo	5	-	5
Liquid/POL	9*	-	9
LNG	2	Progressive towards commissioning (being developed by GSPC LNG Limited as per NOC given by APSEZ)	-
Light & Heavy Engineering	2	-	2
Port Craft	1 (330 m)	-	1
Shipyard	2	-	2

* Liquefied Petroleum Gas (LPG) Terminal is being developed under Waterfront Development Project and will be handled at existing Multipurpose Terminal. LPG terminal is being developed by M/s. Mundra LPG Terminal Pvt. Ltd., which is 100% subsidiary of APSEZ.

In addition to above berths or facilities, following components were also approved.

1. Dredging Quantity: 210 Mm^3. Overall dredging to the tune of 123 Mm^3 is completed till date
2. Back-up area, back-up facilities like railway line, rail slidings, rail truck loading, open paved areas, associated buildings, utilities, amenities, etc. and connectivity to rail and road corridor for each port

were approved and majority of them are constructed and in operation. Remaining facilities will be developed based on future requirements.

3. Seawater intake channel and outfall channel for power plants, desalination plants (47 MLD is operational out of 300 MLD) and other industrial requirements approved and is already in operation.

Further, the point-wise compliance status of Environmental / CRZ Clearance granted to the Waterfront Development Project (WFDP) at Mundra, Kutch being developed by Adani Ports and Special Economic Zone Ltd. (APSEZL) is furnished below:

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
Specific Conditions		
i	No existing mangroves shall be destroyed during construction / operation of the Project.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Project is being developed as per permissions granted. Conservation of mangroves: • In and around APSEZ, approx. 1800 ha. mangrove area was identified by NIO in an EIA report prepared the year 1998. • Out of this 1800 ha area, 1254 ha area was further demarcated as potential mangrove conservation by NIO in the year 2008 (as part of the EIA report of WFDP). • It may be noted that the entire area of 1254 ha is not covered with mangroves. • Entire area is being conserved and there is no disturbance to the mangroves in this area. Measures such as restricted entry and regular surveillance have resulted in overall growth of mangroves within this area. • As per MoEF&CC directive, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, presently, mangrove cover in and around APSEZ is over 2340 ha. The analysis of the comparison between 2011 and 2016-17 has shown an overall growth of 246 ha. Please refer **Annexure – 1 in the main report** for a copy of the report. **In view of the information furnished by the PP supported by the study report of NCSCM, the stipulated condition is considered complied.** **COMPLIED**
ii	There shall be no filling up of the creek and reclamation of the creeks.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Conservation of creeks: • The prominent creek system (main creeks and small branches of creeks) in and around APSEZ are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river).

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Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		• All above creek mouths are open allowing free flow of water in to the creeks and surrounding areas and there is no filling or reclamation of any creek area. • This aspect is also confirmed from the recent study of NCSCM **(Annexure – 1 in the main report)** which highlights the bathymetry data of the entire coast around APSEZ. • From the bathymetry data it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water. • APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Three RCC Bridges have also been constructed over Kotdi creek with total length of 230 m and cost of INR 10 Crores. Photographs of the same are attached as **Annexure – 2 in the main report**. • From the APSEZ operations, there is no discharge of any sewage or effluent to the water streams **In view of the information furnished by the PP supported by the study report of NCSCM showing the bathymetry data, the stipulated condition is considered complied.** **COMPLIED**
iii	The Project proponent shall comply with all the Orders/directions of the Honorable High Court of Gujarat and Supreme Court in the matter.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. There are two ongoing matters pending (one pending at High Court and other pending at Supreme Court). Details regarding both the matters including their status are mentioned below. 1) Kheti Vikas Seva Trust (an association of 200 villagers) has filed a writ petition dated 24th January 2011 before the Gujarat HC against the state of Gujarat, our Company, Adani Power Limited and others alleging that the power plant set up by Adani Power Limited, on the land allotted to our Company for the setting up of a special economic zone, is in violation of the necessary requirements for setting up such plants, including environmental laws. The writ petition has been dismissed by the Gujarat High Court on 17th April 2015. The Hon'ble Supreme Court of India on 18.3.2016 dismissed the appeal against the said order dated 17th April, 2015 of the Gujarat High Court. However, an application filed by the petitioner alleging non-compliance of an order of the Gujarat HC dated 12th July 2011 prohibiting the cutting of mangroves and other forests during the pendency of the petition without permission of the state forest and environment department in relation to the writ petition is still pending. 2) Pravinsingh Bhurabha Chauhan filed a public interest litigation by way of a writ petition before the High Court of Gujarat alleging that a certain plot of land known as 'Mor Dhuva' was not allotted to our Company and accordingly that our Company should be restrained from carrying out any activity, including ship recycling activities, without any prior

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Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		permission or authorization in and around sand dunes including 'Mor Dhuva' in Tunda and Vandh villages, Kutch, Gujarat. In view of the affidavits filed by MOEF, and Govt of Gujarat the High Court dismissed the petition on 18.2.2015. The petitioner filed a special leave to appeal before the Supreme Court of India, challenging the order dated 18.2.2015 of Gujarat High Court and the same is pending. As a law abiding company, we have been regularly complying with all the directions/orders issued by Hon'ble Courts from time to time. Similarly, as both the matters are still pending in the Hon'ble Courts, we agree to comply with all the orders/directions, if any, issued by the Honorable High Court of Gujarat and Supreme Court at any later stages of the cases. **In view of the information furnished by the PP, the condition is considered as agreed to comply by the PP.** **AGREED TO COMPLY**
.iv	Adequate safety measures for the offshore structure and ship navigation shall be taken in view of the High Current in the area.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. The hydrodynamic study for the waterfront area has been carried out by HR Wallingford, a maritime design expert. As per the recommendations in their report, the following safety measures are implemented. 1. The alignment of the berth has been kept in line with the current flow in order to reduce the effect of current on vessels moored alongside. 2. The breasting dolphins have been designed in such a configuration so as to provide appropriate lead to the vessels mooring ropes. 3. The berth being in line with the current flow will facilitate Pilotage operation and provide better maneuverability of vessels. 4. The strength of the berth structure has been calculated to absorb the energy transferred to fenders while berthing of tanker vessels at the terminal. 5. Navigational buoys and lead lights marking the channel and clearing distance off the breakwater are installed. 6. The strength of the fenders at the berth and the SWL of the bollards / winches are sufficient to absorb the forces of vessels alongside keeping in mind the monsoon weather conditions. 7. Sufficient depths are maintained at all times to ensure 10% UKC at the time of berthing / un-berthing. 8. The capstans / winches / bollards are of adequate strength with respect to the vessels being handled. 9. The berth has been designed at an appropriate distance from the existing berths at MMPT-1 in order to safely allow berthing / un-berthing of vessels at MMPT-1 with vessels berthed at the South Port tanker terminal. 10. Berths have been planned close to the breakwater as there is a reduced

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		strength of current along the coastline. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
v	The shore line changes in the area shall be monitored periodically and the report submitted every 6 months to Regional Office Bhopal.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. The shore line change aspect of the project area is monitored periodically and the report of the same is submitted every 6 months to Regional Office Bhopal. Please refer below details in this regard. Shoreline change study for the entire coast of Gujarat was carried out by Anna University, Chennai and same is published by MoEF&CC, Govt. of India in 2011. APSEZ has carried out CRZ mapping of development areas through MoEF&CC authorized agencies in June, 2011 (National Centre of Earth Science Studies) and January, 2013 (National Institute of Oceanography). Same are submitted to MoEF&CC as part of compliance. Shore line change aspect has been studied in detail as part of following two studies; • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. As per the outcome of these studies, no erosion is observed on the coast of the project area. As part of the Regional Impact Assessment study, the possible changes in shoreline that may occur due to the proposed developments in 10 km area on either side of the waterfront development project have been predicted. It has been inferred from the modelling study that the shift in the shoreline will be less than 0.5 m/year, which reconfirms that the APSEZ facility would pose insignificant impact on the Mundra shoreline. Accretion is observed at South port and at West port due to approved reclamation activities. Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years. The said recommendation will be implemented and the next shoreline change assessment will be carried out during 2020-21. Please refer **Annexure – A in the main report** (Compliance of MoEF&CC Order dated 18th Sep, 2015) for further details regarding the mentioned studies.

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		The updated status on monitoring report on shoreline changes is being submitted to MoEF&CC, RO, Bhopal on a six monthly basis. **In view of the information furnished by the PP and the six-monthly reporting of shoreline changes in the compliance reports, the stipulated condition is considered complied.** **COMPLIED**
vi	The recommendations of the risk assessment shall be implemented; any change in the design of the project shall come before the committee for seeking necessary approval.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Risk Assessment was carried out at the time of preparation of the EIA report for the Liquid Berths and LNG terminal. However, it may be noted that liquid berths are not yet developed. Hence recommendations of Risk Assessment will be implemented once the liquid berths & pipelines are developed by APSEZ. The LNG terminal is being constructed by GSPC LNG Ltd. and a separate Environment and CRZ clearance is obtained by them. Please refer general condition no ix below for details regarding the same. LPG is proposed to be handled from the existing multipurpose terminal and storage tanks are being constructed in the back up area. A detailed risk assessment study as per MoEF&CC letter no. F. No. 10-47/2008-IA-III dated 31st May, 2016 is carried out by iFluids Engineering for handling as well as storage activities. Recommendations of the risk assessment are being implemented as part of the construction activity. Some of the recommendations are mentioned below. For a detailed list of the recommendations please refer **Annexure – 3 in the main report.** • Selection of the loading arms and commissioning checks to ensure proper operation of the PERC in the event of ESD actuation (maximum time shall not exceed more than 2 min for complete isolation, loading arm release and ship pumps stop in case of hydrocarbon leak) • All flanges shall be connected for bonding for electrical continuity • Kerb wall height shall be minimum 30 cm but shall not exceed 60 cm. • Leak detection systems based on pressure, temperature and flow • A suitable continuous back-up power supply shall be provided for the control system and operation of ROVs both at jetty end and tank end • Consider HAZOP and SIL study before commissioning the facility and concerns addressed • Ensure CCTV coverage of critical locations and remote monitoring is done continuously There are no other activities which attract requirement of Risk Assessment. **In view of the information furnished by the PP and the detailed compliance of recommendations mentioned in the Annexure-3 in the main report, the stipulated condition is considered as compliance in**

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		progress. **COMPLIANCE IN PROGRESS**
vii	Mangrove plantation of 200 ha to be done in consultation with GEER / GEC of Forest Department, a detailed plan shall be submitted within six months from the date of receipt of this letter.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. APSEZ has consulted Gujarat Institute of Desert Ecology (GUIDE) as they are one of the authorized agencies of Dept. of Forest & Env., Govt. of Gujarat for carrying out mangrove afforestation. GUIDE has completed mangrove plantation in an area of 200 ha at Jakhau, Gujarat during the year 2012-13. Copy of the mangrove plantation completion certificate is attached as **Annexure – 5 in the main report.** Total expenditure for the said work was INR 40 lakh. It may be noted that to enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in more than 2800 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 782 lakh. Please refer **Annexure – 6 in the main report** for green belt development and mangrove afforestation efforts done by APSEZ and the Master Plan of Greenbelt development at APSEZ. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
viii	It shall be ensured that during construction and post construction of the proposed jetty the movement of fishermen vessel of the local communities are not interfered with.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. During project proposal, APSEZ proposed to provide four (4) dedicated accesses at Juna Bandar, Luni, Bavdi Bandar and Zarpara for the fishermen to approach the sea for fishing activity. However, during construction as well as operation, through fishermen consultative process, so far APSEZ has provided seven (7) access roads instead of four (4). Total length of all the approach roads is approx. 23 Kms and expenditure involved is Rs. 637 Lacs. There is no hindrance to the movement of fisherman boats. Further, APSEZ is actively working with local community (including fishermen community) around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation. Following activities have been carried out during the period FY 2017-18.

Area	Activity
Sustainable Livelihood – Fisher folk	• Average 118 KL of water was supplied to 983 households from different settlements on a daily basis under Machhimar Shudhh Jal Yojana. • Computer Training: 20 Fisherman Youth • Sewing Training: 20 Women • RTG Crane Operator: 02 Fisherman Youth • Dori Work Training: 60 Women • Mangrove Plantation: 4526 Man-days

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		• Painting Labour: 47 Fisherman • AF has started poly culture project with consultancy of GUIDE In this system we stocked 6000 fingerlings fishes of 3 gm weight in six different cages. There was 80% survival with 100 to 150 gm each weight after 5 month culture period. • We have facilitated 560 daughters with Kit (Small Bed sheet, Mosquito net, Soap and Cream with nutritious food for mother) under Beti Vadhavo Programme. Please refer **Annexure – 7 in the main report** for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2017-18 is to the tune of INR 1565 lakh. Out of which, Approx. INR 1399 lakh are spent during the year. **In view of the information furnished by the PP and the access roads provided at several locations, the stipulated condition is considered complied.** **COMPLIED**
ix	Relocation of the fishermen community if any shall be done strictly in accordance with the norms prescribed by the State Government.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Not Applicable The project was conceptualized in such a way that there are no fishermen settlements in the project proposal. Hence there is no relocation of fishermen communities required. **In view of the information furnished by the PP, the stipulated condition is considered as not applicable to PP.** **COMPLIANCE NOT APPLICABLE TO PP**
x	Marine ecology monitoring shall be done regularly during construction of breakwater and dredging /disposal operation.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Constructions as well as dredging operations are ongoing activities. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Oct'17 to March'18 is mentioned below. **Total Sampling Locations & frequency: 09 Nos. (once a month)**

Parameter	Unit	Surface		Bottom	
		Max	Min	Max	Min
pH	--	8.28	7.1	8.4	7.2
TSS	mg/L	55	14	47	18
BOD (3 Days @ 27 °C)	mg/L	8.6	0	10	3
DO	mg/L	6.6	4.8	8	4.2
Salinity	ppt	44.72	30.6	4209	37.8
TDS	mg/L	538320	34120	56780	35330

Please refer **Annexure – 8 in the main report** for detailed analysis reports. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the FY 2017-18. Marine monitoring for west port area has been

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		carried out by M/s. Adani Power Limited. Monitoring reports are also enclosed as **Annexure – 8 in the main report.** Summary of ecological parameters is given below: **Plankton Diversity:** A total of five stations were distributed throughout the sampling effort. Samples were collected during September 2017. A maximum 24 genera of Amphidinium, Amphora, Bacteriastrum, Cerataulina, Ceratium, Chaetoceros, Coscinodiscus, Cylindrotheca, Ditylum, Fragilaria, Gunardia, Hemialus, Lauderia, Melosira, Navicula, Odontella, Pleurosigma, Pseudonitzschia, Rhizosolenia, Scrippsiella, Skeletonema, Surirella, Thalassionema and Thalassiosira identified from station 3 during the period of investigation and a minimum 18 genera of phytoplankton Cerataulina, Chaetoceros, Coscinodiscus, Cylindrotheca, Ditylum, Dinophysis, Fragilaria, Leptocylindrus, Melosira, Meuneria, Navicula, Odontella, Pleurosigma, Protoperidinium, Rhizosolenia, Skeletonema, Thalassionema and Thalassiosira identified from station 2 & 4. The phytoplankton abundance in the study region was ranged from 10000 to 41952 cells L-1. Highest phytoplankton abundance was observed at the ST-3 Surface water. However, lowest phytoplankton abundance was observed at the ST-5 Surface water. The maximum number of groups (24) found at ST-3. **Benthic Diversity:** Benthic invertebrates in the present study area were distributed on the surface of bed forms i.e. sandy and Silty clay in nature. The abundance and diversity, species composition of benthic invertebrates were recorded which is the indicators of changing environmental conditions. A total 5 sub tidal stations and 3 intertidal transect were distributed throughout the sampling effort. Samples were collected during December 2017. Sub tidal: A maximum 4 group of Bivalvia, Polychaeta, Amphipoda, and Sipuncula identified from station 1 & 5 during the period of investigation and a minimum 2 Polychaeta and Amphipoda Benthic fauna recorded from station 2. In the sub tidal region macro benthos abundance was higher at ST-1 (575 no. m-2), whereas lowest abundance was recorded at ST-2 (100 no. m-2). Benthic group count was ranged from 2 to 4, with maximum groups at ST-1&5. High biomass was recorded at ST-5 (8.63mg. m-2) as compared to other stations. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xi	Regular Monitoring of air quality shall be done in the settlement areas around the Project site and appropriate safeguard measures shall be taken.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Ambient Air Quality and Noise monitoring are being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Oct'17 to Mar'18 is mentioned below.

<table>
<tr><th>Sr. No.</th><th>Condition as per clearance letter</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>
Air sampling locations & frequency: 8 nos. (twice a week) & Noise sampling locations & frequency: 5 nos. (once in a month)
<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit$</th></tr>
<tr><td>PM_{10}</td><td>$\mu g/m^3$</td><td>96.3</td><td>41.7</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>$\mu g/m^3$</td><td>56.4</td><td>12.4</td><td>60</td></tr>
<tr><td>SO_2</td><td>$\mu g/m^3$</td><td>29.4</td><td>5.0</td><td>80</td></tr>
<tr><td>NO_2</td><td>$\mu g/m^3$</td><td>45.8</td><td>13.3</td><td>80</td></tr>
<tr><th>Noise</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>73.4</td><td>57.1</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>69.4</td><td>53.8</td><td>70</td></tr>
</table>
$ as per NAAQ standards, 2009
Values recorded confirms to the stipulated standards.

Please refer Annexure – 8 in the main report for detailed analysis reports. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the FY 2017-18. Ambient air quality monitoring in surrounding villages is being carried out by M/s. Adani Power Limited, Mundra and monitoring reports of the same are also enclosed in Annexure – 8 in the main report.

Following safeguard measures are taken for abatement of dust emissions.
• Regular sprinkling on road and other open area
• Regular cleaning of roads
• Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts
• Use of water mist canon
• Closed type conveyor belts
• Regular sprinkling on coal heaps
• Covering other types of dry bulk cargo heaps
• Installation of wind breaking wall
• Development of greenbelt along the periphery of the storage yards/back up area
• Mechanized handling system for coal and other dry bulk cargo
• Wagon loading and truck loading through closed silo
In view of the information furnished by the PP and the monitoring data complying the stipulated norms, the stipulated condition is considered complied.
COMPLIED
</td></tr>
<tr><td>xii</td><td>Sewage arising in the Port area shall be disposed off after adequate treatment to conform to the standards stipulated by Gujarat State Pollution Control Board and shall be utilized / recycled</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Entire quantity of sewage generated is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Condition as per clearance letter</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>for Gardening, Plantation and Irrigation.</td><td>
<table>
<tr><th>Location</th><th>Capacity</th><th>Quantity of Wastewater</th><th>Type of ETP / STP</th></tr>
<tr><td>LT</td><td>265 KLD</td><td>85 KLD</td><td>Activated Sludge</td></tr>
<tr><td>West port</td><td>55 KLD</td><td>12 KLD</td><td>FAB</td></tr>
</table>

Third party analysis of the treated water is being carried out once in a month at Liquid Terminal (LT) & twice in a month at West Port by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Oct'17 to Mar'18 is mentioned below.
<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit$</th></tr>
<tr><td colspan="5">Industrial Effluent</td></tr>
<tr><td>pH</td><td>--</td><td>7.75</td><td>6.19</td><td>6.5 to 8.5</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>90</td><td>22</td><td>100</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>2060</td><td>1032</td><td>2100</td></tr>
<tr><td>COD</td><td>mg/L</td><td>96</td><td>72</td><td>100</td></tr>
<tr><td>BOD (3 Days @ 27°C)</td><td>mg/L</td><td>27</td><td>19</td><td>30</td></tr>
<tr><td colspan="5">Domestic Sewage</td></tr>
<tr><td>pH</td><td>--</td><td>7.23</td><td>6.34</td><td>6.5 – 8.5</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>28</td><td>11</td><td>100</td></tr>
<tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>18</td><td>8</td><td>30</td></tr>
<tr><td>Residual Chlorine</td><td>ppm</td><td>0.8</td><td>0.5</td><td>Min 0.5</td></tr>
<tr><td>Fecal Coliform</td><td>Nos.</td><td>920</td><td>84</td><td><1000</td></tr>
</table>
$ as per CC&A granted by GPCB
Values recorded confirms to the stipulated standards.

Please refer Annexure – 8 in the main report for detailed analysis reports. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the FY 2017-18.

In view of the information furnished by the PP and the monitoring data complying the stipulated discharge norms, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>xiii</td><td>Adequate Plantation shall be carried out along the roads of the Port premises and a green belt shall be developed.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial greening as well as mangrove plantation.

The species such as Ficus Infectoria, Ficus religiosa, Terminalia arjuna, Cocos nucifera, Washingtonia fillifera, Casurina spp., Azadirachta Indica, Eucalyptus spp., Jatropha curacus, Ficus bengalensis, Subabool spp., Casia fistula, Date Palm and Delonix regia are grown within APSEZ area.

Within the port areas approx. 122 hectare of greenbelt having 28,119 trees with the density of 2303 trees per hectare is developed till date. So, far more than 400 ha. area is developed as greenbelt with plantation of more</td></tr>
</table>

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		than 8.0 Lacs trees within the entire APSEZ area. Please refer **Annexure – 6 in the main report** for further details regarding greenbelt development, mangrove afforestation and updated green belt development plan. Total expenditures of the horticulture dept. during the FY 2017-18 are INR 607 lakh. **In view of the information furnished by the PP and as per the site observation of excellent greenbelt developed in the saline soils which is commendable, the stipulated condition is considered compliance in progress in light of the proposed phase-wise green belt development.** **COMPLIANCE IN PROGRESS**
xiv	There shall be no withdrawal of Ground Water in CRZ area for this Project.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. APSEZ does not draw any ground water for the water requirement. Present source of water for various project activities is desalination plant of APSEZ and/or Narmada water through Gujarat Water Infrastructure Limited. Average water consumption for entire APSEZ area is average 5.2 MLD in the year 2017-18. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xv	Specific arrangements for rain water harvesting shall be made in the Project design and the rain water so harvested shall be optimally utilized. Details in this regard shall be furnished to this Ministry's Regional Office at Bhopal within 3 months.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rain water within project area is managed through storm water drainage. However, APSEZ has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Following measures are taken for the same during the year 2011 – 13 and the same have benefited to the local farmers. 1. Pond deepening activities at villages 2. 18 check dams were constructed under the 'Sardar Patel Sahbhagi Jalsanchay Yojna' Total cost of these efforts was approx. INR 320 lakh. During FY 2017-18, pond deepening work is completed in Mota Bhadiya, Vadala and Bhujpur villages. The total cost incurred for this work was INR 16.7 Lakhs. Adani foundation has started participatory ground water management project. The objective of the project was to reduce the salinity ingress in and around the coastal regions of Mundra, Kutchh and mitigate the ill-

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
		effects of this manmade problem to improve the livelihoods of the rural people. The Project will help to get water table high, also it will help in agricultural activities. – as part of this initiative, below listed activities are initiated: • Ground Water Recharge activities at Jharpara, Navinal, Siracha, Nana Kapaya and Baroi villages • Monitoring of 109 wells by sample collection and analysis of the same (analysis is under progress) to measure the quality of water Please refer **Annexure – 7 in the main report** for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2017-18 is to the tune of INR 1565 lakh. Out of which, Approx. INR 1399 lakh are spent during the year. **In view of the information furnished by the PP, the stipulated condition is considered complied subject to clarity on the details submission to Ministry's regional office within 3 months.** **COMPLIED SUBJECT TO CONDITION**
xvi	Land Reclamation shall be carried out only to the extent that it is essential for this Project.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Out of approved reclamation area of 1138 ha for west port, 695 ha area is reclaimed and out of approved reclamation area of 700 ha for south port, 665 ha area is reclaimed. A map showing the reclamation areas is attached as **Annexure – 9 in the main report.** **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xvii	No Product other than those permissible in the Coastal Regulation Zone Notification, 1991 shall be stored in the Coastal Regulation Zone area.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. No products other than those permissible in the CRZ Notification 1991 are stored in the CRZ area. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
General Conditions		
i	Construction of Proposed structures, if any in the Coastal Regulation Zone area shall be undertaken meticulously confirming to the existing Central/local rules and regulations	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification.

<table>
<tr><th>Sr. No.</th><th>Condition as per clearance letter</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>including Coastal Regulation Zone Notification 1991 and its amendments. All the construction designs/ drawings relating to the proposed construction activities must have approvals of the concerned State Government Departments/ Agencies.</td><td>Further, the requisite permissions from Gujarat Maritime Board (GMB), for carrying out construction activities are taken from time to time. Details of the same are mentioned below:
• Permission for starting construction work for South port vide letter no GMB/N/PVT/711/870 dated 26.02.2009
• Permission for starting construction work for West port vide letter no GMB/N/PVT/711/871 dated 26.02.2009

Consent to Establish (CtE) and Consent to Operate (CtO) are obtained from GPCB and renewed/amended from time to time as per the progress of the project activity. The present in-force CTE & CtO are mentioned below.

<table>
<tr><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr>
<tr><td>CtE – Amendment</td><td>Waterfront Development Project</td><td>PC/CCA-KUTCH-582(3)/GPCB ID: 35427/170294</td><td>01.07.2018</td></tr>
<tr><td>CtE – Amendment</td><td>Waterfront Development Project – West Port</td><td>CTE - 88318</td><td>01.07.2018</td></tr>
<tr><td>CtO – Renewal</td><td>Mundra Port Terminal</td><td>AWH-83561</td><td>20.11.2021</td></tr>
<tr><td>CtO – Renewal</td><td>West Port – WFDP</td><td>AWH-79241</td><td>23.06.2021</td></tr>
<tr><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>WH-88317</td><td>20.11.2021</td></tr>
<tr><td>CtE – Fresh</td><td>LPG Terminal</td><td>CTE – 88079</td><td>04.07.2022</td></tr>
<tr><td>CtO – Amendment</td><td>West Port – WFDP</td><td>AWH-91678</td><td>01.02.2022</td></tr>
</table>
Copy of updated / amendment in CtO and CtE are attached as Annexure – 10 in the main report.

In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>ii</td><td>Adequate provision for infrastructure facilities such as water supply, fuel, sanitation etc. shall be ensured for construction workers during the construction phase of the project so as to avoid felling of trees/mangroves and pollution of water and the surroundings.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Not applicable

Most of the construction labours reside in the nearby villages where all basic facilities are easily available. There are no housing requirements for labours inside the project area.

In view of the information furnished by the PP, the stipulated condition is considered not applicable to PP.
COMPLIANCE NOT APPLICABLE TO PP</td></tr>
<tr><td>iii</td><td>The project authorities must make necessary arrangements for disposal of solid wastes and for the</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Condition as per clearance letter</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>treatment of effluents by providing a proper wastewater treatment plant outside the CRZ area. The quality of treated effluents, solid waste, and noise level etc. must conform to the standards laid down by the competent authorities including the Central/ State Pollution Control Board and the Union Ministry of Environment and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.</td><td>Constructions as well as dredging operations are ongoing activities. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Oct'17 to March'18 is mentioned below.

Total Sampling Locations & frequency: 09 Nos. (once a month)
<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Surface</th><th colspan="2">Bottom</th></tr>
<tr><th>Max</th><th>Min</th><th>Max</th><th>Min</th></tr>
<tr><td>pH</td><td>--</td><td>8.28</td><td>7.1</td><td>8.4</td><td>7.2</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>55</td><td>14</td><td>47</td><td>18</td></tr>
<tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>8.6</td><td>0</td><td>10</td><td>3</td></tr>
<tr><td>DO</td><td>mg/L</td><td>6.6</td><td>4.8</td><td>8</td><td>4.2</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>44.72</td><td>30.6</td><td>4209</td><td>37.8</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>538320</td><td>34120</td><td>56780</td><td>35330</td></tr>
</table>
Please refer Annexure – 7 in the main report for detailed analysis reports and accreditation certificate. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the FY 2017-18. Marine monitoring for west port area has been carried out by M/s. Adani Power Limited. Monitoring reports are also enclosed as Annexure – 7 in the main report.

Summary of ecological parameters is given below:
Plankton Diversity: A total of five stations were distributed throughout the sampling effort. Samples were collected during September 2017. A maximum 24 genera of Amphidinium, Amphora, Bacteriastrum, Cerataulina, Ceratium, Chaetoceros, Coscinodiscus, Cylindrotheca, Ditylum, Fragilaria, Gunardia, Hemialus, Lauderia, Melosira, Navicula, Odontella, Pleurosigma, Pseudonitzschia, Rhizosolenia, Scrippsiella, Skeletonema, Surirella, Thalassionema and Thalassiosira identified from station 3 during the period of investigation and a minimum 18 genera of phytoplankton Cerataulina, Chaetoceros, Coscinodiscus, Cylindrotheca, Ditylum, Dinophysis, Fragilaria, Leptocylindrus, Melosira, Meuneria, Navicula, Odontella, Pleurosigma, Protoperidinium, Rhizosolenia, Skeletonema, Thalassionema and Thalassiosira identified from station 2 & 4. The phytoplankton abundance in the study region was ranged from 10000 to 41952 cells L-1. Highest phytoplankton abundance was observed at the ST-3 Surface water. However, lowest phytoplankton abundance was observed at the ST-5 Surface water. The maximum number of groups (24) found at ST-3.

Benthic Diversity: Benthic invertebrates in the present study area were distributed on the surface of bed forms i.e. sandy and Silty clay in nature. The abundance and diversity, species composition of benthic invertebrates were recorded which is the indicators of changing environmental conditions. A total 5 sub tidal stations and 3 intertidal</td></tr>
</table>

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018

transect were distributed throughout the sampling effort. Samples were collected during December 2017. Sub tidal: A maximum 4 group of Bivalvia, Polychaeta, Amphipoda, and Sipuncula identified from station 1 & 5 during the period of investigation and a minimum 2 Polychaeta and Amphipoda Benthic fauna recorded from station 2. In the sub tidal region macro benthos abundance was higher at ST-1 (575 no. m-2), whereas lowest abundance was recorded at ST-2 (100 no. m-2). Benthic group count was ranged from 2 to 4, with maximum groups at ST-1&5. High biomass was recorded at ST-5 (8.63mg. m-2) as compared to other stations.

Ambient Air Quality and Noise monitoring are being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Oct'17 to Mar'18 is mentioned below.

Air sampling locations & frequency: 8 nos. (twice a week) & Noise sampling locations & frequency: 5 nos. (once in a month)

Parameter	Unit	Max	Min	Perm. Limit*
PM_{10}	$\mu g/m^3$	96.3	41.7	100
$PM_{2.5}$	$\mu g/m^3$	56.4	12.4	60
SO_2	$\mu g/m^3$	29.4	5.0	80
NO_2	$\mu g/m^3$	45.8	13.3	80
Noise	**Unit**	**Max**	**Min**	**Perm. Limit**
Day Time	dB(A)	73.4	57.1	75
Night Time	dB(A)	69.4	53.8	70

* as per NAAQ standards, 2009

Values recorded confirms to the stipulated standards.

Following safeguard measures are taken for abatement of dust emissions.

- Regular sprinkling on road and other open area
- Regular cleaning of roads
- Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts
- Use of water mist canon
- Closed type conveyor belts
- Regular sprinkling on coal heaps
- Covering other types of dry bulk cargo heaps
- Installation of wind breaking wall
- Development of greenbelt along the periphery of the storage yards/back up area
- Mechanized handling system for coal and other dry bulk cargo
- Wagon loading and truck loading through closed silo

Entire quantity of sewage generated is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018

Location	Capacity	Quantity of Wastewater	Type of ETP / STP
LT	265 KLD	85 KLD	Activated Sludge
West port	55 KLD	12 KLD	FAB

Third party analysis of the treated water is being carried out once in a month at Liquid Terminal (LT) & twice in a month at West Port by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Oct'17 to Mar'18 is mentioned below.

Parameter	Unit	Max	Min	Perm. Limit[$]
Industrial Effluent				
pH	--	7.75	6.19	6.5 to 8.5
TSS	mg/L	90	22	100
TDS	mg/L	2060	1032	2100
COD	mg/L	96	72	100
BOD (3 Days @ 27°C)	mg/L	27	19	30
Domestic Sewage				
pH	--	7.23	6.34	6.5 – 8.5
TSS	mg/L	28	11	100
BOD (3 Days @ 27 °C)	mg/L	18	8	30
Residual Chlorine	ppm	0.8	0.5	Min 0.5
Fecal Coliform	Nos.	920	84	<1000

[$] as per CC&A granted by GPCB

Values recorded confirms to the stipulated standards.

Please refer **Annexure – 7 in the main report** for detailed analysis reports and accreditation certificate. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the FY 2017-18.

Liquid Effluent & Sewage – It is being treated at decentralized treatment plants and treated water confirming the stipulated norms is being utilized for horticulture purposes within APSEZ. Please refer specific condition no xii above for details regarding the same.

Waste Management – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste.

Municipal Solid Waste: A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, Glass etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to

<table>
<tr><th>Sr. No.</th><th>Condition as per clearance letter</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>
cement plant (M/s. Sanghi Industries Ltd.) for Co-processing as RDF (Refused Derived Fuel).

Hazardous Waste:
• E – Waste & Used Batteries are being sold to GPCB registered recyclers namely M/s. e-Processing House.
• Solid Hazardous Waste is being disposed through common facility i.e. M/s. Recycling Solutions Pvt. Ltd., Panoli and/or co-processing at Sanghi Industries Ltd., Kutch. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s.Western India Petrochem Industry, Bhavnagar.
• Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals.
• Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s.Western India Petrochem Industry, Bhavnagar and water is sent to ETP for further treatment. However during the compliance period, there was no disposal of Slope Oil.

The following table summarizes the waste management practice (for Oct'17 to March'18) for different types of wastes at APSEZ:
<table>
<tr><th>Waste</th><th>Quantity in MT</th><th>Disposal method</th></tr>
<tr><td colspan="3">Hazardous Waste</td></tr>
<tr><td>Pig Waste</td><td>5.4</td><td>Co-processing at common facility and/or cement industry</td></tr>
<tr><td>Tank Bottom Sludge</td><td>33.4</td><td>Co-processing at common facility</td></tr>
<tr><td>Oily Cotton waste</td><td>55.2</td><td>Co-processing at Cement Industry</td></tr>
<tr><td>Used / Spent Oil</td><td>86.1</td><td>Sell to GPCB approved recycler</td></tr>
<tr><td>Discarded Containers</td><td>8.7</td><td>Sell to GPCB approved recycler</td></tr>
<tr><td>E-Waste</td><td>2.32</td><td>Sell to GPCB approved recycler</td></tr>
<tr><td colspan="3">Municipal Solid Waste</td></tr>
<tr><td>Dry Waste</td><td>105.6</td><td>After recovery sent for recycling</td></tr>
<tr><td>Wet Waste</td><td>467.4</td><td>Converted to Manure for horticultural use</td></tr>
</table>
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED
</td></tr>
<tr><td>iv</td><td>The Proponent shall obtain the requisite consents for discharge of effluents and emissions under the Water (Prevention and Control of</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Consent to Establish (CtE) and Consent to Operate (CtO) are obtained from</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Condition as per clearance letter</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>pollution) Act, 1974 and the Air (Prevention and Control of pollution) Act, 1981 from the Gujarat Pollution Control Board before commissioning of the Project and copy of each of these shall be sent to this Ministry.</td><td>GPCB and renewed/amended from time to time as per the progress of the project activity. The present in-force CTE & CtO are mentioned below.

<table>
<tr><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr>
<tr><td>CtE – Amendment</td><td>Waterfront Development Project</td><td>PC/CCA-KUTCH-582(3)/GPCB ID: 35427/170294</td><td>01.07.2018</td></tr>
<tr><td>CtE – Amendment</td><td>Waterfront Development Project – West Port</td><td>CTE - 88318</td><td>01.07.2018</td></tr>
<tr><td>CtO – Renewal</td><td>Mundra Port Terminal</td><td>AWH-83561</td><td>20.11.2021</td></tr>
<tr><td>CtO – Renewal</td><td>West Port – WFDP</td><td>AWH-79241</td><td>23.06.2021</td></tr>
<tr><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>WH-88317</td><td>20.11.2021</td></tr>
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<tr><td>CtO – Amendment</td><td>West Port – WFDP</td><td>AWH-91678</td><td>01.02.2022</td></tr>
</table>
Copy of updated / amendment in CtO and CtE are attached as Annexure – 10 in the main report.

In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>v</td><td>The sand dunes, corals, and mangroves, if any, on the site shall not be disturbed in any way.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied

There are no sand dunes and corals at the project site. 1254 ha area identified as potential mangrove conservation is being conserved and there is no disturbance to the mangroves in this area. Please refer specific condition no i above for details regarding the same.

In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>vi</td><td>A copy of the clearance letter will be marked to the concerned Panchayat / Local NGO, if any from whom any suggestions /representations has been received while processing the proposal.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Copy of the clearance letter was marked to the concerned panchayats. A typical proof of the same submitted to Mundra village Panchayat on 21.03.2009 is attached as Annexure – 11 in the main report.

In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>vii</td><td>The funds earmarked for environment protection measures shall be</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Condition as per clearance letter</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>maintained in a separate account and there shall be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards shall be reported to this Ministry's Regional Office at Bhopal and the State Pollution Control Board.</td><td>Separate budget for the Environment protection measures is earmarked every year. All environment and horticulture activities are considered at corporate level and budget allocation is done accordingly. All the expenses are recorded in advanced accounting system of the organization.

Budget for environmental management measures (including horticulture) for the FY 2017-18 is to the tune of INR 957 lakh. Out of which, Approx. INR 890 lakh are spent during the FY 2017-18. Detailed breakup of the expenditures for the past 3 years as well as a summary of expenditures for the past 5 years is attached as Annexure – 11 in the main report.

Details regarding the past six compliance report submissions are mentioned below:

<table>
<tr><th>Sr. no.</th><th>Compliance period</th><th>Date of submission</th></tr>
<tr><td>1</td><td>April 15 to September 15</td><td>31.12.2015</td></tr>
<tr><td>2</td><td>October 15 to March 16</td><td>30.05.2016</td></tr>
<tr><td>3</td><td>April 16 to September 16</td><td>01.12.2016</td></tr>
<tr><td>4</td><td>October 16 to March 17</td><td>07.06.2017</td></tr>
<tr><td>5</td><td>April 17 to September 17</td><td>01.12.2017</td></tr>
<tr><td>6</td><td>October 17 to March 18</td><td>01.05.2018</td></tr>
</table>

In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>viii</td><td>Full support shall be extended to the Officers of this Ministry's Regional Office at Bhopal and the Officers of the Central and State Pollution Control Boards by the Project Proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and other environmental Protection activities.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied

APSEZ is always extending full support to the regulatory authorities during their visit to the project site. All necessary documents are submitted as per the request of the visiting authorities.

In view of the information furnished by the PP and the information furnished from time to time, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>ix</td><td>In case of deviation or alteration in the Project including the implementing agency, a fresh reference shall be made to this</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

LNG terminal was initially approved under the Waterfront Development</td></tr>
</table>

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
	Ministry for modification in the clearance conditions or imposition of new ones for ensuring environmental protection.	Project. However the same is now being developed by GSPC LNG Ltd. for which, separate EC and CRZ clearance has already been obtained from MoEF&CC by them. Copy of the same is attached as **Annexure – 13 in the main report.** LPG terminal was initially approved under the Waterfront Development Project of Adani Ports and SEZ Limited and the same is being developed by M/s. Mundra LPG Terminal Pvt. Ltd., which is 100% subsidery of APSEZ. Other than this, there is no change in the approved project proposal. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
x	The Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted. **COMPLIANCE NOT APPLICABLE TO PP**
xi	This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection which shall be complied with.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied As part of the directions given by MoEF&CC vide order dated 18th Sep, 2015, following studies were proposed. • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. Please refer **Annexure – A in the main report** for further details regarding the mentioned studies. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xii	The project proponent shall advertise at least in two local newspapers widely circulated in the region around the Project, one of which shall be in the vernacular language of the locality concerned informing that the Project	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. The original copy of the EC and CRZ clearance was obtained on 10.03.2009 and advertisement (containing informing that the EC and CRZ clearance is accorded to the proposed project and a copy of clearance letter is available with the SPCB and may also be seen at the website of MoEF&CC) was given in The Indian Express newspaper dated 18.03.2009. Copy of the same

Sr. No.	Condition as per clearance letter	Compliance Status as on 31-03-2018
	has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forest at http://www.envfornic.in. The advertisement shall be made within 7 days from the date of issue of the clearance letter and a copy of the same shall be forwarded to the Regional Office of this Ministry at Bhopal.	is attached as **Annexure – 14 in the main report.** **In view of the information furnished by the PP, the stipulated condition is considered partly complied till the submission of another copy of advertisement in vernacular language.** **PARTLY COMPLIED**
xiii	The Project proponent shall inform the Regional Office at Bhopal as well as the Ministry the date of financial closure and final approval of the Project by the concerned authorities and the date of start of land development work.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. APSEZ had informed the Regional Office of MoEF&CC at Bhopal as well as MoEF&CC, New Delhi regarding the date of financial closure and the date of start of land development work vide letter sent in August, 2009. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xiv	Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred, within period of 30 days as prescribed under section 11 of the National Environment Appellate Act, 1997.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and agreed. This EC and CRZ clearance was challenged in National Environment Appellate Authority. In this matter, Order has also been passed in favour of APSEZ. Copy of the same is attached as **Annexure – 15 in the main report.** **In view of the information furnished by the PP, the stipulated condition is noted for compliance.** **NOTED AND AGREED**

ii. Compliance Status of Environmental Clearance for the period October 2017 to March 2018 issued by MoEF&CC, New Delhi vide letter no. 10-138/2008-IA.III, dated 15th July, 2014

(Details of the project: Environmental and CRZ clearance granted to the Multi Product SEZ, Desalination, Sea Water Intake, Outfall Facility and Pipeline project at Mundra, Kutch being developed by Adani Ports and Special Economic Zone Ltd. (APSEZL) (Formerly, M/s. Mudra Port and SEZ Ltd.))

As per the information furnished by the PP, the status details of Activities/facilities approved, major components completed and proposed future activities as per Environment and CRZ Clearance are as below:

Facilities / Components Approved	Capacity	Status as on 31.03.2018
Desalination Plant	150 MLD	Construction has not been started.
Sea water Intake & Outfall Facility	375 MLD: Intake 241 MLD: Outfall	Construction has not been started.
Common Effluent Treatment Plant	17 MLD	MPSEZ Utilities Pvt. Ltd. (MUPL) has been granted environmental clearance for CETP having 17.0 MLD capacities. Out of which at present one module of CETP having 2.5 MLD capacities has been constructed and is in operation.
	50 MLD	Construction has not been started.
Social Infrastructure Projects	--	Adani Mundra SEZ Infrastructure Pvt. Ltd. (AMSIPL) has granted environmental clearance for township and area development project in 255 Ha. Out of 10,000 no. of residential units, 1368 units are constructed.
Sewage Treatment Plant	62 MLD	APSEZ has installed Sewage Treatment Plant @ 150 KLD Capacities within SEZ for treatment of sewage generated from port user buildings.
Airstrip	--	Airstrip has been developed within SEZ area after obtaining requisite permissions.
Municipal Solid Waste Site	--	Material Recovery site is provided for the management of Municipal Solid Waste.
Free Trade & Ware House Zone (FTWZ)	--	Construction is completed and in operation.

Note:

Environmental / CRZ clearance has been granted for additional facilities like Processing Zones, Non-processing Zones, Warehousing Zones, Road Network (Trunk as well as Internal), Bridges or Culverts over natural drain, Rail Network, IT-Telecommunication Network, Electric Network, Water Supply, Conservation & Drainage Network, Effluent Collection Network and Utilities & Supporting Infrastructure within SEZ area.

Boundary wall is constructed along the project periphery. In some of areas level raising and area development of SEZ area, wherever required is also under progress.

The list of Industrial Units within SEZ area are as given below:

Sr. No.	Name of Unit	Nature of Business	Status
1	SKAPS INDUSTRIES	Textile	Operation
2	TERRAM EOSYNTHETICS	Textile	Operation
3	AHLSTROM	Textile	Operation
4	ASHAPURA GARMENTS	Textile	Not in Operation
5	THERMAX	Engineering	Operation
6	OWS	Ware House	Operation
7	DORF KETAL	Chemical	Operation
8	OCCL	Chemical	Operation
9	MUNDRA OIL	Oil	Operation
10	GARG TUBES LLP	Steel	Operation
11	EMPEZAR LOGISTICS	Ware House	Operation
12	SEABIRD CFS	CFS	Operation
13	HONEYCOMB CFS	CFS	Operation
14	ALL CARGO CFS	CFS	Operation
15	MUNDHRA CFS	CFS	Operation
16	SAURASHTRA CFS	CFS	Operation
17	FORBES CFS	CFS	Operation
18	TRANSWORLD CFS	CFS	Operation
19	MICT CFS	CFS	Operation
20	MARUTI SUZUKI INDIA LIMITED	Pre Delivery Inspection Yard	Operation
21	MSTPL (Mundra Solar Technopark Pvt. Ltd.)	Electronics Manufacturing Cluster	Operation
22	STEINWEIGE	FTWZ	Operation
23	KERRY INDEV LOGISTIC	FTWZ	Operation
24	BRITANNIA INDUSTRIES LIMITED	Food Products	Construction work completed
25	ADANI POWER LIMITED	Thermal Power Plant	Operation

During the site visit, following industries were randomly visited to check the compliance of EC conditions at individual industry level:

- Oriental Carbon & chemicals Ltd.
- Garg Tubes Exports LLP
- Britannia Industries Ltd.
- Terram Geosynthetics Pvt. Ltd.
- Dorf Ketal Chemicals Pvt. Ltd.
- Adani Mundra SEZ Infrastructure Pvt. Ltd.-Samudra Township STP
- MPSEZ Utilities Pvt. Ltd.(CETP)
- Mundra Solar PV Limited

Based on the site visit and information furnished by the PP, the point-wise compliance status of Environmental / CRZ Clearance granted to the Multi Product SEZ, Desalination, Sea Water Intake, Outfall Facility and Pipeline project at Mundra, Kutch being developed by Adani Ports and Special Economic Zone Ltd. (APSEZL) is prepared and furnished below:

Sr. No.	Conditions	Compliance Status as on 31-03-2018
Part – A: Specific Conditions		
i.	PP shall abide by the final order/decision of Hon'ble Supreme Court in SLP (Civil) no. 1526/2014 and connected matters.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and will be complied. Vide order dated 14.07.2014, the Hon'ble Supreme Court directed MoEF&CC to complete the process of environmental clearance to the MSEZ project of APSEZ within eight weeks. MoEF&CC issued EC and CRZ clearance to the proposed project vide letter dated 15.07.2014. Hence, the SLP (Civil) no. 1526/2014 is deemed closed. Copy of the order is attached as **Annexure – 1 in the main report.** **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
ii.	Properly conserve the creeks, river and the mangroves area in the area.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. This reply covers condition no ii, iii, ix, x, xi, xii & xiii. Conservation of creeks and rivers: • The prominent creek system (main creeks and small branches of creeks) in and around APSEZ are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river). • Rivers passing through the APSEZ area are: (1) Khari (2) Nagmati (3) Phot (4) Bhukhi (5) Dhaneshwari (6) Buchiya (7) Jidal. • All the rivers passing through the SEZ area are dry throughout the year except for monsoon season. • All creeks as well as rivers are in existence allowing free flow of water and there is no filling or reclamation of any creek or river area. APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Three RCC Bridges have also been constructed over Kotdi creek with total length of 230 m and cost of INR 10 Crores. Photographs of the same are attached as **Annexure – 2.** • From the APSEZ operations, there is no discharge of any sewage or effluent to the water streams Conservation of mangroves: • In and around APSEZ, approx. 1800 ha. mangrove area was identified by NIO in an EIA report prepared the year 1998. • Out of this 1800 ha area, 1254 ha area was further demarcated as potential mangrove conservation by NIO in the year 2008 (as part of the EIA report of WFDP).

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		• It may be noted that the entire area of 1254 ha is not covered with mangroves. • Entire area is being conserved and there is no disturbance to the mangroves in this area. Measures such as restricted entry and regular surveillance have resulted in overall growth of mangroves within this area. • As per MoEF&CC directive, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, presently, mangrove cover in and around APSEZ is over 2340 ha. The analysis of the comparison between 2011 and 2016-17 has shown an overall growth of 246 ha. Please refer **Annexure – 3 in the main report** for a copy of the report. **In view of the information furnished by the PP supported by the study report of NCSCM, the stipulated condition is considered complied.** **COMPLIED**
iii.	Ensure that mouths of all the creeks are kept open to ensure flushing of the creeks.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. • The prominent creek system (main creeks and small branches of creeks) in and around APSEZ are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river). • All above creek mouths are open allowing free flow of water in to the creeks and surrounding areas and there is no filling or reclamation of any creek area. • This aspect is also confirmed from the recent study of NCSCM **(Annexure – 3 in the main report)** which highlights the bathymetry data of the entire coast around APSEZ. • From the bathymetry data it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water. **In view of the information furnished by the PP supported by the study report of NCSCM, the stipulated condition is considered complied.** **COMPLIED**
iv.	Bring the creeks to the condition as was seen in the satellite map of 2005 which will be a "reference" satellite map and a copy of which shall be sent to you separately.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Not applicable This reply covers condition no iv, v, vi. The stated conditions were stipulated in the EC and CRZ clearance with respect to the pending SCNs and based on Ms. Sunita Narain committee report. In continuation to the SCNs and subsequent submissions by APSEZ, MoEF&CC issued a final order vide letter dated 18.09.2015 (which disposed the pending Show Cause Notices). Full compliance of the directions issued vide the said order is provided as **Annexure – A in the main report.** It may be noted that the stated conditions related to the satellite image

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		of 2005 are not imposed to APSEZ as part of the said order. Hence, APSEZ has made submission to MoEF&CC vide letters dated 23.05.2016 and 07.11.2016. Copies of the said letters are attached as **Annexure – 4 in the main report**. Further there are no directions from MoEF&CC. **In view of the submission by the PP, the stipulated condition is considered complied subject to acceptance by MoEF&CC, New Delhi.** **COMPLIED SUBJECT TO ACCEPTANCE BY MOEF& CC, New Delhi.**
v.	Submit once in a year latest satellite map which can be compared with the reference satellite map of 2005 to ensure that no modifications in the creeks, rivers, mangroves and mouth of creeks have taken place.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Not applicable This reply covers condition no iv, v, vi. The stated conditions were stipulated in the EC and CRZ clearance with respect to the pending SCNs and based on Ms. Sunita Narain committee report. In continuation to the SCNs and subsequent submissions by APSEZ, MoEF&CC issued a final order vide letter dated 18.09.2015 (which disposed the pending Show Cause Notices). Full compliance of the directions issued vide the said order is provided as **Annexure – A in the main report.** It may be noted that the stated conditions related to the satellite image of 2005 are not imposed to APSEZ as part of the said order. Hence, APSEZ has made submission to MoEF&CC vide letters dated 23.05.2016 and 07.11.2016. Copies of the said letters are attached as **Annexure – 4 in the main report**. Further there are no directions from MoEF&CC. **In view of the submission by the PP, the stipulated condition is considered complied subject to acceptance by MoEF&CC, New Delhi.** **COMPLIED SUBJECT TO ACCEPTANCE BY MOEF& CC, New Delhi.**
vi.	Any direction issued by the MoEF with respect to the report submitted by Ms Sunita Narain Committee shall be complied with by the Proponent as applicable.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Not applicable Based on Ms. Sunita Narain Committee report and subsequent submissions from APSEZ, MoEF&CC disposed the pending Show Cause Notices and issued 10 specific directions. Full compliance of the directions issued vide the said order is provided as **Annexure – A in the main report.** **In view of the information furnished by the PP and the detailed compliance submitted against the 10 directions issued by the MoEF&CC, the stipulated condition is considered complied.** **COMPLIED**
vii.	At its cost get Inspection study done once in a year by the organizations like NEERI or any organization	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. NEERI has been appointed to carry out the inspection study up to the

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	approved by this Ministry to - (i) ensure compliance of all the EC conditions (ii) development of SEZ meeting of the environment norms, and (iii) advise any mid-term correction that can be introduced depending on the recommendation of the independent Third Party.	year 2020 at a cost of INR 12 Lacs. Compliance report of the period from April'17 to Sept'17 was submitted to NEERI. Based on the site visit during period Oct'17 to Mar'18 as well as the said compliance report NEERI has given their feedback. No non-compliance is observed by NEERI. Copy of the same is annexed as **Annexure – 5 in the main report.** **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
viii.	"Consent for Establishment" for the SEZ shall be obtained from Gujarat Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Consent to Establish (CtE) is obtained for the project from Gujarat Pollution Control Board vide their letter no. GPCB/CCA-KUTCH-1044/ GPCB ID 31463/ 109800, dated 16.04.2012. Copy of the same was submitted to MoEF&CC, Regional Office, Bhopal vide our letter dated 05th Aug, 2014. APSEZ has been granted Consent to Operate (CtO) from GPCB for common infrastructure facilities developed vide Order No. AWH-88998, dated 26.10.2017. Copy of the CtE and CtO are attached as **Annexure – 6 in the main report.** **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
ix.	PP shall get detailed bathymetry done for all the creeks and rivers within Port and SEZ areas along with mapping of co-ordinates, running length, HTL, CRZ boundary, mangrove area including buffer zone through NCSCM /NIOT. PP shall also get prepared a detailed action plan for conservation and	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied Based on the MoEF&CC directions, APSEZ has entrusted NCSCM to carry out the detailed study. Scope of the study include the following: • Detail bathymetry and topography survey of creeks • Demarcation of mangrove areas and buffer zone • Demarcation of HTL and CRZ areas with co-ordinates • Preparation of a comprehensive and integrated conservation plan for protection of creeks and mangroves In order to complete the study, NCSCM has carried out number of site surveys which are mentioned below:

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	protection of creeks /mangrove area etc through NCSCM/NIOT and submit the same to GCZMA for their examination and recommendation. GCZMA will submit its recommendations to MoEF for approval.	• Bathymetry survey of creeks • Topography survey of intertidal areas • Mangrove survey (health and area demarcation) • Sampling of soil and water for analysis of physico-chemical and biological parameters • Tide and currents data collection (including residence time of tidal water) study Based on the study, the following points can be summarized: • There is no obstruction to any water stream (creeks / branches of creeks / rivers) • Presently, mangrove cover in and around APSEZ is over 2340 ha. There is substantial growth in mangrove cover to the tune of 246 ha (comparison between 2011 and 2016-17) • Majority of the development at Mundra has happened between this tenure. Hence it can be interpreted that the infrastructure development has not left any adverse impacts on ecology. The study report is submitted to GCZMA (with a copy to MoEF&CC) for their examination and recommendation. Copy of the same is attached as **Annexure – 3 in the main report**. Please refer the survey maps in the report for interpretation of the details mentioned above. Cost of the study as per the NCSCM proposal is 315.5 Lakh. 90% of the payment against the proposal value is already paid to NCSCM. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
x.	PP shall demarcate the CRZ area on land with GPS coordinates in consultation with GCZMA/ the agency which has done the HTL /LTL demarcation for the area. There shall be no allotment of plot/s in CRZ area to industries. No industrial activity within CRZ area except the port and harbor & the foreshore facilities shall be allowed as committed.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Being complied Based on the MoEF&CC directions and in consultation with GCZMA, APSEZ has entrusted NCSCM for demarcation of HTL and CRZ areas. NCSCM has prepared the draft maps. Once the maps are finalized, they will be submitted to GCZMA and MoEF&CC for their examination and recommendation. In addition to that please note that • There is no allotment of plot(s) in CRZ area to any industry. • Only those activities which are allowed within CRZ area are being carried out (with due approvals from concerned authorities) • No industrial activity within CRZ area except the port and harbor & the foreshore facilities are carried out. **In view of the information furnished by the PP and the progress made w.r.t. demarcation of HTL/LTL maps, the stipulated condition is**

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		considered compliance in progress. **COMPLIANCE IN PROGRESS**
xi.	Till the approval of action plan for conservation and protection of creeks /mangrove area, the CRZ area within SEZ shall be demarcated as "No Development Zone". PP shall not allow / undertake any development in CRZ area of SEZ.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied The action plan for conservation of creeks and mangrove areas is prepared by NCSCM and the same is submitted to GCZMA and MoEF&CC for their examination and recommendation. The main action plan as per the study are mentioned summarized below: • Monitoring of mangrove cover in Jan/Mar, 2020 using latest satellite images and validation with field observations • Monitoring of tidal range in the mangrove areas and comparison with the data collected during 2017 • Removal of silt / sand spits from the central part of navinal creek • Dredging of shallow area off Bocha Island to reduce current velocity. These measures will be discussed with GCZMA and the same will be implemented after obtaining their approval. No development is carried out in the 'No Development Zone' (i.e. CRZ area of SEZ) **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xii.	The implementation of action plan approved by the MoEF shall be monitored by the NCSCM/NIOT. Compliance with action plan shall be submitted to GCZMA and to MoEF, RO at Bhopal along with six monthly monitoring report.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and will be complied The action plan for conservation of eco sensitive areas prepared by NCSCM is submitted to GCZMA and MoEF&CC for their approval. Implementation of the action plan will be carried out by APSEZ and same will be monitored by NCSCM and compliance report in this regard will be submitted to all the concerned authorities as part of the six monthly compliance report. **In view of the information furnished by the PP, the stipulated condition is considered as agreed to comply by the PP.** **AGREED TO COMPLY**
xiii.	PP shall earmark separate budget for the implementation of the above action plan. The details of the expenditure shall be submitted to GCZMA and to MoEF, RO at	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and will be complied A separate budget will be allocated for implementation of this action plan and details of the same will be submitted as part of the six monthly compliance report.

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	Bhopal along with six monthly monitoring report.	**In view of the information furnished by the PP, the stipulated condition is considered as agreed to comply by the PP.** **AGREED TO COMPLY**
xiv.	All the industry in SEZ shall be connected through impervious drainage lines to the STP/CETP for the discharge of their sewage or industrial effluent. There shall not be any discharge to creeks / rivers. PP shall be accountable for implementing this condition and necessary clause shall be incorporated in the MoU while allotting the plot to the individual industries.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. As per the Lease Deed agreement, all existing industries are well connected with impervious pipeline to discharge their effluent / sewage after confirming to the inlet norms of CETP. Typical copy of the Lease Deed (Agreement) is attached as **Annexure – 7 in the main report**. Entire quantity of treated wastewater from CETP is being utilized for horticulture purpose within SEZ area. No discharge is allowed in to creeks / rivers. Same practice will be continued in future as well and capacity enhancement of CETP will be carried out based on requirement. List of CETP member units discharging their effluent and details regarding effluent characteristics are submitted as **Annexure – 8 in the main report.** The industries which treat the sewage / effluent within their premises comply the stipulated norms of discharge given by GPCB. Through regular monitoring it is ensured by APSEZ that the treated water is used for gardening within the respective industries and there is no discharge to any water body including rivers or creeks. **In view of the information furnished by the PP and the site observation that 2 industries (namely, M/s. Dorf Katl, M/s. Ahlstorm) have been connected to CETP and the remaining industries (located in SEZ) discharging their treated effluents as per the consent guidelines of GPCB after complying to the discharge norms, the stipulated condition is considered complied subject to acceptance by MOEF&CC, New Delhi.** **COMPLIED SUBJECT TO ACCEPTANCE BY MOEF&CC, New Delhi.**
xv.	PP shall not carry out any river course modification.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied The project was conceptualized in such a way that no river course modification is required to be carried out. All the river passing through SEZ are maintained through proper path for area drainage. **In view of the information furnished by the PP, the stipulated condition is considered complied.**

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		COMPLIED
xvi.	The individual industrial units shall obtain prior EC under EIA Notification, 2006 as applicable.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. All industrial units coming up in within the SEZ are informed and aware about the said requirement. Out of total units established within SEZ, only APL & Dorf Ketal falls under purview of EIA Notification 2006 and they have obtained their specific EC as applicable. During the compliance period of Oct'17 to Mar'18, no new such industry has been established at SEZ which requires EC under EIA Notification, 2006. The condition is being followed on case to case basis as applicable. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xvii.	Proponent shall identify 200 ha of land for mangrove plantation as per the condition laid by SEAC.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. 100 Ha. Mangrove plantation is carried out by SAVE at Tala Tadav village of Khambhat Taluka of Anand district. 100 Ha. Mangrove plantation is carried out by GEC. Out of 100 ha., 38 ha. plantation is completed at Tala Tadav village of Khambhat Taluka of Anand district during 2017-18. Remaining 62 ha. plantation is carried out at Aliya Bet of Bharuch district during 2017-18. Completion report of SAVE and GEC are enclosed as **Annexure – 9 in the main report**. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xviii.	50 meter buffer from the existing mangrove area should be provided for any developmental activity.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. 50 meter buffer from the existing mangrove area as per the CRZ notification is being maintained and all developmental activities are being carried out as per the approval only. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xix.	Proponent shall develop	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	the green belt with 3 layers of canopy all along the periphery.	Bhopal on 14.05.2018 submitted the following: Being complied. APSEZ has developed "Dept. of Horticulture" which is taking measures/ steps for terrestrial greening as well as mangrove plantation. Development of greenbelt at various locations within the SEZ is an ongoing activity. Green belt of 3 layer canopy will be developed as part of the development of SEZ. The species such as Ficus Infectoria, Ficus religiosa, Terminalia arjuna, Cocos nucifera, Washingtonia fillifera, Casurina spp., Azadirachta Indica, Eucalyptus spp., Jatropha curacus, Ficus bengalensis, Subabool spp., Casia fistula, Date Palm and Delonix regia were grown in SEZ area. Width of the green belt varies from 2 m to 8 m and density varies from 2000 to 2500 trees per hectare at various locations. Total 99.5 hectares of land with approx. 2.2 Lacs trees is developed within SEZ area till date. So, far more than 400 ha. area is developed as greenbelt with plantation of more than 8.0 Lacs trees within the entire APSEZ area. Please refer **Annexure – 10 in the main report** for further details regarding greenbelt development and mangrove afforestation. An updated green belt development plan is also attached as part of the said annexure. Total expenditures of the horticulture dept. for the F.Y. 2017-18 periods are INR 607 lakh. It may be noted that individual industrial units will also developed the greenbelt within their premises based on their planning & approvals and new industries coming up any will also comply as per their approvals. The same will be ensured by the environment monitoring committee of APSEZ. For the area where further development is yet to be carried out, APSEZ will ensure that greenbelt with 3 layer canopy is developed by either APSEZ or the industrial unit to whom the land is allotted. **In view of the information furnished by the PP and as per the site observation of excellent greenbelt developed in the saline soils which is commendable, the stipulated condition is considered compliance in progress in light of the proposed phase-wise green belt development.** **COMPLIANCE IN PROGRESS**
xx.	All the recommendation of the EMP shall be complied with in letter and spirit. All the mitigation measures submitted in the EIA report shall be prepared	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Compliance report of environmental management plan and mitigation measures proposed as part of the EIA repot is summarized below. The same is submitted to the concerned authorities including MoEF&CC, RO,

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>in a matrix format and the compliance for each mitigation plan shall be submitted to MoEF along with half yearly compliance report to MoEF-RO.</td><td>
Bhopal as part of the six monthly compliance reports. Details of the past six compliance reports are mentioned below.
<table>
<tr><th>Sr. no.</th><th>Compliance period</th><th>Date of submission</th></tr>
<tr><td>1</td><td>Apr'15 to Sep'15</td><td>30.11.2015</td></tr>
<tr><td>2</td><td>Oct'15 to Mar''16</td><td>30.05.2016</td></tr>
<tr><td>3</td><td>Apr'16 to Sep'16</td><td>01.12.2016</td></tr>
<tr><td>4</td><td>Oct'16 to Mar'17</td><td>30.05.2017</td></tr>
<tr><td>5</td><td>Apr'17 to Sep'17</td><td>01.12.2017</td></tr>
<tr><td>6</td><td>Oct'17 to Mar'18</td><td>01.05.2018</td></tr>
</table>
Summary of the compliance to the measures suggested in EMP is mentioned below.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED
<table>
<tr><th>Suggested Measures</th><th>Compliance Status</th></tr>
<tr><td colspan="2">Construction Phase:</td></tr>
<tr><td colspan="2">Air Environment</td></tr>
<tr><td>Water sprinkling in vulnerable areas</td><td>Water sprinkling on road and other construction area as well as on construction materials is being carried out on regular bases.</td></tr>
<tr><td>Enforce proper maintenance of vehicles and construction equipment. Allowing only PUC approved vehicles in the site.</td><td>Please refer Condition No. ix of Part-B(General Conditions Construction phase) of EC and CRZ Clearance.</td></tr>
<tr><td>Enforce usage of covered trucks for transport of construction material.</td><td>Covered trucks are being used for handling of construction materials.</td></tr>
<tr><td colspan="2">Noise Environment</td></tr>
<tr><td>Enforce proper maintenance of vehicles and construction equipment. Enforce use of earmuffs / earplugs to workers in high noise level areas.</td><td>The vehicles of on-going construction work enter inside the premises after the fitness check. Ear protection device is provided to workers in high noise areas.</td></tr>
<tr><td colspan="2">Water Environment</td></tr>
<tr><td>Provide temporary drinking water supply and proper sanitation facilities within the site</td><td>Provision of drinking water and sanitation facility is being provided.</td></tr>
<tr><td colspan="2">Land / Soil Environment</td></tr>
<tr><td>Proper disposal of construction debris at regular intervals</td><td>Construction debris is being kept at identified temporary storage area and is being</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2018	
			utilized for area development.
		Thermal Environment	
		Enforce (i) use of Portland Pozzalano Cement / (ii) use of Portland Slag Cement / (iii) use fly ash as admixture in construction	Part of fly ash generated from Adani Power Limited, Mundra is being utilized by Adani Group to manufacture paver blocks and the same paver blocks are used for development of back up area, footpath, colonies area, parking area, approach road etc. Please refer Condition No. xi of Part-B (General Conditions: Construction phase) of EC and CRZ Clearance.
		Energy	
		Wherever possible, piping shall be along the natural topography to permit gravity flow. Else, energy efficient pumps shall be used. Pipe material shall be such as to minimize friction losses. Wherever possible, natural light shall be used. Energy efficient electrical fittings and fixtures shall be used.	Energy efficient pumps and HDPE Pipelines are used for supply of utilities. Refer point no. xii of EC & CRZ Clearance in Part – B (Operation Phase) for energy efficient electrical fittings. Few of the buildings in MSTPL are designed as green building.
		Operation Phase:	
		Land / Soil Environment	
		Good quality non-corrosive type pipeline should be used. Regular checking of the pipelines for early detection of any possible leakage and damage. Regular ground water monitoring should be done within the SEZ.	HDPE pipelines are used for supply of utility. Regular visual surveillance along the utility lines corridor is being done to check leakage or damage. Third party analysis of the ground water is being carried out at every three month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Please refer Condition No. v of Part-B (General Conditions: Construction phase) of EC and

Sr. No.	Conditions	Compliance Status as on 31-03-2018	
			CRZ Clearance.
		The waste should be transported in covered trucks. Vermi-composting is highly recommended for treatment and disposal of biodegradable and kitchen wastes. Other domestic solid waste (garbage) shall be disposed through MSW facility or as per prevailing norms.	Please refer Condition No. iv of Part-B (General Conditions: Construction phase) of EC and CRZ Clearance.
		The waste should be transported in covered trucks. Transporter should be informed of remedial measures required to be taken in case of spillage of waste	Waste handling vehicles are being handled through covered trucks only. Details were submitted along with last compliance report submission i.e. Apr'17 to Sep'17.
		Socio-Economic Environment	
		It will encourage development of surrounding areas & further generate employment. People from various cultures shall mingle encouraging a more tolerant society.	Please refer Condition No. vii of Annexure – B (Compliance Status of MoEF & CC Order dated 18.09.2015).
xxi.	There shall be no disturbance to the sand dunes. The pipelines shall be laid using advanced method viz. Horizontal Directional Drilling (HDD) so as to avoid disturbance to the sand dunes/creeks/ mangroves.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. There is no sand dune in the SEZ area. Point noted. No pipelines for intake and outfall of sea water are laid till now and same will be studied as and when required. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**	
Part – B: General Conditions			
	Construction Phase		
i.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Not applicable at present. Most of the construction labours reside in the nearby villages where all basic facilities are easily available. There are no housing requirements for labours inside the project area.	

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	**In view of the information furnished by the PP, the stipulated condition is considered not applicable to PP.** **COMPLIANCE NOT APPLICABLE TO PP**
ii.	A first aid room will be provided in the project both during construction and operation of the project.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. APSEZ has established Occupational Health Center & First Aid facility, which will be utilized during entire construction as well as operation phase of SEZ project. In case of emergency situation requiring higher level of treatment, the facilities at Adani hospital located with SEZ area can be utilized. **In view of the information furnished by the PP and as per the site observation, the stipulated condition is considered complied.** **COMPLIED**
iii.	All the topsoil excavated during construction phase should be stored for use in horticulture/landscape development within the project site.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Excavated topsoil, if any, will be used for the horticulture /landscape development within the project site. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
iv.	Disposal of muck during construction phase should not create any adverse effect on the neighboring communities and be disposed, taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. No excavated muck has been generated and disposed-off. Construction waste, if any, is utilized for area development within the project site. **In view of the information furnished by the PP and as per the site observation, the stipulated condition is considered complied.** **COMPLIED**
v.	Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Environment Monitoring is being carried out on regular basis in Port & SEZ areas through NABL accredited and MoEF&CC approved agency

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	toxic contaminants.	namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the ground water as well as soil assessment for duration from Oct'17 to Mar'18 is mentioned below.

Bore Hole Water Sampling:

Sampling locations & frequency: 4 nos. (every quarter)

Sr. No.	Parameter	Unit	Max. Value	Min. Value
1	pH	--	8.12	6.93
2	Salinity	ppt	29.51	0.54
3	Oil & Grease	mg/L	4.40	1.06
4	Hydrocarbon	mg/L	BDL*	BDL*
5	Lead as Pb	mg/L	22.20	0.02
6	Arsenic as As	mg/L	BDL*	BDL*
7	Nickel as Ni	mg/L	0.18	0.18
8	Total Chromium as Cr	mg/L	0.022	0.003
9	Cadmium as Cd	mg/L	0.17	0.01
10	Mercury as Hg	mg/L	BDL*	BDL*
11	Zinc as Zn	mg/L	2.74	0.02
12	Copper as Cu	mg/L	50.40	0.03
13	Iron as Fe	mg/L	16.30	0.04
14	Insecticides/Pesticides	mg/L	BDL*	BDL*
15	Depth of Water Level from GL	meter	2.84	1.70

*BDL = Below Detectable Limit

Soil Sampling:

Sampling locations & frequency: 4 nos. (Half Yearly)

Sr. No.	Parameter	Unit	Max. Value	Min. Value
1	pH	--	8.15	7.41
2	Nitrogen as N	%	0.0088	0.0045
3	Phosphorus as P	mg/kg	680	134
4	Potassium as K	mg/kg	52	16
5	Baron as B	mg/kg	3.2	2.1
6	Calcium as Ca	mg/kg	1210	55
7	Magnesium as Mg	mg/kg	1456	6
8	Iron as Fe	%	0.53	0.24
9	Moisture	%	14.8	10.4
10	Organic Matter	%	0.069	0.023
11	CEC	meq/100 gm	8.1	5.9
12	TVC	CFU/gm	2.2x10-6	4.0x10-7
Heavy Metal				
13	Cadmium as Cd	mg/kg	4.70	1.92
14	Thorium as Th	mg/kg	BDL*	BDL*
15	Antimony as Sb	mg/kg	BDL*	BDL*
16	Arsenic as As	mg/kg	BDL*	BDL*
17	Lead as Pb	mg/kg	30.6	17.8
18	Chromium as Cr	mg/kg	18.2	15.4
19	Cobalt as Co	mg/kg	2.2	0.9
20	Copper as Cu	mg/kg	12.6	10.1
21	Nickel as Ni	mg/kg	136	64
22	Manganese as Mn	mg/kg	490	88
23	Vanadium as V	mg/kg	12.6	7.6

*BDL = Below Detectable Limit

From the above results it can be inferred that

- The ground level in this area is saline in nature due to close proximity to the coast.
- There is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.
- There is no leaching of heavy metals and other toxic contaminants through soil.

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		Please refer **Annexure – 11 in the main report** for detailed analysis reports and accreditation certificates. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the FY 2017-18 period. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
vi	Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Construction spoils including bituminous material is being kept at identified temporary storage area outside CRZ and is being utilized for area development purpose as and when required. Hazardous materials such as diesel, lube oil etc. are handled with utmost care and all applicable rules are followed. Storage area is provided with paving and spill kit to ensure there is no contamination to soil or ground water. Used oil is sold to GPCB approved recycler namely M/s. Western India Petrochem Industries, Bhavnagar. Oily rags are being disposed though co-processing at cement industries namely M/s. Sanghi Industries Ltd., Kutch and / or Recycling Solutions Pvt. Ltd., Panoli. Dates of validity of all the vendors and copy of agreement are attached as **Annexure – 12 in the main report.** Necessary approval from GPCB for disposal of hazardous wastes is obtained. Please refer **Annexure – 6 in the main report** for a copy of the same. Individual units within SEZ are handling their hazardous wastes as per Hazardous waste rules – 2016 after obtaining necessary permissions from GPCB. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
vii	Any hazardous waste generated during construction phase should be disposed off as per applicable rules and norms with necessary approvals of the Gujarat Pollution Control Board.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Used oil is sold to GPCB approved recycler namely M/s. Western India Petrochem Industries, Bhavnagar. Oily rags are being disposed though co-processing at cement industries namely M/s. Sanghi Industries Ltd., Kutch and / or Recycling Solutions Pvt. Ltd., Panoli. Dates of validity of all the vendors and copy of agreement are attached as **Annexure – 12 in the**

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>main report. Hazardous waste authorization from GPCB for disposal of hazardous wastes is obtained. Please refer Annexure – 6 in the main report for a copy of the same.

Individual units within SEZ are handling their hazardous wastes as per Hazardous waste rules – 2016 after obtaining necessary permissions from GPCB.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>viii</td><td>The diesel generator sets to be used during construction phase should be low sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

DG sets are being used only as power back up source in case of power failure. Presently, cumulative capacity of all DG sets installed at APSEZ is 4843 KVA. During the compliance period of Oct'17 to Mar'18, there was no instance of power failure hence it was not required to operate the DG sets. However, for the air and noise emission assessment, the DG sets were turned on. Assessment was carried out by NABL accredited and MoEF&CC approved agency namely M/s. Pollucon Laboratories Pvt. Ltd. The summary of analysis results is mentioned below.

<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit*</th></tr>
<tr><td>PM</td><td>mg/Nm^3</td><td>15.62</td><td>10.84</td><td>150</td></tr>
<tr><td>SO_2</td><td>ppm</td><td>4.53</td><td>2.46</td><td>100</td></tr>
<tr><td>NOx</td><td>ppm</td><td>31.72</td><td>26.69</td><td>50</td></tr>
</table>
*GPCB Permissible Limit

From the above results it can be inferred that the air and noise emissions are well within the stipulated norms. Please refer Annexure – 11 in the main report for detailed analysis reports and accreditation certificate. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the period of FY 2017-18.

All the DG sets are of low sulphur diesel type. Certificate showing Sulphur content in diesel is attached as Annexure – 13 in the main report. DG sets are being used in conformance to the EPA norms and proof for the same is attached as Annexure – 14 in the main report.

In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>ix.</td><td>The diesel required for operating DG sets shall be stored in underground tanks if</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>required; clearance from Chief Controller of Explosives shall be taken.</td><td>Diesel is stored in the underground tank located in existing port area and approval of the same from Chief Controller of Explosives is obtained from PESO with License no. P/WC/GJ/14/4671 (P291058) dated 18.12.2015 and is valid till 31.12.2018. Copy of Certificate from CCE is attached as Annexure – 15 in the main report.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>x.</td><td>Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards and should operate only during non-peak hours.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

The vehicles of on-going construction work enter inside the premises only after passing through the fitness check at vehicle health-check centre established by APSEZ. At the vehicle health check-up centre, parking light, reverse light, Horne, wheel, breaks, mirror, etc. are checked before allowing the vehicle to enter the site.

APSEZ has also established a licenced PUC station to monitor the compliance with applicable Motor Vehicle Act for vehicles. Photographs of the health check-up centre and PUC station are attached as Annexure – 16 in the main report.

Majority of the vehicles bringing construction materials are operated during non-peak hours.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>xi.</td><td>Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/GPCB.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Ambient Air Quality and Noise monitoring are being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Oct'17 to Mar'18 is mentioned below.

Air sampling locations & frequency: 8 nos. (twice a week) & Noise sampling locations & frequency: 5 nos. (once in a month)
<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit*</th></tr>
<tr><td>PM_{10}</td><td>µg/m³</td><td>98.3</td><td>40.2</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>µg/m³</td><td>56.6</td><td>12.4</td><td>60</td></tr>
<tr><td>SO_2</td><td>µg/m³</td><td>28.6</td><td>5.3</td><td>80</td></tr>
<tr><td>NO_2</td><td>µg/m³</td><td>45.1</td><td>9.6</td><td>80</td></tr>
<tr><th>Noise</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>73.4</td><td>45.9</td><td>75</td></tr>
</table></td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		Night Time | dB(A) | 68.4 | 41.8 | 70 $ as per NAAQ standards, 2009 Values recorded confirms to the stipulated standards. Such environmental monitoring is being carried out on continuous basis at stipulated frequencies. The analysis results are being closely observed for incremental pollution load. From the above results and past data, it can be inferred that the emission levels are well within the prescribed standards. All the analysis data collected are submitted to the concerned authorities as part of the six monthly compliance reports. The data is also submitted to GPCB on monthly basis as part of the online submission – Monthly Patrak. Please refer **Annexure – 11 in the main report** for detailed analysis reports and accreditation certificates. Approx. INR 27.0 Lakh is spent for all environmental monitoring activities during the period FY 2017-18. Following safeguard measures are taken for abatement of dust and noise emissions. • Regular sprinkling on road and other open area • Regular cleaning of roads • Development of greenbelt along the periphery of the storage yards/back up area • D.G. Sets having Acoustic enclosures **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xii.	Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003. (The above condition is applicable only if the project site is located within 100 Kms of Thermal Power Stations).	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Part of fly ash generated from Adani Power Limited, Mundra is being utilized by Adani Group to manufacture paver blocks and the same paver blocks are used for development of back up area, footpath, colonies area, parking area, approach road etc. APSEZ has utilized 787 MT of fly ash to manufacture paver block during the period of Oct'17 to Mar'18. Please refer **Annexure – 17 in the main report** for methodology and photographs of manufacturing. Fly ash based PPC cement is used for construction activity. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xiii.	Ready mixed concrete must be used in building construction.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied.

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		Only RMC is used for construction activity. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xiv.	Storm water control and its re-use should be regulated as per CGWB and BIS standards for various applications.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Storm water drainage systems are provided. There are no perennial rivers and the possibility of storm water run off is only during monsoon season. The area is receiving scanty rainfall and there is no continuous flow of water during monsoon. Therefore presently, the storm water drainage is designed to facilitate the area drainage meeting with the downstream part of water area. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xv.	Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other referred best practices.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Only RMC is used for construction activity. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xvi.	Permission to draw ground water shall be obtained from the competent Authority prior to construction /operation of the project.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. No ground water is used during construction & operation stage of the project. Current sources of water are Narmada water through GWIL and desalination plant of APSEZ. Average water requirement is approx. 5.2 MLD. **In view of the information furnished by the PP, the stipulated condition is considered as compliance not applicable to PP.** **COMPLIANCE NOT APPLICABLE TO PP**
xvii.	Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Not applicable As per the master planning all types of waste water generated are transferred through common conveying system for providing desired treatment at CETP. Treated waste water is utilized for gardening purpose within the premises of APSEZ / individual industries.

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries. In view of the information furnished by the PP, the stipulated condition is considered complied subject to needful amendment in EC condition by the EC issuing authority. COMPLIED SUBJECT TO NEEDFUL AMENDMENT IN EC CONDITION BY THE EC ISSUING AUTHORITY
xviii.	Fixtures for shower, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Water flow reducers are installed at various locations within APSEZ. The water flow reducers consume approx. 66% less water compared to the normal tap. Water free urinals are also installed at Port User Buildings for water conservation. In phase wise manner, all the fixtures will be replaced with such water efficient devices. It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xix.	Use of glass may be reduced by up to 40% to reduce the electricity consumption and load on air-conditioning. If necessary, use high quality double glass with special reflective coating in windows.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied Majority of the building envelops are constructed with energy efficient building materials. While using glass, wherever required, it is ensured that only high quality glass with reflective coating is used. It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries.

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.	Bhopal on 14.05.2018 submitted the following: Complied. SEZ industries were visited to check measures taken for Energy Conservation, Water Conservation, Waste and Hazardous waste management and phase out plan of Ozone depleting substance during the compliance period. Various industries shared the data in line with above reference. Such supervision will be undertaken once in every six months. Please refer **Annexure – 18 in the main report** for a typical sample of the data collection sheet from an industry within SEZ. It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xxiv.	Under the provisions of Environment (Protection) Act 1986, legal action shall be initiated against the project proponent if it is found that construction of the project has been started without obtaining environmental clearance.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted. Wherever applicable, construction activities have started only after obtaining environmental clearance. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
	Operation Phase	
i.	The PP while issuing the allotment letter to individual member units shall specifically mention the allowable maximum quantity of water usage and effluent generated by each member unit.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Provisions are made while issuing the allotment letter to individual member units for specifically mentioning the allowable maximum quantity of water usage and effluent generated by each member unit. Sample copy of one of such letter is attached as **Annexure – 7 in the main report**. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
ii.	The PP shall establish an environmental	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		In view of the information furnished by the PP, the stipulated condition is considered complied. **COMPLIED**
xx.	Roof should meet prescriptive requirements as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirements.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied Majority of the building envelops (including roofs) are constructed with ECBC compliant building materials having appropriate thermal insulation. It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xxi.	Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all air-conditioned spaces while it is aspirational for non-air-conditioned spaces by use of appropriate thermal insulation material to fulfil these requirement.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied Majority of the building envelops (including walls) are constructed with ECBC compliant building materials having appropriate thermal insulation. It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xxii.	The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of firefighting equipments, etc. as per National Building Code including protection measures from lightning etc.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied Mundra falls in seismic zone V. All the building structures are constructed to meet with the requirements of the applicable guidelines for safety. The same practice will continue in future also. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xxiii.	Regular supervision of	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>monitoring cell with all the potential polluting units as members to review the environmental monitoring data and suggest improvements.</td><td>Complied.

APSEZ has a well structured Environment Management Cell, staffed with qualified manpower for reviewing the environmental monitoring data and suggest improvements. Environment Management Cell organogram is attached as Annexure – 19 in the main report.

SEZ industries were visited to check measures taken for Energy Conservation, Water Conservation, Waste and Hazardous waste management and phase out plan of Ozone depleting substance during the compliance period. Various industries shared the data in line with above reference. Such supervision will be undertaken once in every six months. Please refer Annexure – 18 in the main report for a typical sample of the data collection sheet from an industry within SEZ.

It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>iii.</td><td>Treated effluent emanating from STP shall be recycled / reused to the maximum extent possible. Treatment of 100% grey water by decentralized treatment should be done. Discharge of unused treated effluent shall conform to the norms and standards of the Pollution Control Board. Necessary measures should be made to mitigate the odour problem from STP.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

APSEZ has total installed capacity of 5.6 MLD for treatment of effluent / sewage generated at various locations. Details regarding the same are mentioned below. The treated sewage from these decentralized units meets the norms stipulated by GPCB and it is used for gardening purpose.

<table>
<tr><th>Location</th><th>Capacity</th><th>Technology</th></tr>
<tr><td>CETP</td><td>2.5 MLD</td><td>Aerobic Digestion</td></tr>
<tr><td>Shantivan Colony STP</td><td>350 KLD</td><td>Aerobic Digestion</td></tr>
<tr><td>Shantivan Colony STP</td><td>250 KLD</td><td>Aerobic Digestion</td></tr>
<tr><td>Adani House STP</td><td>150 KLD</td><td>PVA Gel Technology</td></tr>
<tr><td>Samudra Township STP</td><td>2.0 MLD</td><td>MBR</td></tr>
<tr><td>Adani Hospital STP</td><td>30.0 KLD</td><td>Aerobic Digestion</td></tr>
<tr><td>Liquid Terminal ETP</td><td>265 KLD</td><td>Aerobic Digestion</td></tr>
<tr><td>West Port STP</td><td>55.0 KLD</td><td>FAB</td></tr>
</table>

CETP of 2.5 MLD capacity is also constructed in SEZ area (having a separate independent environmental clearance). Sewage generated from individual industry is treated by individual industry itself. However, some of the industries are giving their sewage to the CETP for treatment and final disposal. List of CETP member units discharging their sewage and</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>details regarding sewage characteristics are attached as Annexure – 8 in the main report.

The treated effluent from CETP confirms to the GPCB norms. Treated water is used for gardening / horticulture purpose within CETP premises and SEZ areas. Online monitoring system at the discharge point is provided to get the system alert in case of any deviation from discharge norms.

Assessment of treated sewage is being carried out by NABL accredited and MoEF&CC approved agency namely M/s. Pollucon Laboratories Pvt. Ltd. The summary of analysis results is mentioned below.

Treated Water Analysis (Frequency Twice in a Month)
<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit[$]</th></tr>
<tr><td>pH</td><td>--</td><td>7.28</td><td>6.56</td><td>6.5 – 8.5</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>26</td><td>14</td><td>100</td></tr>
<tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>20</td><td>12</td><td>30</td></tr>
<tr><td>Fecal Coliform</td><td>MPN/ 100 ml</td><td>920</td><td>84</td><td>< 1000</td></tr>
</table>
[$] as per CC&A granted by GPCB

Please refer Annexure – 11 in the main report for detailed analysis reports and accreditation certificate. Approx. INR 27.0 Lakh is spent for all environmental monitoring activities during the period FY 2017-18.

Greenbelt area developed around the treatment plants act as barrier for odour. In addition to this, regular supervision is done to ensure there is no odour problem from any of the treatment plants.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>iv.</td><td>The solid waste generated should be properly collected and segregated. Wet garbage should be composted and dry/inert solid waste should be disposed off to the approved sites for land filling after recovering recyclable material.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Waste Management – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste.

<u>Municipal Solid Waste</u>: A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, Glass etc. are then sent to respective recycling units, whereas</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>
remaining non-recyclable waste is bailed and sent to cement plant (M/s. Sanghi Industries Ltd.) for Co-processing as RDF (Refused Derived Fuel).

Hazardous Waste:
• E – Waste & Used Batteries are being sold to GPCB registered recyclers namely M/s. e-Processing House.
• Solid Hazardous Waste is being disposed through common facility i.e. M/s. Recycling Solutions Pvt. Ltd., Panoli and/or co-processing at Sanghi Industries Ltd., Kutch. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s.Western India Petrochem Industry, Bhavnagar.
• Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals.
• Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s.Western India Petrochem Industry, Bhavnagar and water is sent to ETP for further treatment. However during the compliance period, there was no disposal of Slope Oil.

The following table summarizes the waste management practice (for Oct'17 to March'18) for different types of wastes at APSEZ:
<table>
<tr><th>Waste</th><th>Quantity in MT</th><th>Disposal method</th></tr>
<tr><td colspan="3">Hazardous Waste</td></tr>
<tr><td>Pig Waste</td><td>5.4</td><td>Co-processing at common facility and/or cement industry</td></tr>
<tr><td>Tank Bottom Sludge</td><td>33.4</td><td>Co-processing at common facility</td></tr>
<tr><td>Oily Cotton waste</td><td>55.2</td><td>Co-processing at Cement Industry</td></tr>
<tr><td>Used / Spent Oil</td><td>86.1</td><td>Sell to GPCB approved recycler</td></tr>
<tr><td>Discarded Containers</td><td>8.7</td><td>Sell to GPCB approved recycler</td></tr>
<tr><td>E-Waste</td><td>2.32</td><td>Sell to GPCB approved recycler</td></tr>
<tr><td colspan="3">Municipal Solid Waste</td></tr>
<tr><td>Dry Waste</td><td>105.6</td><td>After recovery sent for recycling</td></tr>
<tr><td>Wet Waste</td><td>467.4</td><td>Converted to Manure for horticultural use</td></tr>
</table>

SEZ industries were visited to check measures taken for Energy Conservation, Water Conservation, Waste and Hazardous waste management and phase out plan of Ozone depleting substance during the compliance period. Various industries shared the data in line with above reference. Such supervision will be undertaken once in every six months. Please refer Annexure – 18 in the main report for a typical sample of the data collection sheet from an industry within SEZ.
</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>It may be noted that condition number xvi to xxi are imposed on all member industries coming up within the SEZ areas (as part of the Lease Deed agreement). The same practice will continue in future also. As suggested by RO, Bhopal during the site visit, an environment monitoring committee is formed which will ensure strict compliance of the stipulated conditions by individual industries.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>v.</td><td>Diesel power generating sets proposed as source of backup power for elevators and common area illumination during operational phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Low sulphur diesel should be used. The location of the DG sets may be decided in consultation with the Gujarat Pollution Control Board.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:

Complied
DG sets are being used only as power back up source in case of power failure. Presently, cumulative capacity of all DG sets installed at APSEZ is 4843 KVA. All the generators are of enclosed type. During the compliance period of Oct'17 to Mar'18, there was no instance of power failure hence it was not required to operate the DG sets. However, for the air and noise emission assessment, the DG sets were turned on. Assessment was carried out by NABL accredited and MoEF&CC approved agency namely M/s. Pollucon Laboratories Pvt. Ltd. The summary of analysis results is mentioned below.

<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit$</th></tr>
<tr><td>PM</td><td>mg/Nm^3</td><td>15.62</td><td>10.84</td><td>150</td></tr>
<tr><td>SO_2</td><td>ppm</td><td>4.53</td><td>2.46</td><td>100</td></tr>
<tr><td>NOx</td><td>ppm</td><td>31.72</td><td>26.69</td><td>50</td></tr>
</table>
$GPCB Permissible Limit

From the above results it can be inferred that the air and noise emissions are well within the stipulated norms. Please refer Annexure – 11 in the main report for detailed analysis reports and accreditation certificate. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the period of FY 2017-18.

All the DG sets are of low sulphur diesel type. Certificate showing Sulphur content in diesel is attached as Annexure – 13 in the main report. DG sets are being used in conformance to the EPA norms and proof for the same is attached as Annexure – 14 in the main report.

Heights of stacks are maintained as needed for the combined capacity of all attached DG Sets. Locations of the DG sets are checked by GPCB officials during the site visits. Details of all DG set stack heights are mentioned below.

<table>
<tr><th>Location</th><th>Capacity (KVA)</th><th>Stack height (m)</th></tr>
<tr><td>Sherkhariya gate</td><td>5</td><td>3</td></tr>
<tr><td>Sherkhariya gate</td><td>5</td><td>3</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Airstip</td><td>140</td><td>4</td></tr>
<tr><td>Airstip</td><td>125</td><td>4</td></tr>
<tr><td>BAROI ROAD</td><td>5</td><td>3</td></tr>
<tr><td>Airport road entry gate</td><td>5</td><td>3</td></tr>
<tr><td>Addi salt</td><td>5</td><td>3</td></tr>
<tr><td>Adani hospital</td><td>500</td><td>3.5</td></tr>
<tr><td>GMB road</td><td>5</td><td>3</td></tr>
<tr><td>East gate</td><td>30</td><td>4</td></tr>
<tr><td>MITAP substation</td><td>62.5</td><td>4</td></tr>
<tr><td>ROB</td><td>320</td><td>5</td></tr>
<tr><td>Zharpara fishermen corridor</td><td>5</td><td>3</td></tr>
<tr><td>Navinal fishermen corridor</td><td>5</td><td>3</td></tr>
<tr><td>109 culvert</td><td>5</td><td>3</td></tr>
<tr><td>Anupam Junction</td><td>5</td><td>3</td></tr>
<tr><td>West gate</td><td>30</td><td>3</td></tr>
<tr><td>MRSS</td><td>250</td><td>3</td></tr>
<tr><td>Agripark</td><td>125</td><td>3</td></tr>
<tr><td>Labour colony</td><td>100</td><td>3</td></tr>
<tr><td>WTP</td><td>380</td><td>4</td></tr>
<tr><td>Mundra guest house</td><td>15</td><td>3</td></tr>
<tr><td>Shantivan colony</td><td>750</td><td>3</td></tr>
<tr><td>Shantivan colony</td><td>250</td><td>3</td></tr>
<tr><td>Shantivan colony</td><td>5</td><td>3</td></tr>
<tr><td>STP plant shantivan</td><td>200</td><td>4</td></tr>
<tr><td>Adani public school</td><td>82.5</td><td>3</td></tr>
<tr><td>Wadhala farm house</td><td>30</td><td>3</td></tr>
<tr><td>Adani house</td><td>750</td><td>4</td></tr>
<tr><td>PUB Building</td><td>500</td><td>4</td></tr>
<tr><td>PMC stores</td><td>82.5</td><td>3</td></tr>
<tr><td>R&D yard</td><td>50</td><td>3</td></tr>
<tr><td>Near DG house(Adani house)</td><td>5</td><td>2.5</td></tr>
<tr><td>Near DG house(Adani house)</td><td>5</td><td>2.5</td></tr>
<tr><td>Near DG house(Adani house)</td><td>5</td><td>2.5</td></tr>
</table>
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED
</td></tr>
<tr><td>vi.</td><td>Noise should be controlled to ensure that it does not exceed the prescribed standards,</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>During night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.</td><td>Noise monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Oct'17 to Mar'18 is mentioned below.

Noise sampling locations & frequency: 5 nos. (once in a month)
<table>
<tr><th>Noise</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>73.4</td><td>45.9</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>68.4</td><td>41.8</td><td>70</td></tr>
</table>
$ as per NAAQ standards, 2009
Values recorded confirms to the stipulated standards.

Noise monitoring is being carried out on regular basis at stipulated frequencies. The analysis results are being closely observed for incremental pollution load. From the above results and past data, it can be inferred that the noise levels are well within the prescribed standards. All the analysis data collected are submitted to the concerned authorities as part of the six monthly compliance reports. The data is also submitted to GPCB on monthly basis as part of the online submission – Monthly Patrak.

Please refer Annexure – 11 in the main report for detailed analysis reports and accreditation certificates. Approx. INR 27.0 Lakh is spent for all environmental monitoring activities during the period FY 2017-18.

Following safeguard measures are taken for abatement of noise emissions.
• Development of greenbelt along the periphery of the storage yards/back up area
• D.G. Sets having Acoustic enclosures
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>vii.</td><td>Green belt of adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Being complied.

APSEZ has developed "Dept. of Horticulture" which is taking measures/ steps for terrestrial greening as well as mangrove plantation. Development of greenbelt at various locations within the SEZ is an ongoing activity. Green belt of 3 layer canopy will be developed as part of the development of SEZ.

The species such as Ficus Infectoria, Ficus religiosa, Terminalia arjuna, Cocos nucifera, Washingtonia fillifera, Casurina spp., Azadirachta Indica, Eucalyptus spp., Jatropha curacus, Ficus bengalensis, Subabool spp., Casia fistula, Date Palm and Delonix regia were grown in SEZ area.

Width of the green belt varies from 2 m to 8 m and density varies from 2000 to 2500 trees per hectare at various locations. Total 99.5 hectares of</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		land with approx. 2.2 Lacs trees is developed within SEZ area till date. So, far more than 400 ha. area is developed as greenbelt with plantation of more than 8.0 Lacs trees within the entire APSEZ area. Please refer **Annexure – 10 in the main report** for further details regarding greenbelt development and mangrove afforestation. An updated green belt development plan is also attached as part of the said annexure. Total expenditures of the horticulture dept. for the F.Y. 2017-18 periods are INR 607 lakh. It may be noted that individual industrial units will also developed the greenbelt within their premises based on their planning & approvals and new industries coming up any will also comply as per their approvals. The same will be ensured by the environment monitoring committee of APSEZ. For the area where further development is yet to be carried out, APSEZ will ensure that greenbelt with 3 layer canopy is developed by either APSEZ or the industrial unit to whom the land is allotted. **In view of the information furnished by the PP and as per the site observation of excellent greenbelt developed in the saline soils which is commendable, the stipulated condition is considered compliance in progress in light of the proposed phase-wise green belt development.** **COMPLIANCE IN PROGRESS**
viii.	Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Boundary walls are constructed in such a way by keeping weep holes for defined river path to facilitate free flow of water and it is ensured that water is not stagnant at any given point during rainy season. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
ix.	Rain water harvesting for roof run-off and surface run-off, as plan submitted should be implemented.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Ground water recharge may not yield good results due to close proximity to the sea coast. Hence, APSEZ has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Following measures are taken for the same during the year 2011 – 13 which have benefited to the local farmers. 1. Pond deepening activities at villages 2. 18 check dams were constructed under the 'Sardar Patel Sahbhagi

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Sr. No.	Conditions	Compliance Status as on 31-03-2018
		Jalsanchay Yojna' Total cost of these efforts was approx. INR 320 lakh. During FY 2017-18, pond deepening work in Mota Bhadiya, Vadala and Bhujpur villages was carried out. The total cost incurred for this work was INR 16.7 Lakhs. Adani foundation has started participatory ground water management project. The objective of the project was to reduce the salinity ingress in and around the coastal regions of Mundra, Kutchh and mitigate the ill-effects of this manmade problem to improve the livelihoods of the rural people. The Project will help to get water table high, also it will help in agricultural activities. – as part of this initiative, below listed activities are initiated: • Ground Water Recharge activities at Jharpara, Navinal, Siracha, Nana Kapaya and Baroi villages • Monitoring of 109 wells by sample collection and analysis of the same (analysis is under progress) to measure the quality of water For further details please refer **Annexure – 20 in the main report** for CSR report. It may be noted that the individual industrial units will also be encouraged for taking various initiatives for rainwater harvesting within their premises / in the villages around the SEZ area. **In view of the information furnished by the PP, the stipulated condition is considered complied subject to acceptance by EC issuing authority.** **COMPLIED SUBJECT TO ACCEPTANCE BY EC ISSUING AUTHORITY**
x.	The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Environment Monitoring is being carried out on regular basis in Port & SEZ areas through NABL accredited and MoEF&CC approved agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the ground water assessment for duration from Oct'17 to Mar'18 is mentioned below. **Bore Hole Water Sampling:** **Sampling locations & frequency: 4 nos. (every quarter)**

Sr. No.	Parameter	Unit	Max. Value	Min. Value
1	pH	--	8.12	6.93
2	Salinity	ppt	29.51	0.54
3	Oil & Grease	mg/L	4.40	1.06
4	Hydrocarbon	mg/L	BDL*	BDL*
5	Lead as Pb	mg/L	22.20	0.02
6	Arsenic as As	mg/L	BDL*	BDL*
7	Nickel as Ni	mg/L	0.18	0.18
8	Total Chromium as Cr	mg/L	0.022	0.003

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		9 Cadmium as Cd mg/L 0.17 0.01 10 Mercury as Hg mg/L BDL* BDL* 11 Zinc as Zn mg/L 2.74 0.02 12 Copper as Cu mg/L 50.40 0.03 13 Iron as Fe mg/L 16.30 0.04 14 Insecticides/Pesticides mg/L BDL* BDL* 15 Depth of Water Level from GL meter 2.84 1.70 *BDL = Below Detectable Limit From the above results it can be inferred that • The ground level in this area is saline in nature due to close proximity to the coast. • There is no threat to ground water quality by leaching of heavy metals and other toxic contaminants. Please refer **Annexure – 11 in the main report** for detailed analysis reports and accreditation certificates. Approx. INR 27 Lakh is spent for all environmental monitoring activities during the FY 2017-18 period. It may be noted that the analysis results of ground water quality are submitted to CGWB, West Central region, Ahmedabad. Copy of the last submission is attached as **Annexure – 21 in the main report.** **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xi.	Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. The entry and exit gates of SEZ and port are provided with ample parking area (210838 m^2) near the gate. The entry / exit complex is fully equipped with traffic control equipments and round the clock security is provided for seamless support. No public space is utilized for parking of the vehicle. Please refer **Annexure – 22 in the main report** for photographs and area demarcation. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xii.	A report on the energy conservation measures conforming to energy conservation norms finalized by Bureau of Energy Efficiency should be prepared incorporating details about building materials	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied Energy audit of port user buildings (including the details about building materials and technology etc.) is carried out once in three years. Last energy audit was done during Oct-2016. Report of the same is submitted to Chief Electrical officer, Gandhinagar. The said report was submitted to MoEF&CC, RO, Bhopal as part of the compliance report for the period Apr – Sept, 2017. Recommendations of the report are attached as **Annexure –**

2713

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	& technology, R & D Factors etc. and submitted to the Ministry along with six monthly monitoring report.	**23 in the main report**. Some of the recommendations of these reports have already been implemented as follows. • Saving in PAC by overhauling with repairing damage fall ceiling and window curtain • Saving with Improving Power Factor • APFC Panel has already been installed and average PF maintained during last 2 months comes to 0.987 • The system voltage at load end is being maintained 230V and therefore there is no need to install AVC **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xiii.	Energy conservation measures like installation of CFLs/TFLs for the lighting the areas outside the building should be an integral part of the project design and should be in place before project commissioning. Used CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines / rules of the regulatory authority to avoid mercury contamination. Solar panels may be used to the extent possible.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied Energy Conservation through Installation of Motion Sensor (Occu switch) & AC Temp. controls in few of the buildings are provided. Measures for energy conservation are incorporated at design stage. Few of the buildings in MSTPL are designed as green building. Some features of the same are as below. • Used fly ash based cement and bricks • Special types of glasses were used which gives maximum sunlight and less heat • VOC free paint used certified by CII (Certificate of Indian Industries) • Water flow reducer installed in the entire building CFL / LED lighting are being used at various common areas of SEZ. Used CFL are collected and sent for recycling through authorized e-waste collection agency. APSEZ installed & commissioned 1.5 MW roof top solar plant at residential township. Additional 1.7 MW roof top solar plants at the various locations of SEZ area are ready for commissioning. Please refer **Annexure – 24 in the main report** showing the photographs of the same. It may be noted that the individual industrial units will also be encouraged for taking various initiatives with respect to energy conservation (such as energy audit, installation of renewable energy sources, utilization of energy efficient fixtures etc.) **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xiv.	Adequate measures	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td>should be taken to prevent odour problems from solid waste processing plant and STP.</td><td>Bhopal on 14.05.2018 submitted the following:
Complied

5R principals are adopted for sustainable waste management at APSEZ. Utmost care is being taken during the waste management and sewage /effluent treatment to ensure that there is no odour generation. Proper secondary treatment and disinfection is provided to the domestic sewage and treated sewage and then it is utilized for horticulture purpose. These measures ensure that odor problem is not created in the surrounding area. Furthermore, greenbelt on the periphery of the treatment plant as well as waste management sites help to prevent odour problems.

In view of the information furnished by the PP and as per the site observation during the visit to STP located in township area, the stipulated condition is considered complied.

COMPLIED</td></tr>
<tr><td>xv.</td><td>The buildings should have adequate distance between them to allow movement of fresh air and passage of natural light, air and ventilation.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Presently, all the buildings have adequate distance between them to allow movement of fresh air and passage of natural light, air and ventilation. The same practice will be continued in future also.

It may be noted that the individual industrial units will also be encouraged for consideration of these design parameters.

In view of the information furnished by the PP and as per the site observation, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>xvi.</td><td>The environmental safeguards contained in the EIA Report should be implemented in letter and spirit.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

All the environmental safeguards contained in the EIA report are implemented in letter and spirit.

In view of the information furnished by the PP and as per detailed compliance furnished below, the stipulated condition is considered complied.
COMPLIED
<table>
<tr><th>Suggested Measures</th><th>Compliance Status</th></tr>
<tr><td>Construction Phase:</td><td></td></tr>
<tr><td>Air Environment</td><td></td></tr>
<tr><td>Water sprinkling in vulnerable areas</td><td>Water sprinkling on road and other construction area as well as on</td></tr>
</table></td></tr>
</table>

2715

Sr. No.	Conditions	Compliance Status as on 31-03-2018	
			construction materials is being carried out on regular bases.
		Enforce proper maintenance of vehicles and construction equipment. Allowing only PUC approved vehicles in the site.	Please refer Condition No. ix of Part-B (General Conditions Construction phase) of EC and CRZ Clearance.
		Enforce usage of covered trucks for transport of construction material.	Covered trucks are being used for handling of construction materials.
		Noise Environment	
		Enforce proper maintenance of vehicles and construction equipment. Enforce use of earmuffs / earplugs to workers in high noise level areas.	The vehicles of on-going construction work enter inside the premises after the fitness check. Ear protection device is provided to workers in high noise areas.
		Water Environment	
		Provide temporary drinking water supply and proper sanitation facilities within the site	Provision of drinking water and sanitation facility is being provided.
		Land / Soil Environment	
		Proper disposal of construction debris at regular intervals	Construction debris is being kept at identified temporary storage area and is being utilized for area development.
		Thermal Environment	
		Enforce (i) use of Portland Pozzalano Cement / (ii) use of Portland Slag Cement / (iii) use fly ash as admixture in construction	Part of fly ash generated from Adani Power Limited, Mundra is being utilized by Adani Group to manufacture paver blocks and the same paver blocks are used for development of back up area, footpath, colonies area, parking area, approach road etc. Please refer Condition No. xi of Part-B (General Conditions: Construction phase) of EC and CRZ Clearance.
		Energy	
		Wherever possible, piping shall be along the natural topography to permit gravity flow. Else, energy efficient pumps shall be used. Pipe material shall be such as to minimize friction losses. Wherever possible, natural light	Energy efficient pumps and HDPE Pipelines are used for supply of utilities. Refer point no. xii of EC & CRZ Clearance in Part – B (Operation Phase) for energy efficient electrical

Sr. No.	Conditions	Compliance Status as on 31-03-2018	
		shall be used. Energy efficient electrical fittings and fixtures shall be used.	fittings. Few of the buildings in MSTPL are designed as green building.
		Operation Phase:	
		Land / Soil Environment	
		Good quality non-corrosive type pipeline should be used. Regular checking of the pipelines for early detection of any possible leakage and damage. Regular ground water monitoring should be done within the SEZ.	HDPE pipelines are used for supply of utility. Regular visual surveillance along the utility lines corridor is being done to check leakage or damage. Third party analysis of the ground water is being carried out at every three month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Please refer Condition No. v of Part-B (General Conditions: Construction phase) of EC and CRZ Clearance.
		The waste should be transported in covered trucks. Vermi-composting is highly recommended for treatment and disposal of biodegradable and kitchen wastes. Other domestic solid waste (garbage) shall be disposed through MSW facility or as per prevailing norms.	Please refer Condition No. iv of Part-B (General Conditions: Construction phase) of EC and CRZ Clearance.
		The waste should be transported in covered trucks. Transporter should be informed of remedial measures required to be taken in case of spillage of waste	Waste handling vehicles are being handled through covered trucks only. Details were submitted along with last compliance report submission i.e. Apr'17 to Sep'17.
		Socio-Economic Environment	
		It will encourage development of surrounding areas & further generate employment. People from various cultures shall mingle encouraging a more tolerant society.	Please refer Condition No. vii of Annexure – A (Compliance Status of MoEF & CC Order dated 18.09.2015).
xvii.	Adequate drinking water facility be provided.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied.	

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>Drinking water facility at approx. 200 locations within APSEZ area is provided.

In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>xviii.</td><td>Incremental pollution loads on the ambient air quality, noise and water quality should be periodically monitored after commissioning of the project.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Environment Monitoring (air, noise, water, soil) is being carried out on regular basis in Port & SEZ areas through NABL accredited and MoEF&CC approved agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the assessment for duration from Oct'17 to Mar'18 is mentioned below.

Air sampling locations & frequency: 8 nos. (twice a week) & Noise sampling locations & frequency: 5 nos. (once in a month)
<table>
<tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit$</th></tr>
<tr><td>PM_{10}</td><td>$\mu g/m^3$</td><td>98.3</td><td>40.2</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>$\mu g/m^3$</td><td>56.6</td><td>12.4</td><td>60</td></tr>
<tr><td>SO_2</td><td>$\mu g/m^3$</td><td>28.6</td><td>5.3</td><td>80</td></tr>
<tr><td>NO_2</td><td>$\mu g/m^3$</td><td>45.1</td><td>9.6</td><td>80</td></tr>
<tr><th>Noise</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>73.4</td><td>45.9</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>68.4</td><td>41.8</td><td>70</td></tr>
</table>
$ as per NAAQ standards, 2009
Values recorded confirms to the stipulated standards.

Following safeguard measures are taken for abatement of dust and noise emissions.
• Regular sprinkling on road and other open area
• Regular cleaning of roads
• Development of greenbelt along the periphery of the storage yards/back up area
• D.G. Sets having Acoustic enclosures

<u>Bore Hole Water Sampling:</u>
Sampling locations & frequency: 4 nos. (every quarter)
<table>
<tr><th>Sr. No.</th><th>Parameter</th><th>Unit</th><th>Max. Value</th><th>Min. Value</th></tr>
<tr><td>1</td><td>pH</td><td>--</td><td>8.12</td><td>6.93</td></tr>
<tr><td>2</td><td>Salinity</td><td>ppt</td><td>29.51</td><td>0.54</td></tr>
<tr><td>3</td><td>Oil & Grease</td><td>mg/L</td><td>4.40</td><td>1.06</td></tr>
<tr><td>4</td><td>Hydrocarbon</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
<tr><td>5</td><td>Lead as Pb</td><td>mg/L</td><td>22.20</td><td>0.02</td></tr>
<tr><td>6</td><td>Arsenic as As</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
<tr><td>7</td><td>Nickel as Ni</td><td>mg/L</td><td>0.18</td><td>0.18</td></tr>
<tr><td>8</td><td>Total Chromium as Cr</td><td>mg/L</td><td>0.022</td><td>0.003</td></tr>
<tr><td>9</td><td>Cadmium as Cd</td><td>mg/L</td><td>0.17</td><td>0.01</td></tr>
<tr><td>10</td><td>Mercury as Hg</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2018

11	Zinc as Zn	mg/L	2.74	0.02
12	Copper as Cu	mg/L	50.40	0.03
13	Iron as Fe	mg/L	16.30	0.04
14	Insecticides/Pesticides	mg/L	BDL*	BDL*
15	Depth of Water Level from GL	meter	2.84	1.70

*BDL = Below Detectable Limit

Soil Sampling:

Sampling locations & frequency: 4 nos. (Half Yearly)

Sr. No.	Parameter	Unit	Max. Value	Min. Value
1	pH	--	8.15	7.41
2	Nitrogen as N	%	0.0088	0.0045
3	Phosphorus as P	mg/kg	680	134
4	Potassium as K	mg/kg	52	16
5	Baron as B	mg/kg	3.2	2.1
6	Calcium as Ca	mg/kg	1220	55
7	Magnesium as Mg	mg/kg	1456	6
8	Iron as Fe	%	0.53	0.24
9	Moisture	%	14.8	10.4
10	Organic Matter	%	0.069	0.023
11	CEC	meq/100 gm	8.1	5.9
12	TVC	CFU/gm	2.2 x 10-6	4.0 x 10-7
Heavy Metal				
13	Cadmium as Cd	mg/kg	4.70	1.92
14	Thorium as Th	mg/kg	BDL*	BDL*
15	Antimony as Sb	mg/kg	BDL*	BDL*
16	Arsenic as As	mg/kg	BDL*	BDL*
17	Lead as Pb	mg/kg	30.6	17.8
18	Chromium as Cr	mg/kg	18.2	15.4
19	Cobalt as Co	mg/kg	2.2	0.9
20	Copper as Cu	mg/kg	12.6	10.1
21	Nickel as Ni	mg/kg	136	64
22	Manganese as Mn	mg/kg	490	88
23	Vanadium as V	mg/kg	12.6	7.6

*BDL = Below Detectable Limit

From the above results it can be inferred that

- The ground level in this area is saline in nature due to close proximity to the coast.
- There is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.
- There is no leaching of heavy metals and other toxic contaminants through soil.

Such environmental monitoring is being carried out on continuous basis at stipulated frequencies. The analysis results are being closely observed for incremental pollution load. From the above results and past data, it can be inferred that the emission levels are well within the prescribed standards. All the analysis data collected are submitted to the concerned authorities as part of the six monthly compliance reports. The data is also submitted to GPCB on monthly basis as part of the online submission – Monthly Patrak.

Please refer **Annexure – 11 in the main report** for detailed analysis reports and accreditation certificates. Approx. INR 27.0 Lakh is spent for all environmental monitoring activities during the period FY 2017-18.

In view of the information furnished by the PP, the stipulated

Sr. No.	Conditions	Compliance Status as on 31-03-2018
		condition is considered complied. **COMPLIED**
xix.	Application of solar energy should be incorporated for illumination of common areas, lighting for gardens and street lighting in addition to provision for solar water heating. A hybrid system or fully solar system for portion of the apartments should be provided.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. APSEZ installed & commissioned 1.5 MW roof top solar plant at residential township. Additional 1.7 MW roof top solar plants at the various locations of SEZ area are ready for commissioning. Entire solar system installations are connected with the grid. Please refer **Annexure – 24** in the main report showing the photographs of the same. It may be noted that the individual industrial units will also be encouraged for taking various initiatives with respect to energy conservation (such as energy audit, installation of renewable energy sources, utilization of energy efficient fixtures etc.) **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
xx.	Ozone depleting substance (Regulation & Control) Rules should be followed while designing the air conditioning system of the project.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. APSEZ is not procuring air conditioning systems which use ozone depleting gases. All the HVAC systems are with Ozone friendly gases within APSEZ. All new air conditioning systems installed, if any, will be designed in line with Ozone depleting substance (Regulation & Control) Rules. It may be noted that the individual industrial units will also be encouraged to follow Ozone depleting substance (Regulation & Control) Rules while designing the air conditioning system of the project. The same will be implemented by individual unit as per project suitability **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
12	Officials from the Regional Office of MOEF, Bhopal who would be monitoring the implementation of environmental safeguards should be given full cooperation,	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Full support is always extended to officers of regulatory authorities (including MoEF&CC and GPCB) visiting the project site. The documents as per their requirements are provided to them.

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	facilities and documents / data by the project proponents during their inspection. A complete set of all the documents submitted to MoEF should be forwarded to the CCF, Regional Office of MOEF, Bhopal.	The communication documents like application Form – 1, ToR received from MoEF&CC, Final EIA report, Public Hearing proceedings and recommendations of GCZMA are submitted to MoEF&CC, RO, Bhopal for necessary records.. **In view of the information furnished by the PP and as per the site observation, the stipulated condition is considered complied.** **COMPLIED**
13	In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Ministry.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and agreed. **In view of the submission by the PP, the stipulated condition is noted and agreed for compliance by the PP.** **NOTED AND AGREED**
14	The Ministry reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provision of the Environmental (Protection) Act, 1986, to ensure effective implementation of the safeguard measures in a time bound and satisfactory manner.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and agreed. **In view of the submission by the PP, the stipulated condition is noted and agreed for compliance by the PP.** **NOTED AND AGREED**
15	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponent from the respective competent authorities.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Not Applicable at present. The mentioned approvals are not applicable to APSEZ since we are the infrastructure support provider. However, the applicable approvals will be availed by the individual member industries prior to construction of work. The environment management committee will ensure strict adherence to the condition by the individual industries. **In view of the submission by the PP, the stipulated condition is considered not applicable to PP.** **COMPLIANCE NOT APPLICABLE TO PP**
16	These stipulations would	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.	Bhopal on 14.05.2018 submitted the following: Point noted and agreed. **In view of the submission by the PP, the stipulated condition is noted and agreed for compliance by the PP.** **NOTED AND AGREED**
17	The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Clearance and copies of clearance letters are available with the Gujarat Pollution Control Board and may also be seen on the website of the Ministry of Environment and Forests at http://www.envfor.nic.in. The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bhopal.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Already complied. Not applicable at present. APSEZ has advertised Environmental and CRZ Clearance in two local newspapers "The Indian Express" (in English language) and "Kutch Mitra" (in vernacular language) on 24.07.14 (within 10 days from the date of receipt of the clearance letter) and copy of the same was submitted vide letter dated 05.08.2014 to Ministry of Environment, Forests & Climate Change, Bhopal. Copy of the said letter is attached as **Annexure – 25 in the main report**. **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
18	Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No. 460 of 2004 as may be applicable to this	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and agreed. **In view of the submission by the PP, the stipulated condition is noted and agreed for compliance by the PP.** **NOTED AND AGREED**

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	project.	
19	Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Point noted and agreed. **In view of the submission by the PP, the stipulated condition is noted and agreed for compliance by the PP.** **NOTED AND AGREED**
20	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parishad/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Already complied. Not applicable at present. Copy of clearance letter was sent to concerned Panchayats, Zilla Parishad, Urban Local Body, Local NGOs and from whom suggestion/representation received. Typical proof of the same is attached as **Annexure – 26 in the main report**. Clearance letter is also put up on the website of the Adani ports https://www.adaniports.com/ports-downloads **In view of the information furnished by the PP, the stipulated condition is considered complied.** **COMPLIED**
21	The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.	Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following: Complied. Compliance report of EC conditions is uploaded regularly. Last compliance report including results of monitoring data for the period of Apr'17 to Sep'17 was submitted to Regional Office of MoEF&CC @ Bhopal, Zonal Office of CPCB @ Baroda, GPCB @ Gandhinagar & Gandhidham and Dept. of Forests & Env., Gandhinagar vide our letter dated 22.11.2017. Copy of the same is also available on our web site https://www.adaniports.com/ports-downloads. A soft copy of the same was also submitted through e-mail on 15.12.2017 to all the authorities. Please refer below for the details regarding past six compliance submissions.

Sr. no.	Compliance period	Date of submission
1	Apr'15 to Sep'15	30.11.2015
2	Oct'15 to Mar''16	30.05.2016
3	Apr'16 to Sep'16	01.12.2016
4	Oct'16 to Mar'17	30.05.2017
5	Apr'17 to Sep'17	01.12.2017
6	Oct'17 to Mar'18	01.05.2018

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2018</th></tr>
<tr><td></td><td></td><td>In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>22</td><td>The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Compliance report of EC conditions is uploaded regularly. Last compliance report including results of monitoring data for the period of Apr'17 to Sep'17 was submitted to Regional Office of MoEF&CC @ Bhopal, Zonal Office of CPCB @ Baroda, GPCB @ Gandhinagar & Gandhidham and Dept. of Forests & Env., Gandhinagar vide our letter dated 22.11.2017. Copy of the same is also available on our web site https://www.adaniports.com/ports-downloads. A soft copy of the same was also submitted through e-mail on 15.12.2017 to all the authorities. Please refer below for the details regarding past six compliance submissions.

<table>
<tr><th>Sr. no.</th><th>Compliance period</th><th>Date of submission</th></tr>
<tr><td>1</td><td>Apr'15 to Sep'15</td><td>30.11.2015</td></tr>
<tr><td>2</td><td>Oct'15 to Mar''16</td><td>30.05.2016</td></tr>
<tr><td>3</td><td>Apr'16 to Sep'16</td><td>01.12.2016</td></tr>
<tr><td>4</td><td>Oct'16 to Mar'17</td><td>30.05.2017</td></tr>
<tr><td>5</td><td>Apr'17 to Sep'17</td><td>01.12.2017</td></tr>
<tr><td>6</td><td>Oct'17 to Mar'18</td><td>01.05.2018</td></tr>
</table>
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
<tr><td>23</td><td>The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environmental (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the</td><td>Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted the following:
Complied.

Environmental statement for each financial year is submitted to GPCB. The same for the FY ending 31.03.2018 in Form-V is submitted to GPCB vide our letter dated 10th May, 2018. Acknowledge copy of the same is attached as Annexure – 27. Copy of the same is also available on our web site https://www.adaniports.com/ports-downloads. A soft copy of the same was also submitted through e-mail to all the authorities vide e-mail dated 06.06.2018.
In view of the information furnished by the PP, the stipulated condition is considered complied.
COMPLIED</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2018
	respective Regional Offices of MoEF by e-mail.	

A. Sumary Note for Waterfront Development Project (WFDP)

i. Implementation of Conditions:

Out of 31 total conditions, it may be seen that 22 are fully complied, 1 is agreed to comply, 3 are compliance not applicable to PP, 1 is partly complied, 2 are compliance in progress, 1 is complied subject to condition and 1 is noted and agreed. These have been explained in the foregoing compliance report against each of the conditions, and the PP needs to take necessary and time bound action for early compliance in respect of the relevant conditions.

ii. Court Cases and show cause/closure notices:

Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted that there are two court cases pending against the project (details below) and no show cause /closure notices have been issued by GPCB over the past 3 years.

Court cases:

There are two ongoing matters pending (one pending at High Court and other pending at Supreme Court). Details regarding both the matters including their status are mentioned below:

1) Kheti Vikas Seva Trust (an association of 200 villagers) has filed a writ petition dated 24th January 2011 before the Gujarat HC against the state of Gujarat, our Company, Adani Power Limited and others alleging that the power plant set up by Adani Power Limited, on the land allotted to our Company for the setting up of a special economic zone, is in violation of the necessary requirements for setting up such plants, including environmental laws. The writ petition has been dismissed by the Gujarat High Court on 17th April 2015. The Hon'ble Supreme Court of India on 18.3.2016 dismissed the appeal against the said order dated 17th April, 2015 of the Gujarat High Court.

   However, an application filed by the petitioner alleging non-compliance of an order of the Gujarat HC dated 12th July 2011 prohibiting the cutting of mangroves and other forests during the pendency of the petition without permission of the state forest and environment department in relation to the writ petition is still pending.

2) Pravinsingh Bhurabha Chauhan filed a public interest litigation by way of a writ petition before the High Court of Gujarat alleging that a certain plot of land known as 'Mor Dhuva' was not allotted to our Company and accordingly that our Company should be restrained from carrying out any activity, including ship recycling activities, without any prior permission or authorization in and around sand dunes including 'Mor Dhuva' in Tunda and Vandh villages, Kutch, Gujarat. In view of the affidavits filed by MOEF, and Govt of Gujarat the High Court dismissed the petition on 18.2.2015. The petitioner filed a special leave to appeal before the Supreme Court of India, challenging the order dated 18.2.2015 of Gujarat High Court and the same is pending.

2725.

B. Summary note for Multi Product SEZ, Desalination, Sea Water Intake, Outfall Facility and Pipeline project:

i. Implementation of Conditions:

Out of 77 total conditions, it may be seen that 59 are fully complied, 2 is agreed to comply, 3 are compliance not applicable to PP, 4 are complied subject to acceptance by MoEFCC, New Delhi, 5 are noted and agreed, 3 are compliance in progress, 1 is complied subject to needful amendment in EC by EC issuing authority. These have been explained in the foregoing compliance report against each of the conditions, and the PP needs to take necessary and time bound action for early compliance in respect of the relevant conditions and the general observations mentioned below.

ii. General Observations

Greenbelt needs to be further strengthened at individual industry level (located within the SEZ), which shall be reviewed Monitoring Committee constituted at SEZ level.

iii. Court Cases and show cause/closure notices:

Project Proponent vide letter dated 11.05.2018 received in MOEF&CC, RO Bhopal on 14.05.2018 submitted that there are two court cases pending against the project (details below) and one show cause notice have been issued by GPCB over the past 3 years (details below):

Court cases:

There are two ongoing matters pending (one pending at High Court and other pending at Supreme Court). Details regarding both the matters including their status are mentioned below:

1) Kheti Vikas Seva Trust (an association of 200 villagers) has filed a writ petition dated 24th January 2011 before the Gujarat HC against the state of Gujarat, our Company, Adani Power Limited and others alleging that the power plant set up by Adani Power Limited, on the land allotted to our Company for the setting up of a special economic zone, is in violation of the necessary requirements for setting up such plants, including environmental laws. The writ petition has been dismissed by the Gujarat High Court on 17th April 2015. The Hon'ble Supreme Court of India on 18.3.2016 dismissed the appeal against the said order dated 17th April, 2015 of the Gujarat High Court.
   However, an application filed by the petitioner alleging non-compliance of an order of the Gujarat HC dated 12th July 2011 prohibiting the cutting of mangroves and other forests during the pendency of the petition without permission of the state forest and environment department in relation to the writ petition is still pending.
2) Pravinsingh Bhurabha Chauhan filed a public interest litigation by way of a writ petition before the High Court of Gujarat alleging that a certain plot of land known as 'Mor Dhuva' was not allotted to our Company and accordingly that our Company should be restrained from carrying out any activity, including ship recycling activities, without any prior permission or authorization in and around sand dunes including 'Mor Dhuva' in Tunda and Vandh villages, Kutch, Gujarat. In view of the affidavits filed by MOEF, and Govt of Gujarat the High Court dismissed the petition on 18.2.2015. The petitioner filed a special leave to appeal before the Supreme Court of India, challenging the order dated 18.2.2015 of Gujarat High Court and the same is pending.

Show cause notices:

Sr. No.	Date of Show Cause Notice issued	Reason	Our Reply / Compliance	Reply submitted vide letter dated
1	01.12.2017	1. Resisted the Natural flow of River by providing of dredging material in Kevadi River 2. Diverted the Naturalflow of River	1. APSEZ has developed 3 culverts on the river Kevli to maintain the flow of the river and thus flow of the river is nowhere blocked. 2. Dredged material is used to provide proper bund so as to maintain the natural flow of Kevli River. No diversion of the Natural flow of River is made, rather it is channelized to meet main stream of Bhukhi River.	13.12.2017

GHvcchary

(Dr.H.V.C. Chary Guntupalli)
Scientist-D

adani

APSEZL/EnvCell/2019-20/015 **Date:** 20.05.2019

To

Additional Principal Chief Conservator of Forests (C),
Ministry of Environment, Forest and Climate Change,
Regional Office (WZ), E-5, Kendriya
Paryavaran Bhawan, Arera Colony,
Link Road No. – 3, Bhopal – 462 016.
E-mail: rowz.bpl-mef@nic.in

Sub : Half yearly Compliance report of Environment Clearance under CRZ notification for "Port expansion project including dry/break bulk cargo container terminal, railway link and related ancillary and back-up facilities at Mundra Port, Dist. Kutch in Gujarat by M/s. Adani Ports & SEZ Limited."

Ref : Environment clearance under CRZ notification granted to M/s Adani Ports & SEZ Limited vide letter dated 20th September, 2000 bearing no. J-16011/40/99-IA.III

Dear Sir,

Please refer to the above cited reference for the said subject matter. In connection to the same, it is to state that copy of the compliance report for the Environmental and CRZ Clearance for the period of October – 2018 to March – 2019 has been submitted through mail communication and acknowledge of the same is attached here for your records.

Thank you,
Yours Faithfully,
For, **M/s Adani Ports and Special Economic Zone Limited**

Avinash Rai
Chief Executive Officer
Mundra & Tuna Port

Encl: As above
Copy to:

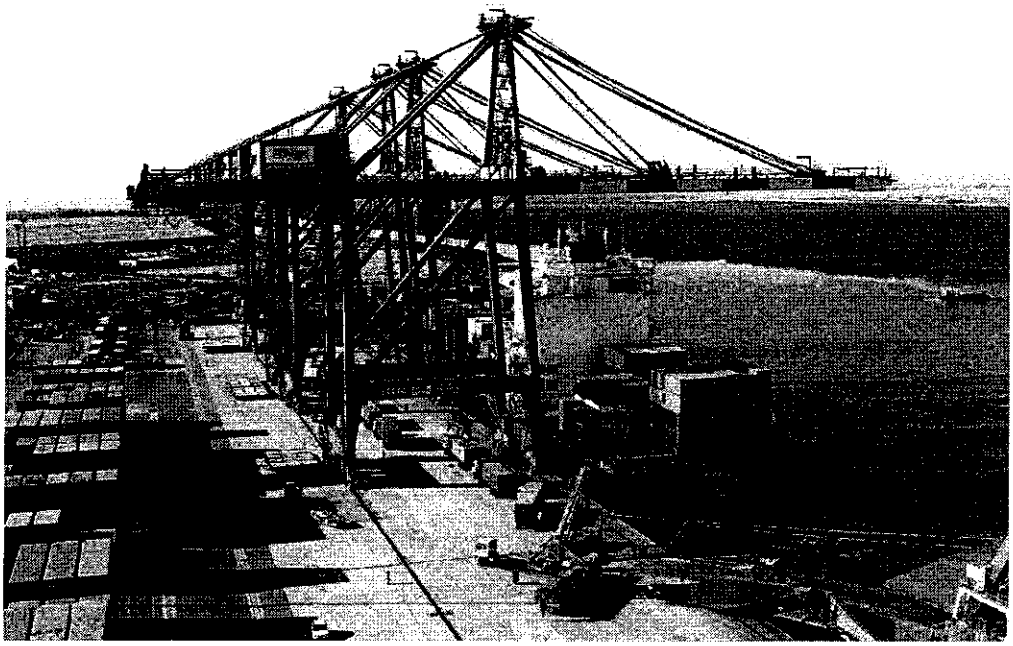
1) The Director (IA Division), Ministry of Environment, Forests & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110003
2) Zonal Officer, Regional Office, CPCB – Western Region, Parivesh Bhawan, Opp. VMC Ward Office No. 10, Subhanpura, Vadodara – 390 023
3) Member Secretary, GPCB – Head Office, Paryavaran Bhavan, Sector 10 A, Gandhi Nagar – 382 010
4) Deputy Secretary, Forests & Environment Department, Block – 14, 8th floor, Sachivalaya, Gandhi Nagar – 382 010
5) Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham, 370201

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

adani

Environmental Clearance Compliance Report



Port Expansion Project including Dry/Break Bulk Cargo Container Terminal, Railway Link and related Ancillary and Back-up facilities at Mundra Port, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited

For the Period of:
October – 2018 to March – 2019

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19
Status of the conditions stipulated in Environment Clearance under CRZ notification		

Index

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Compliance Report

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

Status of the conditions stipulated in Environment Clearance under CRZ notification

Half yearly Compliance report of Environment Clearance under CRZ notification for "Port expansion project including dry/break bulk cargo container terminal, railway link and related ancillary and back-up facilities at Mundra Port, Dist. Kutch in Gujarat vide letter no. J-16011/40/99-IA.III dated 20th September, 2000"

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2019</th></tr>
<tr><td colspan="3">A. Specific Condition</td></tr>
<tr><td>i</td><td>All the conditions stipulated by the Gujarat Pollution Control Board vide their NOC No. PC/NOC/Kutch/391/18424 dated 10.6.99 and No. PC/NOC/Kutch/222(2)16880 dated 1.5.99 shall be strictly implemented.</td><td>Complied.

Consent to Establish (CtE) and Consent to Operate (CtO) is obtained and renewed/amended from time to time as per the progress of the project activity. The present in-force CTE & CtO summaries are as below.

<table>
<tr><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr>
<tr><td>CtO – Renewal</td><td>Mundra Port Terminal</td><td>AWH-83561</td><td>20.11.2021</td></tr>
<tr><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>WH-88317</td><td>20.11.2021</td></tr>
<tr><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>GPCB/CCA-Kutch -39(5)/ ID-17739/473575</td><td>20.11.2021</td></tr>
<tr><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>H-98086</td><td>20.11.2021</td></tr>
</table>

Copy of the updated/amended CC&A was submitted as part of compliance report for the duration of Apr'17 to Sep'17.

Copy of updated / amendment in CtO are attached as Annexure – 1.</td></tr>
<tr><td>ii</td><td>The conditions stipulated in the letter No ENV-1098-6477-PI dated October 28, 1999 and No. ENV-1099-2702-PI dated 27.12.99 of shall be strictly implemented.</td><td>Complied.

Point wise compliance report of CRZ recommendations issued vide letter No ENV-1098-6477-PI dated October 28, 1999 and No. ENV-1099-2702-PI dated 27.12.99 is enclosed as Annexure- A.</td></tr>
<tr><td>iii</td><td>The turning circle should be increased from 550 m to 600 m.</td><td>Complied.
Construction activities are completed and project is in operation phase.</td></tr>
<tr><td>iv</td><td>A girdle canal with settlement tanks shall be provided around the coal storage area.</td><td>Not applicable at present.
Coal handling is not practiced at project site.</td></tr>
</table>

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2019
v	All efforts shall be made for water conservation and rain water harvesting. Arrangements shall be made for roof top rain water harvesting from various structures.	Complied. Under the Water Conservation and Optimization Drive at APSEZ, various initiatives were taken for conservation of water such as, 1. 100% utilization of treated water for horticultural purpose. 2. Total 128 Water-free urinals are installed and in operation within APSEZ. 3. Recirculation of water from fixed firefighting system to reservoir through flexible pipe during testing of firefighting system. 4. Conservation of Condensate from Air Conditioner and use for gardening. 5. Water flow reducers (total 8740 nos.) are provided in taps of Adani House, Tug Berth, CT2, CT3 & CT4 buildings to reduce the water consumption and are in use. 6. Water Maker machine is installed near Tug Berth jetty which generates drinking water from atmospheric moisture. The capacity of this machine is 250 liters per day. 7. Attending leakages and damages of water lines at various locations of APSEZ. Above initiative have saved substantial amount of water consumption. Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rain water within project area is managed through storm water drainage. During current year approx. 24 KL of rain water from storm water collected and utilized on land for gardening / plantation purpose. We have also connected roof top rain water duct of operational building (Tug Berth Building within MPT) with u/g water tank for utilization of collected rain water for gardening / horticulture purpose. Photograph showing roof top rain water harvesting system is attached as **Annexure – 2.** However, APSEZ has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Following measures are taken for the same during the

Sr. No.	Conditions	Compliance Status as on 31-03-2019
		year 2011 – 13 and the same have benefited to the local farmers. 1. Pond deepening activities at villages 2. 18 check dams were constructed under the 'Sardar Patel Sahbhagi Jalsanchay Yojna' Total cost of these efforts was approx. INR 320 lakh. Under Sujlam Suflam project Adani Foundation has successfully completed pond deepening work in Mundra & Abdasa Taluka in record time. 26 pond deepening in Mundra and 7 pond deepening in Abdasa accomplished with all parameters calculated. In Mundra taluka 51723 cum excavation work has been done which increase storage capacity of 51 ML. In Naliya taluka 14550 cum excavation work has been done which increase storage capacity of 15 ML. Total 66 ML storage capacity will be increased. **Participatory Ground Water Management:** Adani foundation has started participatory ground water management project. The objective of the project was to reduce the salinity ingress in and around the coastal regions of Mundra, Kutchh and mitigate the ill-effects of this manmade problem to improve the livelihoods of the rural people. The Project will help to get water table high, also it will help in agricultural activities. As a part of pre monsoon activities with ACT (Arid Communities and Technologies – NGO) under this program, we have carried out following work. But, due to negligible rainfall we are not able to find out outcome of this project. i. Borana – Artificial bore well recharge (work completed) ii. Mangara – Artificial bore well recharge (work completed) iii. Dhrub – Pond deepening work (work completed) iv. Mota Kapaya – abended bore well recharge (work completed) Please refer **Annexure – 3** of detailed CSR activity report for more details upon participatory ground water management initiatives and ground water recharging

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2019</th></tr>
<tr><td></td><td></td><td>activities in surrounding villages.</td></tr>
<tr><td>vi</td><td>To obviate the problem of coastal erosion due to dredging, the setback distance of at least 50 m from the Chart Datum line of Bocha island would be maintained.</td><td>Complied.

During Maintenance dredging in this area, it is ensured that at least 50 m distance is maintained.</td></tr>
<tr><td>vii</td><td rowspan="2">The dredged material shall be disposed of only in the identified locations outside the CRZ area. While dumping the dredged material, sufficient distance should be ensured from the existing mangroves so that there is no damage to the ecology. During dumping of dredged material the mitigative measures as suggested by NIO shall be implemented. It shall be ensured that there is no dumping of dredged material in the CRZ.</td><td>Complied.

Capital dredging is completed and only maintenance dredging is being carried out, if required.

Dredged material generated by maintenance dredging is used for level rising. The measures recommended by NIO are implemented.

In order to ensure no damage to marine ecology Marine water & sediment monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Oct'18 to Mar'19 is mentioned below.

Total Sampling Locations: 09 Nos.
<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Surface</th><th colspan="2">Bottom</th></tr>
<tr><th>Max</th><th>Min</th><th>Max</th><th>Min</th></tr>
<tr><td>pH</td><td>--</td><td>8.37</td><td>8.07</td><td>8.24</td><td>8.03</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>382</td><td>182</td><td>364</td><td>218</td></tr>
<tr><td>BOD (3 Days @27 °C)</td><td>mg/L</td><td>12.8</td><td>3.0</td><td>5.0</td><td>2.0</td></tr>
<tr><td>DO</td><td>mg/L</td><td>6.8</td><td>6.0</td><td>6.8</td><td>5.6</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>35.7</td><td>33.9</td><td>36.0</td><td>3.0</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>36734</td><td>34327</td><td>37434</td><td>34218</td></tr>
</table>
The results depict that there is no damage to the marine ecology.

Please refer Annexure – 4 for detailed analysis reports. Approx. INR 20.36 Lakh is spent for all environmental monitoring activities during the FY 2018-19.</td></tr>
<tr><td>viii</td><td>The mangrove afforestation shall be</td><td>Complied.</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	undertaken at the identified sites and the progress report in this regard shall be submitted to this Ministry regularly. All the recommendations suggested in the NIO report for restoration of the coastal habitat by mangrove afforestation at Navinal island shall be strictly implemented.	All construction activities are completed and project is in operation phase since long time. 24 hectare of mangrove afforestation was carried out at identified sites in consultation with Dr Maity, (Mangrove Consultant of India). Green belt was developed in 78.87 ha. Total 159197 trees were planted with the density of 1993 trees per hectare within the port area. To enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in more than 2850 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 832 lakh. So, far APSEZ has developed more than 455 ha. area as greenbelt with plantation of more than 8.3 Lacs saplings within the APSEZ area. Details on mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as **Annexure – 5**.
ix	No ground water shall be withdrawn for this project.	Complied. Present source of water for various project activities is desalination plant of APSEZ and/or Narmada water through Gujarat Water Infrastructure Limited. Average water consumption for entire APSEZ area is 4.2 MLD during compliance period i.e. Oct'18 to Mar'19.
x	The project proponent shall ensure that the construction workers do not cut the Mangroves for fuel wood etc.	Complied. All construction activities are completed and project is in operation phase since long time.
xi	The project proponent shall ensure that no creeks are blocked and the natural drainage of the area is not affected due to project activities.	Complied. Prominent creek system (main creeks and small branches of creeks) in the study region are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river) All above creeks are in existence allowing free flow of water and there is no filling or reclamation of any creek area. APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Apart from that three RCC Bridges have been constructed over Kotdi creek with total length of 230 m at the cost of INR 10 Crores. Photographs of the same were attached as part of compliance report for the

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2019
		duration of Apr'17 to Sep'17.
xii	The project proponent shall ensure that there will be no disposal of sludge and sewage generated from construction camps, surface run-off from construction sites, and oil and grease spillage from the construction equipment's in the creeks.	Complied. Project is in operation phase. Sewage generated from port is being treated in designated STP and treated sewage is used for horticulture purposes. **Location** / **Capacity** / **Quantity of Wastewater (Avg. from Oct'18 to Mar'19)** / **Type of ETP / STP** LT / 265 KLD / 99 KLD / Activated Sludge Third party analysis of the treated water is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Oct'18 to Mar'19 is mentioned below. **Parameter** / **Unit** / **Max** / **Min** / **Perm. Limit$** pH / -- / 8.4 / 7.1 / 6.5 to 8.5 TSS / mg/L / 72 / 25 / 100 TDS / mg/L / 1921 / 1024 / 2100 COD / mg/L / 94 / 68 / 100 BOD (3 Days @27°C) / mg/L / 26 / 18 / 30 $ as per CC&A granted by GPCB Please refer **Annexure – 4** for detailed analysis reports. Approx. INR 20.36 Lakh is spent for all environmental monitoring activities during the FY 2018-19.
xiii	The project proponent shall stick to the time bound program submitted to the Department of Environment, Government of Gujarat for the proposed activities including installation of desalination plant for meeting the entire water requirement. They shall coordinate their construction/operations	Complied. Desalination plant has already been installed as per time bound program and is in use. Details regarding water consumption are mentioned in Sr. no. ix above.

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	schedule with the installation schedule of desalination plant.	
xiv	The project proponent shall ensure that the commercial fisheries are not hampered due to presence of barges, vessels and other activities in the region. Necessary plan in this regard shall be prepared in consultation with the NIO and submitted within 3 months.	Complied. No commercial fisheries are prevailing in this area except Pagadia and fishermen with small boats. Unhindered access is provided to the fishing boats. During project proposal, APSEZ proposed to provide four (4) dedicated accesses at Juna Bandar, Luni, Bavdi Bandar and Zarpara for the fishermen to approach the sea for fishing activity. However, during construction as well as operation, through fishermen consultative process, APSEZ has provided seven (7) access roads. Total length of all the approach roads is approx. 23 Kms and expenditure involved was Rs. 637 Lacs. There is no hindrance to the movement of fisherman boats. Details of the same were submitted along with last EC Compliance report for the period Apr'18 to Sep'18.
xv	The project proponent shall bear the cost of the external agency that may be appointed by the Department of Environment, Government of Gujarat for carrying out the supervision and/or the monitoring of the construction activities.	Complied. Construction activities are completed and project is in operation phase. As part of the directions given by MoEF&CC vides order dated 18th Sep, 2015, following studies were proposed. • NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around has been submitted to the concerned authorities i.e. MoEF&CC, New Delhi and GCZMA, Gandhinagar vide our letter dated 04.06.2018 and details of the same were submitted along with last EC Compliance report for the period Apr'18 to Sep'18. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. Total cost of the study is approx. INR 1.3 cr. which is financed by APSEZ. The study is recently concluded and the final report is submitted vide our letter dated 30.04.2018 to GCZMA and MoEF&CC for their consideration. Details of the same were submitted along with last EC Compliance report for the period

Sr. No.	Conditions	Compliance Status as on 31-03-2019
		Apr'18 to Sep'18.
xvi	The project proponent shall carry out the post-project monitoring of various environmental parameters in consultation with the Department of Environment, Government of Gujarat and Gujarat Pollution Control Board.	Complied. Monitoring of various environmental parameters for Ambient Air, Noise, Wastewater, ground water, marine water and sediments along with the parameters mentioned in the consent order issued by GPCB is being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Monitoring reports for the period from Oct'18 to Mar'19 are enclosed as **Annexure – 4**.
xvii	The project proponent shall prepare the detailed traffic control management plan for the port and shall participate in the VTMS to be developed for the Gulf of Kachchh.	Complied. APSEZ is practicing well defined traffic control procedure. A VTS service for Gulf of Kutch is operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India. APSEZ is practicing well defined traffic control procedure. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel-77. Arrival and departure information in Gulf of Kutch is provided to VTS information cell through an agent or directly by sending an e-mail to vtsmanagergulfofkutch @yahoo.com and vtsgok@yahoo.com.
xviii	Action plan shall be prepared by the project proponents to prevent damage to marine life and also to the coastline in case of any oil spillage and the same shall be strictly implemented. Regular mock drills shall be carried out to ensure fitness of the equipment in place.	Complied. Oil spill contingency response plan updated on 01.10.2018 is in place and implemented. Copy of updated plan is enclosed as **Annexure – 6**. A Joint Inspection of Port Oil Spill Response (OSR) capability by Indian Coast Guard (ICG), Gujarat Maritime Board (GMB) & Oil Industry Safety Directorate (OISD) was held on 13 Feb 2018 at APSEZ. The final assessment rating was given as "Very Satisfactory." Mock drills are conducted regularly. Latest mock drill was conducted on 25.08.2018 for overflow of bunkers from vessel during inter tank transfer. Report was submitted along with last EC Compliance report for the period Apr'18 to Sep'18.

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2019
xix	The project proponents shall work out the maximum quantity of spilled material, which can find its way into the coastal waters, under different accident scenarios, and their impact on aquatic life shall be studied after clearly demarcating the impact zones. On the basis of such studies, the necessary action plan to mitigate the likely impacts shall be prepared before commencement of the operations. Action taken report in this regard shall be submitted to the Ministry.	Complied. Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Based on the oil spill modeling study, it has been observed that crude oil spill of 700 tons (Tier-I) will spread over an area having radius of around 400 m within 4hr. APSEZ already has facilities for combating a Tier-1 spill. Recommendations of Marine EIA by NIO with respect to pollution emergency contingency plan for Multipurpose Terminal, Container, Dry & Break Bulk Terminal as well as associated facilities are addressed in Oil Spill Response Plan. This action plan prepared by APSEZ to combat the oil spill (LOS-DCP) is in accordance with the NOS DCP, International Petroleum Industry Environmental Conservation Association (IPIECA). A Joint Inspection of Port Oil Spill Response (OSR) capability by Indian Coast Guard (ICG), Gujarat Maritime Board (GMB) & Oil Industry Safety Directorate (OISD) was held on 13 Feb 2018 at APSEZ. The final assessment rating was given as "Very Satisfactory." The copy of updated Oil Spill Contingency Response Plan is attached as **Annexure – 6**.
B. General Condition		
i	Construction of the proposed structures should be undertaken meticulously conforming to the existing Central / local rules and regulations. All the construction designs / drawings relating to the proposed construction activities must have approvals of the concerned	Already complied. Not applicable at present. All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification. Approval under the preview of GMB, PESO and Factories act were taken prior to start of construction.

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2019</th></tr>
<tr><td></td><td>State Government Departments / Agencies.</td><td></td></tr>
<tr><td>ii</td><td>The proponent shall ensure that as a result of the proposed constructions ingress of the saline water into the ground water does not take place. Piezometers shall be installed for regular monitoring for this purpose at appropriate locations on the project site.</td><td>Complied.

To monitor the ground water quality, bore wells are provided at various location in the port and SEZ areas. Third party analysis of the ground water is being carried out twice a year by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Oct'18 to Mar'19 is mentioned below. Monitoring Reports are attached as Annexure – 4 for the same.

Number of Sampling Locations: 5
<table>
<tr><th>Parameter</th><th>Unit</th><th>Minimum</th><th>Maximum</th></tr>
<tr><td>pH</td><td>-</td><td>7.42</td><td>8.14</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>1.26</td><td>17.33</td></tr>
<tr><td>Oil & Grease</td><td>mg/L</td><td>2</td><td>2.4</td></tr>
<tr><td>Hydrocarbon</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
<tr><td>Lead as Pb</td><td>mg/L</td><td>0.031</td><td>0.96</td></tr>
<tr><td>Arsenic as As</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
<tr><td>Nickel as Ni</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
<tr><td>Total Cromium as Cr</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
<tr><td>Cadmium as Cd</td><td>mg/L</td><td>0.014</td><td>0.058</td></tr>
<tr><td>Mercury as Hg</td><td>mg/L</td><td>BDL*</td><td>BDL*</td></tr>
<tr><td>Zinc as Zn</td><td>mg/L</td><td>0.072</td><td>2.1</td></tr>
<tr><td>Copper as Cu</td><td>mg/L</td><td>0.84</td><td>0.92</td></tr>
<tr><td>Iron as Fe</td><td>mg/L</td><td>0.25</td><td>9.8</td></tr>
<tr><td>Insecticides/Pesticides</td><td>--</td><td>Absent</td><td>Absent</td></tr>
<tr><td>Depth of Water Level from GL</td><td>meter</td><td>0.9</td><td>1.05</td></tr>
</table>
*BDL = Below Detectable Limit

Approx. INR 20.36 Lakh is spent for all environmental monitoring activities during the FY 2018-19.</td></tr>
<tr><td>iii</td><td>A comprehensive contingency plan in collaboration with the concerned authorities must be formulated to contain in case of any oil spills. Appropriate devices</td><td>Complied.

Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Updated Oil Spill Contingency Response Plan is enclosed as Annexure – 6.</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2019</th></tr>
<tr><td></td><td>such as oil skimmer, oil monitor, oil water separator must be acquired for strengthening the contingency plan. All the service vessels that required for oil spill operations must be equipped with booms and dispersants. The personal onboard of these vessels must be properly trained in operation of these booms and dispersants.</td><td>Shoreline Resources available with APSEZ, for deployment during shoreline cleanup/ emergent situation:

<table>
<tr><th>Item</th><th>Quantity</th></tr>
<tr><td>Oil Spill Dispersants</td><td>40250 ltr.</td></tr>
<tr><td>Absorbent pads</td><td>1000</td></tr>
<tr><td>Portable dispersant storage tank: 1000 ltr. capacity</td><td>1 no.</td></tr>
<tr><td>Portable pumps</td><td>2 nos.</td></tr>
<tr><td>Oil discharge hose, 3", 2 x 10 m</td><td>1 set</td></tr>
<tr><td>Rachet belt (Eco make)</td><td>10 nos.</td></tr>
<tr><td>Tool box (Eco)</td><td>6 nos.</td></tr>
<tr><td>Tanker Trucks</td><td>04 nos.</td></tr>
<tr><td>Mini Vacuum Pump (30 m3 / hr)</td><td>02 nos.</td></tr>
<tr><td>Slurry Pump (60 m3 / hr)</td><td>01 no.</td></tr>
</table>

11 Dolphin tugs are fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required; out of them 10 Dolphin Tugs are fitted with a fire curtain and remote controlled fire monitors.

IMO module course organized by Maritime Training Institute is conducted & 36 personnel have achieved IMO level 1 & 4 personnel have achieved IMO Level 2. Different training modules as Oil Spill, Oil Spill Equipment, Notification exercise, Incident are conducted at different frequency.

Detail of resource available at APSEZL is provided in annexure 3 of Oil Spill Contingency Plan.</td></tr>
<tr><td>iv</td><td>The operation plan for responding to an oil spill must include clear procedures for notification of a spill, response decision, cleanup operations, communications, and termination of cleanup operations, cleanup cost, oil pollution, damage control and disaster management plan.</td><td>Complied.

Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Updated Oil Spill Contingency Response Plan is enclosed as Annexure – 6.

Oil Spill Contingency Plan includes procedures for notification of a spill as point no 7.1, response strategy as Point no. 3.0, cleanup operations, Cleanup cost and termination of cleanup in point no. 3.5, communications in point no. 6.0.</td></tr>
</table>

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

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Sr. No.	Conditions	Compliance Status as on 31-03-2019
v	A well-equipped laboratory with suitable instruments to monitor the quality of air and water shall be set up so as to ensure that the quality of ambient air and water conforms to the prescribed standards. The laboratory will also be equipped with qualified manpower including a marine biologist so that the marine water quality is regularly monitored in order to ensure that the marine life is not adversely affected as a result of implementation of the said project. The quality of ambient air and water shall be monitored periodically in all the seasons and the results should be properly maintained for inspection of the concerned pollution Control agencies. The periodic monitoring reports at least once in 6 months must be sent to this Ministry as well as its Regional Office at Bhopal.	Being complied Site is provided with environment monitoring equipment with sufficient & competent staff of Third Party laboratory accredited by NABL & MoEF&CC. Ambient Air Quality (twice in a week) and Noise (once in a month) monitoring are being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Oct'18 to Mar'19 is mentioned below. **Total Ambient Air & Noise Sampling Locations: 4 Nos.** **Parameter** | **Unit** | **Max** | **Min** | **Perm. Limit$** PM_{10} | $\mu g/m^3$ | 99.6 | 50.2 | 100 $PM_{2.5}$ | $\mu g/m^3$ | 59.2 | 20.4 | 60 SO_2 | $\mu g/m^3$ | 27.5 | 6.6 | 80 NO_2 | $\mu g/m^3$ | 46.6 | 13.6 | 80 **Noise** | **Unit** | **Max** | **Min** | **Perm. Limit** Day Time | dB(A) | 74.1 | 56.0 | 75 Night Time | dB(A) | 72.3 | 57.4 | 70 $ as per NAAQ standards, 2009 Values recorded confirms to the stipulated standards Sewage generated from port is being treated in designated STPs and treated sewage is used for horticulture purposes. Third party analysis of the treated water is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of the same for duration from Oct'18 to Mar'19 is provided above in point No. xii (specific conditions). <u>Marine Monitoring:</u> Summary of the marine water monitoring for duration from Oct'18 to Mar'19 is provided above in point No. vii (specific conditions) Adani group has appointed a marine biologist Mr. Shivanagouda Sanagoudra to monitor marine water quality. Also the third party monitoring of the Marine

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2019</th></tr>
<tr><td></td><td></td><td>water is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. who has marine biologist to ensure that the marine water quality do not adversely affects the marine life. Monitoring Reports are attached as Annexure – 4 for the same. Approx. INR 20.36 Lakh is spent for all environmental monitoring activities during the FY 2018-19.

Compliance report of EC conditions is uploaded regularly. Last compliance report including results of monitoring data for the period of Apr'18 to Sep'18 was submitted to Regional Office of MoEF&CC @ Bhopal, Zonal Office of CPCB @ Baroda, GPCB @ Gandhinagar & Gandhidham and Dept. of Forests & Env., Gandhinagar vide our letter dated 23.11.2018. Copy of the same is also available on our web site https://www.adaniports.com/ports-downloads. A soft copy of the same was also submitted through e-mail on 30.11.2018 to all the authorities. Please refer below for the details regarding past six compliance submissions.
<table>
<tr><th>Sr. no.</th><th>Compliance period</th><th>Date of submission</th></tr>
<tr><td>1</td><td>Oct'15 to Mar"16</td><td>30.05.2016</td></tr>
<tr><td>2</td><td>Apr'16 to Sep'16</td><td>01.12.2016</td></tr>
<tr><td>3</td><td>Oct'16 to Mar'17</td><td>30.05.2017</td></tr>
<tr><td>4</td><td>Apr'17 to Sep'17</td><td>01.12.2017</td></tr>
<tr><td>5</td><td>Oct'17 to Mar'18</td><td>29.05.2018</td></tr>
<tr><td>6</td><td>Apr'18 to Sep'18</td><td>30.11.2018</td></tr>
</table></td></tr>
<tr><td>vi</td><td>Adequate provision for infrastructure facilities such as water supply, fuel for cooking, sanitation etc. must be provided for the laborers during the construction period in order to avoid damage to the environment. Colonies for the laborers should not be located in the CRZ area. It should also be ensured that the construction workers do not cut trees including mangroves for fuel wood purpose.</td><td>Already complied. Not Applicable at present.

Construction Activity is already completed. Adequate infrastructure facilities as mentioned in the condition were provided during construction phase.

The facility for drinking water, toilet and rest shelter are provided for the dignity of operation labours.

Photographs of the same were provided along with the compliance submission for the duration of Oct'16 to Mar'17.</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2019
vii	To prevent discharge of sewage and other liquid wastes in to the water bodies, adequate system for collection and treatment of the wastes must be provided. No sewage and other liquid wastes without treatment should be allowed to enter into the water bodies. The quality of treated effluents, emissions, solid wastes and noise levels must confirm to the standards laid down by the competent authority including the Central/State Pollution Control Board.	Complied. Adequate pipelines are provided to ensure the collection and treatment of effluent. Raw sewage is collected from 30 different collection pits at APSEZ locations through browsers and is transferred to ETP/STPs for treatment. Sewage generated from port is being treated in designated ETP/STPs and treated sewage is used for horticulture purposes. No treated water is discharged into the water bodies. Summary of treated effluent for the duration from Oct'18 to Mar'19 is provided in Specific Condition No. xii above. Third party analysis of the treated water, Flue Gas, Ambient Air and Noise is being carried out regularly by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Summary of six monthly monitoring of Flue gas emission is provided below. **Total Nos. of Stacks: 16 Nos.** **Parameter** | **Unit** | **GPCB Limit** | **Min** | **Max** PM | mg/Nm^3 | 150 | 14.28 | 24.62 SO_2 | ppm | 100 | 2.93 | 6.68 NO_x | ppm | 50 | 23.70 | 39.45 Six monthly reports of flue gas emissions for duration from Oct'18 to Mar'19 are attached as **Annexure – 4.** Summary of Ambient Air and Noise for duration from Oct'18 to Mar'19 is provided in general condition No. v above. **Waste Management** – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste. **Municipal Solid Waste**: A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for

Sr. No.	Conditions	Compliance Status as on 31-03-2019
		compost manufacturing and/or biogas generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, Glass etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plant (M/s. Sanghi Industries Ltd., Kutch and/or M/s. Ambuja Cement Ltd., Kodinar) for Co-processing as RDF (Refused Derived Fuel). **Hazardous Waste:** • E – Waste & Used Batteries are being sold to GPCB registered recyclers namely M/s. e-Processing House. • Solid Hazardous Waste is being disposed through co-processing through common facility i.e. M/s. Saurshtra Enviro Projects Pvt. Ltd., Bhachau and/or cement industries of Sanghi Industries Ltd., Kutch and/or Ambuja Cement Ltd., Kodinar. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s. Western India Petrochem Industry, Bhavnagar. • Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals. • Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s. Western India Petrochem Industry, Bhavnagar and water is sent to ETP for further treatment. However during the compliance period, there was no disposal of Slope Oil. Details of permissions / agreements of hazardous waste authorized vendors were submitted along with last EC Compliance Report for the period Apr'18 to Sep'18.

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<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2019</th></tr>
<tr><td></td><td></td><td>The following table summarizes the waste management practice (for Oct'18 to Mar'19) for different types of wastes at APSEZ:
<table>
<tr><th>Type of Waste</th><th>Quantity in MT</th><th>Disposal method</th></tr>
<tr><td colspan="3">Hazardous Waste</td></tr>
<tr><td>Pig Waste</td><td>5.87</td><td rowspan="4">Co-processing at cement industries</td></tr>
<tr><td>Tank Bottom Sludge</td><td>21.59</td></tr>
<tr><td>Oily Cotton waste</td><td>66.22</td></tr>
<tr><td>ETP Sludge</td><td>5.21</td></tr>
<tr><td>Used / Spent Oil</td><td>92.03</td><td rowspan="2">Sell to registered recycler</td></tr>
<tr><td>Discarded Containers</td><td>8.72</td></tr>
<tr><td colspan="3">Municipal Solid Waste</td></tr>
<tr><td>Recyclables</td><td>92.26</td><td>After recovery sent for recycling</td></tr>
<tr><td>Refuse Derived Fuel</td><td>178.24</td><td>Co-processing at Cement Industries</td></tr>
<tr><td>Wet Waste (Food waste + Organic waste)</td><td>188.44 (Manure) & 1938 Cum (Biogas)</td><td>Converted to Manure for Horticulture use / Biogas for cooking purpose</td></tr>
</table></td></tr>
<tr><td>viii</td><td>Appropriate facility should be created for the collection of solid and liquid wastes generated by the barges/vessels and their safe treatment and disposal should be ensured to avoid possible contamination of the water bodies.</td><td>Complied.
Ships berthing at Mundra Port comply with MARPOL regulations.
Waste reception facility provided at port collects Solid waste (i.e. Garbage) from vessels and collected waste is being sorted at Material Recovery Facility & it is sent for recycling.
No discharge such as bilge wastes, sewage or any other liquid wastewater is allowed into marine environment inside port limits and APSEZ does not receive sewage/liquid waste from ship.
Oily sludge (a mixture of oil, water and dirt) is disposed through authorized recycler / re-processor.
As a general practice APSEZ provide facility for receiving slop oil from vessels through hose connection with oil tankers. These tankers divert slop oil to Oil water separator system where water and oil particles are separated. Separated oil is being sold to authorized recycler /re-processor. However, no slope oil was received during the compliance period.</td></tr>
<tr><td>ix</td><td>Necessary navigational aids such as channel markers should be provided to prevent accidents.</td><td>Complied.

Navigational aids such as buoys and leading lights have been provided. The rules and regulation of the port</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	Internationally recognized safety standards shall be applied in case of barge /vessel movements.	contributes to the safe, efficient and environmentally responsible handling of shipping traffic. The international rules of IMO, such as SOLAS convention and its amendments and national regulations are in force at APSEZ, Mundra. **APPLICABLE REGULATION** ➢ Port Security Law (ISPS) ➢ Indian Port Act ➢ Gujrat Maritime Board Act 1981 ➢ Navigational Safety Port Committee (NSPC) ➢ All relevant international rules and regulations on MARPOL, Load lines etc.
x	During operation phase proper precautions should be taken to avoid any oil spills and no oily wastes shall be discharged into the water bodies.	Complied. Proper precautions are taken to avoid any oil spills during operation such as pressure checks of oil transfer lines and manual watch during oil cargo transfer. Available mechanisms to avoid oil spills are identified as below <u>At liquid terminal:</u> • Immediate shut off valve from vessel and shore. • Periodical testing of lines • Immediate suction of material by pump. • Emergency operation shut down. <u>At Marine Operations:</u> • Scupper plug, dip tray, absorbent pad, saw dust is provided to address confined spillage/leakage. <u>At Container Terminals:</u> • Leak cart is available for collect spilled chemical. • Spill control materials in place. • Oil drums are stored in covered shed where pellets are used. Tray provided to collection of spillage/leakage if occurred. No oily waste is discharged to water bodies. Oily waste or oil contaminated waste is being disposed as mentioned in General Condition no. vii above.
xi	The project authorities should take appropriate community development and welfare measures for	Complied. APSEZ is actively working with local community around the project area and provides required support for their

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<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31-03-2019</th></tr>
<tr><td></td><td>the villagers in the vicinity of the project site, including drinking water facilities. A separate fund should be allocated for this purpose.</td><td>livelihood and other concerns through the CSR arm – Adani Foundation.

Brief information about activities in the main five persuasions is mentioned below. Please refer Annexure – 3 for full details of CSR activities carried out by Adani Foundation in the Mundra region.
<table>
<tr><th>Area</th><th>Activity</th></tr>
<tr><td>Community Health</td><td>• The Adani Foundation runs two mobile health care units. Main objective of Mobile Van is to reduce travel time, hardships and expenses. Two mobile health care units cover 34 villages and 05 fishermen settlements. Around 109 types of general and lifesaving medicines are available in these units. Total patient was treated under this scheme during the year 2018-19: 19092 Nos. & 22256 Nos. through Rural Clinic
• During the year 2018-19, total 10161 transactions were done by 8599 card holders of 66 villages of Mundra Taluka and they received cash less medical services under this project. The limit for the beneficiary was set to 30000/- within a period of 3 years.
• Total 10161 OPDs were given medical treatment in various villages through rural dispensaries.
• During this year, anthropometry study done for 6548 children. under "Suposhan" Project. Additionally, 965 FGD were conducted during this year.
• During the year 2018-19, Specialty camps were organized and 4384 Patients were benefitted.
<table>
<tr><th>Project Details</th><th>Beneficiaries (Nos.)</th><th>Remarks</th></tr>
<tr><td>Mobile Van</td><td>19092</td><td>OPD Numbers</td></tr>
<tr><td>Rural Clinic</td><td>22256</td><td>OPD Numbers</td></tr>
<tr><td>Senior Citizen</td><td>10161</td><td>Transactions</td></tr>
<tr><td>Medical Camps</td><td>4384</td><td>Patients</td></tr>
<tr><td>Awareness Sessions</td><td>987</td><td>Participants</td></tr>
<tr><td>Needy Patients Support</td><td>1022</td><td>OPD/IPD</td></tr>
<tr><td>Shakti Raksha Project</td><td>624</td><td>Breast n cervix Cancer</td></tr>
<tr><td>Dialysis</td><td>5</td><td>Patients (2 times a week)</td></tr>
<tr><td>Suposhan</td><td>17025</td><td>Mundra and Bitta</td></tr>
</table></td></tr>
<tr><td>Sustainable Livelihood – Fisher folk</td><td>• Average 123 KL of water was supplied to 1086 households from different settlements on a daily basis under Machhimar Shudhh Jal Yojana.
• Adani Foundation constructed four Balwadis for kids between the age group of 2.5 years to 5 years at different settlements under Vidya Deep Yojana.
• Participatory scholarship support for fisherman children studying in SMJ high school Luni and to above 12th standards Students. 80 percentage support given by Adani foundation and 20 percentage support by parents!
• RTG Crane Operator: 03 Fisherman Youth</td></tr>
</table></td></tr>
</table>

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			• Dori Work & Mud Work Training: **65 Women** • Mangrove Plantation, moss cleaning, etc.: **6261 Man-days.** • In addition to this, employment worth of **35787 man-days** has been provided till date. The Foundation has also supported Pagadiya fishermen as painting labours by providing them with employment and job in various fields. • Total average **560 fishermen** were benefitted by Mobile Dispensary during last half year. Adani Foundation has extended financial assistance to more than **114 financially challenged patients** from the Fisher Folk Community in case of medical urgency during this year. • The project for the senior citizens is popularly known as Vadil Swasthya Yojana and till date **350 senior citizens** from fisher folk community are enrolled in the scheme. **Fisherman Amenities work** 391 Students : Education Support 134 Stunners : Adani Vidya Mandir 16 Fisherman : Alternate livelihood 78 Fisherwomen : Linkages for schemes 1312 Fisherman : Community Engagement 1086 Fisherman : Potable water provision 6261 Mandays : Mangroves Plantation 231 Fisherman : Capacity Building
		Education	• Adani foundation adopted **17 government school** located at Mundra Taluka under the project **'UTTHAN'** a drive of quality education. • To motivate children for schooling by providing the welcome kit / education kit and to create conducive children for " joyful learning" Environment for children for Learning during shala Praveshotsav Govt. has wide spread network of 111 Govt. primary schools in total **62 villages of Mundra Taluka, 3 villages of in Anjar taluka, YMC school, AVMB and two villages of Mandvi Taluka (118 Schools)** every year on an average **2550 to 2700** children gets enrolled in 1st std in Taluka **For 2018-2019 total 2300 children** got enrolled & Adani foundation provided the "Enrollment kit" to all new enrollee in Taluka • Total **3270 educational institutes** has visited Adani Port, Adani Power & Adani Wilmar and **236032 beneficiaries** of the project till date and **33932 beneficiaries** during current year. • Along with quality education, the school also focuses on providing nutritious food, uniforms and other services to the children for free. Currently, **387 students**, from Std. 1 to Std. 10 are studying in the Adani Vidya Mandir. Out of these **134 children** come from the fisher folk community. **Beneficiaries Details** 2598 Students : 17 Schools Utthan 2300 Enrollment Kit : 118 Schools 704 Students : Dignity of Workforce 345 Mothers : Mother's meet

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Sr. No.	Conditions	Compliance Status as on 31-03-2019
		<table><tr><td></td><td>↓ 5542 Students : 116 Institute Udaan ↓ 387 Students : Adani Vidya Mandir ↓ 206 Teachers : Guruvandana- I,II,III,IV</td></tr><tr><td>Rural Infrastructure</td><td>• Under Dignity of Drivers Project, Adani Foundation has constructed Resting Shed for Drivers entering in SEZ Premises. Total **50 beds** are constructed, drinking water and sanitation plus recreational – TV Facilities. • Adani Foundation has constructed **45 Toilet block** and proper bathing place for labours. • **Work Completed** ↓ Road repairing various vasahat ↓ Open shed at Juna Bandar ↓ Sand Filling plot at JUNA BANDAR ↓ Concrete Step ladder at Juna Bandar ↓ House construction at Shekhadia ↓ Two approach road 5000 meter Zarpara Fishermen and 5000 meter Luni Pagadiya ↓ Drinking water storage tank 5000 ltr capacity bavdi Bandar -2, Juna Bandar -2, Kutdi Bandar -1 ↓ water pipe line installation at Wandi village 2000meter. ↓ Basic amenities at Rampar Village Paver block 6000 LTR Storage tank and Boundary wall at community place. ↓ Additional civil work in community hall ↓ Open shed Gundiyali ↓ Boundary wall in common place at Tragadi.</td></tr><tr><td>Skill Development</td><td>• Soft skill training – 362 Nos. • Technical Training – 1457 Nos.</td></tr></table> Budget for CSR Activity for the FY 2018-19 is to the tune of INR 1697 lakh. Out of which, Approx. INR 1624 lakh are spent during the year.
xii	The quarrying material required for the construction purpose shall be obtained only from the approved quarries / borrow areas. Adequate safeguard measures shall be taken to ensure that the overburden and rocks at the quarry site does not find their way into water bodies.	Not applicable at present. Construction activities are completed. No such activity is carried out during the compliance period of Oct'18 to Mar'19.
xiii	The dredging operations, if any, to be undertaken with the prior approval of this Ministry, shall be executed with appropriate safeguard measures to prevent turbidity conditions in	Complied Capital dredging is completed and only maintenance dredging is being carried out, if required. Dredged material generated by maintenance dredging is

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	consultation with the expert agencies such as CWPRS / NIO.	used for level rising. The measures recommended by NIO are implemented.
xiv	For employing unskilled, semi-skilled and skilled workers for the project, preference shall be given to local people.	Complied • Adani Skill Development Center (ASDC), Mundra is providing skill development training to the locals for Soft Skill, Technical Training and Carrier Guidance & knowledge based training. • During this year Total 1819 people is given various trainings to enhance socio economic development. Out of which 1294 People are getting employment or Self Employment and average income up to Rs. 5200 per month. Digital literacy training is very helpful in coordinating with today's Digital world. • ASDC-Baroi (Mundra):- Adani skill development Center (ASDC) launched 'SAKSHAM' center at Baroi guest house in Mundra on 16th June 2018 to provide skill development training to youth in the Mundra. An initiative of Adani foundation, the center in the Mundra city will benefit about more than 500 candidates every year in Beauty & Wellness course. • Preference is given to local people for employment based on their qualification and experience. • All Mangrove plantations are done in consultation with GUIDE and Local forest dept. • 24 hectare of mangrove afforestation at Mundra was done through active participation of local fishermen at the cost of INR 25.0 Lac. • During this compliance period, the foundation provided employment to the fishermen equivalent to 6261 man–days for mangrove plantation, moss cleaning, etc. In addition to this, employment worth of 35787 man-days has been provided till date. The Foundation has also supported Pagadiya fishermen as painting labors by providing them with employment and job in various fields. Details on skill development training imparted during financial year of 2018-19 by Adani Foundation are enclosed as **Annexure – 3.**
xv	To meet any emergency situation, appropriate	Complied.

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	firefighting system and water pipelines should be installed. Appropriate arrangements for uninterrupted power supply to the environment protection equipment and continuous water supply for the firefighting system should be made.	Tug (Dolphin-11) has firefighting system of 1200 m^3/hr. along with 20 ton lifting "A" frame and diving support facility for support at offshore. With respect to onshore facilities valve station, pumping station and transportation pipeline, foam base fire tender, fire water network is available. Fire-fighting system has been installed and maintained to meet emergency situations. Additionally for emergency, DG Set is provided for fire water pumps to ensure continuous water supply for firefighting purpose. Detail information on firefighting facility available at APSEZ was submitted as a part of compliance report for the duration of Apr'17 to Sep'17.
xvi	Regular drills should be conducted to check the effectiveness of the on-site Disaster Management Plan.	Complied. Regular drills are being conducted for effectiveness of the system. There were four drills conducted for various scenarios during compliance period (Oct'18 to Mar'19) as mentioned below. **Location** / **Date** / **Scenario** CT3 Container Terminal / 23.10.2018 / Fire broke out in Hazardous container MPT / 25.01.2019 / ITV driver got minor injury due to two ITV collisions Liquid Terminal (Encl. 09, Tank No. 117) / 25.01.2019 / MTBE (Methyl Tert-Butyl Ether) leakage from the body valve of T – 117, catches fire and two person found unconscious due to inhalation CT4 Container Terminal / 19.02.2019 / Wharf checker Mr. Tushar fell down into the sea Typical report of mock drill conducted during the compliance period is enclosed as **Annexure – 7.**

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2019	
xvii	The recommendations made in the Environmental Plan and Disaster Management Plan, as contained in the EIA and Risk Analysis Reports of the project, shall be effectively implemented.	Complied All the recommendations are being implemented. **Few Marine EIA recommendations:**	
		Operational protocols and safety procedure should be printed and freely available to concerned staff. The employees must be adequately trained to inculcate a high level of competence not only in day to day operations but also during emergency situations. Periodic refresher courses must also be organized to maintain the level of their competence.	The company has written the operational protocols and safety procedures as a part of ISO 14001:2015, ISO 45001:2018 and ISO 9001:2015 certifications. APSEZ has established training department to impart training to its employees. IMO module course organized by Maritime Training Institute is conducted & 36 personnel have achieved IMO level 1 & 4 personnel have achieved IMO Level 2. Different training modules as Oil Spill, Oil Spill Equipment, Notification exercise, Incident are conducted at different frequency.
		Periodic monitoring should be undertaken at the designated sites after the terminals become operational and the results of each monitoring should be carefully evaluated to identify changes if any and to take corrective measures, if warranted.	Monitoring of various environmental parameters for Ambient Air, Noise, Wastewater, ground water, marine water and sediments is being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Monitoring reports for the period from Oct'18 to Mar'19are enclosed as **Annexure – 4**.
		Adequate vigilance is required to adherence of ships to Marpol protocol and related regulations.	During the vessel declaration compliances with respect to Air Pollution and Oil are monitored by the Port Authority. The ships are certified with international certification bodies only after complying with the Marpol protocol.
		Manual Listing Procedure for conducting ship movement operations in the port area must be available to the concerned staff.	Berthing Policy & Tariff Structure is made available for conducting ship movement to the concerned staff and made available on web link www.adaniports.com/pdfs/PIB_06122013.pdf Port Information Booklet is also made available on web link www.adaniports.com/Port_Operations_Port_Tariffs.aspx

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

Status of the conditions stipulated in Environment Clearance under CRZ notification

Sr. No.	Conditions	Compliance Status as on 31-03-2019
		Few Risk Assessment Recommendations of EIA of Multipurpose Terminal carried out in 1995:
		There should be a provision for activating a fire alarm at the fire control room from various strategic/hazard prone areas in the factory. In areas where there is high level of Noise, It may be necessary to install more than one audible alarm transmitter or flashing lights. — Provision of activating a fire alarm is available at Control Room. Employees are provided with communication system with which they can communicate about any emergency to Control Room. Emergency alarm systems are installed which is audible from any port location. Alarm testing is carried out at a frequency of once in a month.
		Wind sleeves with adequate lightings around them should be provided at various places to guide personnel to escape in a direction perpendicular to the prevailing wind direction. — Wind sleeves with adequate various lighting system around them are available at various places of Port locations to guide personnel to escape in a direction perpendicular to the prevailing wind direction.
		Succession or second line Coordinators should be named for assuming responsibilities in case disaster occurs in the absence of principal coordinators. — Disaster Management Plan for APSEZ is in place and that includes second line coordinators to assume responsibilities in absence of principal coordinators.
xviii	A separate Environment Management Cell with suitably qualified staff to carry out various environment related functions should be set up under the charge of a Senior Executive who will report directly to the Chief Executive of the company.	Complied. M/s APSEZL has a well structured Environment Management Cell, staffed with qualified manpower for implementation of the Environment Management Plan. The Environment Management Cell is headed by Sr. Manager who directly reports to the top management. The organogram of Environment Cell is enclosed as **Annexure – 8**.
xix	The project affected people, if any, should be properly compensated and rehabilitated.	Not applicable. The project was conceptualized in such a way that there are no impacts on the local settlements due to the project proposal. However, the project is already implemented and is in operation phase.
xx	The funds earmarked for environment protection measures should be maintained in a separate	Complied. Separate budget for the Environment protection measures is earmarked every year. All environment and horticulture activities are considered at corporate level

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	account and there should be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards should be reported to this Ministry.	and budget allocation is done accordingly. No separate bank account is maintained for the same however, all the expenses are recorded in advanced accounting system of the organization. Budget for environmental management measures (including horticulture) for the FY 2018-19 is to the tune of INR 1069 lakh. Out of which, Approx. INR 1008 lakh are spent during the FY 2018-19. Detailed breakup of the expenditures for the past 3 years is attached as **Annexure – 9**.
xxi	Full support should be extended to the officers of this Ministry's Regional office at Bhopal and the officers of the Central and State Pollution Control Boards by the project proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and other environmental protection activities.	Complied APSEZL is always extending full support to the regulatory authorities during their visit to the project site. Last visit of Regional Office, GPCB was done on 20.11.2018 for Main port. APSEZL has submitted the reply to the site visit report vide letter dated 22.11.2018 incorporating details of action taken in respect of the observations of the GPCB representative. The details of the same are attached as **Annexure – 10**.
xxii	In case of deviation or alteration in the project including the implementing agency, a fresh reference should be made to this Ministry for modification in the clearance conditions or imposition of new ones for ensuring environmental protection. The project proponents should be responsible for implementing the suggested safeguard measures.	Point Noted.
xxiii	This Ministry reserves the right to revoke this	Point Noted.

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry.	
xxiv	This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection, which shall be complied with.	Point Noted.
xxv	A copy of the clearance letter will be marked to concerned Panchayat / local NGO. If any, from whom any suggestion / representation has been received while processing the proposal.	Not applicable at present
xxvi	State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industries centre and Collector's Office/Tehsildar's Office for 30 days	Applicable for State Pollution Control Board.
xxvii	The project proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letters are available with the State Pollution Control	Already Complied.

Sr. No.	Conditions	Compliance Status as on 31-03-2019
	Board and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in/.	
xxviii	The Project Proponents should inform the Regional Office as well as the Ministry the date of financial closure and final approval of the project by the concerned authorities and the date of start of Land Development Work.	Already Complied.
xxix	The Project Proponent should make specific arrangements for rainwater harvesting in the project design and the rainwater so harvested should be optimally utilized.	Complied Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rain water within project area is managed through storm water drainage. Please refer specific condition no. v for further details upon ground water recharging and rain water harvesting is being done by Adani Foundation as a part of CSR activity.

Annexure - A

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19
Status of the conditions stipulated under CRZ Recommendation		

Half yearly Compliance report of CRZ recommendation for "Port expansion project including dry/break bulk cargo container terminal, railway link and related ancillary and back-up facilities at Mundra Port, Dist. Kutch in Gujarat vide DoEF, GOG letter no. ENV-1098-6477-p1 dated 28th October 1999.

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2019
A. Specific Condition		
1	The company shall submit comprehensive Environmental Impact Assessment Report and Risk Assessment Report containing worst case scenario and detailed oil spill control management plan before carrying out the construction activities and shall implement all the mitigative measures/suggestions/recommendations given in the report of NIO and Tata AIG Risk Management Services.	Already Complied. Not applicable at present Environmental Clearance was granted based on the submission of said documents. Rapid EIA was submitted on Feb 29, 2000 & Risk Assessment Report containing worst case scenario and detailed oil spill control management plan was submitted on Dec 28, 1999. For more details, please refer to general condition no xvii of the compliance of EC and CRZ clearance
2	The company in no case tap ground water.	Complied. Please refer to Specific Condition no. ix of the compliance of EC and CRZ clearance above for details.
3	The company shall not cut mangroves for the project activities except for stray mangrove seeding required for the railway line only after detailed assessment through NIO and 25 acre of land shall be planted with mangroves in consultation with NIO.	Already Complied. Not applicable at present The company has not cut any mangroves. APSEZ has carried out 24 hectare of mangrove plantation near Navinal creek. To enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in more than 2850 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 832 lakh. So, far APSEZ has developed more than 455 ha. area as greenbelt with plantation of more than 8.3 Lacs saplings within the APSEZ area. Details on mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as **Annexure – 5**. EIA report was prepared by NIO in which all impacts on
4	The company shall carry out the mangroves plantation programme in addition to 25-acre	

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19

Status of the conditions stipulated under CRZ Recommendation

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2019
	mangrove plantation to be done with the help of the NIO, in consultation with the forest department.	mangroves and coastal ecology of the region for the proposed design were studied in detail. Please refer to Specific Condition no. viii of the compliance of EC and CRZ clearance above for details.
5	The company shall ensure that the construction labors do not cut mangroves for fuel, etc.	Already Complied. Not applicable at present Construction activity is already completed. Most of the construction labours were residing in the nearby villages where all basic facilities are easily available. However, for those residing near the construction site, infrastructure facilities such as water supply, fuel, sanitation, first aid, ambulance etc. were provided by APSEZ.
6	The company shall ensure that no creek are blocked due to the project activities,	Complied. Please refer to Specific Condition no. xi of the compliance of EC and CRZ clearance above for details.
7	The company shall ensure that there will be no disposal of sullage and sewage generated from construction camps, surface run-off from construction sites, and oil and grease spillage from construction equipment in the creeks.	Already complied. Not applicable at present. Summary of the sewage sample results for duration from Oct'18 to Mar'19 is mentioned in the condition no. xii of EC Compliance report. Project is in operation phase. Sewage and effluent generated from port is being treated in designated ETP and treated water is used for horticulture purposes. Third party analysis of the treated water is being carried out twice in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. The results of the same are attached as **Annexure – 4.**
8	The company shall stick to the time bound programme submitted to this department for the proposed activities including installation of desalination plant for meeting the entire water requirement.	Already complied. Not applicable at present. Construction work was completed on time and project is in operation phase. Desalination plant with the capacity of 47 MLD is installed to meet the water requirement. For detail on present source of water and quantity of water consumption, Please refer to Specific Condition no. ix of the compliance of EC and CRZ clearance above.
9	The company shall ensure that the	Complied. Communication mechanisms have been developed for the

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19
Status of the conditions stipulated under CRZ Recommendation		

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2019
	commercial fisheries are not hampered due to the presence of barges, vessels and other activities in the region. Necessary plan in this regards shall be prepared in consultation with the NIO.	smooth movement of fishing boats vis-à-vis shipping activities. Please refer to Specific Condition no. xiv of the compliance of EC and CRZ clearance above for details.
10	The company shall bear the cost of the external agency that may appointed by this department for carrying out the supervision and/or the monitoring of the construction activities.	Complied. Construction activities are completed and project is in operation phase. If at all any study is suggested by Govt. of Gujarat, we will give full co-operation. Please refer to Specific Condition no. xv of the compliance of EC and CRZ clearance above for details.
11	The company shall carry out the post project monitoring of various environmental parameters in consultation with this department and Gujarat Pollution Control Board.	Being complied. Post project monitoring of various environmental parameters is being carried out regularly. Please refer to Specific Condition no. xvi of the compliance of EC and CRZ clearance above for details.
12	The company shall prepare the detailed traffic control management plan for the port and shall participate in the VTMS to be developed for the Gulf of Kachchh.	Complied. APSEZ has participated in VTMS. Please refer to Specific Condition no. xvii of the compliance of EC and CRZ clearance above for details.
13	In order the eliminate adverse impact on the mangroves of Bocha Island and coastal ecology of the region, the company shall carry out construction activities only after the construction design and methodology is	Already complied. Not applicable at present. Construction activity is already completed. EIA report was prepared by NIO in which all impacts on mangroves and coastal ecology of the region for the proposed design were studied in detail.

adani	Adani Ports and SEZ Limited	From : Oct'18 To : Mar'19
Status of the conditions stipulated under CRZ Recommendation		

Sr. No.	Conditions	CRZ Compliance Status as on 31-03-2019
	approved by NIO.	
14	Any other conditions may be stipulated by this department from time to time.	Point noted.

2463.

ANNEXURE – 1

2764.

GPCB

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector-10-A, **Gandhinagar** 382 010
Phone : (079) 23222425
(079) 23232152
Fax : (079) 23232156
Website : www.gpcb.gov.in

By R.P.A.D.

CORRECTION OF CONSOLIDATED CONSENT AND AUTHORIZATION (C C & A)

GPCB/CCA-Kutch -39 (5)/ ID-17739/ **Date 09.10.2018**

To,
M/s. Adani Ports & Special Economic zone Limited,
Plot No: 169/P
At Navinal Island, Taluka: Mundra,
Dist: Kutch – 370 421

Sub: - Correction of Consolidated Consent and Authorization (CC& A) of this Board.

Ref: -

1. Consent Renewal Order No: AWH-83561 dated 9.1.2017 validity up to 20.11.2021 issued vide letter No: GPCB/CCA-Kutch-39 (4)/ID-17739/403658 dated 9.2.2017
2. Your CCA- Amendment Application Inward no-124026 dated 12.7.2017
3. CCA Amendment vide No: GPCB/CCA-Kutch -39 (4)/ID-17739/424578 dated 03.10.2017
4. CCA Amendment vide No: GPCB/CCA-Kutch -582(3)/ID-35427/448701 dated 22.03.2018
5. CTE obtained vide letter No PC/CCA-Kutch-582 (3) / ID-35427/1700294 dated 4.1.2014
6. Your Letter dated 5.09.2018

2. The Products mentioned at Condition No: 2 of the above said CCA issued dated 03.10.2017 corrected as under: -

No.	Name Of Product	Existing Quantity	Proposed Quantity	TOTAL Quantity
1	General Cargo	4.0 Lac MT/Month	------	4.0 Lac MT/Month
2	Liquid Cargo (Chemical/Poc Products	2.65 Lac MT/Month	--------	2.65 Lac MT/Month
3.	Storage And Distribution Of Bitumen	26,400 MT/Month	------	26,400 MT/Month
4.	Dry Cargo Handling	9 MMT/Month	------	9 MMT/Month
5.	Container Terminal Handling Operation	4.5 Million TEUs/Annum	1.2 Million TEUs/Annum	5.7 Million TEUs/Annum
6.	Waste destruction system for decomposition/destruction of municipal solid waste	3.5 Cubic Meter (MSW Destruction Capacity @ 500 Kg/day)	-----	3.5 Cubic Meter (MSW Destruction Capacity @ 500 Kg/day)
7.	Oil water separate (Flame Proof) to remove –Oil portion from slope oil received from Vessels/Ships	25 M^3/Hr	---	25 M^3/Hr
8.	Import, Storage And Distribution Of Edible Oil	1.25 Lac MT/Month	0.6 Lac MT/ Month	1.85 Lac MT/Month

Outward No: 12577 24/10/2018

3. Earlier, Board has granted CTE with reference to point No 5 of reference and accordingly, certain project activities to be further developed like cargo handling facilities for Adani port and SEZ limited for various commodities like Container, Coal, Iron ore, Steel & Scrap, Dry Bulk, Project and Heavy Engineering, Crude oil (SPM), POL, Chemicals and vegetables oils, automobiles etc.

   The Development for this balance cargo handling capacity will be done in future based on your business requirements and CCA amendment will be applied and issued in their respective PCB IDs as and when specific commodities will be commissioned only after completing the necessary formalities for obtaining of CCA amendment.

4. Remaining all other conditions of Consolidated Consent (CC&A) vides order No: AWH-83561 dated 9.1.2017 validity up to 20.11.2021 issued vide letter No: (1) GPCB/CCA-Kutch-39 (4)/ID-17739/403658 dated 9.2.2017. (2) No: GPCB/CCA-Kutch -39 (4)/ID-17739/424578 dated 03.10.2017 (3) No: GPCB/CCA-Kutch -39 (4)/ID-17739/424578 dated 03.10.2017 shall remains unchanged.

For and on behalf of
Gujarat Pollution Control Board

(Sushil Vegda)
Senior Environmental Engineer

Outward No: 473575, 24/10/2018

2766.

GPCB

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
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Fax : (079) 23232156
Website : www.gpcb.gov.in

By R.P.A.D.

AMENDMENT TO CONSOLIDATED CONSENT AND AUTHORIZATION (CC&A)

No. PC/CCA-KUTCH-39(~~0~~)/GPCB ID-~~17739~~/ 491900 **Date:** 21/01/19

To,
Adani Ports & Special Economic zone Limited,
Plot No: 169/P
At Navinal Island, Taluka: Mundra,
Dist: Kutch – 370 421

Subject : Amendment to Consolidated Consent and Authorisation (CC&A).

Reference :
1) CCA of the Board issued to your unit vide order No.AWH-83561 dated 09/01/201,No.PC/CCA-KUTCH-39(4)/GPCB ID17739/403658 date 09/02/201 .
2) Correction of CCA of the Board issued to your unit vide order No. PC/CCA-KUTCH-39(5)/GPCB ID17739/473575 date 24/10/2018.
3) Your CCA Amendment Application Inward ID No.146485, dated 24/10/2018.

Sir,

In exercise of the power conferred under section-27 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under rule 6(2) of the Hazardous & Other Waste (Management & Transboundary Movement) Rules-2016 & as amended framed under the Environmental (Protection) Act-1986 and without reducing your responsibility under the said Acts/Rules in anyway; this Board is empowered to amend consent order conditions. Accordingly, the Consolidated Consent and Authorisation (CC&A) issued vide letter no. Consent order no. AWH-83561, dated 09/01/2018 no. PC/CCA-KUTCH-39(4)/GPCB ID17739/403658 date09/02/2017.which is valid up to 20/11/2021 under reference (1) and (2) stands amended in respect of the following conditions.

1. **Consent Order No.: H-98086 Date of Issue: 25/12/2018.**
2. The consent order shall be valid up to **20/11/2021.**
3. There shall be no change in any manufacturing activity and Air Details.
4. **CONDITIONS UNDER WATER ACT 1974 AMENDED AS FOLLOWS:**
   - The condition no. 3.1 shall be read as;

3.1 The quantity of the industrial effluent from manufacturing process and other ancillary operations shall not exceed 90.31KL/day. further generated waste water of 60 KL/day from washing of tank is treated in exiting ETP & treated waste water shall be used for Gardening and Plantation purpose.

SUBJECT TO THE FOLLOWING SPECIFIC CONDITIONS:

1. Unit shall strictly adhere to provisions of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 (H&OW (M&TBM) Rules-2016 and generated waste oil within ship shall be disposed as per the provisions of (H&OW (M&TBM) Rules-2016 only.

2. Unit shall not import of waste oil/ slope oil as per provisions of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016.
3. Unit shall provide port reception facility to channelize the disposal of waste oil generated from ships/ vessels in environmentally sound manner.
4. Unit shall submit waste oil records and submit waste oil details with quantity to Board for every six months to this office and also to Regional office, Kutch (East) for its review and inspection.
5. Unit shall dispose of entire waste oil of ships/ vessels to the Registered Recyclers/ Re-processors as per the provisions of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

5. **CONDITIONS OF AUTHORIZATION UNDER HAZARDOUS AND OTHER WASTE (M & TM) RULES – 2016 AMENDED AS FOLLOWS:**

- The conditions no 5.1 shall be read as:

5.1 Adani Ports & Special Economic zone Limited, is hereby granted an authorization to operate facility for following hazardous wastes on the premises situated at Plot No: 169/P At Navinal Island, Taluka: Mundra, Dist: Kutch

Sr. No.	Waste	Quantity per Year			Cat.	Facility
		Existing	Proposed	Total		
1	Used Spent Oil	238 MT	--	238 MT	5.1	Collection, storage, Transportation, Disposal by selling out to registered recyclers
2.	ETP Sludge	1.095 MT	--	1.095 MT	35.3	Collection, storage, Transportation, Disposal at TSDF site of SEPPL/NECL
3.	Contaminated cotton rags or other cleaning materials	31 MT	--	31 MT	33.2	Collection, storage, Transportation, Disposal by Co-processing at cement plant of CHWIF
4	Asbestos Waste	Whatever quantity generated	--	Whatever quantity generated	B-1	Collection, storage, Transportation, Disposal at TSDF site
5	Glass Wool waste (Thermal insulation material)	Whatever quantity generated	--	Whatever quantity generated	H-6.1	Collection, storage, Transportation, Disposal at TSDF site
6	Down grade chemicals	Whatever quantity generated	--	Whatever quantity generated	20.2	Collection, storage, Transportation, Disposal by sending to authorized Solvent
7	Discarded Container/ Barrel/ Contaminated Liners	16 MT/year	--	26 MT/year	33.3	Collection, storage, Transportation, Disposal by selling out to registered decontamination facility

GPCB

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8	Bottom sludge	Whatever quantity generated		Whatever quantity generated	3.2	Collection, storage, Transportation, Disposal by sending to common facility of SEPPL/NECL and /or sent for co-process at cement industries through recycling solution Pvt Ltd, Panoli
9	Waste Residue containing Oil	100 MT		100 MT	33.2	Collection, storage, Transportation, Disposal by Co-processing at cement industries and / or incineration at CHWIF site.
10	Pig Waste	24 MT		24 MT	3.1	Collection, storage, Transportation, Disposal by sending to common facility of SEPPL/NECL and /or sent for co-process at cement industries through recycling solution Pvt Ltd.Panoli
11	Waste Oil	--	0.18 MT	0.18 MT/ye	5.2	Collection, storage, Transportation, Disposal by selling out to registered recyclers/ Re processors

All other terms and conditions of Consolidated Consent (CC&A) order No.AWH-83561 dated 09/01/2017, No PC/CCA-KUTCH-39(4)/GPCB ID17739/403658 date 09/02/2017 shall remain unchanged.

For and on behalf of
Gujarat Pollution Control Board

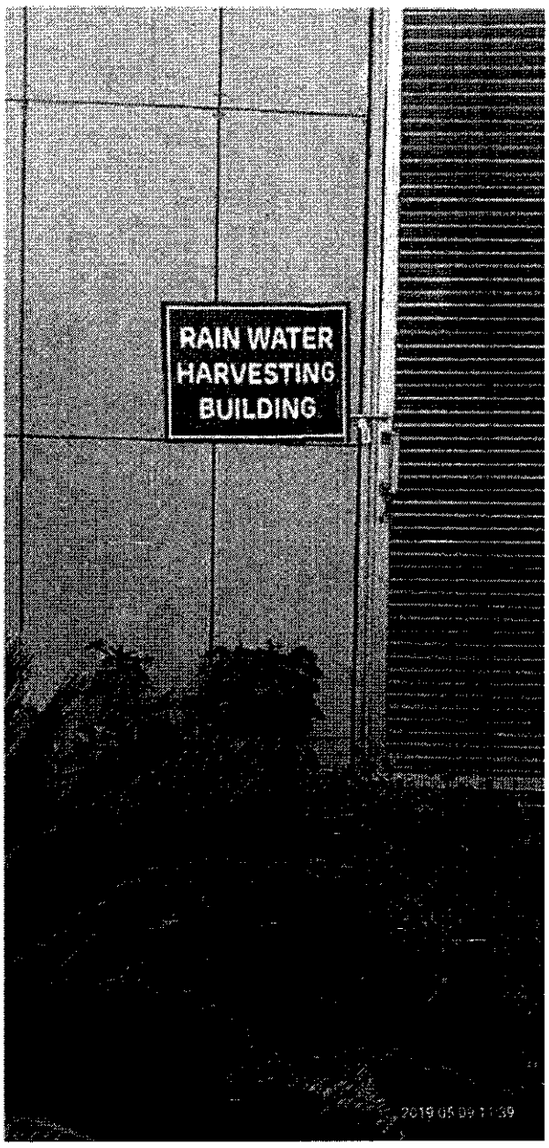
(Sushil Vegda)
Senior Environmental Engineer

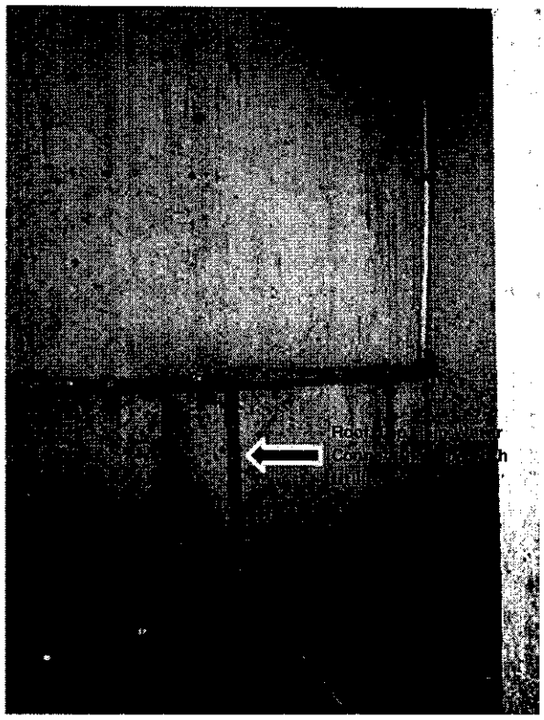
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ANNEXURE – 2

adani

❖ **Roof Top Rain Water Harvesting System**





Location: **Tug Berth Building (Mundra Port Terminal)**

2771

ANNEXURE – 3

Adani Foundation, Mundra

adani Foundation



ANNUAL REPORT 2018-19

For a better tomorrow

Adani Foundation
Adani House, Port Road, Mundra – Kutch 370 421
[info@adanifoundation.com] [www.adanifoundation.com]

Our Journey

The year 2018-19 has passed off with passion and courage to work for the commitment given to the community. It is essential that sustained growth is achieved at rural level along with the industrial development. This can be made possible by involving more and more people in the rural development programme.

Since 1996, The Adani Foundation Mundra is committed to the cause of the deprived and underprivileged. It has been working relentlessly across 6 Talukas, covering 81 villages, to uplift the lives of more than 42,000 families with a multi-faceted approach.

This year conceded with more streamline projects of Education i.e. Utthan – to enhance primary education of 17 schools of Mundra, milestone achievement in malnourishment project, Launched Swachhagraha in four talukas and 400 schools of Kutchh, considerable impact created by fisherman amenities projects and new era defined in agriculture projects i.e. tissue culture and fodder sustainability .

The people of Kutch, especially that of Mundra, have generously supported the activities carried out by the Adani Group or else this wouldn't have been possible. Their determination, understanding and commitment have strengthened the development even more.

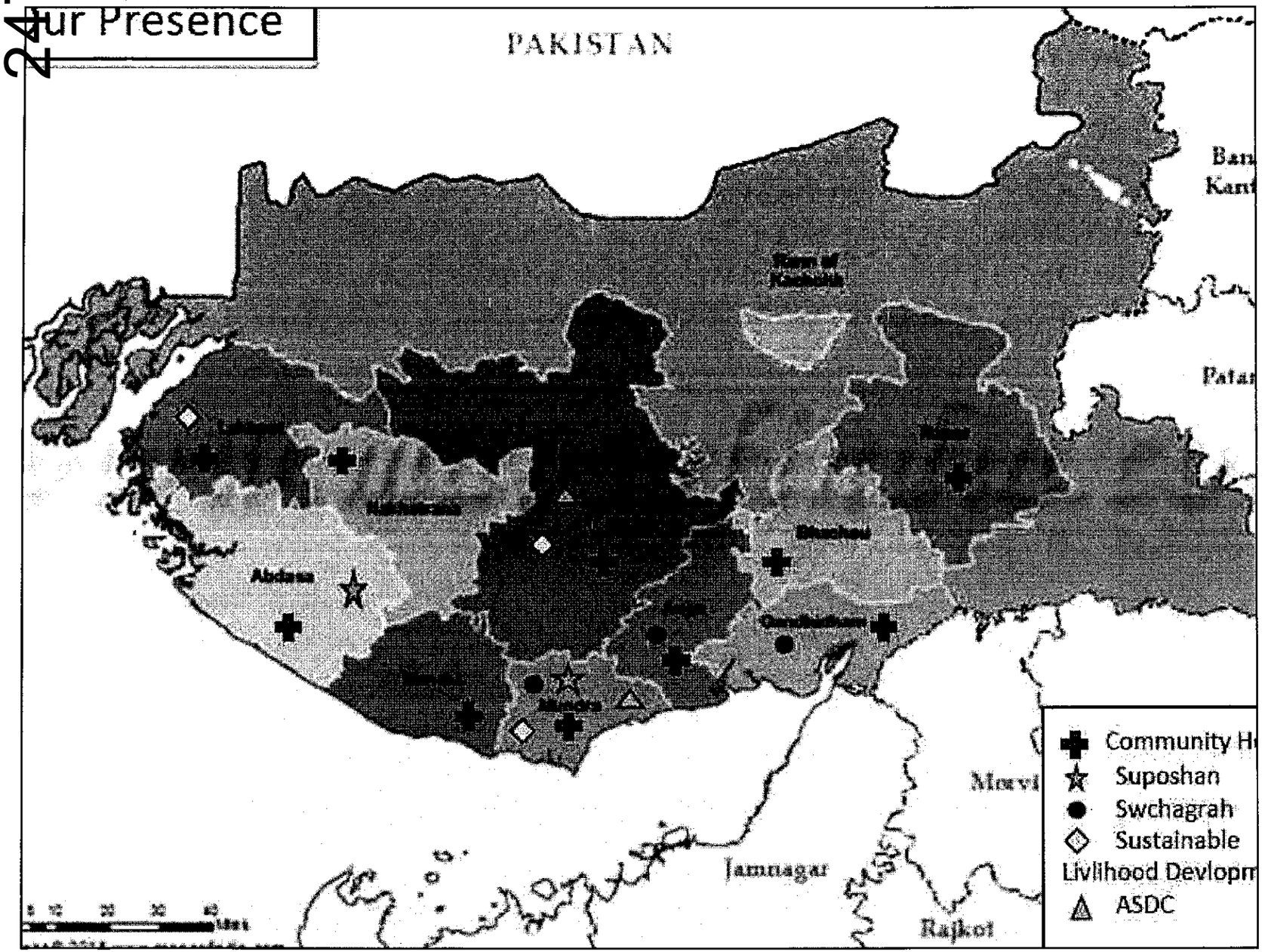
Thanks to Mr. Rakshit Shah and Mr. Avinash Rai for being mentor of the team Always !

Our Achievement would not be possible without the ultimate support by Mr. P N Roy Chaudhry, Executive Director - AF and plentiful faith and passionate support by Dr. (Mrs.) Priti G Adani, Chairperson– Adani Foundation

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ur Presence



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Education



Beneficiaries Detail

- 2598 Students : 17 Schools Utthan
- 2300 Enrollment Kit : 118 Schools
- 704 Students : Dignity of Workforce
- 345 Mothers : Mother's meet
- 5542 Students : 116 Institute Udaan
- 387 Students : Adani Vidya Mandir
- 206 Teachers : Guruvandana- I,II,III,I

Project Utthan

Project Utthan : Adani foundation has been promoting various educational and human initiatives in education, community health, sustainable livelihood and Rural Infrastructure.

In this context with an aim to enhance the quality of primary education in Kutch district, Adani foundation adopted 17 government school located at Mundra Taluka under the project 'UTTHAN' a drive of quality education.

Adani foundation is expected to achieve visible and measurable important in scholastic area.

Adani foundation will be focusing to bring the positive evidences of change in the personal, behavior and academic development of the students.



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Kick Start of "Utthan"

School improvement and teachers development is a multilayered approach. Therefore, school reform and initiative need to be carefully planned and executed by involving all stakeholders. In the process of implementing school improvement programme, teachers play critical role in institutionalizing change initiative.

A number of activities have been taken into account bring about change and enhance quality education in schools by Government, NGO and CSR,

From Year 2018 – Government of Gujrat has given responsibility through memorandum of understanding of 17 Schools for academic and overall development of school under Project "Uthhan" to Adani Foundation. Many workshops and training programmes are organized to improve the quality of education and support government schools.

In Utthan, main focus on upbringing of students (Priya Vidhyarthi) to the minimum level of reading, writing and counting (Vachan, Lekhan and Ganan). For making this mission successful, para teacher is appointed for each school.

Apart from this, English is introduced from standard first to create strong base. Also distributed science kit, sports kit, music kit to all 17 schools along with library cupboard and 100 books.

Smart class is given to all 17 schools with proper training to teachers for optimum utilization.



Objective of "Utthan"

- To improve basic knowledge of Math, Languages, English and Computer among students of Govt. schools.
- To Raise Minimum Level of weak students

Output of "Utthan"

- Increase enrolment ratio of students to 100%
- 100% regular present of students in school
- To improve their arithmetic, reading capacity in various languages, English etc.
- To increase confidence level of students
- Involvement of local community, village leaders and local Govt. through various activities

Outcome of "Utthan"

- Students of class 1th to 7th in government schools will take interest in activity based learning.
- Community and teachers will be positive and satisfy from this education project.
- Increase interest of students in school, they develop knowledge and understand importance of library.
- Education friendly environment development in school as well as in community.



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Expected impact of "Utthan"

- Vachan, Ganan and Lekhan strengthening in Priya students
- Education department of Gujarat government will include activity based learning in regular course curriculum.

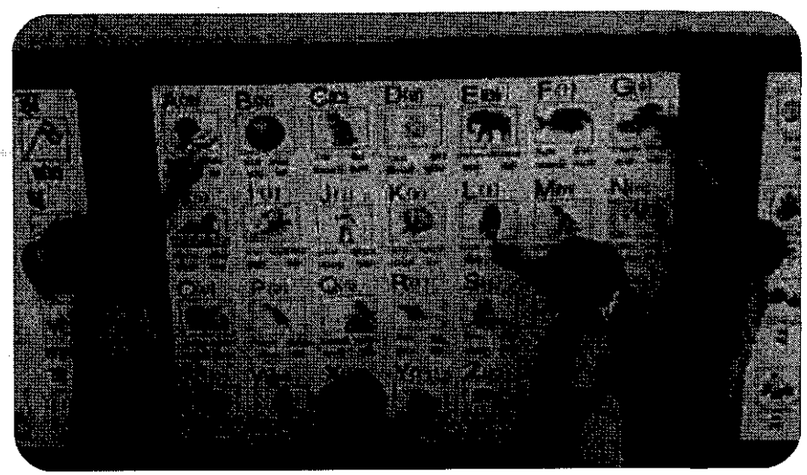
Implementation Partners of "Utthan"

DPEO/TEPO/BRC will provide guidance for implementation and experts will visit on an interval of 6 months to evaluate the project.

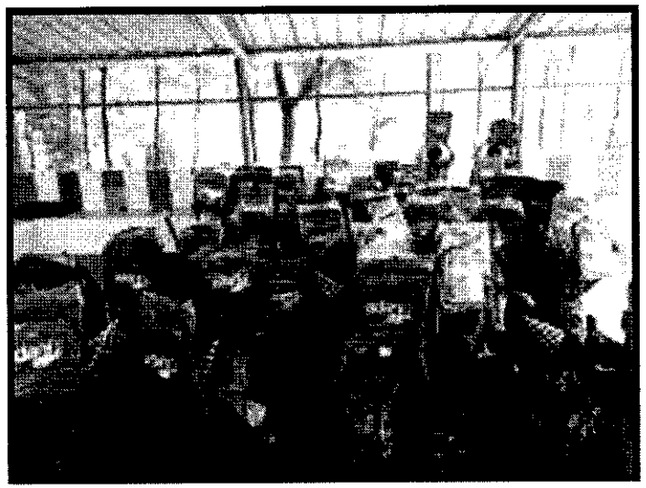
Proposed Activities "Utthan"

- Training of Government School Staff
- Reading, Writing and Maths improvement as per Gunotsav Data
- Development of Teaching Learning Material
- English Language
- Role Model Activity in assembly
- Reading Corner Activities
- Monitoring and Evaluation





Shala Praveshotsav



To motivate children for schooling by providing the welcome kit / education kit and to create conducive children for " joyful learning" Environment for children for Learning during shala Praveshotsav Govt. has wide spread network of 111 Govt. primary schools in total 62 villages of Mundra Taluka, 3 villages of in Anjar taluka, YMC school, AVMB and two villages of Mandvi Taluka (118 Schools) every year on an average 2550 to 2700 children gets enrolled in 1st std in Taluka For 2018-2019 total 2300 children got enrolled & Adani foundation provided the "Enrollment kit" to all new enrollee in Taluka

Mother's Meet

To motivate parents to maintain regularity of school, health hygiene and cleanliness we scheduled 3 mothers meet per week, which is really beneficial for student's overall growth. We arrange quiz completion for mother's to update their general knowledge.



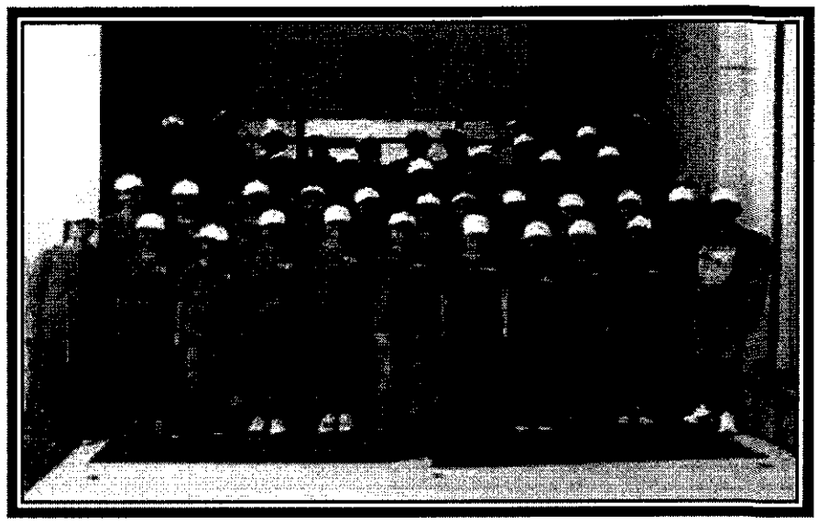
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Udaan

get inspired

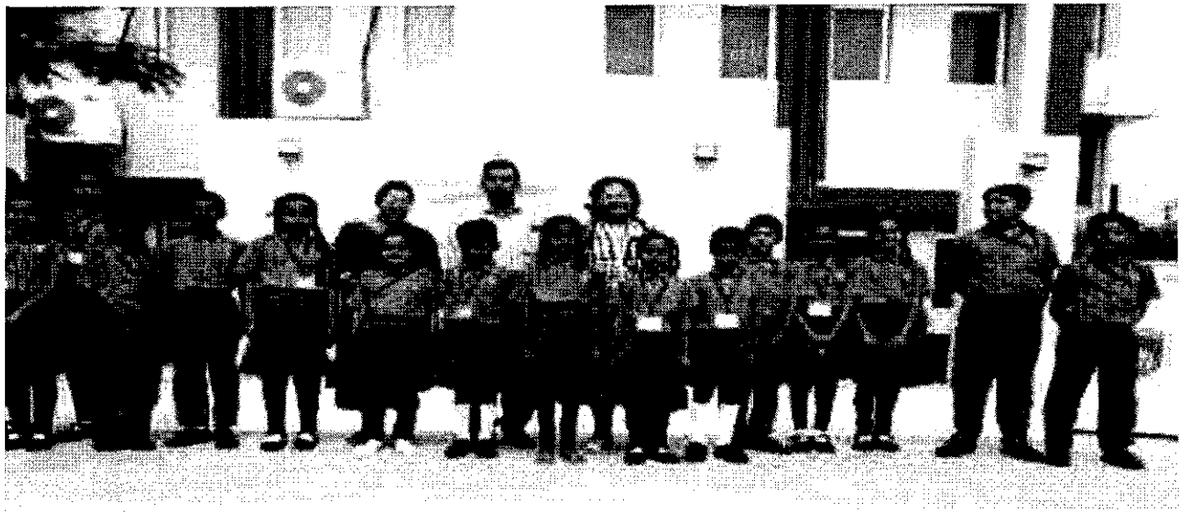
Summary of year 2018-19 for Project "UDAAN"						
NO.	MONTH	SCHOOL/ COLLEGE	BOYS	GIRLS	TEACHERS	TOTAL
1	Apr -18	27	1381	515	108	2004
2	May -18	31	1107	827	105	2039
3	June - 18	30	1333	579	107	2019
4	July - 18	29	1280	727	116	2123
5	Aug -18	29	1256	770	109	2135
6	Sep - 18	28	1317	606	107	2030
7	Oct -18	29	1318	682	107	2107
8	Nov - 18	26	1045	575	87	1707
9	Dec - 18	33	1052	928	110	2090
10	Jan - 19	31	1250	763	113	2126
11	Feb - 19	31	1196	577	96	1869
12	Mar - 19	31	1274	585	104	1963
Total		355	14809	8134	1269	24212
	Local 2018-19	201	5543	3710	467	9720
					Total	33932



Project UDAAN

Mundra has created a position for itself by creating capacities in Port Handling, Edible Oil Refining and Power Generation. With a vision to familiarize, educate and inspire the future generation to become successful business leader, engineers, managers and other professionals, the Adani Foundation organizes Education Exposure visits to Mundra for High schools and educational institutes in Various parts of Gujrat.

Total 3270 educational institutes has visited and 236032 beneficiaries of the project till date and 33932 beneficiaries during current year.



Adani Vidya Mandir, Bhadreshwar

Class	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
1st	53	40	45	41	38	40	40
2nd	26	68	46	41	39	37	37
3rd	27	40	73	45	37	39	39
4th		39	48	70	44	36	36
5th			37	46	58	39	39
6th			37	36	46	58	58
7th			34	37	35	44	44
8th			39	34	36	34	34
9th				38	38	30	30
10th					23	27	30
Total	106	187	359	387	394	384	387

In Bhadreshwar, Mundra, the Adani Vidyamandir has completely revolutionized the education scenario. Only the children of families with an income of less than 1.5 lakh are admitted to this school. Along with quality education, the school also focuses on providing nutritious food, uniforms and other services to the children for free. Currently, 387 students, from Std. 1 to Std. 10 are studying in the school. Out of these 134 children come from the fisher folk community. Many students are the first generation in their families to attend school.

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AVMB Std.-10 Second Batch Result 2018-19

Adani Vidya Mandir Bhadreshwar achievement in Gujrat Board Standard 10th Examination Result 92% (25 students have passed the examination out of 27). Adani Foundation will take all responsibility of further study of students with respect to their interest.

AVMB STD - 10 SECOND BATCH RESULT		
Year 2017-2018		
SR NO	GRADE	STUDENTS
1	Above 80 %	1
2	Above 70 %	3
3	Above 60 %	5
4	Above 50 %	9
5	Above 40 %	7
6	Fail	2
	TOTAL	27



ENVIRONMENT SUSTANABILITY

The Environment Impact Assessment (EIA) Notification, 2006, issued under the Environment (Protection) Act, 1986, as amended from time to time, prescribes the process for granting prior environment clearance (EC) in respect of cevoain development projects/activities listed out in the Schedule to the Notification.

Sustainable development has many important facets/components like social, economic, environmental, etc. these components are closely interrelated and mutually re-enforcing. Under Corporate Environmental responsibility 10 km radious villages from SEZ Boundaries.

To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year we launch project "Sanrakshan" in coordination with GUIDE. MOU has been signed with Dr. Thivakaran – GUIDE for conservation of five spices of mangroves.





SUJLAM SUFLAM JAL ABHIYAN

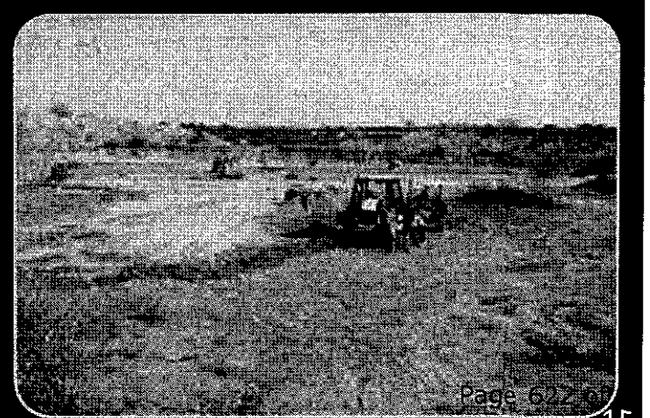
The state government announced its 31-day water conservation drive called 'Sujlam Suflam Jal Abhiyan'. The campaign was launched on "Gujarat Gaurav Din" on May 1, which is the foundation day of Gujarat state. Moreover, the government aims to revive 32 rivers in the state and also to create storage capacity in existing village pond.

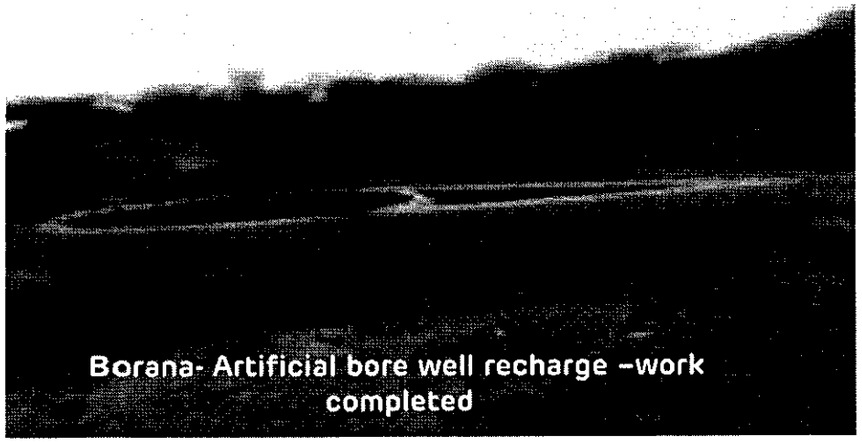
Inauguration by GOG Hon'ble Minister, MLA and DM Kutch and other guest day on 1st may at Gundala village taluka Mundra by Adani foundation, Mundra

During 1st may to 31st may AF Mundra had completed deepening work in 26 pond works as per given target by District Collector Kutch in 19 villages . Total excavation done 51723 Cum. Total storage capacity created 51.72 million liters. These works done as per government guidelines.

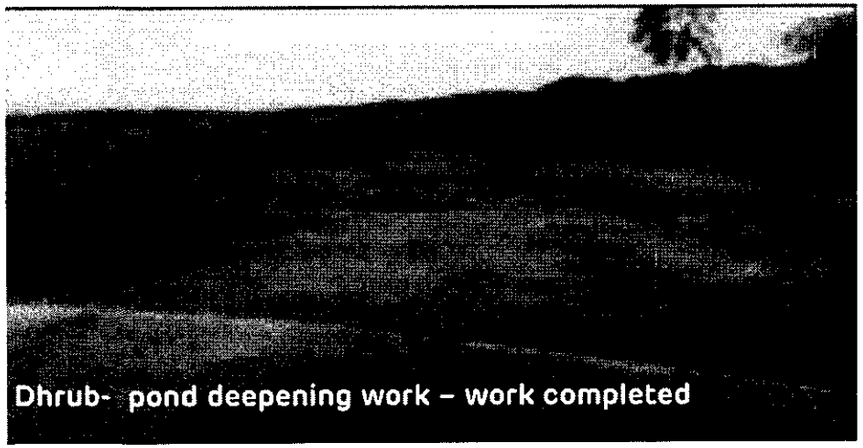







Borana- Artificial bore well recharge –work completed


Mangara- Artificial bore well recharge – work completed


Dhrub- pond deepening work – work completed

PARTICIPATORY GROUND WATER MANAGEMENT

At the turn of millennium, the state watched with growing alarm the steady depletion of its ground water and launched massive drive to achieve water security in Mundra region. As a part of pre monsoon activities with ACT (Arid Communities and Technologies – NGO) we have carried out following work. But, due to negligible rainfall we are not able to find out outcome of this project.

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PROJECT "SANRAKSHAN" - BIODIVERSITY



The mangrove biodiversity enrichment project in and around Adani ports special economic zone limited (APSEZL) aims to introduce select true mangrove species on a pilot scale in suitable coastal belts and assess their survival. Because this project is the first of its kind, the expected survival rate is between 20-30%.

The project is currently in its initial stages of establishing nurseries and sowing seeds of several different species brought in from multiple locations in and outside of Gujarat state. These nurseries have been developed in tidal flats near the village of Luni, Kutchh, Gujarat.

The mangrove seeds/propagules) for the establishment of the nursery were brought in from various locations in India, namely, Machilipatnam (Andhra Pradesh), Pondicherry (Tamil Nadu), Parangipettai (Pichavaram Mangroves, Tamil Nadu), Kandla (Gujarat) and Jamnagar (Gujarat).

In most of these locations, there is adequate fresh water supply available due to high/substantial rainfall and/or presence of major rivers (also important river confluences and deltas that give rise to a thriving estuarine environment). Consequently, the mangrove species that successfully grow in those regions are adapted to a low-salinity environment (where salinity is approximately 20 ppt) against that of 37-44 ppt prevailing in Kutchh coastal waters. Furthermore, the species selected to establish the biodiversity enrichment project also belong to this group of mangrove species. This subsequently creates a challenge for the team heading this project because the Kachchh region does not provide adequate salinity ranges for survival of most of these species. In fact, it provides an extremely harsh saline environment (salinity can range up to as high as 44 ppt during summer).

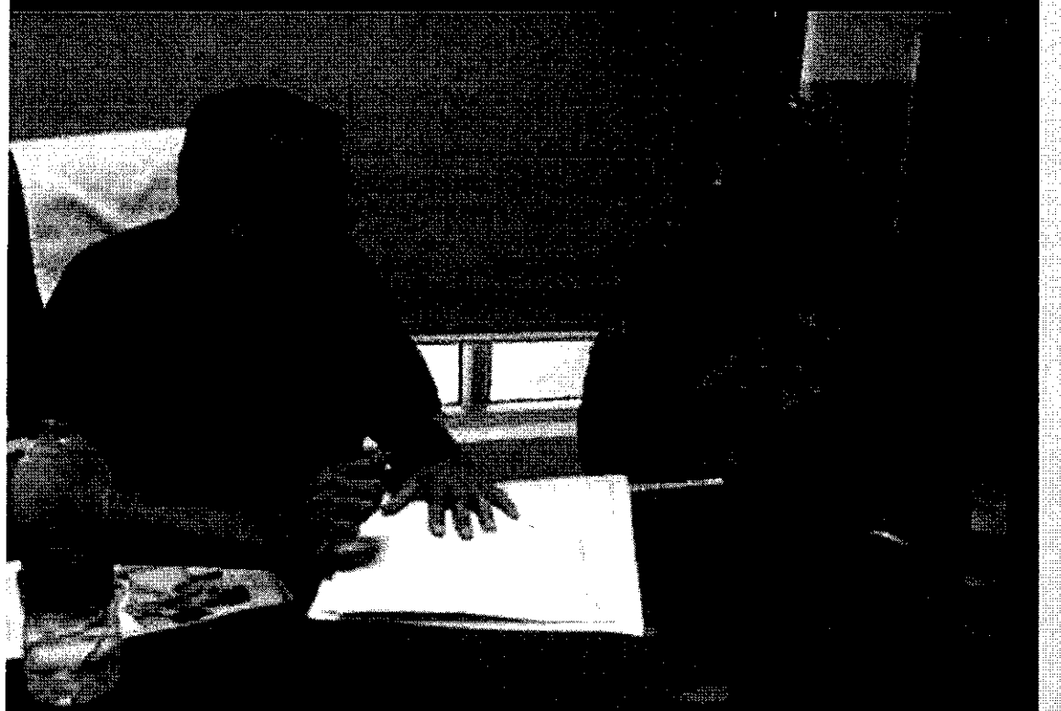
Considering the above-mentioned scenario, the site selection criteria, need for species of high salinity tolerance and studying their natural occurrence in Kutchh becomes critical in ensuring a substantial survival rate of the mangrove species selected to potentially successfully establish a diverse and resilient mangrove community in the Kutchh region.

Furthermore, a highly diverse set of mangrove species will ensure resilience in the face of changing climate and could probably provide as a thriving gene pool and seed bank in the future for the Kutchh region.

Table 1: NURSERY STATUS AS OF SEPTEMBER 2018

Sr. No.	SPECIES	LOCATION (FROM)	SITE	DATE OF ARRIVAL IN BHUJ	DATE OF SOWING	NO. OF SEED-BAGS ESTABLISHED	NO. OF SEEDS IN EACH BAG	TOTAL NO. OF SEEDS SOWN	APPROX. SURVIVAL RATE TILL DATE
1	*Aegiceros corniculatum*	Parangipettai		Sept 21	Sept 25	2000	2	4000	
		Kandla							
2	*Excoecaria agallocha*	Pondicherry		Sept 22	Sept 26	4000	10	40000	
3	*Rhizophora apiculata*	Machilipatnam		Sept 22	Sept 26	4000	1	4000	
4	*Ceriops decandra*	Parangipettai		Sept 21	Sept 25				
		Machilipatnam		Sept 22	Sept 26				
5	*Bruguiera gymnorhiza*								
6	*Xylocarpus moluccensis*	Machilipatnam		Sept 22	Sept 26	1360	1	1360	
7	*Bruguiera cylindrica*	Machilipatnam		Sept 22	Sept 26	1500	1	1500	
8	*Ceriops tagal*	Jamnagar		Sept 15					

Community Health Mundra



Project Details	Beneficiaries (Nos.)	Remarks
Mobile Van	19092	OPD Numbers
Rural Clinic	22256	OPD Numbers
Senior Citizen	10161	Transactions
Medical Camps	4384	Patients
Awareness Sessions	987	Participants
Needy Patients Support	1022	OPD/IPD
Shakti Raksha Project	624	Breast n cervix Cancer
Dialysis	5	Patients (2 times a week)
Suposhan	17025	Mundra and Bitta

Total beneficiaries : 75556



Healthy mind remain in healthy body which create healthy community to make healthy Nation.

Adani Foundation relentlessly working for community in health core area through various kind of activities i.e. Mobile Dispensaries, Rural Clinics, Special Innovative Projects - Health Card to Senior Citizens, "SuPoshan"- Fighting to Mal nourishment in Mundra and support to dialysis patients projects. Adani Foundation also organizes special medical camps during disease outbreak.

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Mobile Dispensaries & Rural Clinics



The population of Mundra block is spread over various villages. Due to inadequate transportation facilities, the villagers have to face many hardships even for reaching to the doctor in case of common diseases.
The medical expenses and zero earning per day add surplus to their hardships.
To help them in the above mentioned health related problems, the service of mobile medical van has been started by the Adani Foundation in Mundra block. In big villages, rural dispensaries have been started considering their population and area.
The Adani Foundation runs mobile health care units. Main objective of Mobile Van is to reduce travel time, hardships and expenses. Mobile health care units cover 34 villages and 05 fishermen settlements. Around 109 types of general and life saving medicines are available in these units. It has turned out to be a boon for women and children as the service is availed at their door - step.

Month	Mobile Van	Rural Clinic
Apr-18	1508	1466
May-18	1397	1491
Jun-18	1236	1533
Jul-18	1523	2166
Aug-18	1512	2103
Sep-18	1796	1726
Oct-18	1832	2068
Nov-18	1386	1628
Dec-18	1897	2187
Jan-19	1684	2013
Feb-19	1743	2037
Mar-19	1578	1821
Total	19092	22256

Mobile Dispensaries & Rural Clinics



The Adani Foundation operates Rural Dispensaries in 08 villages of Mundra block, 03 villages of Anjar block and 01 village of Mandvi block along with one at Rangoli gate. At these dispensaries, health services are provided free of charge for two hours daily by a doctor and a volunteer.

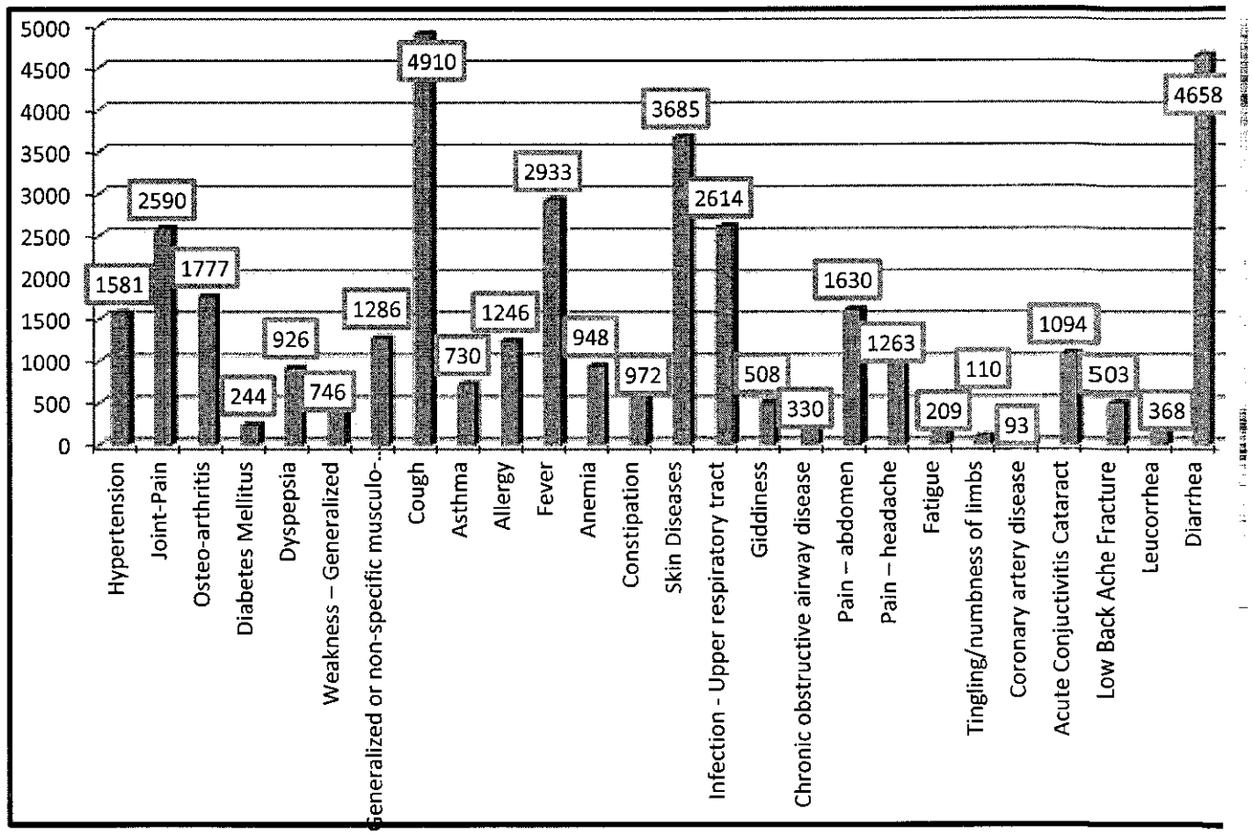
Sr.No	Villages Name	Total
1	Rangoli Gate	510
2	Luni	6,203
3	Wandh	1,272
4	Siracha	3,794
5	Vadala	1,513
6	Bhadreshwar	1,411
7	Tuna	743
8	Vandi	1,443
9	Rampar	519
10	Tunda	831
11	Tragadi	893
12	Navinal	1,732
13	Labour Colony	53
Total		22,256

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Mobile Dispensaries & Rural Clinics

Diagnosis	MV	RC	Total
Hypertension	664	917	1581
Joint-Pain	978	1612	2590
Osteo-arthritis	979	798	1777
Diabetes Mellitus	72	172	244
Dyspepsia	699	227	926
Weakness – Generalized	164	582	746
Generalized or non-specific musculo-skeletal pain	430	856	1286
Cough	2478	2432	4910
Asthma	292	438	730
Allergy	266	980	1246
Fever	1404	1529	2933
Anemia	525	423	948
Constipation	406	566	972
Skin Diseases	1980	1705	3685
Infection - Upper respiratory tract	899	1715	2614
Giddiness	220	288	508
Chronic obstructive airway disease	36	294	330
Pain – abdomen	703	927	1630
Pain – headache	589	674	1263
Fatigue	93	116	209
Tingling/numbness of limbs	25	85	110
Coronary artery disease	16	77	93
Acute Conjuctivitis Cataract	831	263	1094
Low Back Ache Fracture	333	170	503
Leucorrhea	298	70	368
Diarrhea	2134	2524	4658
Total	**17514**	**20440**	**37954**

MV & RC Disease specific pattern reported in the month April-18 to March-19



2795



Health Cards to Senior Citizens

The major junctures of human life are - childhood, adulthood and old age. The first phase is well looked after by the parents and second phase is of self-reliant but the last phase is a dependent one. The needs of old people are less looked after. When people become old, they start living a life of aloofness and solitude. Therefore, the Adani Foundation has started the Adani Health Programme for the aged to look after their health. To address the health care issues related to ageing, AF launched a 3 year long pilot project – 'Adani Vadil Swasthya Yojna' on 20th February 2011 at Mundra and further extended the same for the next three years i.e. up to 2017. Under this Programme, the individuals aged 60 years and above are benefitted. Health Cards are issued to them with the purpose of providing adequate and timely treatment. The families consisting of aged ones with a yearly income of Rs. 2 lacs or more get a Blue Card. The Blue Card holders can avail diagnosis facility and treatment at a subsidized rate in the Adani hospitals, Mundra. The families with a yearly income of less than Rs. 2 lacs are issued a Green Card. Green Card holder aged people get treatment for illness in Adani hospitals, Mundra with an aid up to the limit of Rs. 50,000/- within a period of 3 years.

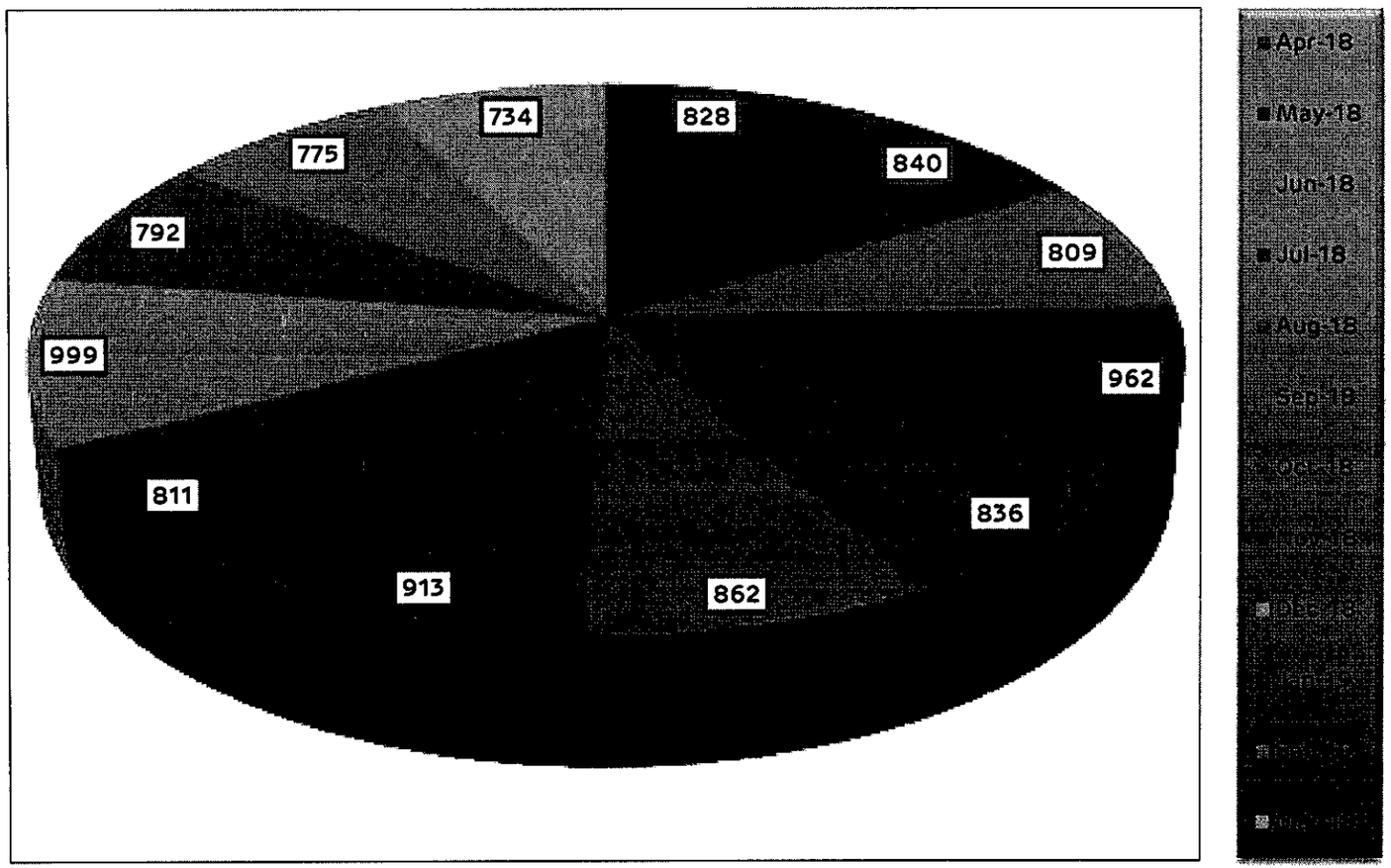
During the year 2018-19, total 10161 transactions were done by 8599 card holders of 66 villages of Mundra Taluka. They received cash less medical services under this project

Scheme is continue since eight years The third phase of this scheme was started in last year. The limit for the beneficiary was set to 30000/- within a period of 3 years. the senior citizens get emergency medical care at Adani Hospital, Mundra and they are referred to GAIMS

2796

Sr.Citizen card utilization status April-18 to March-19

Month	OPD/IPD
Apr-18	828
May-18	840
Jun-18	809
Jul-18	962
Aug-18	836
Sep-18	862
Oct-18	913
Nov-18	811
Dec-18	999
Jan-19	792
Feb-19	775
Mar-19	734
Total	**10161**



Suposhan



Suposhan Project endeavors to address the issue of vicious cycle of Malnutrition and Anemia with a life cycle approach that includes community based management. The project is more focused on preventive measures.

Objective of the Project is to reduce occurrence of malnutrition and anemia. For successful implementation of the project, "Sangini – Village Health Volunteer" plays major role in the Project.

Mundra : 61 Villages

Bitta : 7 Villages

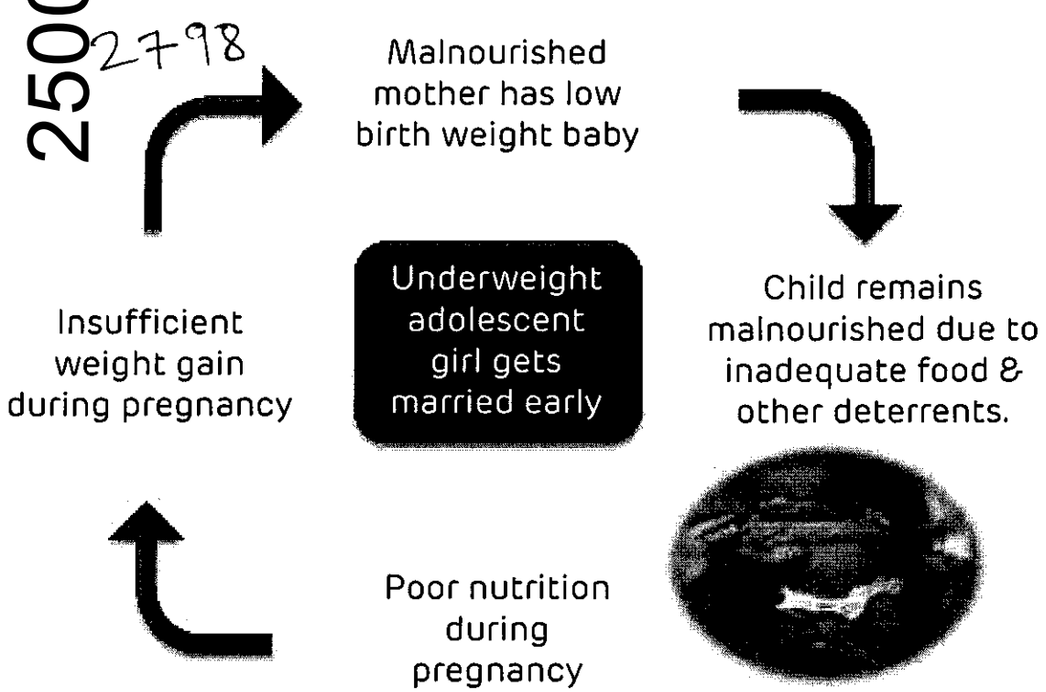
Beneficiaries : 17025

No	Detail	Mundra	Bitta	Total
1	Anthropometric(Children)	5901	647	6548
2	Adolescent – HB Testing	2950	395	3345
3	RPA – HB Testing	5884	1109	6993
4	SAM / MAM to NORMAL	104	35	139
5	FGD	737	228	965





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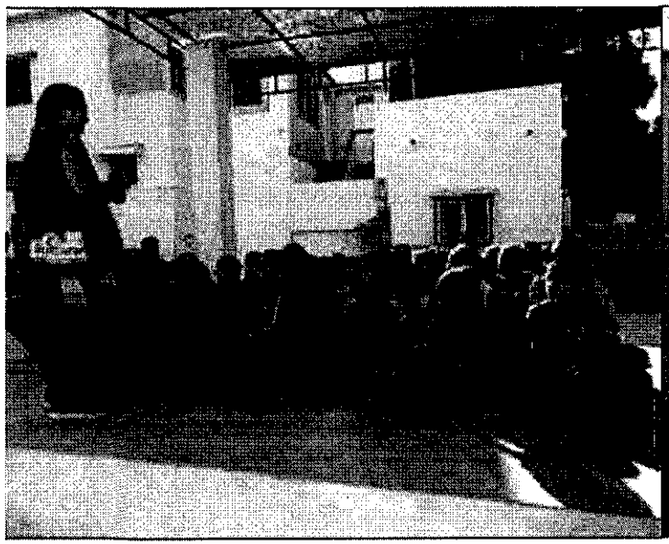
A child's entire life is determined in large measures by the food given to him/her during his/her first five years because childhood is the period of rapid growth and development. Nutrition is one of the most influencing factors in this period. Malnutrition substantially raises the risk of infant and child deaths, and increases the vulnerability to a variety of diseases in later life.

Project Suposhan is initiated with the Motive ....

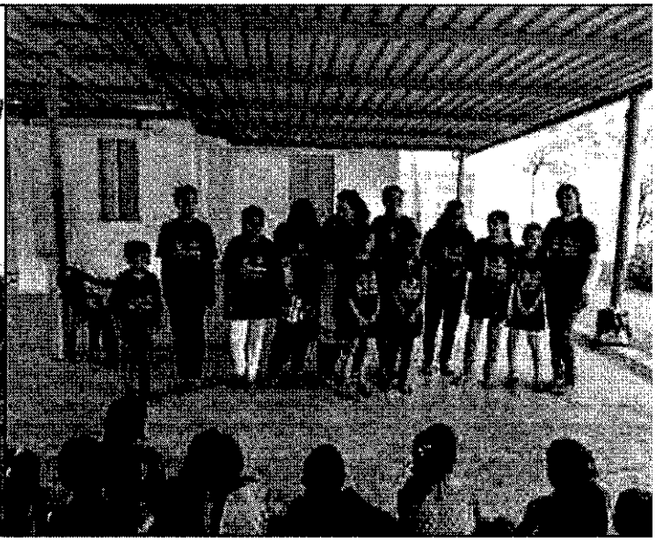
Curb malnutrition amongst Children, Adolescent girls and Women in our CSR villages.

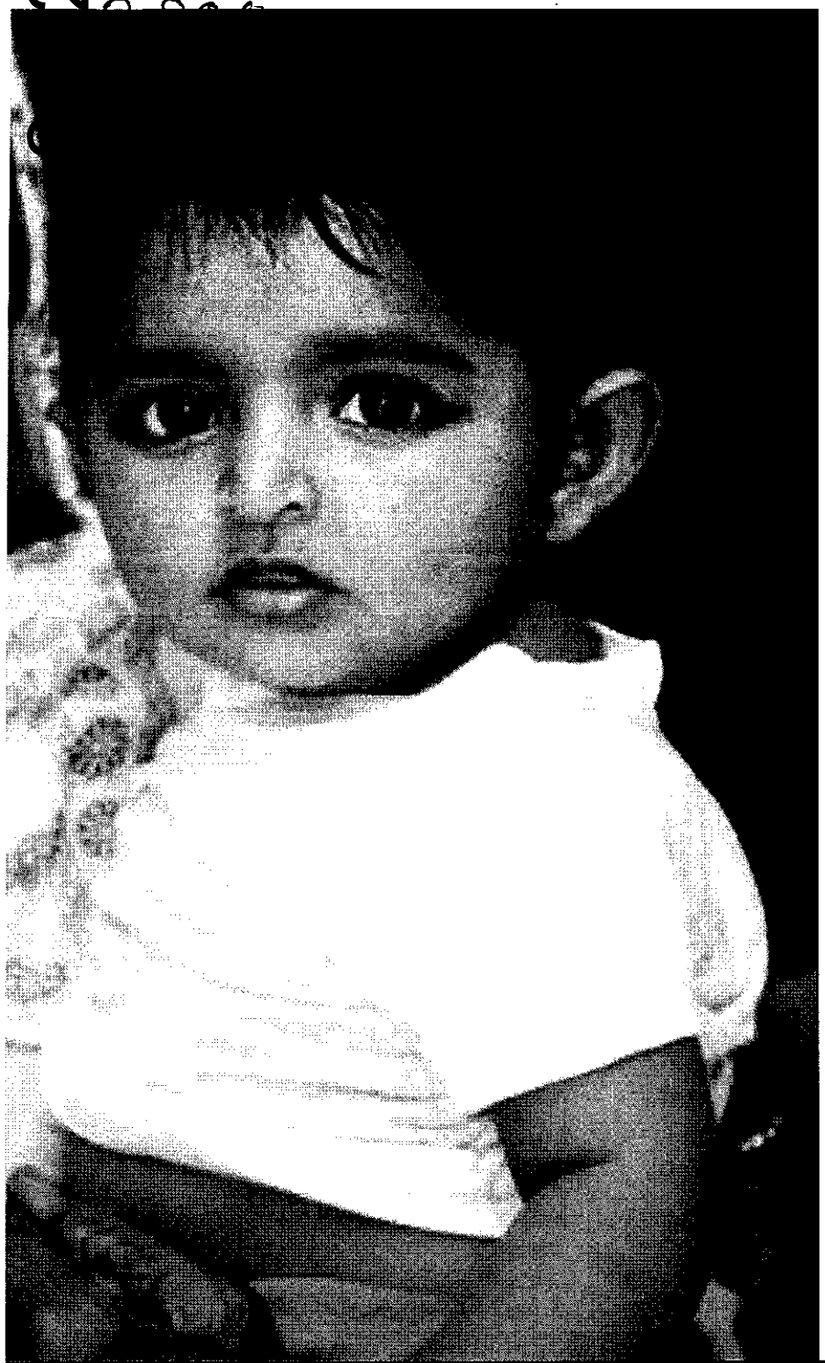
- **To reduce malnutrition and anaemia amongst Children 95 % & adolescent girls and pregnant & lactating women by 70 % in three years**
- **Reduction IMR and MMR**
- **Support Awareness & Cover 100 % Vaccination taken by Child & women.**
- **<u>Interventions with ICDS and Taluka health Office</u>**
  - CMTC Center started again after our written request to DDO Office
  - Distribution of EDF(Energy Dense Food) by THO to 23 Children who are in SAM Category

Community Engagement Activity









Suposhan Saptah

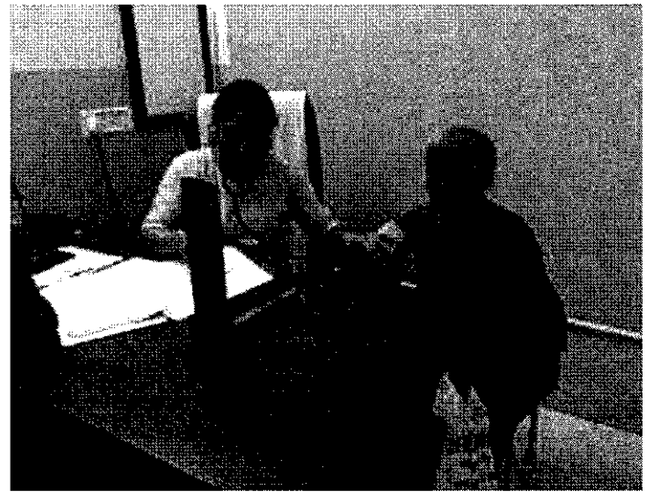
The birth of a healthy newborn child is determined by the health of the mother Mother's health, in turn, has its basis on her health status during adolescence. The health of a society, as a whole, thus depends on the health of the women, in all stages of their lives. Adani Foundation acknowledges this field of health and aims to address women's health, through their entire life cycle. These efforts have culminated in Project Suposhan, Adani Foundation Health initiative. Project aims to generate awareness in communities and facilitate the strengthening of the health systems and healthcare delivery platforms, with a specific focus on the mother and child. Project focuses on increasing health literacy in communities for mothers, child and adolescent health services through trained community health workers (Sangini), creating effective referral linkages to higher services. SuPoshan "Food Guidance Week" celebration systematized in all 61 villages in Mundra Taluka from 13th Nov – 20th Nov. Suposhan Food competition was organized in coordination with ICDS block and Supervisors Sarpanch, ASHA workers and women leaders. The reason behind celebrating "Suposhan Food Guidance Week" is to make people aware about the importance of nourishment so that everyone is able to live healthy life. It involves community by · The importance of Nutrition and Balanced Diet · Importance of locally available food. · Preparing own variety nutritious dishes, · Folk songs on nutritious, · Slogans with actions, · Spreading awareness on different schemes, · Vaccination · Kitchen garden and · Exclusive Beast Feeding

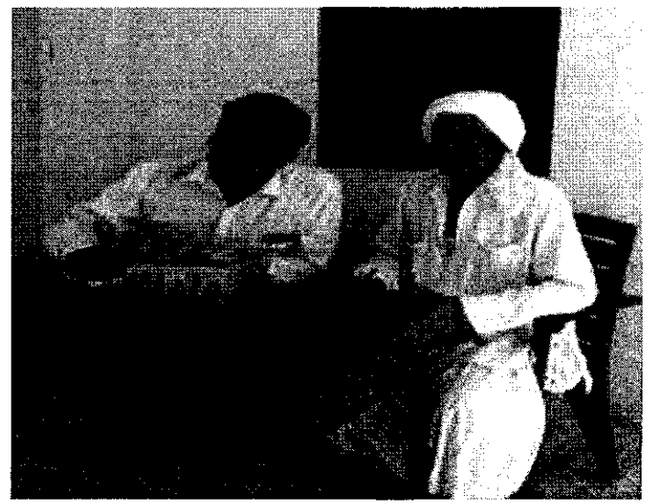
2503

2801

Specialty camp, General Camp & Surgical Health Camp

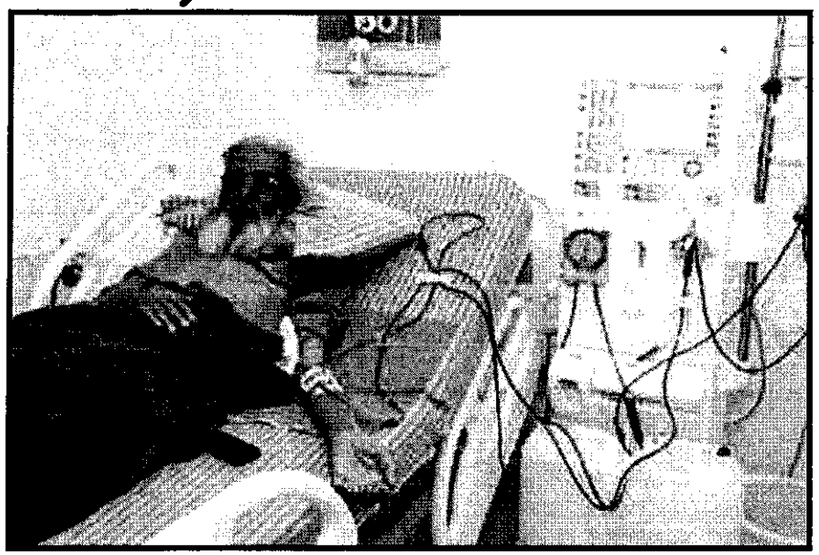
Sr.no.	Place	Villages Name	Total Patinets
1	Jat Malek Muslim & Maheshari Samuha Sadi At Mundra	Mundra	178
2	Maleria Camp Sukhpar Mundra	Mundra	36
3	Karva E Mustfa Hospital Health Camp	Mundra	50
4	Mahesh Nagar Primary School	Mundra	190
5	Muslim Jamat Samuh Sadi, Luni	Luni	40
6	Rotary Hall, Mundra Surgical Mega Camp	Mundra	185
7	Mithani Labour colony Health camp	Dhrub	80
8	Shri Swaminarayan Mandir-Baroi Boad	Baroi	191
9	Mithani Labour colony Health camp	Dhrub	105
10	Jain Derasar, Oshwal Seri	Mundra	56
11	Bava Gor Pir Uras Luni	Luni	525
12	Mundra Kadva Patidar Samajvadi Health Camp	Mundra	92
13	Nana Kapaya Primary school health camp with Rotry club	Nana Kapaya	170
14	Luni Maheshwari Samaj Samuh lagan	Luni	517
15	Bukhari pir uras	Mundra	106
16	Activity Hall Gundala	Gundala	65
17	Ashlambhai Labour colony Health camp	Dhrub	315
18	sonal Bij Health Facility	Zarpara	2
19	Ayushman bharat camp Zarpara Panchyat	Zarpara	19
20	Kapilbhai Labour colony Health camp	Dhrub	140
21	Surgical Mega Camp- Art-comace college	Mundra	109
22	Ayushman bharat camp Art-comace college	Mundra	28
23	Juna Bandar Health camp	Mundra	105
24	Eye checkup camp with THO & Rotry	Mundra	388
25	Vallabha vidyalay Health camp	Dhrab	485
26	General health camp	Juna bandar	107
Total...			**4384**





2504 2802

Urinary stone – Dialysis Treatment



Drinking water of Mundra contains high Fluoride (amount of salt). Hence, the proportion of patients with urinary stone and kidney failure is more . A project for patients who need dialysis is thus initiated so that the poor patients can receive the treatment at subsidized rates in the nearby, well-equipped hospitals. The main objective of providing dialysis treatment is to help the extremely needy patients to live a healthy life.

Total 5 Patients were being supported for regular dialysis (twice in a week) by participatory approach.

Health Awareness season Programme

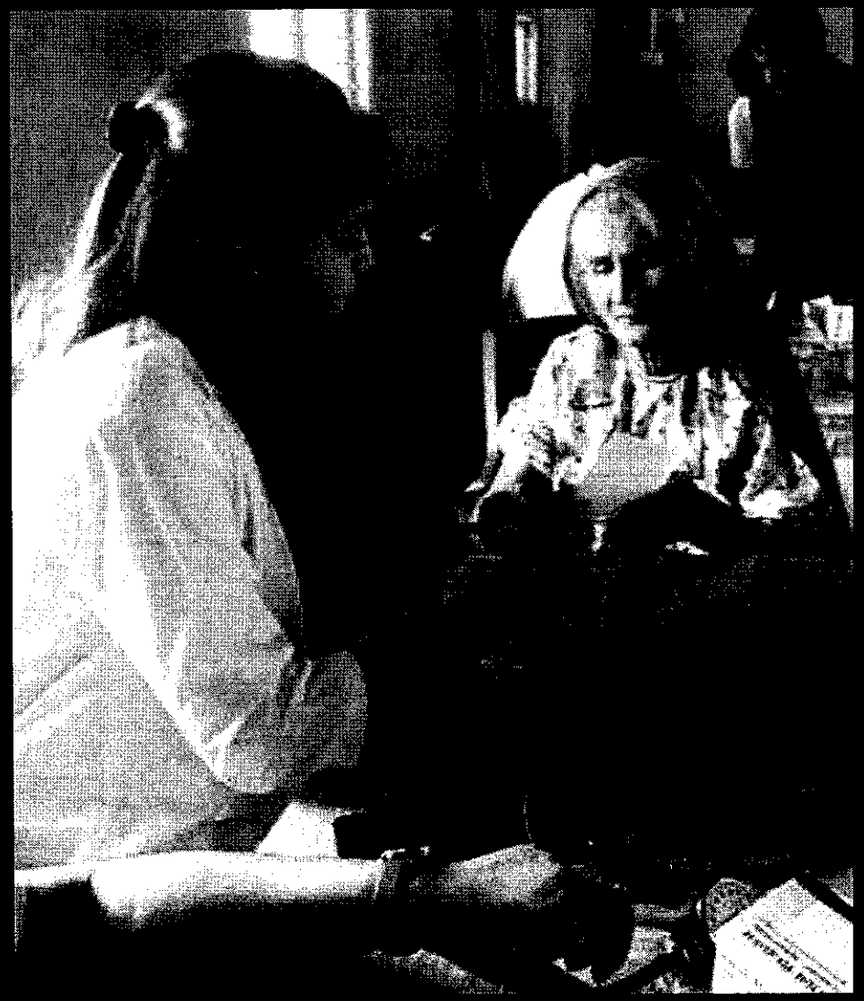
Awareness generation program play crucial role to creak and achieve social transformation for same to create awareness about Health and critical disease various kind of session had been organized.

Sr.no.	Session Topic	Villages Name	Total Beneficiaries
1	Woman Health	Bocha	35
2	Brest & Cervical Cancer & Woman Health	Lifra	20
3	Brest & Cervical Cancer & Woman Health	Desalpar	25
4	Woman Health	Dhrub	28
5	Woman Health	Mundra	125
6	Health & Hygine awareness session	Mota Kandagara	51
7	Anaemic & Suposhan	Samaghogha	50
8	Beast Censor Awareness	Nani Bhujpur	40
9	Gyneac Awareness	Mundra	28
10	Beast Censor Awareness	Dhrub	30
11	Health & Hygiene awareness session	Pragpar-2	20
12	Health & Hygiene awareness session	Wandh	155
13	Swain flu awareness season	Nana kapaya	390
Total....			**987**

2505

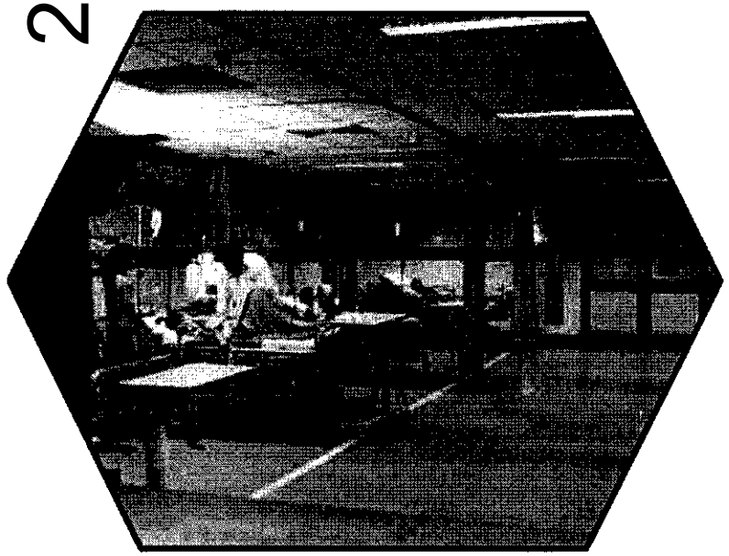
Community Health Bhuj

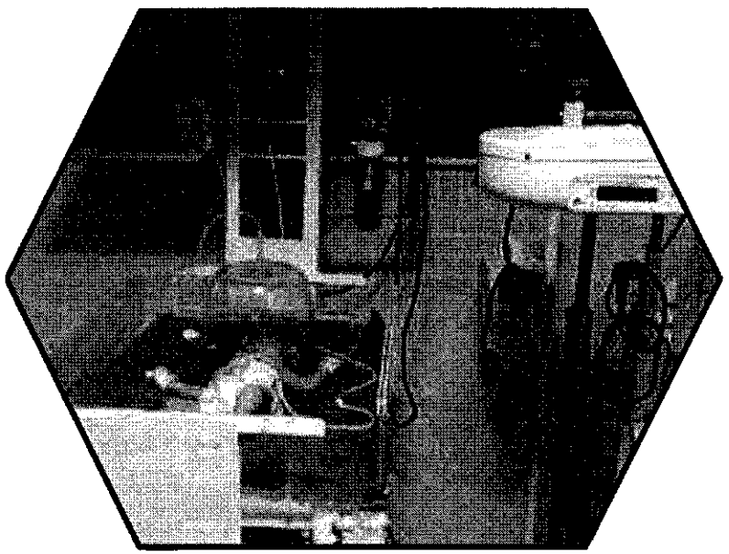
2803



- **5274** Patient Care and Coordination
- **48** Health Camps 25000 beneficiaries
- **543** Dead body referred by carry van
- **272** Ayushman Gold Card facilitation
- **631** Needy patient support
- **3560** Mahiti Setu
- **1137** Students School health Camps
- **36417** Direct Beneficiaries
- Covered **293** Villages

2506 2804





Gujarat Adani Institute of Medical Sciences

Gujarat Adani Institute of Medical Science is the first Medical College of Kutch region. It started in partnership with Adani Group and Government of Gujrat in the year 2009. This college was affiliated by the Medical council of India in the year 2014 for the MBBS with 150 seats per year. Gujarat Adani Institute of Medical Science is affiliate with the first digital university "Krantiguru Shyamji Krishna Verma Kutch University". In GAIMS, currently 750 students are studying, The GAIMS Medical College is situated in heart of Bhuj city on a large plot of 27 acres.

A teaching hospital (G K General Hospital) with 700 beds is established with GAIMS in which patients of Kutch are getting subsidized medical facilities. The Hostel facility is also available for the students in the campus only. The accommodation facility is given to the staff of GAIMS.



- Adani Foundation Team has initiated coordination with GKGH hospital since 2014 and established a reception area for the smooth patient coordination and preparation for the social networking program.
- Adani Foundation organized **48 General Health Camps and Speciality Camps in various interior villages of Kutch in coordination with GKGH which created magical impact and benefitted 25000 patients.** Adani Foundation Bhuj Health team has also organized more than Eleven awareness camps and village level meetings at 293 villages of Kutch regarding services of GKGH.
- Dead body medical van – Dignity to death is one of the noble initiatives taken up by the Adani Foundation. If any death occurs in GKGH, dead bodies are shifted to the native village of the concerned in the Kutch District free of cost. Total 543 dead bodies privileged till now to different locations in Kutch.

2508 2806

Patent Care and coordination



Sr. No.	Month	Total Patient Special Care in OPD and IPD level
1	April to June	1190
2	July to September	1507
3	October to December	1505
4	January to March	1072

In the financial year 18-19 we specially care total 5274 patients from our sites Mundra,bitta and tuna,

Ayushman Yojana

As soon as Government announced for Ayushman Yojana, we started process to enroll Golden card to the eligible families by organizing camps at village level in each taluka

Sr. No.	Month	Total no's ayushman card enrolment
1	December	145
2	January	20
3	February	42
4	March	65
	Total	272



2509

2807

Shakti Raksha – Preventive and Curative Breast and Survical Cancer



Adani hospital Mundra, Taluka health office, Indian Red Cross society and Adani foundation has initiated Shakti Raksha Project in which special gynecologist camp for detection of breast n survival camp and thalassemia testing for pregnant women at CHC MUNDRA. In first phase we have covered all PHC and susceptible cases has been referred for pep test and mammogram at GKGH, Bhuj.

In this project we have covered 103 villages of Mundra and Bhuj this year with curative measures. Most medicine will provided by Taluka health office.

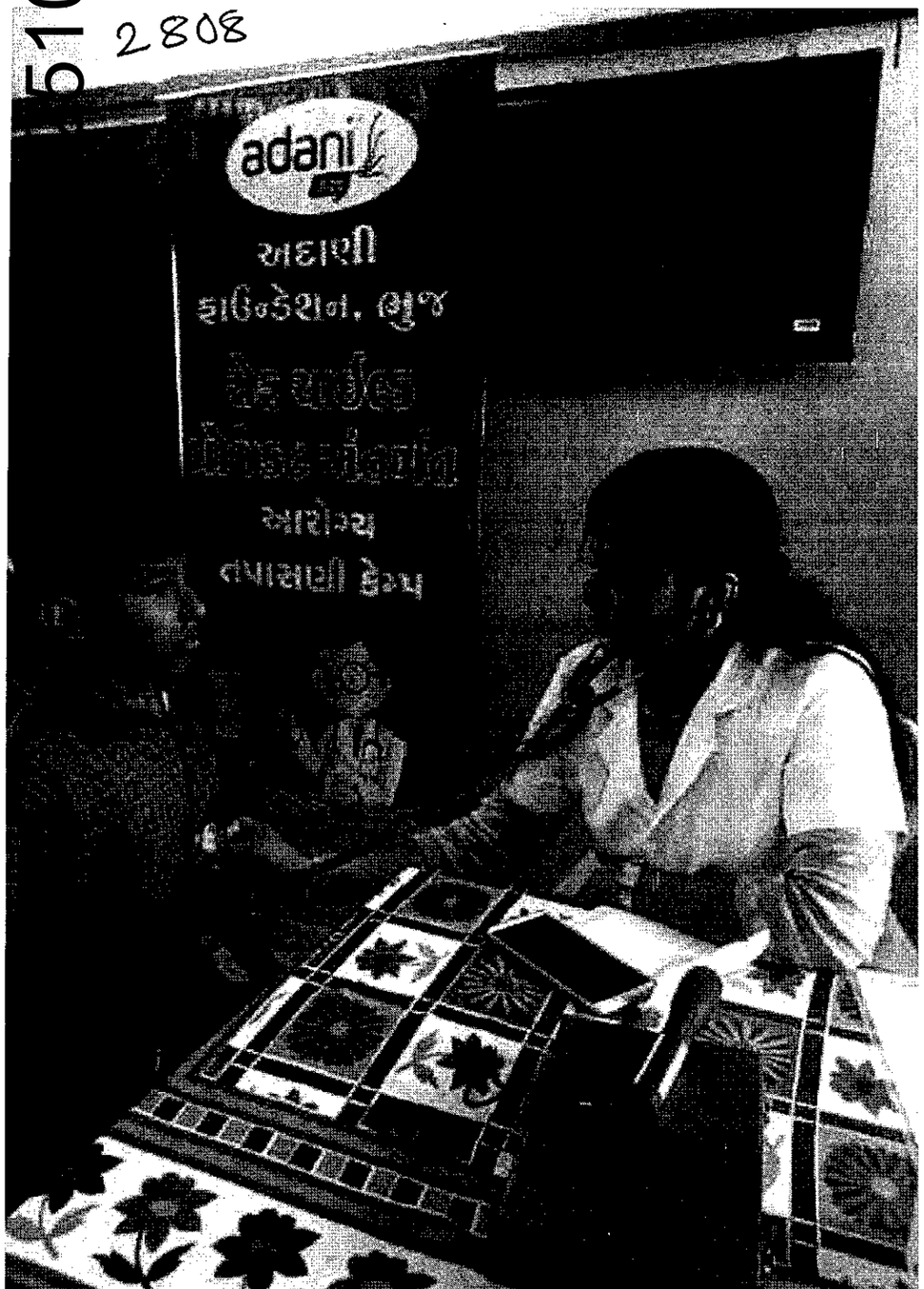
We have covered total 624 patients and 120 cases were referred to GKGH Bhuj. In which two cases diagnosed with breast lump (not malignant).

Sr.No	Place	Gaynec	Thelesmia testing	Total Beneficiary	GAMIS Refar Patients
1	Mundra CHC	62	34	118	25
2	Zarpara PHC	26	6	32	5
3	Moti Bhujpur PHC	54	15	86	18
4	Mota Kandagara PHC	42	11	53	10
5	Nani Tumbadi PHC	55	14	69	12
6	Vanki PHC	48	7	55	8
7	Ratadiya PHC	79	11	90	17
8	Bhadreshwar PHC	52	14	66	11
9	Adani Hospital Mundra	183	0	183	11
10	GEB PHC sub center	23	0	23	3
Total....		**624**	**112**	**775**	**120**

adani Foundation

અદાણી ફાઉન્ડેશન, ઇન્ડિયન રેડ ક્રોસ સોસાયટી,
THO અને ICDS ઓફિસના સંયુક્ત ઉપક્રમે
આયોજીત
સર્વાઇકલ અને બ્રેસ્ટ કેન્સર, થેલેસેમીયા
અને બાળ આરોગ્ય
નિદાન કેમ્પ

510 2808



School Health Camp

``Safe child``

Adani Foundation is regularly organizing health camps in primary government school with support of GKGH. Current year we have carried out check up of 1137 students in Bhuj Taluka.

Month	Nos of camps	Nos of School students
August	1	219
September	2	308
November	2	410
December	1	200
Total	6	1137

Arogya Saptah (8th – 14th August 2018)

Adani foundation, Adani Hospital and GAIMS have Jointly Celebrated "Arogya Saptah" 8th to 14th August-2018 in Respect of 72th Independence of our country. Celebration included multi specialty camps, Workshops, truckers health check up, surgical camp on foundation day and adolescent fair at different part of district. Collector, DDO, Minister, MLA and other dignitaries from NGOs had remained present. Objective of the program was to avail health benefits at GKGH and also at Adani Hospital Mundra and Approximately 4500 people will be direct beneficiaries of the program. (2144 Direct beneficiaries)

Day	Date	Event Name	Detail about Event	Beneficiaries
1	8th August 2018	Specialty Mega Camp	Specialist doctors i.e. Gynaecologist, Paediatrician, Nephrologists and general surgeon from GKGH had extended their services.	218
2	9th August 2018	Cervical/Brest cancer Screening & Awareness camp	In SOS gada village screening camp organize with preventive awareness session. 17 women critically suggested for further check up at GKGH.	113
3	10th August 2018	Haemoglobin Testing camp	Haemoglobin testing and awareness for de warming of 917 adolescent girls at Rapar village.	917
4	11th August 2018	1. Surgical Mega Camp, Mundra 2. Roa accident Awareness programme, Nakhtrana	1. Specialist Doctors from Adani hospital Mundra and Medical officers of Adani foundation had extended their services. 2. On occasion of Adani foundation ay session for Road accident awareness and safety including primary health check up camp was organized at Nakhatrana.	223 172
5	12th August 2018	Class-4 Staff CPR and first aid training	Class-4 Staff CPR and first aid training was organize in campus of G K general hospital for capacity building of staff and their motivation.	181
6	13th August 2018	Adolescent fair, Gadhashisha	Adolescent fair was organized at Gadhashisha high school in which lady gynaecologist had cleared doubts of the adolescent girls and given information.	170
7	14th August 2018	Asha Worker workshop	Capacity building workshop was organized for ASHA workers of urban and rural bhuj.	150

2512
2810

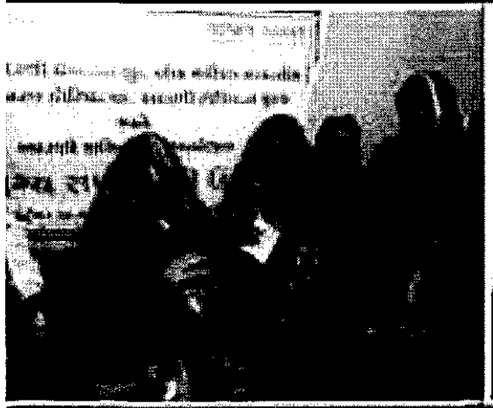
Arogya Saptah (19th – 28th January 2019)

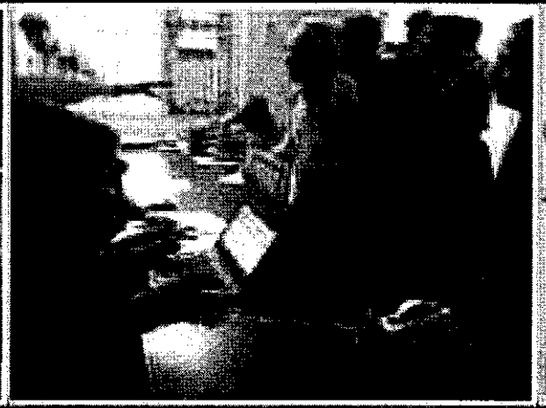
Adani foundation, Adani Hospital and GAIMS have Jointly Celebrated "Arogya Saptah" 19th – 28th January 2019 in Respect of Republic day our country. Celebration included multi specialty camps, Workshops, truckers health check up, surgical camp on foundation day and adolescent fair at different part of district. Collector, DDO, Minister, MLA and other dignitaries from NGOs had remained present. Objective of the program was to avail health benefits at GKGH and also at Adani Hospital Mundra and Approximately 4500 people will be direct beneficiaries of the program. (Direct beneficiaries – 1342)

Day	Date	Event Name	Detail about Event	Beneficiaries
1	19th January 2019	Workshop for Counseling for Overcome Exam fear.	Workshop Dr.Prutha Deshai (Psychiatrist) she explained about how to reduce Exam Fear and Stress.	250
2	20th January 2019	Cataract Detraction Camp	Cataract Detection Camp organized at khavda village. In this camp 12 patients were referred in GAIMS hospital Bhuj for further treatment.	322
3	20th January 2019	Surgical Camp Mundra	Specialist Doctors from Adani Hospital Mundra and Medical officers of Adani foundation had extended their services.	78
4	21st January 2019	Medical Checkup Camp Swaminarayan Temple	All Shankhyogini Women from Swaminarayan Temple Bhuj were examined by gynecologist and Total blood check up was organized.	209
5	22nd January 2019	Infection Control Awareness Training	Conducted Training on infection control and antibiotic medicine by Dr Gurudas Khilnani and Dr. Kashyap Buch .	170
6	23rd January 2019	Anganwadi worker and Asha Training	Training of ASHA and Anganwadi worker conducted by Dr. Hashmukh Chauhan and Dr. Shardul chorasiya.	25
7	24th January 2019	Multi Specialty Health Camp	Multi speciality Camp was organized at Rapar in which Gynec, Eye Specialist, physician and orthopaedic Doctors had extended their services	203
8	25th January 2019	Medical Checkup camp of journalist and family	This unique initiative covered all journalists of Kutchh for health check up and awareness sessions	85

Glimpse of health week



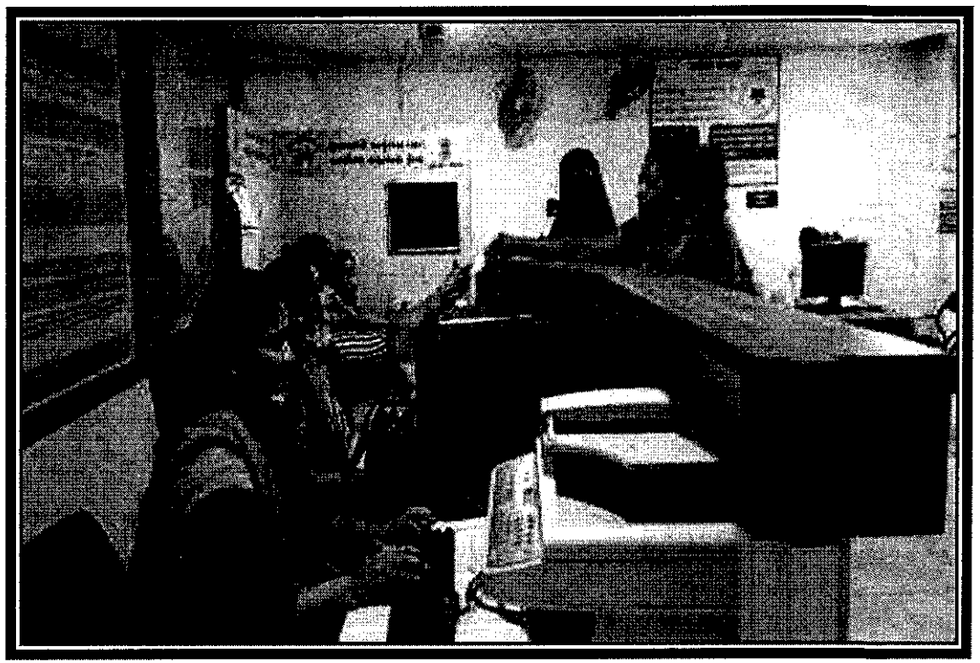






2514 2812

Mahiti Setu





Sr. No.	Month	Total
1	November	814
2	December	814
3	January	764
4	February	889
5	March	279
		3560

"Mahiti Setu"

Objective of Community resource center is to leverage the Government Schemes and making them accessible to community – It's a sustainable community connect!

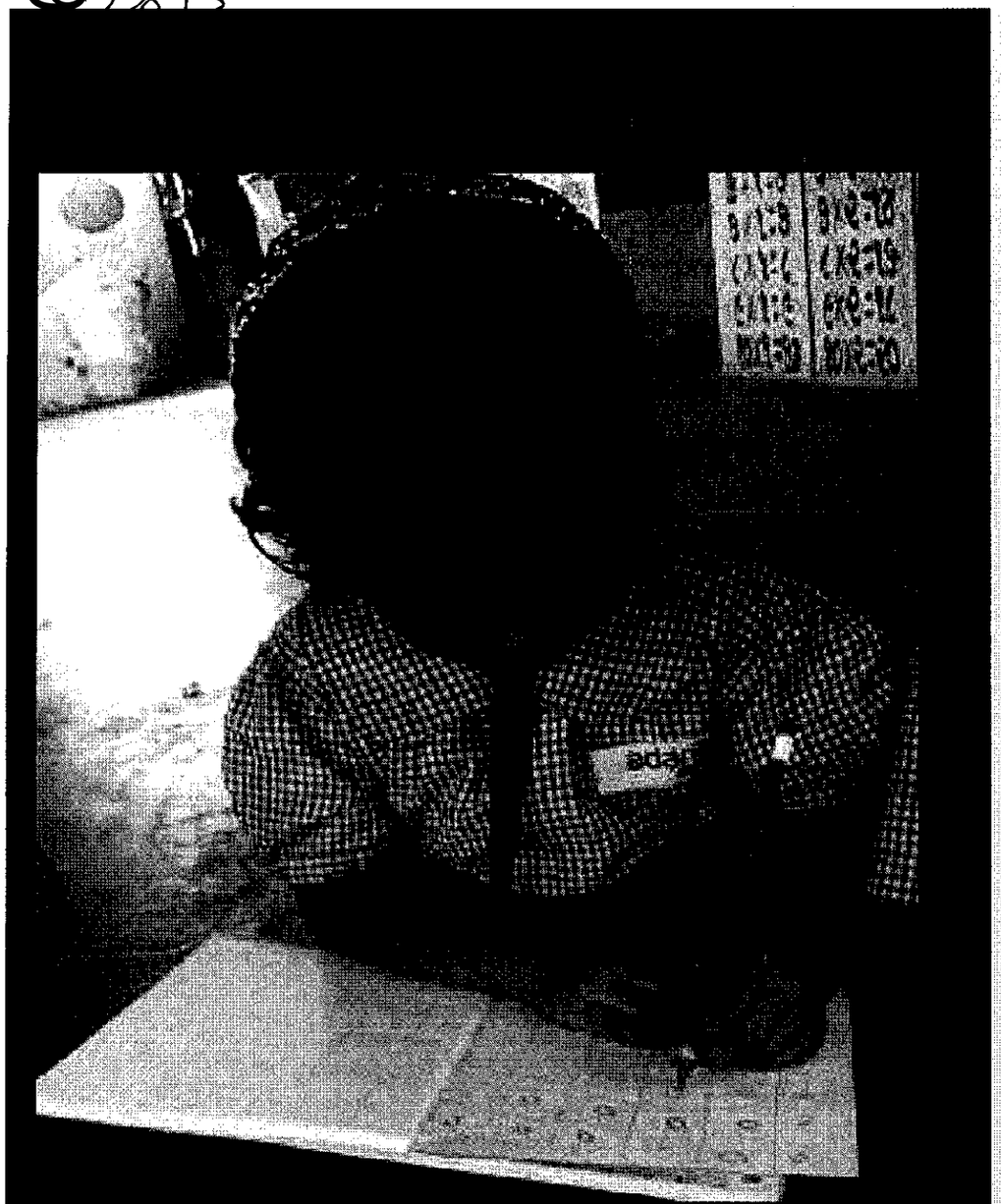
Mahiti Setu has created trust and easy access to various government schemes – outreach will increase with time and awareness.

2515

SUSTAINABLE LIVELIHOOD DEVELOPMENT PROGRAM

Empowering lives and broadening their scope for economic opportunities, Adani Foundation's initiatives introduced under 'Sustainable Livelihood Development Program', have been founded on community based approaches. In the villages at Mundra Taluka, several communities are economically side-lined and weaker that depend on a sole income source or are unemployed. Sustainable livelihood projects have been launched to cater financial independence through building local partnerships, providing diverse livelihood avenues, inculcate the attitude to establish savings, equipping to earn and updating local skills by making use of existing resources to encourage self-reliant lifestyles. Participation is encouraged by launching specific projects for fishermen communities, farmers and cattle owners, youth and women.





Fisherman Amenities work

- 391 Students : Education Support
- 134 Stunners : Adani Vidya Mandir *
- 16 Fisherman : Alternate livelihood
- 78 Fisherwomen : Linkages for schemes
- 1312 Fisherman : Community Engagement
- 1086 Fisherman : Potable water provision
- 6261 Mandays : Mangroves Plantation *
- 231 Fisherman : Capacity Building
- <u>3280 Direct Beneficiaries</u>

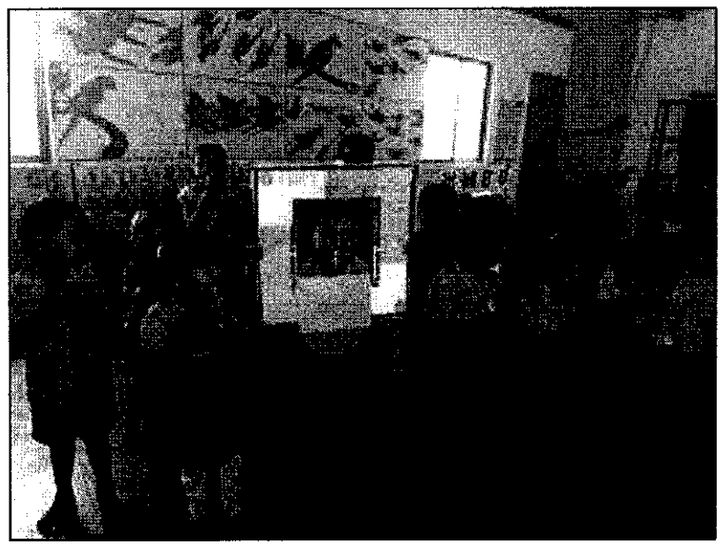
166 Fisherman for mangroves planation

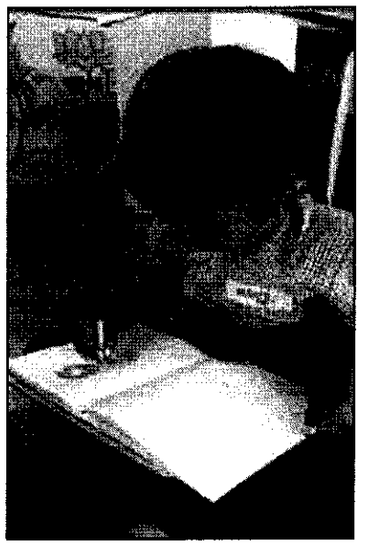
AVMB beneficiaries can count seprately

Education

Education is one of the most important stepping stones to bring about a unified development in any community. The Adani Foundation, through its rigorous surveys and assessments, could understand that it was education which should be taken up to bring about a real change in the status of the fisher folk communities. Following are some of the major education initiatives taken up by the foundation:

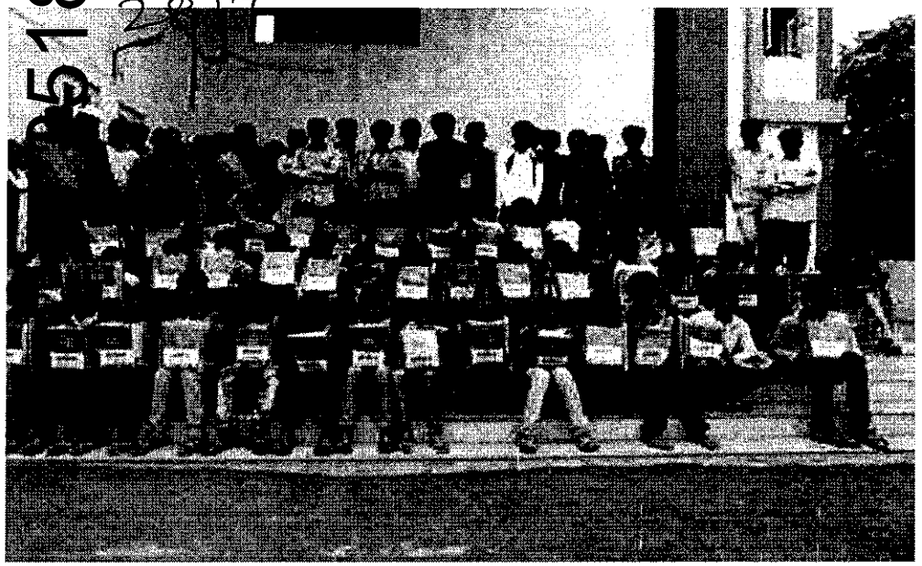
Balvadi		
Sr.	Village & Bandar	Children
1	Juna bandar	55
2	Luni	25
3	Zapara-Chhacha	27
4	Bavadi bandar	30
	Total	137





Vidya Deep Yojana

A great amount of efforts were put in developing school preparedness programmes by empowering 'Balwadis' at Fisher folk settlements. Under the Machhimar Vidya Deep Yojana, Adani Foundation constructed four Balwadis for kids between the age group of 2.5 years to 5 years at different settlements. The programme is inclusive of nutritious food, awareness on health, hygiene, cleanliness, discipline, regularity and development of basic age appropriate concepts.

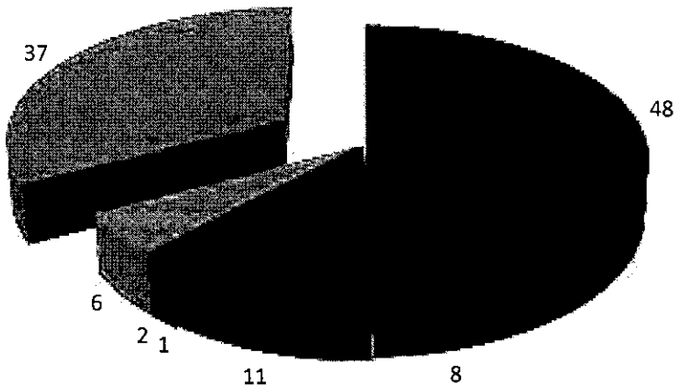


Vidya Sahay Yojana- Scholarship Support

Participatory scholarship support for fisherman children studying in SMJ high school Luni and to above 12th standards Students . 80 percentage support given by Adani foundation and 20 percentage support by parents! They willingly agree for the same.. We also encourage them for technical education for good job opportunities.. Total 66 students has been benefitted.

This year 68 students were given book support and 8 students were given cycle support for higher secondary study.

Education Analysis

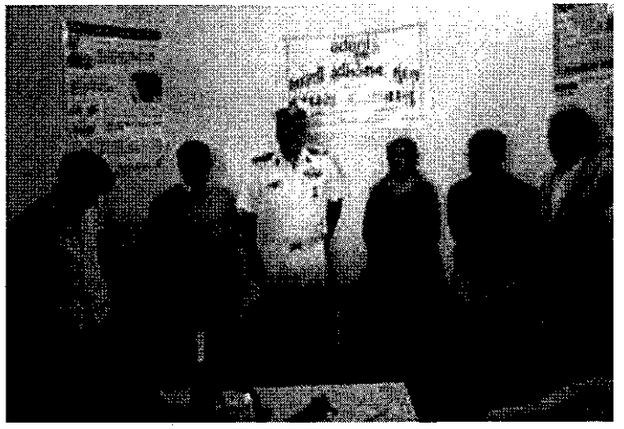


Rather than learn their children, fishermen joined them in their traditional business due to lack of awareness. But Since Adani foundation has started various kind of education initiative like Balwadi , Scholarship support, Cycle support, Book support, free education in AVMB, Transportation support, skill development training ,we bring them in the Ocean of education. By the job placement and motivation we can transform 37 fishermen youth life who have good job and others one continue their further study as below.

Machhimar Arogya Yojana

A healthy person can work well and earn for his family. Hence it is necessary to provide medical facilities to cure and prevent them and to provide then the treatment of diseases prevailing among the people specially women; children and elderly person, especially due the lack of balanced nutritious diet.

Mobile Health Care Unit - the mobile dispensaries have been run by the Adani Foundation since 2009. The mobile dispensary is available not only in the Vasahats/Settlements but also near the coast where the fishermen, can avail the facilities as and when needed. **Total average 560 fishermen were benefitted by Mobile Dispensary during last half year.**





1. Apart from this, a number of subsidiary initiatives such as health awareness camps, medical check-ups, etc. are conducted by the Adani Foundation at frequent intervals, to provide the fisher folk community with the much needed and required information and assistance.
2. Medical Financial Support –Adani Foundation has extended financial assistance to more than **114 financially challenged patients** from the Fisher Folk Community in case of medical urgency during this year.
3. Health Card for Senior Citizen Project – This is one of the major and prominent and the most innovative project of the Adani Foundation. Under this scheme Health Cards were given to the to Senior Poverty Stricken Citizens to provide them financial support to combat with their health related needs. The project for the senior citizens is popularly known as **Vadil Swasthya Yojana and till date 350 senior citizens** from fisher folk community are enrolled in the scheme. Most of them keep these cards in their wallets with other important documents and cards.

2520 2819

Machhimar Shudhh Jal Yojana

This scheme of providing potable water has helped in reducing the drudgery of women and contributed largely towards general wellbeing.
Water tank platforms have been constructed and tanks have been set up in order to provide clean potable drinking water to the community. Daily 1,18,000 Litres of water is supplied at different settlements.

Potable Water		
Sr.	Vasahat	Total liters/ day
1	Juna Bandar (By APSEZ)	30,000
2	Luni Bandar	15,000
3	Randh Bandar	25,000
4	Bavadi Bandar	15,000
5	Veera Bandar (By AKBTPL)	10,000
6	Ghavarvaro Bandar (By AKBTPL)	8,000
7	Kutdi Bandar (By MSPVL)	15,000
	Total	1,18,000

Linkages with various Departments

Coordination with coast guard, Marine Department and Fisher folk for smooth Port operations Regular Meetings with fisherman for various innovate technology for fishing

Machhimar Kaushalya Vardhan Yojana

Apart from providing formal education, special programmes were conducted to enhance youth employability. Based on the need of assessment, a number of trades were introduced by the Adani Skill Development Centre in Mundra, where the fisher folk youth could join and get vocational training for a number of technical and non-technical skills.

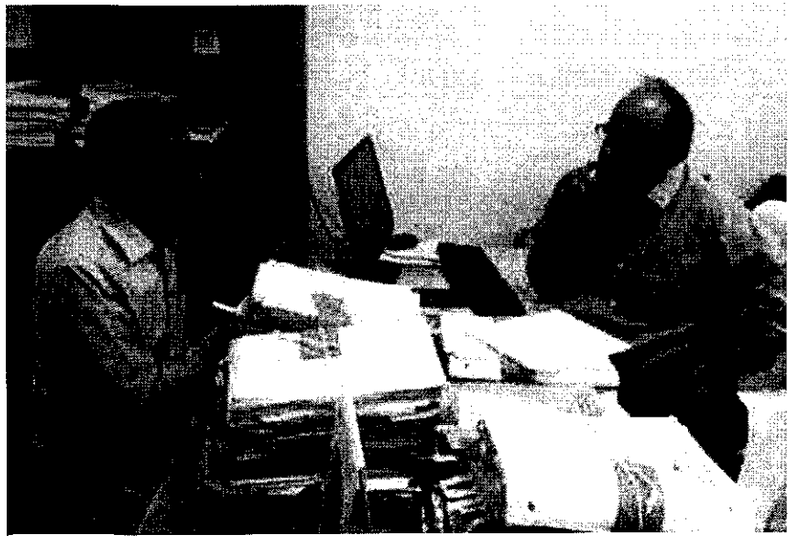
Sr. No	Course Name	No of Students
1	Mud work Zarpara	45
2	Dori work, Navinal	20
3	Checker Cum RTG Crane Operator	03
	Total	**68**



Machhimar Ajivika Uparjan Yojana

The 'Ajivika Uparjan Yojana' was implemented to promote and support alternative livelihoods among the Fisher folk communities during the non-fishing months. The Foundation introduced 'Mangrove Nursery Development and Plantation' in the area as an alternate income generating activity for the people of the region. Both men and women received training on Mangrove plantation, moss cleaning, etc. as per requirements. The Foundation provided them with employment equivalent to 6261 man-days. In addition to this, employment worth of 35787 man-days has been provided till date. The Foundation has also supported Pagadiya fishermen as painting laborers by providing them with employment and job in various field.



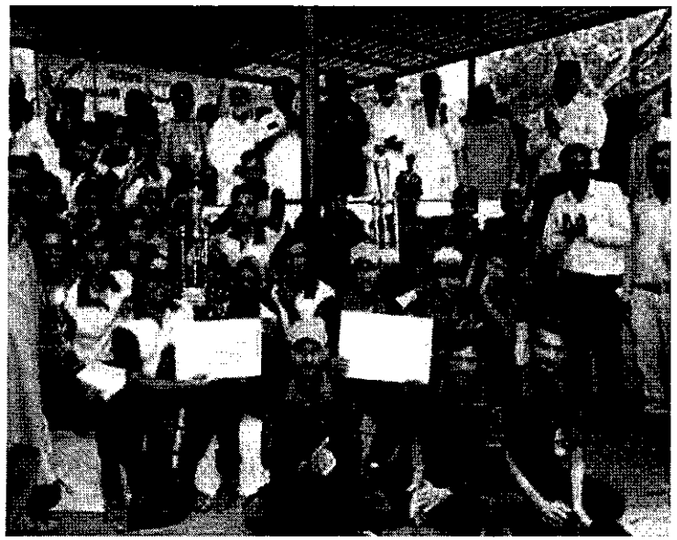


Innovative Project : Solar Tent Dryer

CIFT (Central Institute of Fisheries Technology) has been conducting a prototype study on Solar tent dryers with improved technology at their head quarters in Kochi, which is expected to be completed within a span of another three months. They may be able to upscale or replicate the technology once the study is completed. In all probability, they will provide the designs for the solar tent dryer for drying Bombay duck and / or Acetus Indicus with financial estimate by the first quarter of next year. Meanwhile the team from the HQ and Veravel centre can visit Mundra region for initial site visit and feasibility studies. CIFT requested our team to visit CIFT HQ at Kochi during coming months to assess the prototype model and understand more on other CIFT developed hybrid dryers

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Fisherman Cricket league



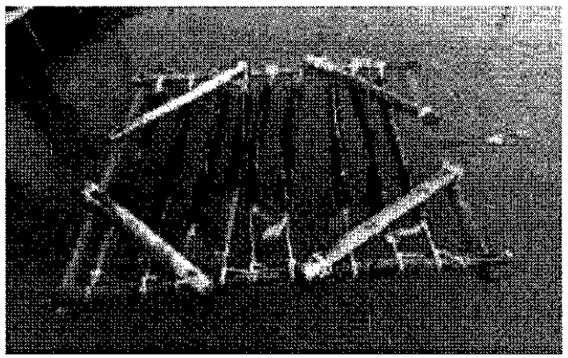
Adani foundation, MUNDRA organized Cricket Tournament " Sixth Adani Premiere League among Fishermen community to promote healthy Sportsmanship and harmonically transparent relationship. The Tournament had been played for 13 days at SVC (Shanti Vihar Cricket Ground) by 6 matches per Days with full of Audience, Total 65 Teams with 780 Fishermen youth were participated with 550Rs. Contribution per teams from Mundra, Anjar and Mandvi Block. The Final Match was played on 9.07.2018 and Pir Saheb (Religious Mentor), Rakshit sir (Executive Director- APSEZ), Dr.A.k Vatsani (Deputy collector ,Bhuj) Mr. Mahesh Dafda (Assistant Director of Fisheries, Bhuj), Mrs. Pankti Shah(Unit CSR Head) ,AF staff and Fishermen Leaders remained present. The Final Match was so interesting and Salaya team becomes winner over Luni Team and more than 1200 Audience from various villages were present. The winner's trophy, Runners-up Trophy, Man of the Series, Man of the Match, Best Baller, and Best Bats-Man Trophy has been given to the Respective Teams and players. The 25000Rs, 15000Rs, 2100Rs, 1100Rs, and 500Rs, 500Rs Prize given to the above Respective Teams and Players from the Teams contribution.

Sea weed culture

Sea weed culture as alternate livelihood for fishermen has been started as pilot base with Vivekananda Research and Training Institute.

To create Fishermen alternate livelihood seaweed raft have been installed at Juna Bandar. After successful results we will support for more raft to fisherman as off season employment.

Natural sea weed which is available at Luni coast and being obstacle in fish net is collected and linkages with VRTI for selling.





Sorting Sieve : Time Saving for Fisher Women



During bulk fishing catch fisher women remain engage whole day to sort out fishes by hand this is time consuming and panic for them so, we provide wooden sorting sieve to sort out small fishes, which make them free from finger pain and time saving.

Adani foundation Mundra, Fisheries Department GOG & CMFRI(Central Marine Fisheries Research Institute) had organized sessions for alternate livelihood for fisher women, importance of savings, bank account and also usage of sieve for Fish sorting work along with 78 wooden sorting sieve distribution. Dr. Imelda Joseph, head & principal scientist of CMFRI, Cochin, Dr. Diu incharge of CMFRI, Veraval and their team had given guidance to all fisher women of Juna Bandar for alternate livelihood possibilities with examples.

Fisherman Ramatotsav

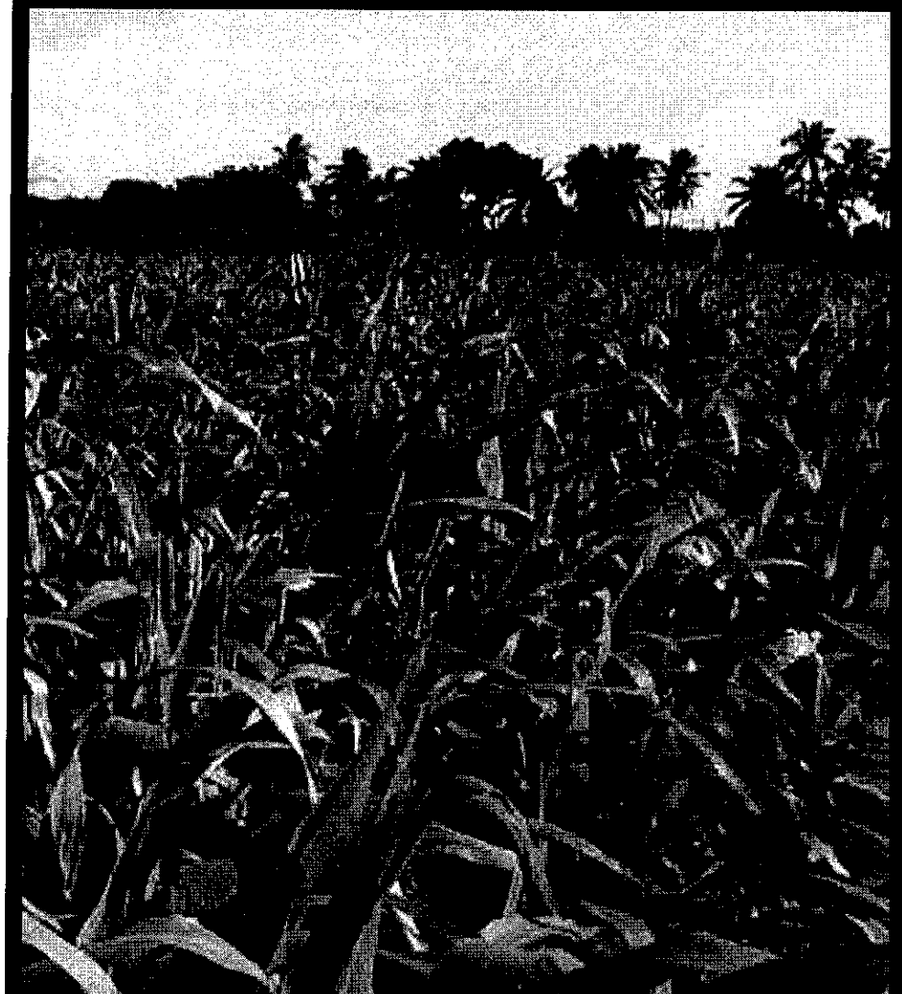
To Development of physical and mental Development of youth Ramotsav week Program was organized at various Vasahat i.e Junabandar, Luni, Zarapara, Bavdi Bandar and Navinal for 1st to 10 th standers .



This year Total 485 children were participated and all were facilitated with school bag as well as 1st ,2nd and 3rd prize from each game.

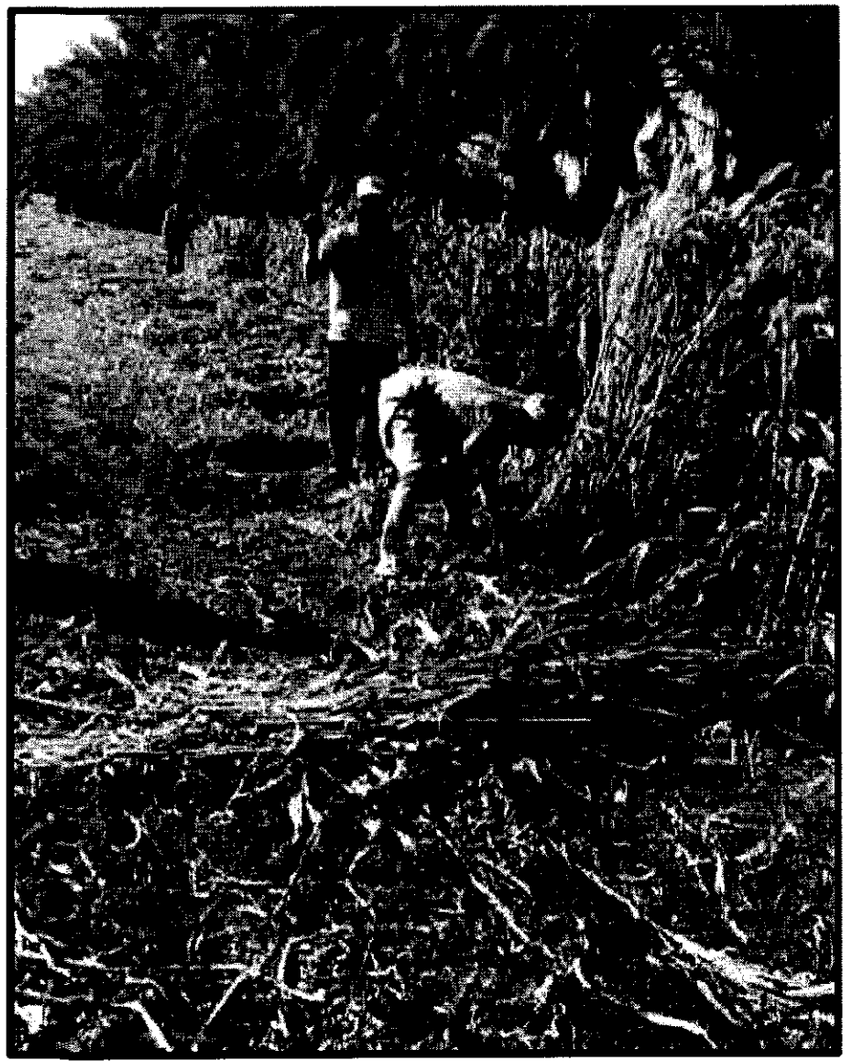
Fisherman Student Ramtotsav Programme-2018-19					
Date- 07-02-2019 to 16-02-2019					
Sr.No	Fishermen vasahat	Date	Students	Attendants	Total
1	Navinal	07-02-2019	47	150	197
2	Zarpara	08-02-2019	94	250	344
3	Zarpara(Chacha)	08-02-2019	81	300	381
4	Bavdibandar	11-02-2019	69	200	269
5	Lunibandar	12-02-2019	60	200	260
6	Junabandar	15-02-2019	134	350	484
Total			485	1450	1935

Agriculture & Animal Husbandry



- 755 Acre – 164 Farmers Drip Irrigation
- 380 Acre – 212 Farmers Maize Cultivation
- 56 Acre - 140 Farmers NB21
- 24 farmers Organic Farming
- 21 Numbers Bio gas Provision
- 387 IG Support and Sadhay Sahay
- 142 Central Govt. Scheme Beneficiaries
- 154 Pension Scheme Linkages
- 132 Women Empowerment Project
- **1364 Direct Beneficiaries**

Drive for Technology to use in agriculture



Adani Foundation puts efforts in Mundra block for consistent betterment in livelihood sector. The organization has carried out remarkable activities in the agricultural and animal husbandry sectors.

- We have initiated Programme for Awareness of Farmers in collaboration with KVK. The outreach is approximate 80 farmers of 5 villages
- The purpose of this project is to initiate village wise integrated agricultural & allied development for sustaining agriculture and socio economic situation of farming community of Mundra block.

Agriculture Programme		
Sr.no	Village Name	Member
1	Zarapara	40
2	Zarapara	42
3	Siracha-	26
4	Navinal	22
5	Dhrub	141
		271

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Fodder Cultivation

The organization provides fodder during the time of scarcity and the last 3 months of summer every year. During this period, fodder is regularly sent to every village with the help of the local people. This has given stability to the families who earn their livelihood through animal husbandry.

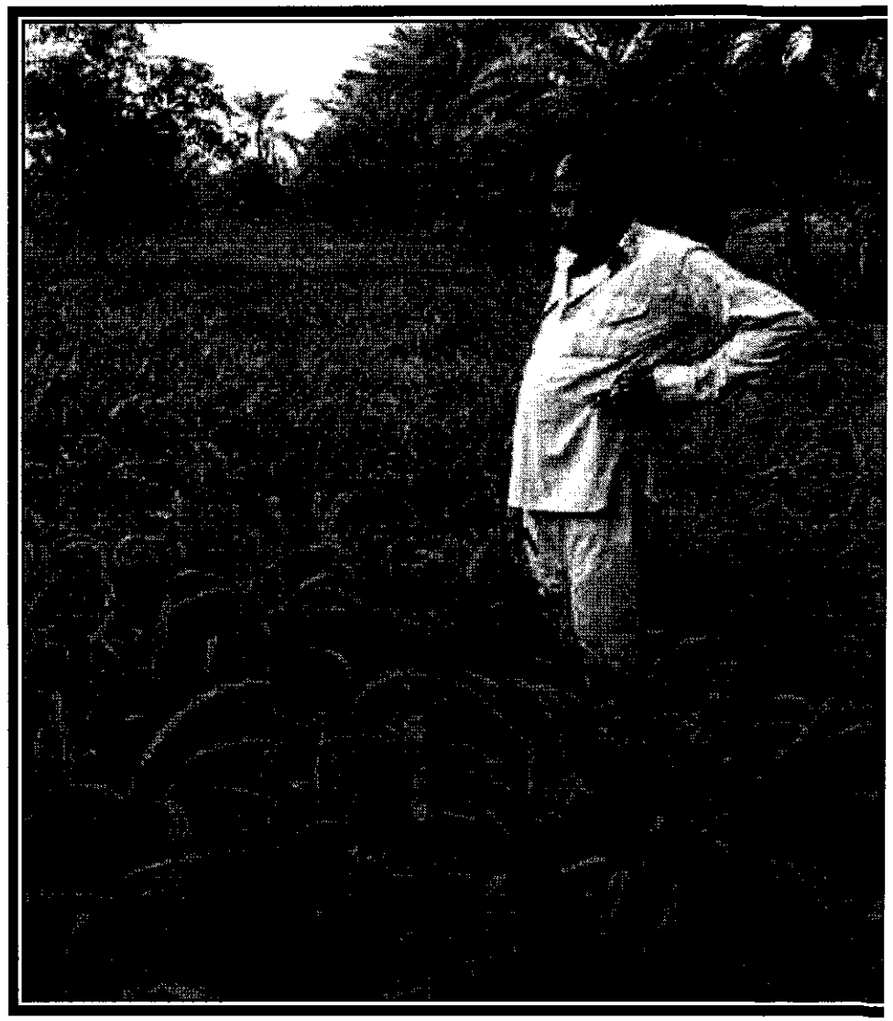
In order to meet the demand of fodder, the Adani Foundation purchases it from the regional farmers. This gives them fair rates in return.

This year we have given 1,78,000 man fodder worth Rs. 402.00 Lacs approximately at Mundra, Lakhpat, Anjar, Abdasa and Rapar Taluka

But, For this Critical Condition some Sustainable Solution is required to find out

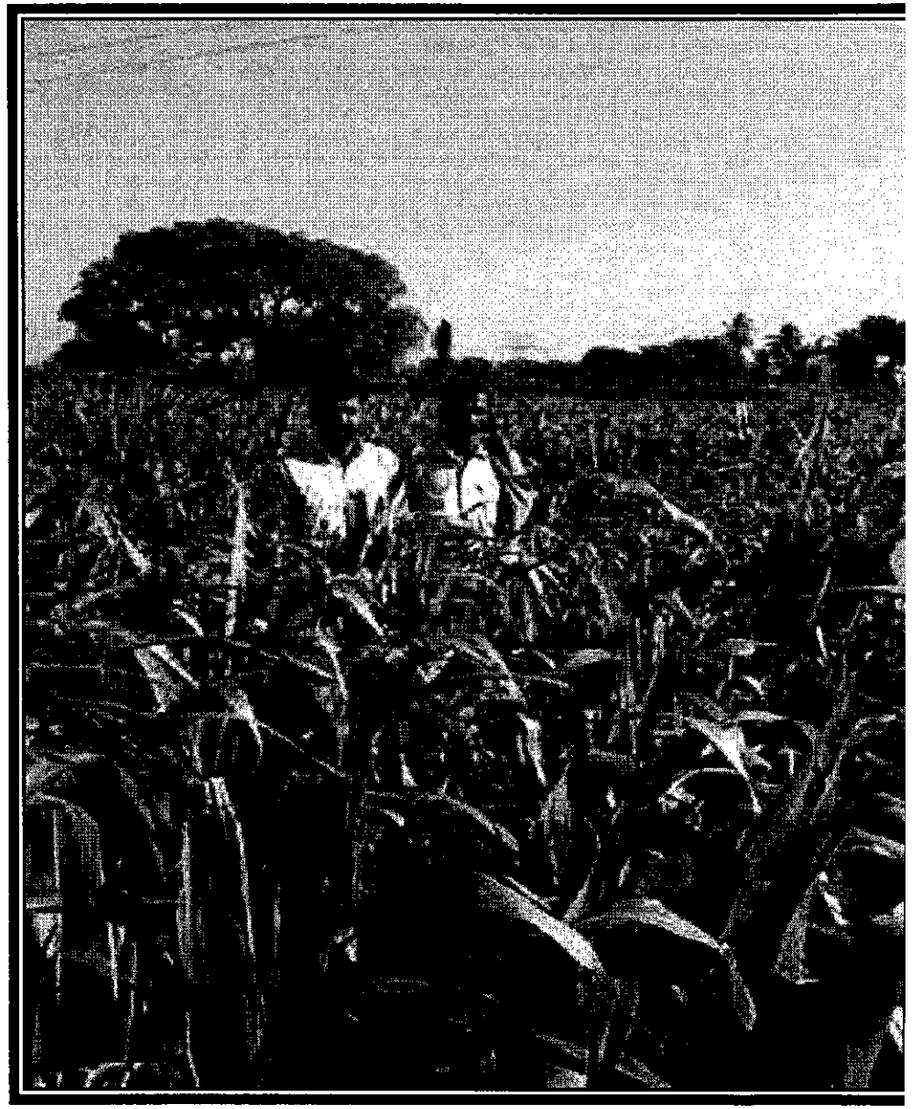
Fodder is the main issue as rainfall is very less in this region. Adani Foundation is working intensively in direction of fodder sustainability in three ways

1. Individual Fodder Cultivation Support – NB21 demonstration – Supported 140 Farmers of Dhrub and Zarpara
2. Drip Irrigation support Linkages with Fodder – First phase we will support drip irrigation in 22 villages and this linkages will help to convince them for NB21 at least in one acre land



3. Village Level Fodder Cultivation : Participatory Approach
   (a) Winter crop Cultivation – Support to 180 Individual (Supported for seeds of Makai for 180 acre land)
   (b) Winter Crop Cultivation – Support to Group of Farmers (200 acre of land with 32 farmers)

We are also planning for grassland development at Village Zarpara and Siracha in Gauchar with mutual understanding with Gram Panchayat.



Win win situation of this project

- Cost saving initiative: Financial saving by Rs. 7.23 lac in three months. (15%)
- Assured of green fodder and supply
- Empowerment of farmers by providing livelihood
- Increase of Green fodder cover
- Milk productivity enhancement
- Fulfilment of double the farmer income concept of Govt. of India
- Crop rotation increases the soil fertility

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PROJECT "DRIP IRRIGATION"

- **Basis of Requirements of Drip Irrigation**

The main source of livelihood being agriculture, the cultivators tend to use more and more underground water for irrigation. Underground waters have gone very highly saline. The use of such water for irrigation has made the soil also saline and the crop yields have dwindled.

- **Process of Drip Support**

Farmer have to applied in the prescribed form of Adani foundation with photograph.

Inspection and verification will be by AF representative.

Ration card, work order of G.G.R.C, 7/12 certificate and all bills must be attached.

Farmer will be informed by telephonic to have form query.

Primary information about farmer land will be received by telephone.

Farm visit within 10 days of after received of application and verified the installation of system as per map and material as per bill will be checked and get farmer feed back.

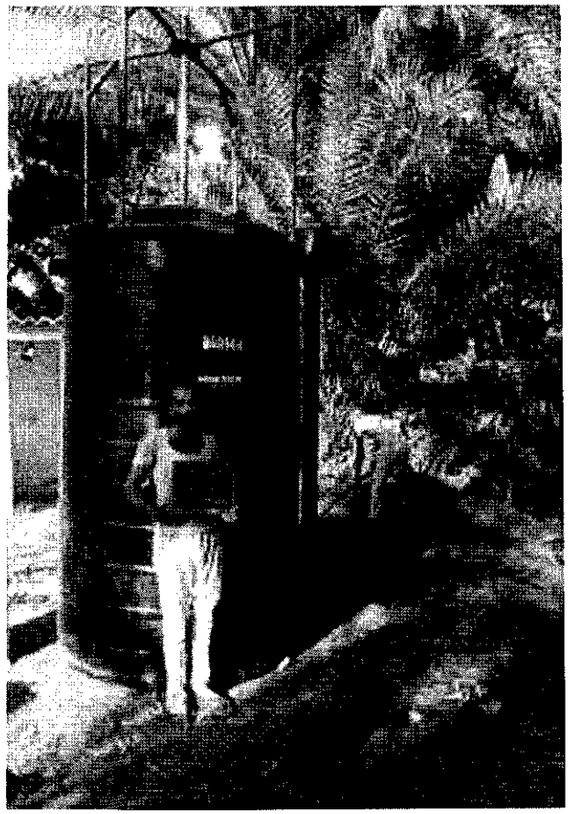
Verification report submitted to account office.

Payment within 20 days if all document is complete through net banking.

Farmer economic study after our support.

- **Villages of Drip Support**

Keeping in view the situation and request comes from community, once again **Drip irrigation support is planned in three phase. As a part of first phase, we are considering 22 potential villages. We have covered 164 farmers and 755 acre drip irrigation area.**



Biogas

Biogas is a clean, non-polluting and low cost fuel. It contains about 55 to 75 percent methane, which is inflammable. Bio gas can be produced from cattle dung, human waste and other organic matter by a process called "Anaerobic digestion" which takes place in a biogas plant. The digested effluent, which comes out of the plant, is enriched manure.

The Multiple benefits of the biogas have changed many lives in rural areas. During this year 21 plants have been constructed. We are providing support addition to Government support to the beneficiary. (Under bio-gas scheme of government, the total cost is Rs.33, 500 out of which Rs.15, 000 will be granted by the government and out of the pending amount of Rs.18, 500 sum of Rs.10, 000 will be contributed by the Adani Foundation. The beneficiary will have to pay only Rs. 8, 500). Beneficiary women use the time, saved from cooking and fuelwood collection, to take up an additional economic activities.

Representation of Adani Foundation was invited as Guest of honor by Krishi Vigyan Kendra in 'Scientific Advisory Committee Meeting" . Main Objective of meeting was to study about present agricultural Scenario of Kutchh and new CROP Patter. Representative from ICAR ,GOG and Various NGO were present. We made presentation of our activities for sustainable agriculture in this forum.





Agriculture Fair

Adani Foundation has Participated in District Level Agriculture Fair for three days in first week of January. We had show case various activities of Adani Foundation in field of Fodder Sustainability, Bio Gas Support, Cattle care, water conservation and Biodiversity.

Adani Foundation was felicitated award for " To Develop Unique Model for Fodder Sustainability in Kutchh".

State Minister Mr. Vasanbhai Ahir has inaugurated this event. By this platform we could able to connect with approximately 12000 farmers of Kutchh District by providing guidance for NB21 and Maize Cultivation. We have also given information about Saheli Mahila Gruh Udyog and could also our products i.e. Eco Friendly bags, Banana Wafers and Washing powder.

Tissue Culture

Date is the Amrut Fal of Kutchh and Mainly best quality available in some villages in Mundra Taluka. To maintain quality uniformity Adani Foundation is planning for cultivate 4000 tissue cultured plants of elite varieties to the farmers of project area. For this, we will select best offshoots of elite plants from farmers fields in coordination with farmers groups. The selected planting materials will be given to identify tissue culture laboratory for developing tissue culture plants in 3 years. Hence, whole program is coordinating farmers participation basis having four party i.e. Tissue culture laboratory, Adani Foundation, KVK and farmers committee of project area. Major functions of all parties are as under;

• TC Lab: Develop TC plantlets of elite varieties • Adani foundation: Financial support • KVK : Technical support to the program

Farmers committee : Provide best planting materials for developing TC plants & contribution in distribution & provide nominal cost of plants. Hence, the farmers contribution in the program is 10 Lakh.

Ground work for this project is completed during current financial year i.e. Registration of 200 farmers, series of meeting with KVK and Anand University



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Project Swavlamban

Project Swavlamban Launched with blessings of differently abled people of MUNDRA TALUKA.

Our objective is

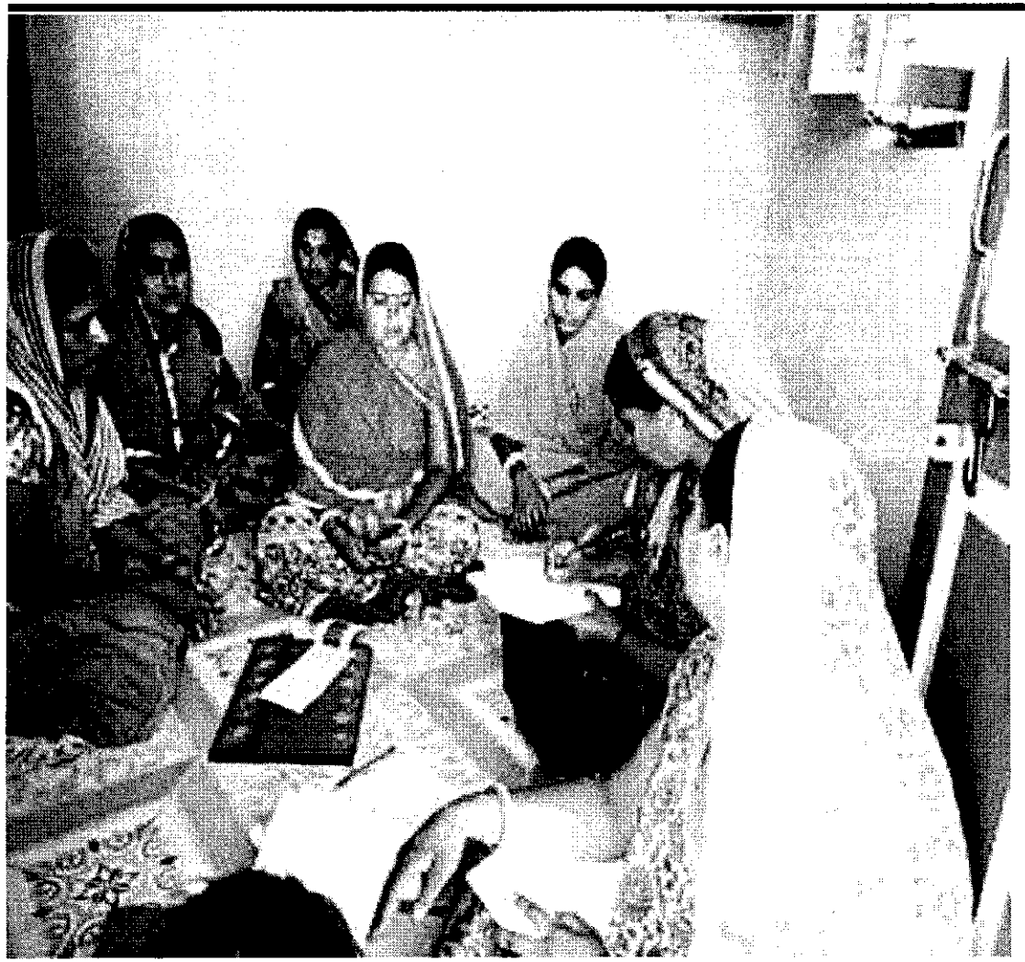
- To increase awareness about Government schemes for Divyang people, widows and senior citizens and coordinate them with Social Welfare Department, GoG
- After getting income generation equipment support - Proper training provision to make them self-reliant in true sense!!
- Adani Foundation is playing the role of facilitator in case of tie up with Government Scheme for Widows, Senior Citizens and Handicapped people. The identity cards are issued for the handicapped in coordination with Bhuj Samaj Suraksha Khata which is beneficial for them to get specific kit for their disability type. This year 154 beneficiaries linked up with pension scheme.
- The financial benefit of the senior citizen Yojana is Rs. 500 per month and the widow scheme is of Rs. 1250 per month. Jilla Samaj Suraksha Officer and team remain present every time.

No	Type	Beneficiaries	Financial benefit
1	Disabled	409	10,00,000
2	Widow	92	3,25,000
3	Senior Citizen	32	1,75,000
	Total	533	15,00,000



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Women Empowerment Projects



- In Kutch, the situation of women is miserable. Women are totally dependent on male members of family for their needs. Consumption of liquor is one of the main culprits in Kutch. Due to this evil prevalent among men many women are suffering.
- Considering this situation, We have started our training program with two major women's group of Villages near Adani Power and Adani Ports. Both the groups of women **(132 women in total)** successfully completed their training for preparing washing powder, phenyl, liquid for cleaning utensils and hand wash etc.
- We have selected 12 women groups having 132 members total, as per their ability for different work i.e. accounting, banking, leadership, marketing, administration etc.
- As a further step to bring sustainability, we thought to start a shop "Saheli Mahila Gruh Udyog" at Shantivan Colony.
- Main Perishable/ Non perishable items by Saheli are

1. Washing Powder
2. Phynayle
3. Dish wash liquid
4. Pickle of Bijora
5. Suf handicraft
6. Ahir Handicraft

Women Empowerment Projects
Step towards socio economic development

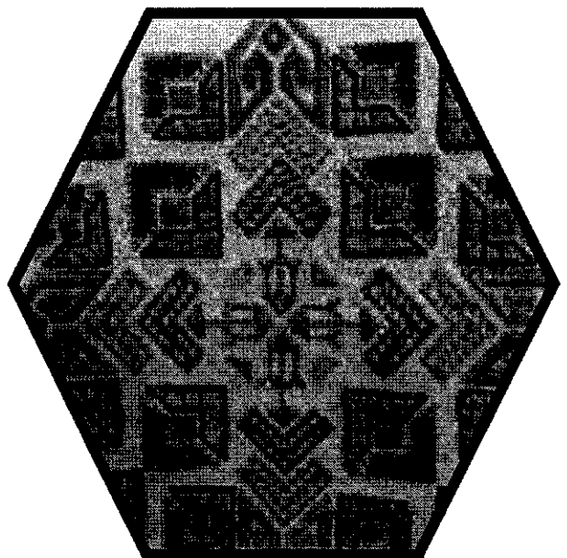
No	Village	Group	Members	Saving Amount	Work
1	Mota Kandagra	Jay Mekran	18	100	Stitching
2	Mota Kandagra	Jay Momai	10	200	Stitching
3	Navinal	Vishwas	14	100	Stitching/Dori
4	Navinal	Chamunda	10	100	Phynayle making
5	Baroi	Adhar	12	100	Perishable items
6	Sadau	Vishwasi	16	100	Dhadki, Frames
7	Shekhadia	Sonal	12	200	Washing Powder
8	Mota Kapaya	Tejasvi	10	100	Eco friendly bags
9	Mundra	Meghdhanushya	18	100	Mud work
10	Mundra	Aaarambh	20		Suf Handicraft
			132	1100	

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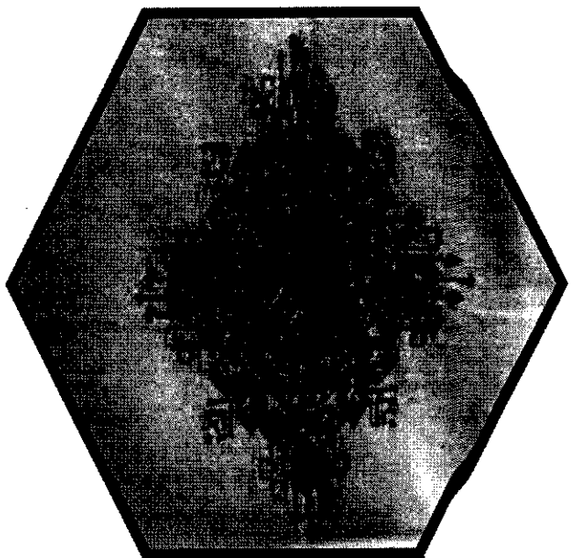
Glimpse of Women Empowerment Projects

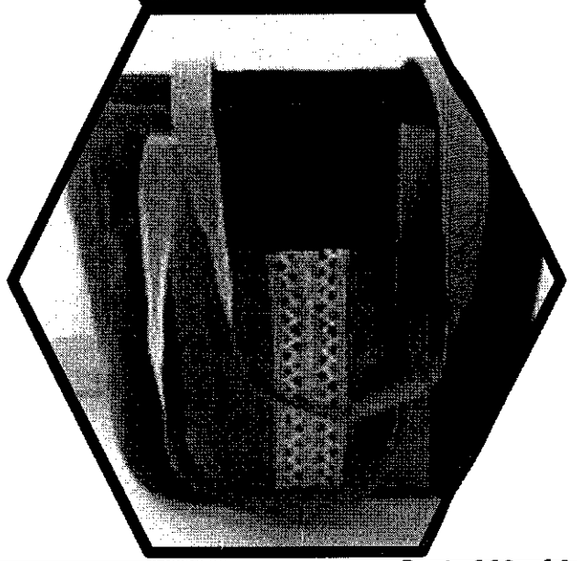
SHG Meetings in various Villages regarding record check , Loan , Interest detail also collect information for their hidden Skill.











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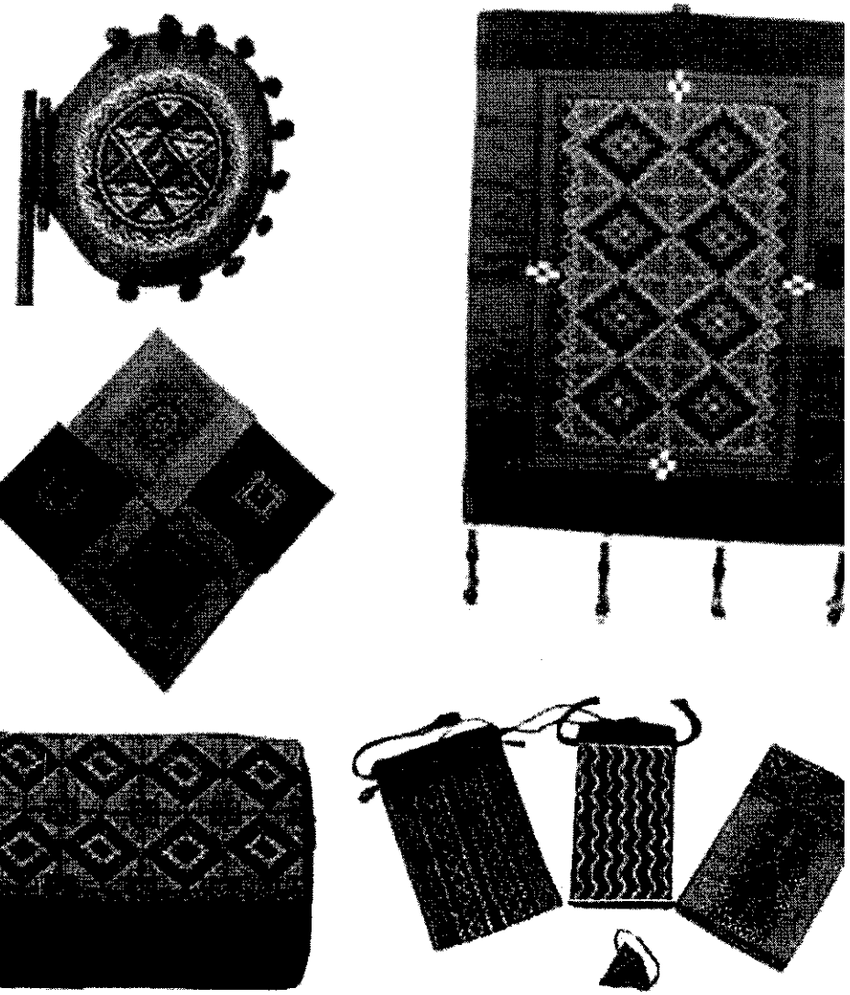
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एक प्रारम्भ

aaarambh

Adani Foundation launched programme AAARAMBH to revive the dying art form of Suf in a ceremony in Mundra, Kutch. Under this project, Adani Foundation will facilitate the training of about 30 women in the handicraft and also help them with market linkages to ensure sustained livelihood for them. On the occasion, Adani Foundation also launched a website made by the women themselves to market their products.

Suf handicraft was practiced in Kutchh District, Gujarat. Due to lack of patrons this handicraft has been dwindling. Suf handicraft is painstaking embroidery based on the shape of a triangle. Suf is counted on the wrap and weft of the cloth in a surface satin stitch worked from the back. Each artisan imagines her design and then counts it out in reverse.



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International Women's Day

International Women's Day Celebration Mundra





International Women's Day has been celebrated by the Adani Foundation, Mundra with Integrated Child Development Scheme. Chief Guest of the event was Mr. Komal Singh (Commandant Coast Guard) and Ms. Ami Rakshit Shah (APS School) .Distinguished Guest Mr. Vayda (Taluka Development Officer, Mundra)

On this momentous occasion the supervisors of ICDS were felicitated for their noble work. Adani Foundation also honored Eight women entrepreneurs who were supported by the Adani Foundation, Mundra for income generation.

The Adani Foundation Mundra was also facilitated by the ICDS for their remarkable work in field of women empowerment and Suposhan as well.

Additionally, In coordination with DDO, Kutchh Pradhanmantri Mandhan Yojana form filled up for @ 225 women – who will give benefit of pension of Rs. 3500 per month after age of 60 years. Our Suposhan Sangini remained present and guided about nutrition.

As a Matter of Celebration , Same Day ICDS Mundra got state level Mata Yashoda award at Gandhinagar for best Anganwadi work.

Total 300 women attended the programme with great enthusiasm and Zeal.

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International Women's Day Celebration Bhuj

International Women's Day has been celebrated by the Adani Foundation, Bhuj with SOS Gada Village, Bhuj Engineering College as well as Army force Bhuj. Chief Guest of the event was Dr. Kunika Patel (Gynecologist GAIMS) and Dr. Rajendra Harnagar (Gynecologist GAIMS) and Distinguished Guest was Mr. Mishra (Airport Authority, Bhuj)

As a part of Bhuj and Lakhpat CSR celebration International Women's Day in Various place Bhuj Engineering collage, SOS village and Bhuj Airport. Awareness for Breast and cervical cancer, and health - hygiene. Total 230 women are benefitted in this awareness session. Also discussed about various psychological issues during menopause age and its solution.

RURAL INFRASTRUCTURE DEVELOPMENT

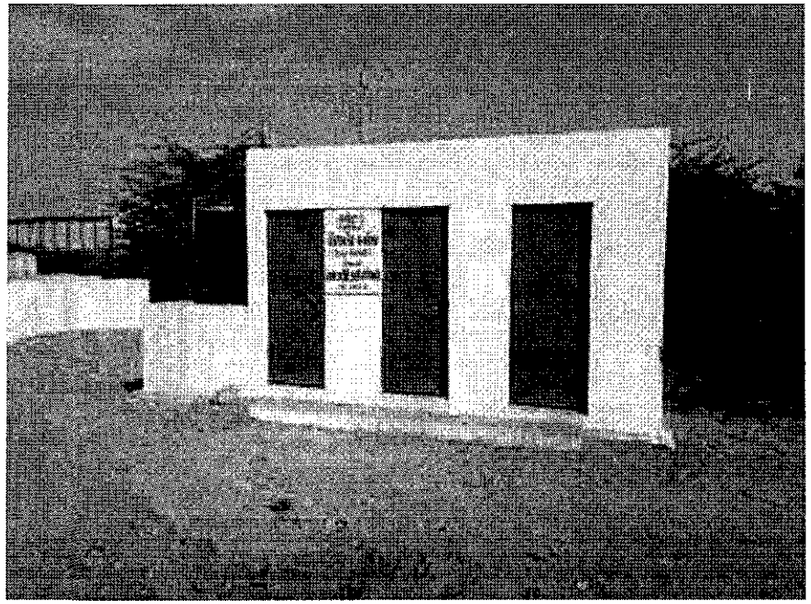


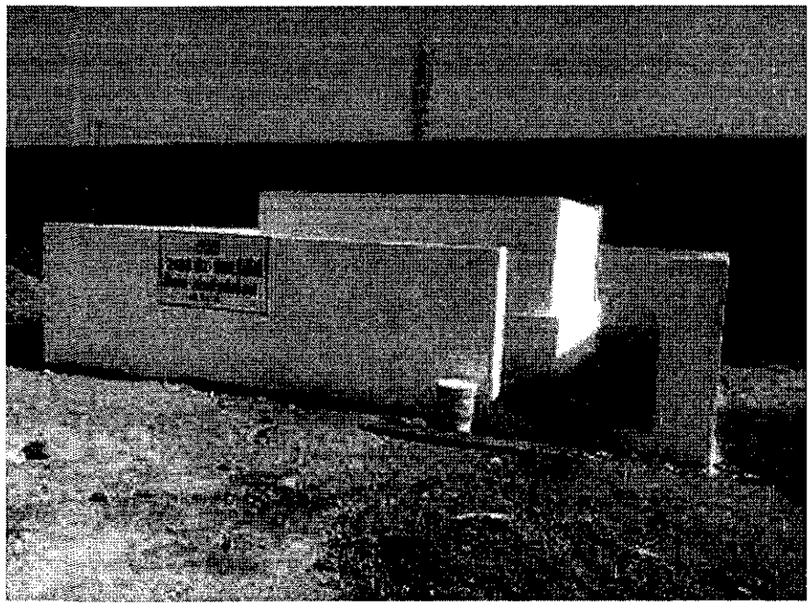
Building a strong community relationship is the key to progress of Adani Foundation. The programs such as Education, Health and Sustainable livelihood development play a very important role in building this strong relationship with the community. These three programs are incomplete without the inclusion of the Rural Infrastructure Development program.

This year on path of sustainability, we have taken some steps as follows...

Under Dignity of Drivers Project, Adani Foundation has constructed Resting Shed for Drivers entering in SEZ Premises. Total 50 beds are constructed, drinking water and sanitation plus recreational – TV Facilities and will be charged minimum. Adani Foundation has handed over the project to ASSET Department – SEZ as a revenue generation model.

In this ceremony Mr. Avinash Rai (CEO- APSEZ), Mr. Rakshit Shah(Executive Director – APSEZ), Mr. Pritpal Sinh (Head – SEZ Operation) and other transporters remained present.





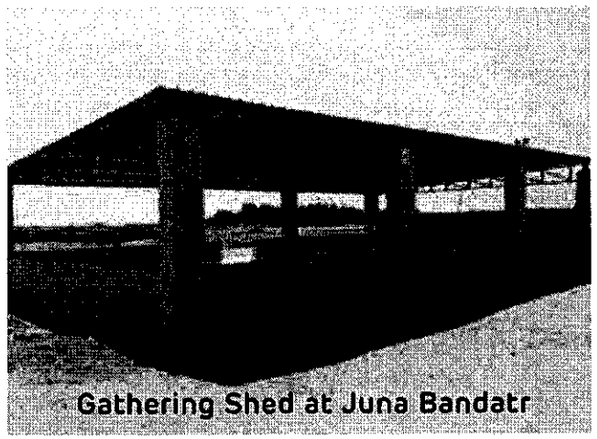
RID – Dignity of Workforce

Present condition of migrated labour community of Adani port, power and Willmar is really matter of concern. They are living in pathetic condition. It is true that we cannot achieve our goal of development until we support to up bring lives of this community. Basic needs of this labour force needs to be address. In labour Vasahats they are not getting facility of pure drinking water, proper living condition, sanitation or proper living atmosphere. To build up trust and transparency in labour community, union labours and Smooth business operations and to create more efficiency by providing better living conditions Adani Foundation has constructed 45 Toilet block and proper bathing place for labours.

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Work Completed

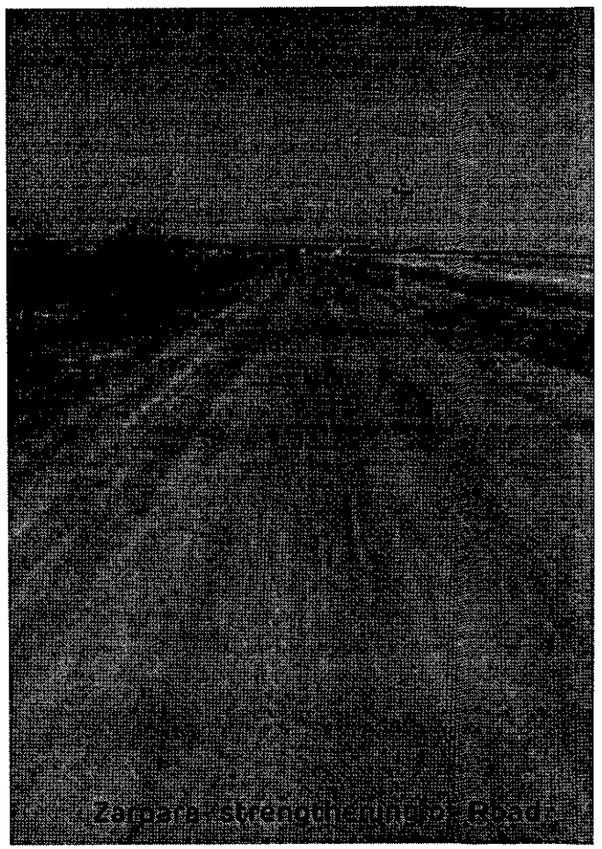
- ✓ Road repairing various vasahat
- ✓ Open shed at Juna Bandar
- ✓ Sand Filling plot at JUNA BANDAR
- ✓ Concrete Step ladder at Juna Bandar
- ✓ House construction at Shekhadia
- ✓ Two approach road 5000 meter Zarpara Fishermen and 5000 meter Luni Pagadiya
- ✓ Drinking water storage tank 5000 ltr capacity bavdi Bandar -2, Juna Bandar -2, Kutdi Bandar -1
- ✓ water pipe line installation at Wandi village 2000meter.
- ✓ Basic amenities at Rampar Village Paver block 6000 LTR Storage tank and Boundary wall at community place.
- ✓ Additional civil work in community hall
- ✓ Open shed Gundiyali
- ✓ Boundary wall in common place at Tragadi.



Gathering Shed at Juna Bandatr



Room Veera Bandar



Zarpara strenothening RCC Road

An initiative by
adani
Foundation

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Swachhagraha



Adani Foundation has launched project "Swachhagraha" Swachhata ka Satyagraha in the year 2015, to support the 'Swachh Bharat Abhiyan'. Falling in line with our Honorable Prime Minister's call for a Clean India, we launched this mass movement towards making our Nation litter free.

The programme draws inspiration from one of the largest mass movements - Satyagraha, which catalyzed action by winning over people's hearts through tremendous patience and resolve, instilling dignity and self-respect among our people. Swachhagraha aims to engage people and bring about a behavior change, where people get involved 'to create a culture of cleanliness'. Swachhagraha is inculcating behavior change education in cleanliness, sanitation, personal hygiene and civic consciousness amongst young minds.



Presently the Swachhagraha project is being implemented in 3000+ schools across 17 States. So far 3500+ teachers have been trained in behavior change education in schools, ranging from elite private schools to government municipal schools. The programme has directly involved over 57000+ students who have further reached out to their peers, parents and community through a variety of planned action projects and campaigns.

Mundra site- Adani Foundation launched Swachhagraha in 4 Blocks of Kutch District (Mundra, Anjar, Gandhidham, Bhuj). The Swachhagraha programme was launched in Bhujwith participation of over 450 Schools in Swachhagraha Prerak's Training Workshop with support of District Education Department, Kutch District. The programme was launched by Mrs. Shilin R. Adani, Trustee (Adani Foundation); Mr. Prabhav Joshi(DDO, Kutch), Mr. V.S.Gadhavi, (Director, Adani Foundation); Mrs. Sushama Oza, (Director, Adani Foundation); Mrs. Ami Rakshit Shah (Adani Public School); Mr. (Rakesh Vyas – DEO, Kutch); Mr. Sanjay Parmar (DPEO, Kutch) on 1st October 2018.











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SWACHHAGRAHA - ACTIVITIES



Swachhagraha Marathon : Run Against Depression

Gujarat Adani Institute of Medical Sciences G K General Hospital and Student Counsel Organized the Bhuj Marathon. Theme of the marathon was Run against Depression and Swachhagraha.
Total more than 800 participants took part in this marathon with enthusiasm and zeal.





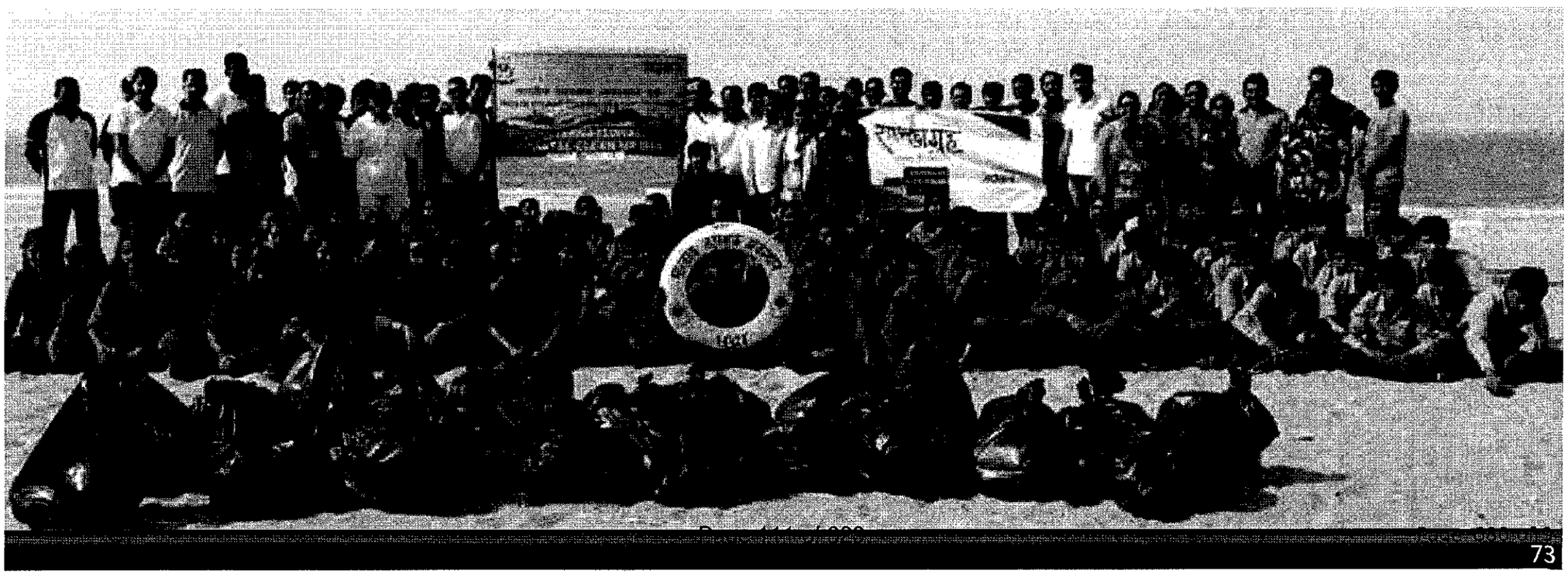


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International Coastal Clean up Day



Mundra Adani foundation MUNDRA has celebrated swachhagraha related International Coastal Clean up Day celebrated with Coast Guard" with theme swachhagraha.. School students, Coast Guard staff and Adani foundation staff had cleaned Mandvi beach and give a message of swachhagraha.. At the end information given about swachhagraha project



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Adani Skill Development Centre



Adani Skill Development Centre (ASDC) is playing a pivotal role in implementing sustainable development in the state.

Several miscellaneous industries exist in Kutch district. Adani Skill Development Centre has started a center in Mundra block so that the needs of these industries are fulfilled, the local youth is enrolled in various training / skill courses and the distance between the both is minimized.

The objective of this center is to impart different kinds of training to the students of 10th, 12th, college or ITI from surrounding areas. Thus, various employment-oriented trainings are organized to optimize the skills, art and knowledge through proper guidance and direction.

During this year Total 1819 people is given various trainings to enhance socio economic development.

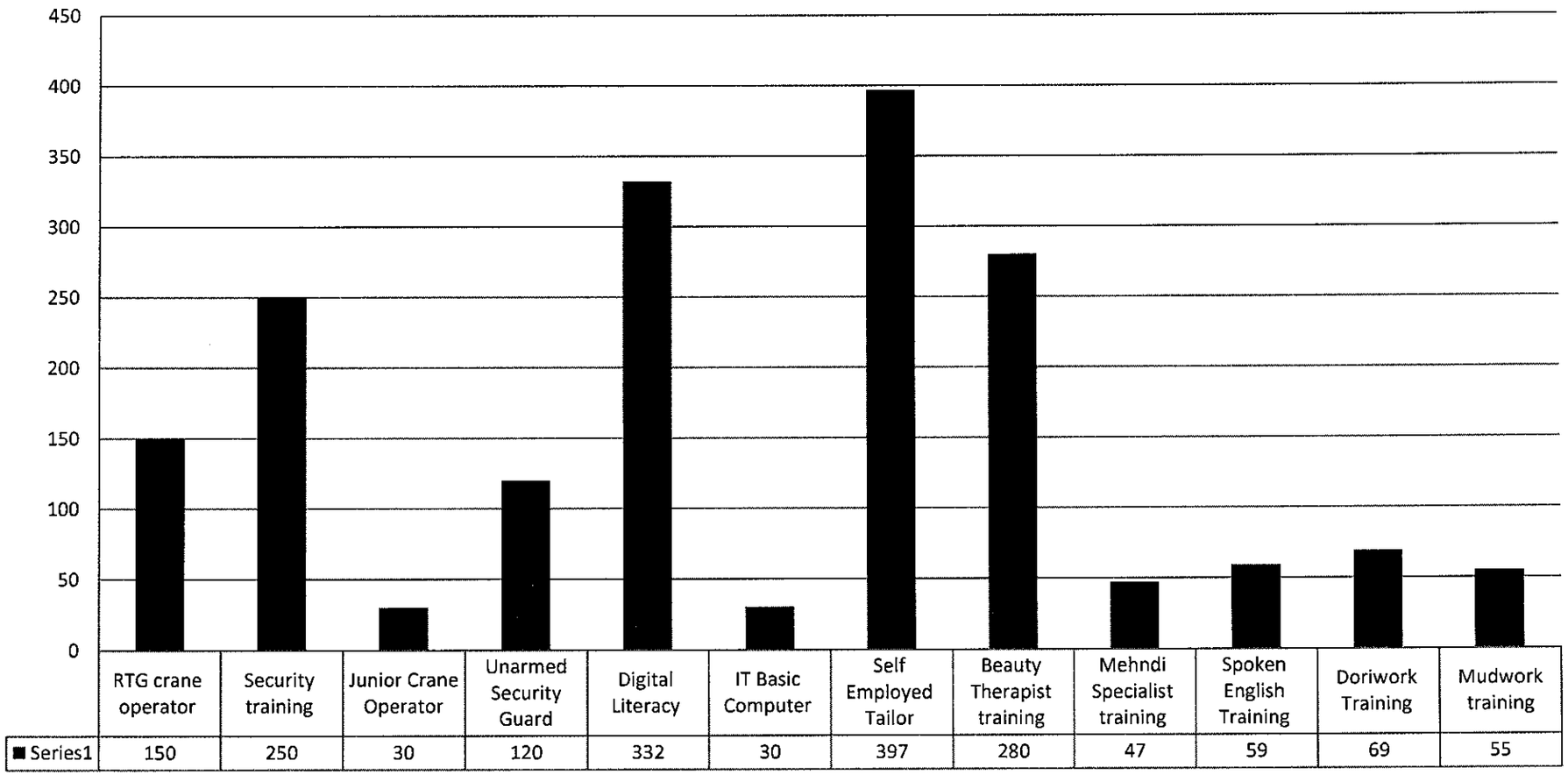
Out of which 1294 People are getting employment or Self Employment and average income up to Rs. 5200 per month. Digital literacy training is very helpful in coordinating with today's Digital world....

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In the year 2018-19, ASDC trained 1819 candidates at Mundra.

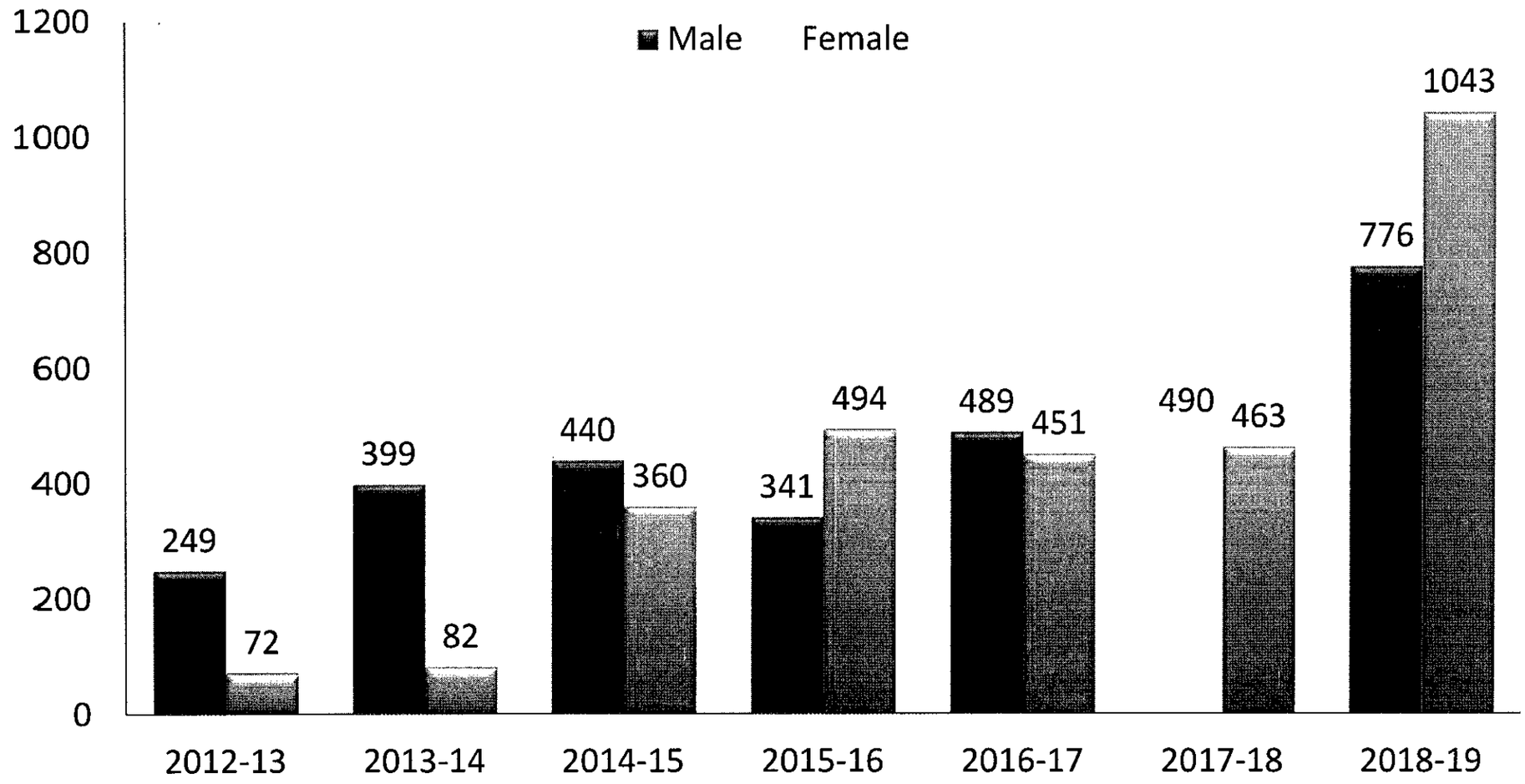
THE YEAR IN REVIEW : KEY HIGHLIGHTS

Training chart 2018-19



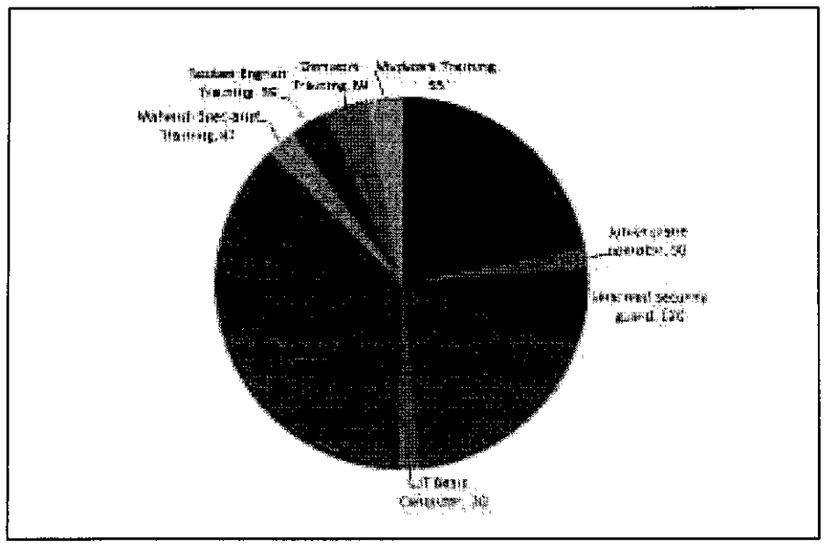
	RTG crane operator	Security training	Junior Crane Operator	Unarmed Security Guard	Digital Literacy	IT Basic Computer	Self Employed Tailor	Beauty Therapist training	Mehndi Specialist training	Spoken English Training	Doriwork Training	Mudwork training
Series1	150	250	30	120	332	30	397	280	47	59	69	55

OUR PROGRESS MUNDRA

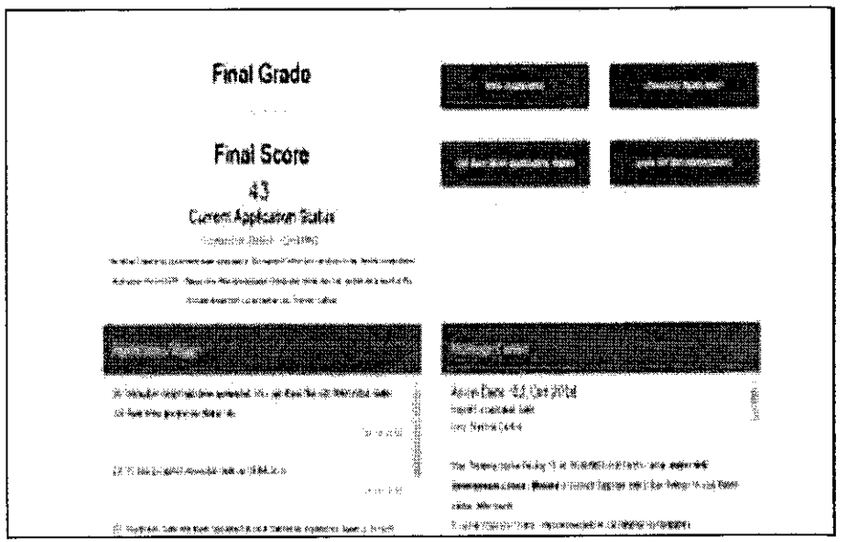


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DETAILS OF VARIOUS TRAINING UNDERTAKEN



Adani skill development centre Mundra Placement figures of ASDC. Total 1294 people are getting employment after training with approximate ROI Rs. 5200 per month.



Adani skill development centre Mundra is qualified in NSDC with 5 star rating for job role junior crane operator and unarmed security guard.

LAUNCHED "SAKSHAM" CENTER AT BAROI GUEST HOUSE



ASDC-Baroi (Mundra):- Adani skill development Center (ASDC) launched 'SAKSHAM' center at Baroi guest house in Mundra on 16th June 2018 to provide skill development training to youth in the Mundra.

An initiative of Adani foundation, the center in the Mundra city will benefit about more than 500 candidates every year in Beauty &Wellness course.

The center will provide skill development training to the youths in the age group of 14-40years initially in Beauty & Wellness course. Total enrolled for this training were 90 students.

LAUNCHED "DIGITAL LITERACY" AT UTHHAN VILLAGES



Adani Skill Development center, Mundra has started digital literacy class in local village. 40 girls and boy are participated in first session. All village people are happy for this training in phase. We have also arrange evening batches to cover all people of various village.

Digital literacy training done through laptops and Tablets:-

1). The course duration is 26 days and number of hours is 52.

2). Per day training delivery hour is 2.

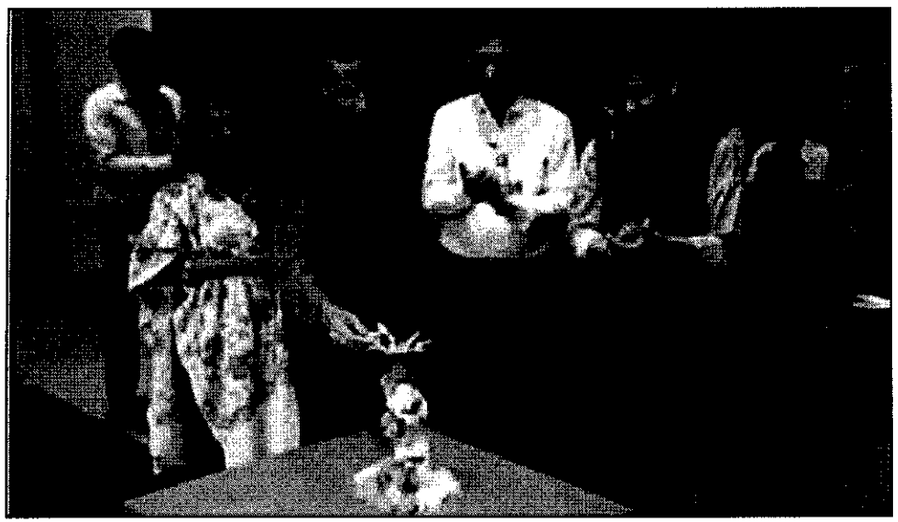
3). This is completely based on demonstrative and practical training methodologies.

4). The delivery is intended to be done through Desktops and Tablets

5). Attaching Also cover for payment banking topics .

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LAUNCHED "JUNIOR CRANE OPERATOR" COURSE UNDER PMKVY



On 6th December 2018 launching program was organized at Adani house for (1) Junior Operator crane (2) Unarmed Security guard

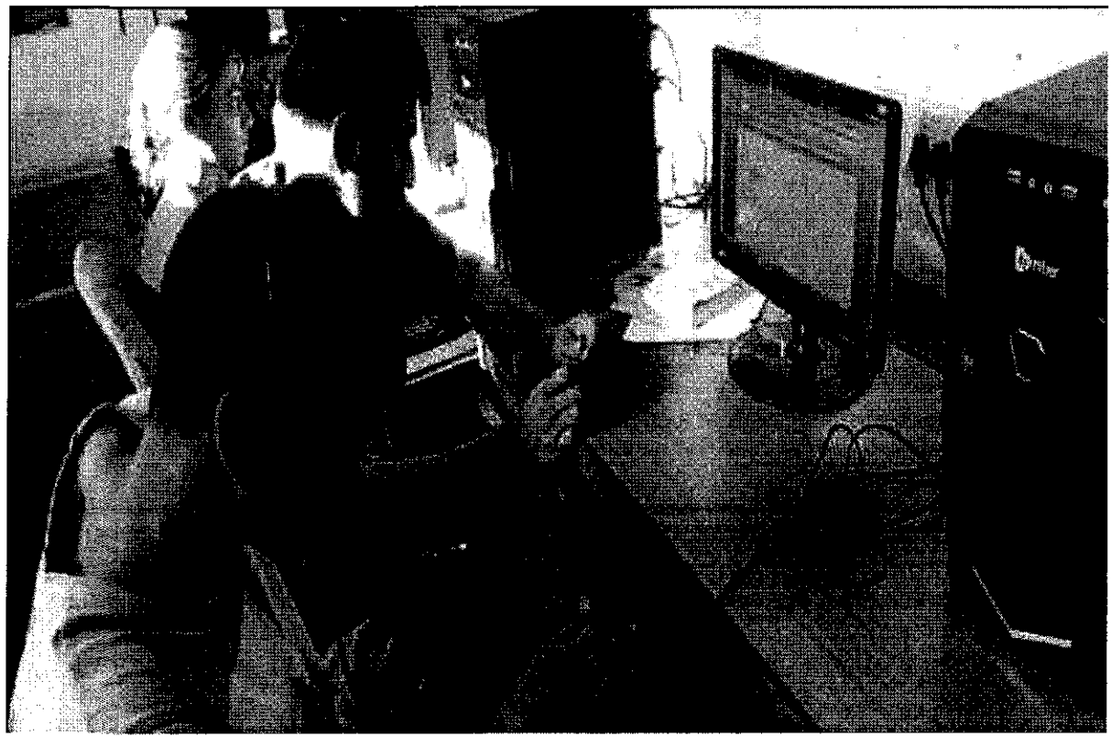
Total 30 beneficiaries identified and registered for Junior operator crane PMKVY portal. Mr. Vasant Gadhavi Sir (Director of Adani Foundation), Mr. Avinash Rai (CEO,APSEZ), Mr. Rakshit sir (ED APSEZ), and all HOD remained present and all motivated by their speech.

STARTED UNARMED SECURITY GUARD COURSE UNDER PMKVY



Adani Skill Development Centre, Mundra received 120 candidates target of Unarmed Security guard training of PMKVY (NSDC). We have started 2 batch with 60 candidates of Unarmed security guard training at Adani Security training school at Mundra.

Adani Skill Development Centre - Bhuj



One more feather added in Cap of Project Saksham – Adani Skill Development Center started in Bhuj.

PMKVY certification received with Four Star Rating in October 2018.

We have started Adani Skill Development Center at Campus of Gujrat Adani Institute of Medical Sciences with a main stream course of "General Duty Assistant". After that we started digital literacy, beauty and wellness plus stitching courses.

ASDC Bhuj got overwhelming response of district administration for organizing special batch for widows and coordinating for their placements.

We got prodigious rejoinder during training of visually impaired and hearing impaired students at Navchetan Andhjan Mandal Madhapar.

By the unique activities and coordination, ASDC Bhuj received huge amount of appreciation from media.

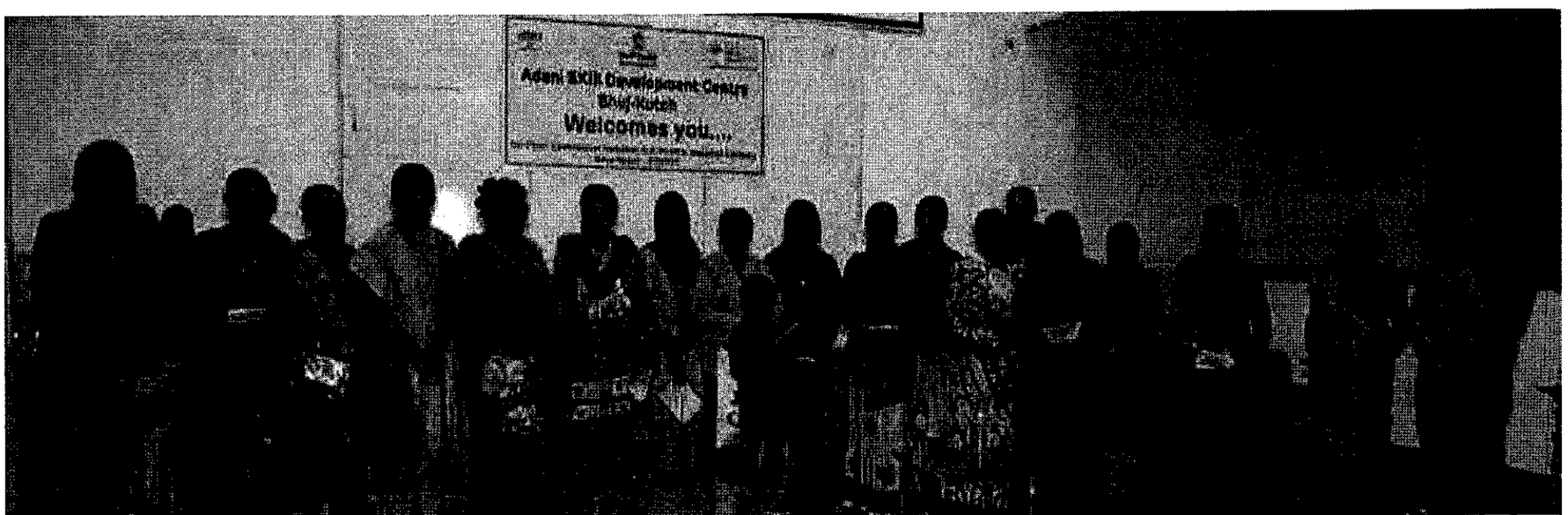
Total 663 Beneficiaries have taken training out of which 432 people are doing job or self employment.

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In the year 2018-19, ASDC trained 663 candidates at Bhuj.

Training Details	Qtr.–1	Qtr.–2	Qtr.–3	Qtr.–4	Total
Digital Literacy	0	27	58	175	260
General Duty Assistant	59	55	83	00	197
Spoken English	0	14	0	0	14
Beauty & Wellness	0	35	18	79	132
Banking Related Training	0	0	0	60	60
Total	**59**	**131**	**159**	**295**	**663**





Event Celebration





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Teacher's Day Celebration : Guru Vandana



- Teacher's day Celebration - Guruvandana' Program was organized under esteemed presence of Shri Prabhav Joshi (District Development Officer) and teachers of 106 government primary schools with great enthusiasm.
- Objective of the programme was "healthy mind resides in a healthy body which is why a health checkup is scheduled for all the teachers which included BMI, BP, RBS, HB and vision test. Health check was done by Adani hospital Mundra.
- Followed by a motivational speech by Dr. Darshana Dhodakiya who is the Director of Bhasha Bhavan of Gujarati Subject, Throwing light on the principle that teachers cannot be trained in to be coming a teacher, but they are teachers because they actually are born teachers.
- Soft skill training by Ms. Riddhi Trivedi who is a highly skilled trainer from ASDC and would explain us the importance and need of soft skills. A highly thought provoking drama by students of 'Shekhadiya' school. And last but not the least session taken by Mr. Jatin Upadhyay.

Utthan :
Review and setting tone





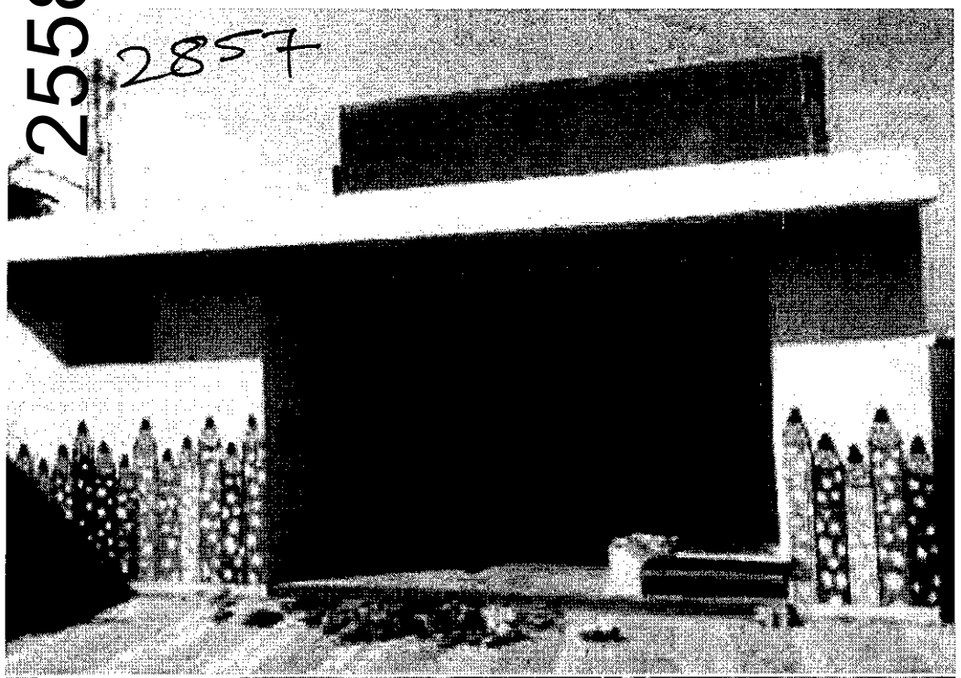
To review and propel the Project Utthan was scheduled on 18th February 2019 at Kamandpur Primary School and Dhrub. Distinguished Guest of the Programme was Mr. Prabhav Joshi – District Development Officer, Kutch , Mr. Rakshit Shah - ED, Mundra , Shri Vasant Gadhavi, Director - Adani Foundation. SMC members of the School and villagers were gathered in Kamandpur Primary School.

DDO appreciated this unique initiative taken by Adani Foundation to enhance the level of Primary education of Kutch district. He is happy for the concept of Mothers' meet which is the keen area of this project for sending students on regular basis. He requested to all the mothers to send their ward in school daily. He especially recognized the installation of Smart Classroom in all the 17 School.

SMC members were highly appreciated the material support and introduction of English language in classes- 1 to 4 by the teachers which were appointed by Adani foundation. Principal briefed the project and shared his satisfaction towards this project on behalf of 17 School Principal.

Villagers are accepted Project Utthan with open handed and broad minded. Around 130 people were witnessed of this program.

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Uthhan : Anganwadi Upgradation

Under Project Utthan and part of early intervention Adani Foundation has upgraded Anganwadi infrastructure. To inauguration of the upgraded Anganwadi was scheduled on 18th February 2019 at Dhrub. Distinguished Guest of the Programme was Mr. Prabhav Joshi – District Development Officer, Kutch , Mr. Rakshit Shah - ED, Mundra , Shri Vasant Gadhavi, Director - Adani Foundation. ICDS members remained present to motivate the Anganwadi supervisors.

Coastal Week Celebration with Indian Coast Guard





During celebration of coastal week - Safety and Security awareness program for fishermen while fishing as well as health check up camp and fishermen shed inauguration program was organized at Juna Badar with collaboration of Indian coast guard department. In this occasion Mamlatdar of Mundra, Commandant of coast guard and Mr. Ashvin Zinzuvadiya (Media : Kutchh Mitra) were present. Mainly they emphasized on national security as well as Personnel security in their speech.

Health camp was organized with support of Adani Hospital Mundra. Total 107 patients were benefitted by health check up camp and prize distributed to winner of Ramaotsav program.

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Fisher Folk Amenities..

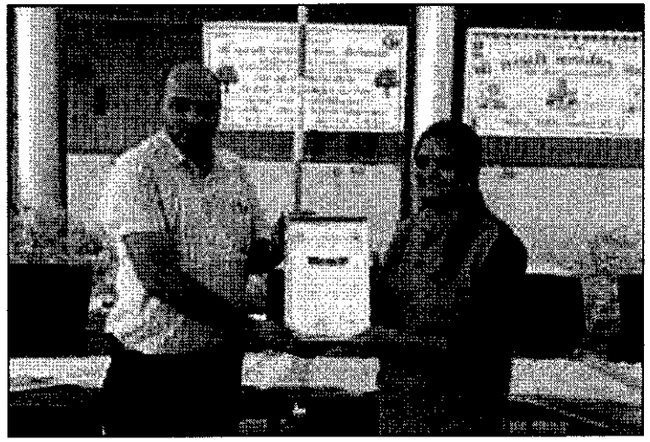
Adani foundation, MUNDRA organized Cricket Tournament " Sixth Adani Premiere League among Fishermen community to promote healthy Sportsmanship and harmonically transparent relationship. The Tournament had been played for 13 days at SVC (Shanti Vihar Cricket Ground) by 6 matches per Days with full of Audience, Total 65 Teams with 780 Fishermen youth were participated with 550Rs. Contribution per teams from Mundra, Anjar and Mandvi Block. The Final Match was played on 9.07.2018 and Pir Saheb (Religious Mentor), Rakshit sir (Executive Director- APSEZ), Dr. A.k Vatsani (Deputy collector ,Bhuj) Mr.Mahesh Dafda (Assistant Director of Fisheries, Bhuj), Mrs. Pankti Shah(Unit CSR Head) ,AF staff and Fishermen Leaders remained present. The Final Match was so interesting and Salaya team becomes winner over Luni Team and more than 1200 Audience from various villages were present. The winner's trophy, Runners-up Trophy, Man of the Series, Man of the Match, Best Baller, and Best Bats-Man Trophy has been given to the Respective Teams and players. The 25000Rs, 15000Rs, 2100Rs, 1100Rs, and 500Rs, 500Rs Prize given to the above Respective Teams and Players from the Teams contribution.





Celebration of World Environment Day at High School, Moti Khakhar

- Plantation of 1111 trees in Moti Khakhar high school ground in coordination with forest department : Moti Khakhar is a Village in Mundra Taluka .It is located 19 KM from Mundra. School is constructed in year 2008 and it is with large ground. Principal requested Adani Foundation to support for tree plantation in area. As per size of ground we can plant more than 1000 plants. In addition, Soil condition is also appropriate. Adani Foundation contacted Forest Department for Tree plantation before monsoon and Forest Department supported for 4000 plants. After getting support from Forest Department – Adani Foundation supported for Drip and Fence for protection of plantation. On 5th June 2018, Adani Foundation Mundra planted 1111 trees at Moti Khakhar. Function was scheduled by Gram Panchayat. Mr. Vyas (District Education Officer),Mr. Anjan (DCF, Mundra), Mr. Saxena (COO, APSEZ),AF Team, students of the school and Village leaders remained present





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Talent Hunt:
International Disability Day

Adani Foundation is working intensively for differently abled in Mundra Taluka since 4 years in coordination with District Social Welfare Department. Till date we could able to support more than 560 Divyang in Mundra Taluka .

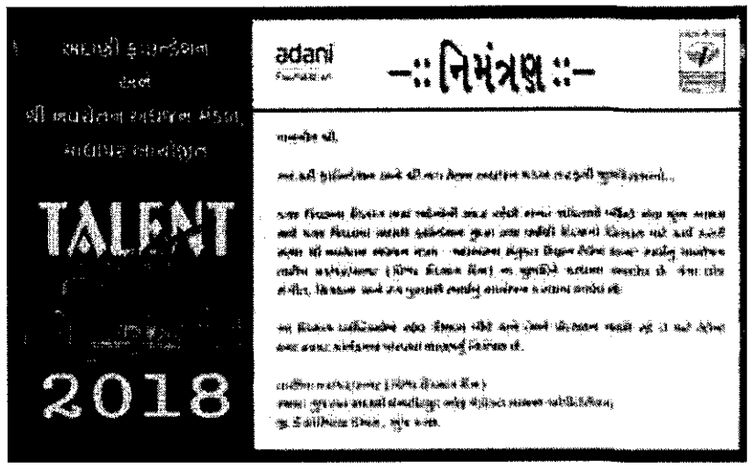
In celebration of International disability day, Adani Foundation organized Music and Painting competition at Taluka Level and Zone Level.

For Winner s of Zone level – District level competition was organized on 3rd December 2018.

With the blessings of almighty, divine Start of the program with blessings speech of District social Defense officer and Laljibhai Prajapati of Navchetan Andhjan Mandal.

Total 675 people from different institutes remained present in inaugural session. All Divyang participants remained present with full preparation.

Some glimpse of the programme Second session of Talent Hunt - International Disability Day was prize distribution with musical celebration. District Collector Ms. Remya Mohan IAS, Mr. Prabhav Joshi IAS, Rakesh Vyas DEO, Mr Arvind District Social welfare officer remained present. Mr. Rakshit bhai Shah ED, APSEZ was with us throughout the program. All four categories got 3 prizes. District social defense officer had given certificate of appreciation to Adani Foundation Mundra..





Talent Hunt : International Disability Day Glimpse

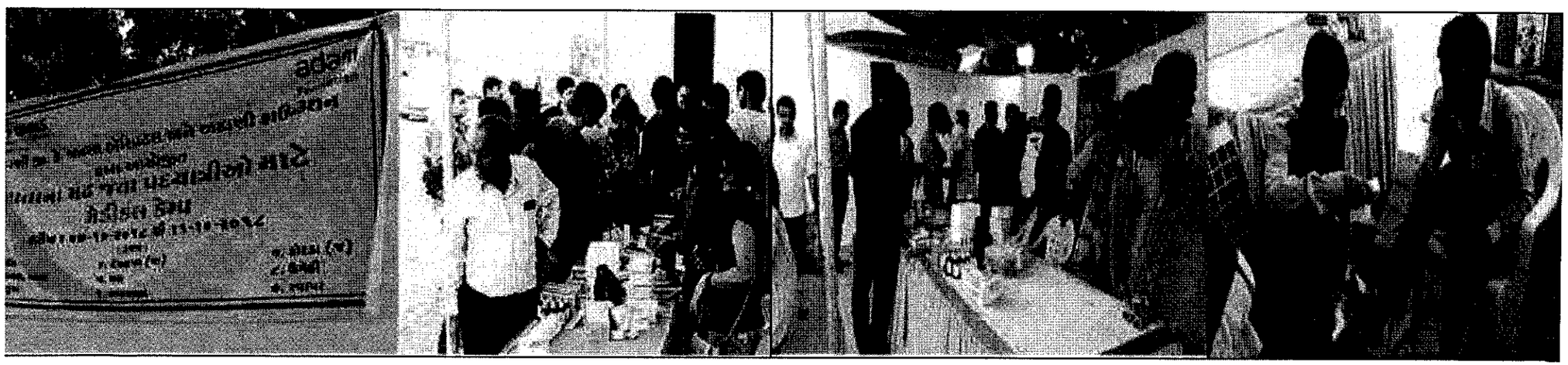


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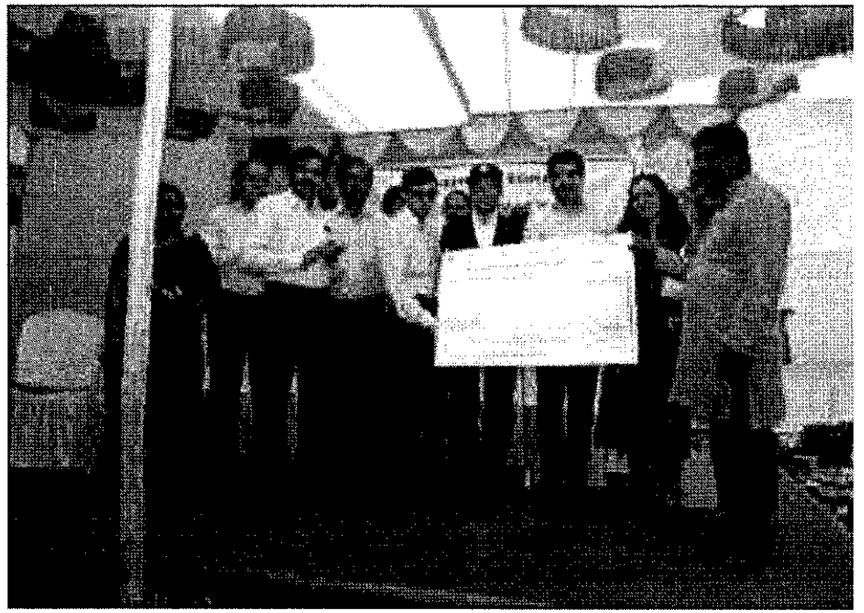
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Divine feeling towards Mata no Madh!!

Mata no Madh is a village in Lakhpat Taluka of Kutch district, Gujarat, India. The village lies surrounded by hills on both banks of a small stream and has a temple dedicated to Ashapura Mata, the household deity of former Jadeja rulers of Cutch State. She is also considered patron deity of Kutch. Many people are used to reach this Ashapura temple by feet from different parts of India. G K General hospital has organized health facility through at 10 locations on way of Mata Na Madh during Navaratri 5th to 11th oct.. In addition to medical facility, This health shibir will provide awareness of swachhagraha, swine flu and Beti bachavo as well The concept given by Shri Gadhvi Sir and implementation will be taken care by Dr. Chintan and Adani foundation health team.



Employee Volunteering Programme





In a move first of its kind employees of the Adani Group have adopted all the students of the Vallabh Vidyalaya school in Mundra in their Employee Volunteering Programme (EVP). All the 704 children in the school are from families of migrant labourers working in various industries in and around Mundra. Children from migrant labourer families in addition to resource constraints at home also bear the disadvantage of unfamiliarity with local language and culture inhibiting participation in school.

Vallabh Vidyalaya by passes the language barrier as the medium of instruction is in Hindi and mostly the kids are from Hindi speaking families. "Thanks to Adani EVP financial resource constraint will be substantially relieved", Dharmendra Bhai who created the school from one shed institution gratefully acknowledged.

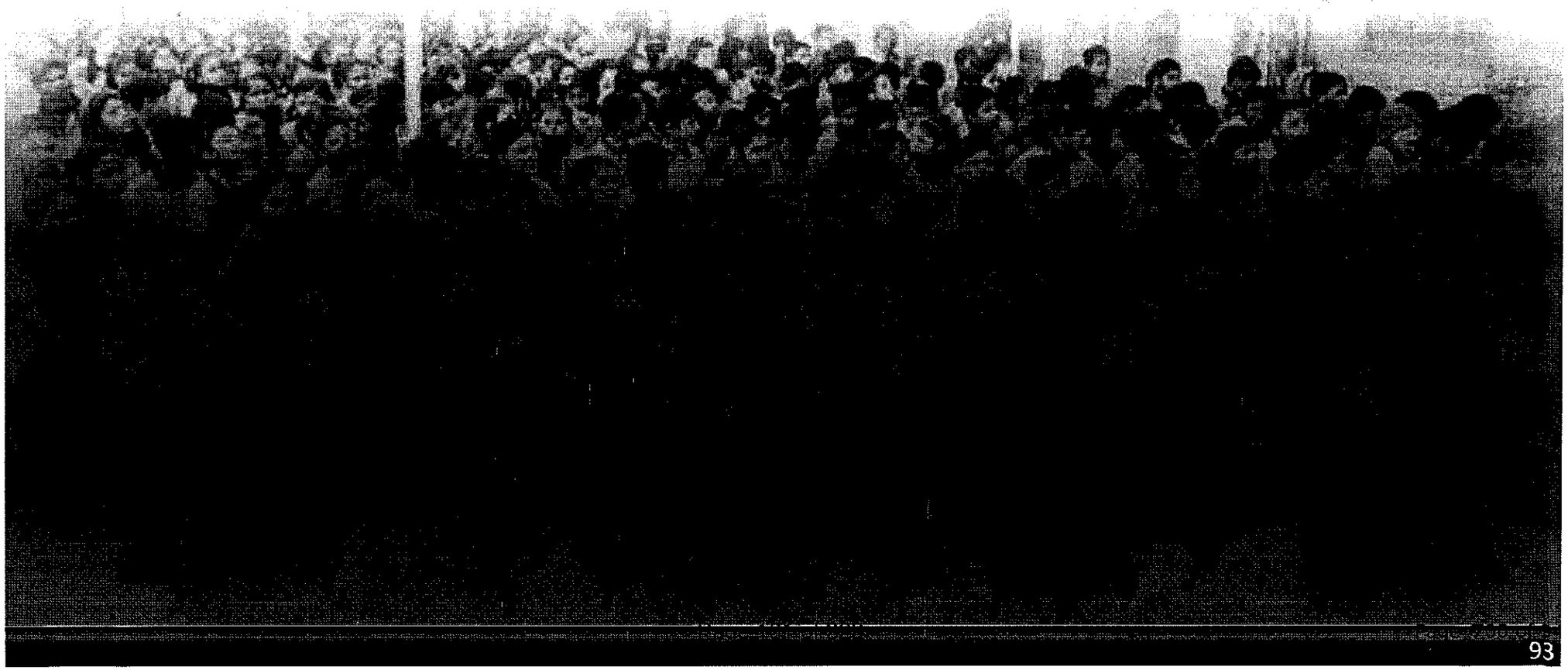
Energised by the inspiring leadership of Adani Foundation's Chairperson Dr. Priti Adani the Group employees handed over a collective cheque in an impressive function at the school premises. One student of Std. VII joyfully expressed, "Your benevolence will have indelible imprints and impact on our lives. Will remember you ever."

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Employee Volunteering Programme

Adani Group is deeply involved in all round social and economic development of the areas in and around Mundra. Adani EVP is context driven and employees have taken part in teaching, improving Aanganwadis, giving impetus to national Swachhata Mission and blood donation. The journey continues





Employee Volunteering Programme

Dignity of workforce day was organized jointly of APSEZ (Adani ports n SEZ Limited), AWL(Adani Wilmar Limited), MSPVL (Mundra Solar Pvt Limited) Adani Hospital and Adani foundation at labour colony with medical camp and handing over of sanitation. more than 32 employees have volunteered in this event.

1. Total OPD by Medical camp at Labour colony-315

2. Blanket Distribution to 800 workers

In this event Mr. Sharad Sharna Head-AWL with staff, Bhaktbandhu DGM HR and Admin staff (APSEZ), Mr. Ganesh Sharma Head HR, President - Kutch Labour Union and Adani foundation team remained.



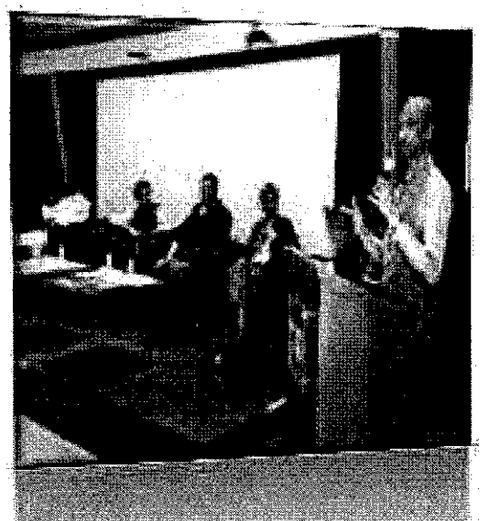


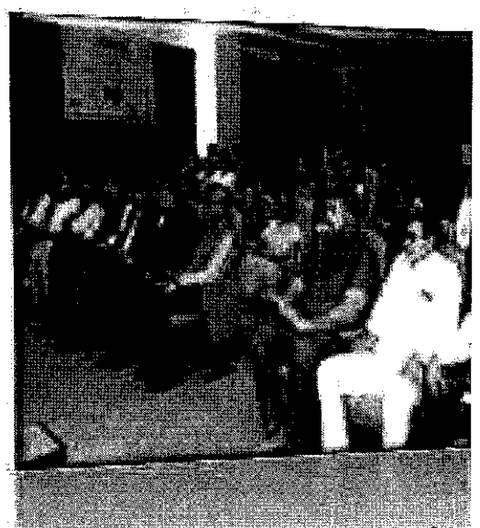


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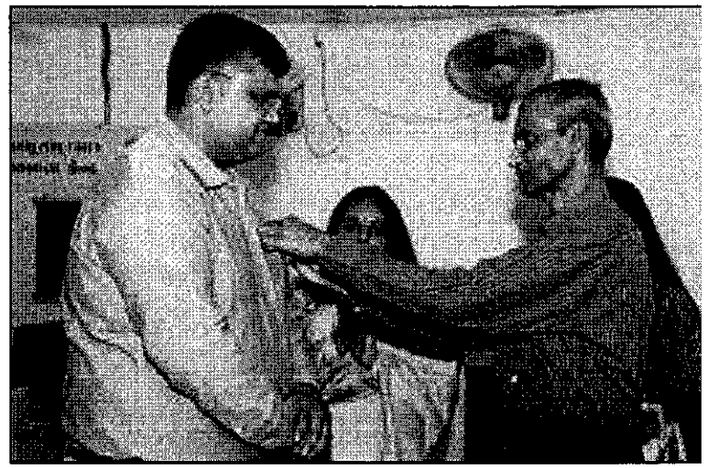
Inauguration of Skill Development training program for Schedule cast beneficiaries

Another milestone reached on 28th Dec 2018, ASDC launched its program for schedule caste in the state of Gujarat. This program will train candidates in various vocational training educational course like Self employed tailor and Beauty & Wellness. Total 60 women/Girls participated in this training. This course is sponsored by Department of Social justice and Empowerment . It was inaugurated in the esteemed presence of Mr. V. S Gadhavi sir (Executive Director ASDC), Mr. Rakshitbhai Shah (ED of APSEZ, Mundra), Mr. K D Kapdiya (Director of Department of social justice and Empowerment), Mr. B P Soyantar (Dep. Director of Social justice and Empowerment, Gandhinagar), Mr. Dhangaru (Dep. Director of Social justice and Empowerment, Bhuj), Mr. Jatin Trivedi (HOD of ASDC), Mrs. Pankti Shah (Unit CSR Head of AF Mundra), Mr. Javaid Akhatar (HR Manager of ASDC).



SWACHHAGRAHA :
At Gujrat Adani Institute of Medical Sciences



"Swachhagraha " – Project launched at Adani G K General Hospital to embed values of cleanliness in minds of the staff and community as well. Separate staff member is also appointed by HO team for the same. Mr. Gadhavi had launched swachhagraha by presenting insignia to Dr. Bhadarka' (Head, Adani GKGH).



SAMVEDANA :
Series of Motivational Sessions

To motivate and felicitate paramedical and nursing staff motivational session was organized with help of Ms. Hiral Pandya which is critical requirement of GKGH. She talked about behavior aspect as well as compassionate approach to patients.

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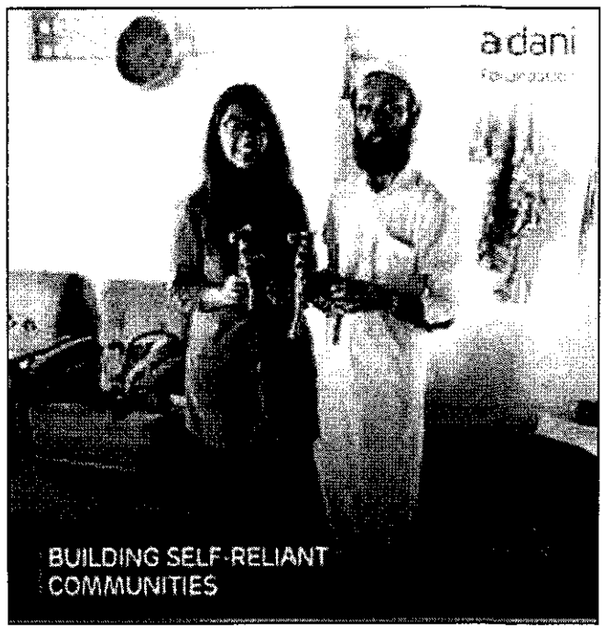
NAMDA ON REVIVAL PATH

Even as a breakthrough is waiting to happen, five trainees were enrolled on Tuesday 5th Dec 17 by Adani Skill Development Centre (ASDC) for the age-old Namda craft, a dying art form of Kutchh district in Gujarat. First initiative of its kind, the skill development training on Namda is aimed at preparing a future generation of artisans for the historic art form.

Adani Foundation, the CSR wing of Adani Group had vowed to save Namda from extinction and bring back its past glory. Originally innovated by an artisan of Mughal Era in the 11th Century India, Namda craft was primarily practiced by the Pinjara and Mansuri communities and Sama Muslims native to Kutchh. Sans proper encouragement, marketing avenues and promotion, the art suffered a major setback with artisans gradually switching over to other professions for livelihood earning.

Till recently, when the Adani Foundation, Mundra team members approached Mansuri Karimbhai Umar bhai, perhaps the sole survivor of the craft in Kutchh, Namda was dying a natural death. As a good corporate citizen, the Adani Group initiated a move to protect the art form, as well to make it popular and sustainable.

The first step towards the enormous goal of reviving Namda, the training programme kicked started with lots of positivity and enthusiasm among the trainees, who are committed to put best efforts for bringing back the past glory for this craft. And the best part of the initiative is that, the Namda survivor himself would train the future-artisans.



GREAT ACHIEVEMENT IS....

KARIM MANSOORI ONCE AN ORDINARY NAMDA ARTISAN IS NOW AN ENTERPRENUAR. THE ADANI FOUNDATION FEELS CONTENTIN REVIVING THE DYING NAMDA ART FORM AND SUPPORTING MANSURI IN STARTING HIS OWN BUSINESS.

HIS JOURNEY IS OFF TO TO A FLYING START AND WE WISH HIM ALL THE BEST.

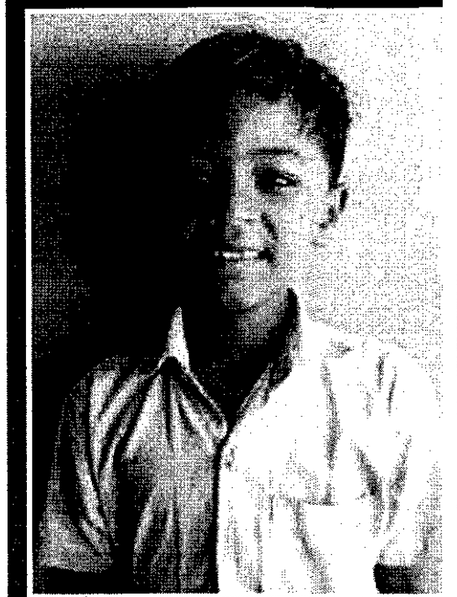
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Beneficiaries Speaks



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Utthan : Enhancing Quality of Education !!



Navinal is a small village of Mundra Taluka. The village boasts of the works done by the goodwill of the Mahajans.The village is inhabited by approximately 1000 people. Rameshbhai Sathwara , his wife Champaben along with their three sons are one of the families residing over here. Rameshbhai is a greengrocer and lives a contended life with his family. The eldest son 14 year old Haresh and the middle one 10 year old Lalji study with devotion and bring good result with god's grace and the blessings of the elders of the family. Their final result would bring a new ray of hope for the parents every year.

But the youngest son, Sanjay studying in class 3 could not read or write. Even after a lot of efforts nothing could not make him read and write. He himself did not even feel like reading or writing. It was meaningless to drag him into learning without his own willingness. The teachers also accepted Sanjay as a dull boy and didn't pay much attention.

But one August morning became august for this boy as it brought a bright ray of hope for him.

A new teacher who had come to teach students like Sanjay talked to Sanjay in his Kutchi mother tongue and this attitude of this teacher made the little boy go wonderstruck. The new teacher made them sing a lot of poems, showed a lot of colourful books and told them a lot of stories. Her attitude interested Sanjay and he willingly came ahead. He sat in the first raw and told the teacher about a lot of things including the beehive outside his home, his parents and elder brothers. What appealed Sanjay the most was the constant attention paid by the new teacher to him. The next day led Sanjay to the special classroom made for the students like him.

Thus, every morning became a new, exciting morning for him.

And today, the innovative rangoli making in shape of alphabets using the fallen tree leaves interested him so much that he got interested in writing letters. This interest led him to write alphabets and later words. Moreover, he got interested in co-curricular activities like reciting poems and colouring the pictures.

The factor that attracted him the most was the loving teacher and this teacher is Hansbai Gadhvi. A resident of Mundra itself Hansbai, studied at Adani Public School. She provides her services to Adani Foundation's Utthan programme.

The Utthan project is the result of the agreement under which Shri Bhupendra bhai Chudasama, the Minister of Education of Gujarat assigned the responsibility of improving the quality of Education to the Adani Foundation. And the responsibility has religiously been accepted by Shri V.S.Gadhvi Sir for the 17 government primary school. Shri Gadhvi Sir has taken it as a mission for the foundation to lead the below average students to the upper level. The teachers having command over Hindi, English and Kutchi have been providing their services in these schools.

The Utthan Project initiated in August 2018 has been heartily welcomed and appreciated by the students, parents and teachers of this area. Under this project, the children who are weak at reading, writing and basic calculation are taught in such innovative ways that their foundation becomes strong and they can come into mainstream level of their class.

The best characteristic of this project is introducing English language from the class 1. Talking about the co-curricular activities, these schools have been facilitated by libraries, smart class rooms and sports equipment.

The efforts are made with a hope that these children get the benefit of this teaching mission and move towards a happy, bright and prosperous future.

Utthan : Enhancing Quality of Education !!



"Her eyes today had a shine so different, so divine, probably astral... was the shine real or an illusion? Or it was a simple result reflecting the efforts put in?"

These are the words of Siddhi Shah who is one of the teachers working as Utthan Sahayak in the Utthan project. She works in the Zarpara village, a village where the chief occupation is agriculture and this works as the chief reason behind the irregularity of children in attending school.

The area in and around Zarpara is quite vast and looking at this only the Government has approved 6 Government Primary Schools. But the scenario on the education side is still dismal. There is a long way to go to achieve the desired results. The teachers like Siddhi Shah who work as Utthan Sahayak have their role here. They play a key role in leading the children to school and bringing their academic level up.

Let's talk about what Siddhi Shah has to say about one such girl Prgna who studies in the Khoyadi Government Primary School.

Pragna's father Haribhai is in agriculture field and rearing cattle. This work cannot be carried ahead without the support given by the wife and thus the mother Malsriben too is busy helping the husband in his daily work along with shouldering the responsibilities of performing the household chores of a joint family and bringing up of her own three children. Hence, she finds it difficult to monitor the schooling of her children.

Pragna herself did not have much interest in studies and being the only girl child of the family, Pragna didn't take going to school seriously.

Siddhiben Shah would check the attendance registers daily and would go to meet the parents of those children who do not come to school regularly.

Pragna's irregular attendance was noticed by Siddhiben Shah and she decided to visit her home.

Once she visited her mother Malsriben and persuaded to send Prgna at school. This worked and Prgna started coming regularly. To her surprise, Siddhiben found that Pragna who was not at all interested in reading and writing could do Maths sums excellently well. Siddhiben used her interest in Maths and led her to reading and writing. Under Siddhiben's guidance, Pragna started with letters, words and with the passage of time she acquired fluency in reading flawlessly. It was like a test for the teacher and Pragna's reading fluently and with interest was the fruit the teacher's hard work bore.

And today when in the Saturday morning assembly, Siddhiben saw Pragna reading the newspaper fluently, she realized that it was her hard work that had borne fruit.

Siddhiben Shah is basically a computer engineer but her love for social work, especially in schools brought her to work in Utthan. The students studying in Adani Foundation and in the schools under the Utthan Project salute her dedication.

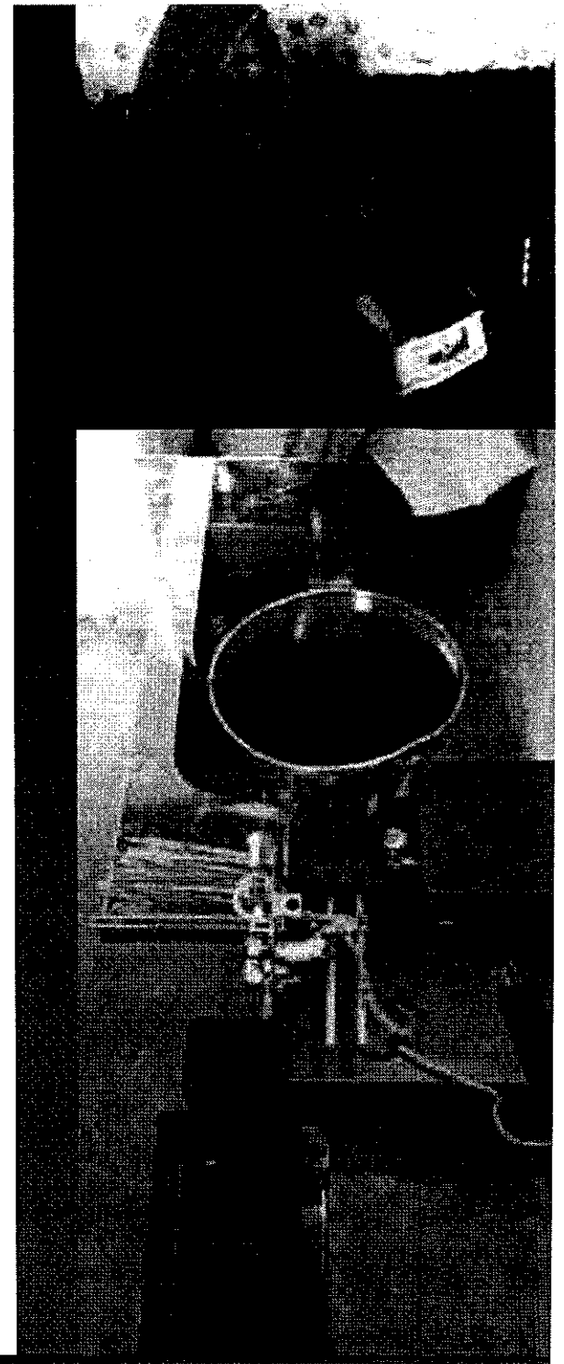
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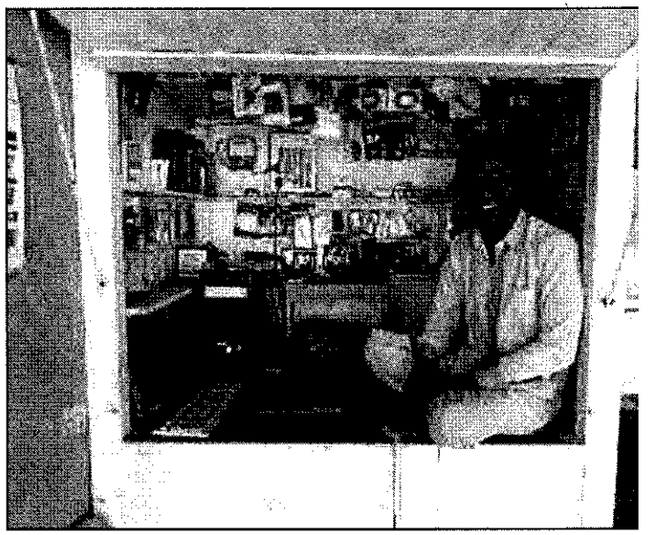
Swavlamban :
Pathways to become Self Reliant !!

Mina Ben is resident of Baroi village. She is widow and living with his two children who are studying in school. Adani foundation is coordinating with Jilla samaj Surakha department for availing various benefits of Government of Gujarat to widow women, differently abled and senior citizens of Mundra, Mandvi and Anjar Taluka. We did all procedure for Mina Ben for regular pension scheme.

Mina Ben was ready n passionate to start Gruh Udyog with loan support with 40 percent subsidy by Vajpayee Bankable scheme "With our efforts she got loan and now she will start Gruh Udyog of " Aggarbatti " with pre defined marketing linkages with Ashapura temple trust.



Swavlamban : Pathways to become Self Reliant !!



Adam Bhai Bayad is living at Moti Khakhar Village He is differently abled and having wife and two children in his family. He is having one skill of mobile and computer repairing.
As per his request we allotted him one cabin for income generation. Now he is started to sale Mobile, Mobile accessories. Additionally he started repairing mobile and computer. By hard work he started earning considerable amount. Adam Bhai says "due to this support my children can study well and my quality of life is enhanced



Parvina ben is Divyang but strong lady. She is educated and use to work as a teacher primary school. She was using sticks to reach school. Adani Foundation had given support of tricycle for her comfortable transport.
She says "Adani Foundation is working as a great facilitator for needy people. This is true social work which has created very good imprint in heart of village people. God bless !

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Swavlamban : Pathways to become Self Reliant !!

As the wheels of her sewing machine keep moving, so as the dreams of a better life and empowerment enthuse Bhanuben overcome the physical deformities which came in the form an injury in the spinal cord during childhood. Both her legs were malfunctioned forcing dependence on calipers for movements.

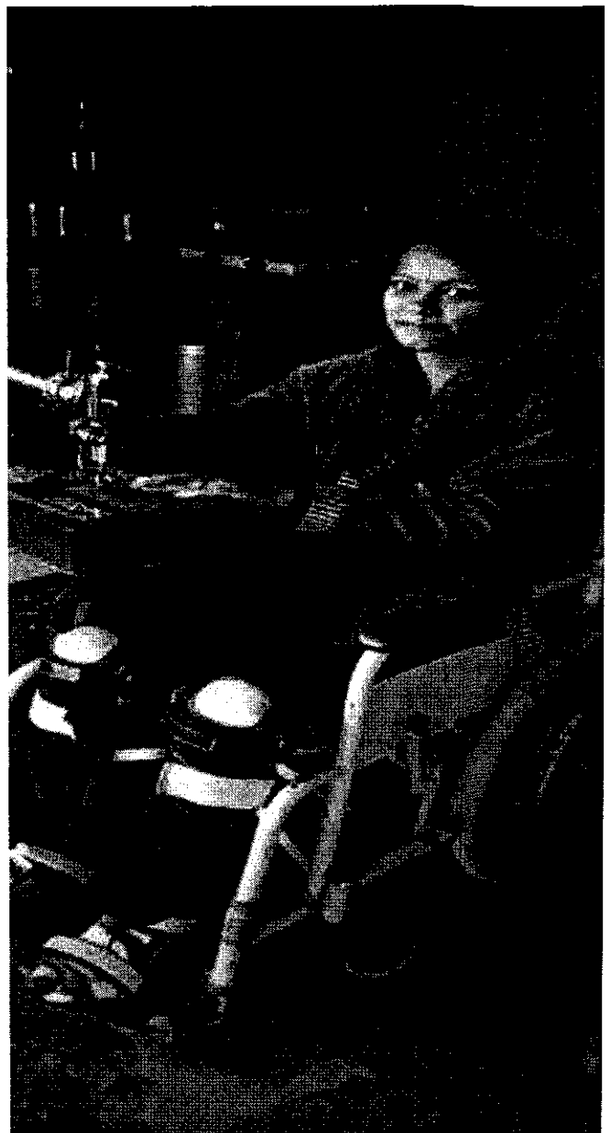
Bhanuben Gangji Patariya of Bhujpur village lost her father when she was just 15 years old, and had very little understanding of the materialistic world and struggle of life. Poverty in the family compelled Bhanuben to drop school and do small odd household jobs of fellow villagers and sometimes accompany her mother as daily labour.

The sudden transition in life, from most adorable darling of her father to an unnoticed and uncared human being in the society, often disturbed the innocent mind of Bhanuben.

Few months back, Bhanuben had enrolled at Adani Skill Development Centre for stitching training, which she could successfully complete within the deadline due to a strong will power and aspiration to win over all odds in life. During her training period only she learnt about AF's Project Swavlamban and expressed the desire to be part of it.

Followed by proper counselling and guidance for self-sustainability, AF donated her one wheel chair and a sewing machine which helped Bhanuben change her life and build the self-confidence of stitching a bright future for her family. Now she earns an average of Rs. 2500 a month which takes care of the basic livelihood needs of her family.

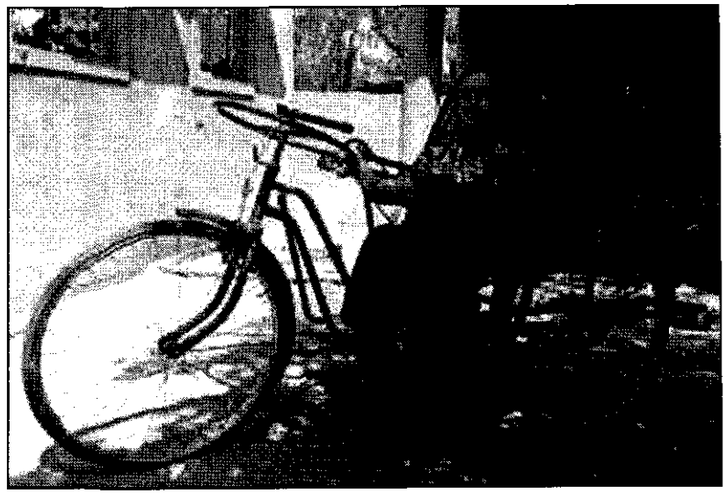
Wearing a smile of satisfaction on her face and the pride of being self-sufficient, Bhanuben expresses her heart-felt gratitude to AF for standing by her during this critical juncture of life. She has become a ambassador to spread the message of all good works by AF in her locality. She is yet, another success story in the saga of sustainable CSR by AF.



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Swavlamban : Pathways to become Self Reliant !!



Her name is Sanjuben. Residing in Vadala village with her Divyang husband and 9 years old son. Her husband is working at one shop and trying for two ends meet. During Divyang Mahiti card Vitran by Mamlatdar office she came to know about project Swavlamban. She meet Kalyan Gadhvi who is community mobilizer in Adani foundation. Kalyanbhai had given information n support for Divyang pension scheme.

Since two years couple is getting pension which amount can be used for further study of their son. Additionally, Adani foundation supported her for tricycle in coordination with district social welfare department. Sanjuben is daily using tricycle to give tiffin to her husband. Small linkage can bring life transformation !!!

Spruha : Motivating fisher folk for bright future !!



Fakir Mamad Hasan Vagher

24 year old from poor fisherman family was selected by AF To provide cricket coaching last year. he has completed successful training at Rajkot YB sport academy with excellent performance even in Kutch 23 selection. The YB academy organized honor ceremony and invited AF. On this occasion dignitaries and more than 400 peoples were present and they all appreciated noble support by Adani Foundation.

Fakir Mamad saying that he was playing on behalf of other team and earn RS 500 to 600 but after cricket coaching he get status and honor in Kutch cricket even in society and earn Rs 1500 to 2500 for each match.

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Sparuha : Motivating fisher folk for bright future !!

Mamad Sakil Osman Ghani Adani Vidya Mandir – Bhadreshwar 'A High Leap by a Poor Child from the Fisher folk Community.....Towards Engineering Studies.....Through Adani Vidya Mandir' 2017-18 Name: Mamad Sakil Osman Ghani Father's Name: Osman Ghani Mother's Name: Halimaben Family: Brother (1) + Sisters (4) & Parents; total 8 members Occupation: Fishing Village: Luni; Taluka: Mundra; District: Kutchh In modern times along with its importance, education has also made changes in our lifestyle.

Adani Vidya Mandir, Bhadreshwar, is like a lighthouse giving a ray of hope in remote areas. It was established to provide education to children from socio-economically backward communities. The school provides high-quality education, nutritious food as well other kinds of facilities so that children's self-respect increases through the education. Speaking of students, Mamad Sakil was enrolled in the Std. 7, in 2014-15 in the Adani Vidya Mandir, Bhadreshwar. His father, Osman Ghani, is a fisherman. His family of eight members consists of his mother, his father, a brother and four sisters. They live in Luni Bandar.

From the beginning it was seen that he was a quiet, straightforward, humble and cultured boy. He also exhibits behavior with moral values. Everyone helped the family socio-economically. In the Adani Foundation with the help of Vijayhai and Ishwarbhai noted details of the family and found that nobody was educated. In such times of rising prices and inflation it is difficult to raise so many children. So the school management decided to take over and fulfil his basic necessities. Efforts for this child's educational success were made including counselling and guidance.

During his first year in the school, he participated in the running competition in the Khel Mahakumbh and came first in the district. In this way, he began to progress in not just education but also other areas. He started getting promoted to the next standard every year and eventually he reached Std. 10. With the help of the school in various ways and his own hard work, he successfully cleared Std. 10 with 77%. He stood second in the school. Now, the journey of his life has really started. He has started to see new and inconceivable dreams for his future career. Now, the Adani Foundation will be holding his hand to fulfil his dreams.

After completing studies of the Std. 10, he was gifted an android phone by the school principal, Smt. Lali madam, as he needed new technology to get admission for further studies. In this way all the obstacles have been removed from his career path. He has now taken admission in mechanical engineering in Bhuj Polytechnic, and the Adani Foundation has paid his entire fee. A new innings has started in his life. With his hard work he is making progress step-by-step. He has set a good example for other students. And we all hope that he will eventually become a strong financial support to his family.



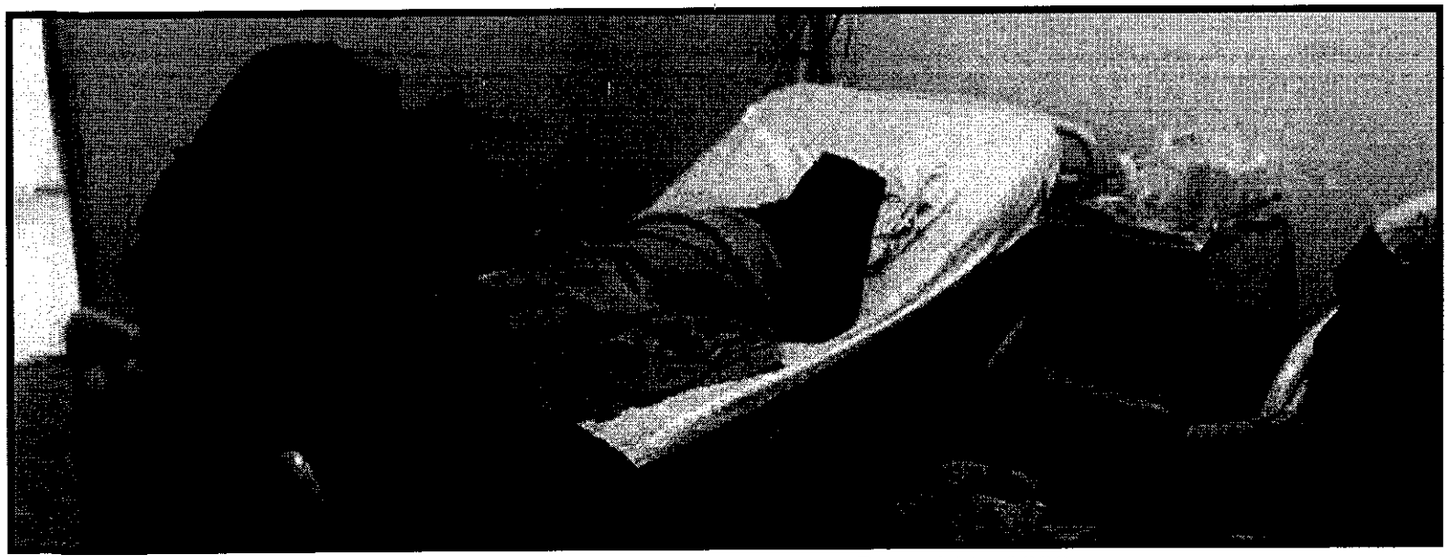
Adani Vadil Swasthaya Yojana: Holding Hands !!

Every human being has specific periods of the life wherein the childhood is for fun and the adulthood is spent for the family; remains old age to take care of health

Adani Foundation is holded hands of the senior citizens of Mundra

Manubha and his wife stay alone. Their son and daughters stay separately. They earn their living by grazing cattle. Manubha is having **respiratory disorder.** The source of income is very meager and that to dependent on rain. He had to borrow money from family friends or at times take on interest for taking basic treatment. His wife Shantaba also has blood sugar and hence she also requires medical assistance at times. The couple took **Adani Foundations' *Senior Citizen Health Card*** in 2015 by which they are able to save good amount, which was their medical expense every month.

"Adani Foundations' Senior Citizen Health Card is like a cure to our emotional, physical and psychological problem; in the times when we are completely lonely and handicap at age."....Says both of them while weeping.





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Adani Vadil Swasthaya Yojana: Holding Hands !!

Adani Foundation at Bhuj is aware of its social responsibilities to the surrounding community. Madhapar is a village approximately 28 km away from Bhuj wherein resides Aseembhai who was financially, health-wise and socially unstable until he availed help from AF at G K General Hospital Bhuj. Aseembhai settled in Madhapar 30 years ago. before 8 years, he lost his wife to heart attack.

His parents passed away when he was 3 years of age and the only surviving relative he could call his own was his brother who was also mentally-challenged. His problems did not end there as e suffered from high blood pressure and stress induced thyroid which required he took medication as long as he lived.

Slowly his body stopped reacting to the medicines and these did not work. One He got convulsions as a side effect of over dose of medicine. His neighbors took him to Adani G K G H Hospital. Adani Foundation staff took very good care of Aseembhai. For one month he admitted to hospital and daily staff members ask about his health.

When he got discharged he said

"Adani is Like my Second Son.. I get the services even without asking for it"



Saksham Superhero's : Skill Development



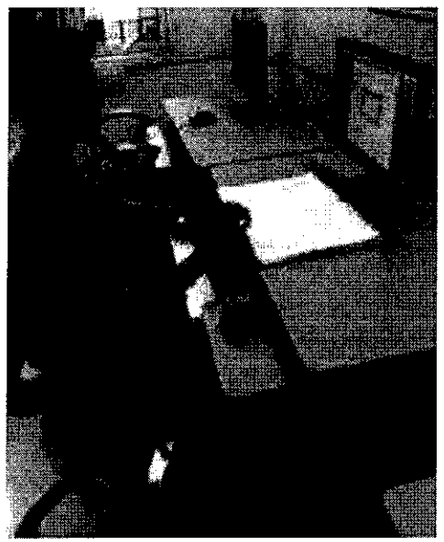
My father is a working as a mechanic in ST workshop and his income was not sufficient for live life better so my mother also was working in different fields. I also was trying to find job for support to my family financially. One of my friends suggested me to visit Adani Skill Development Centre – Bhuj and join General Duty Assistant. When I visited center I got all the GDA related information from the staff, I took admission. During this course I learnt lots of Medical related things from the faculty I also was taught about Personality Development, Computer basics, Basic English, Interview Skills. During my practical for 1(one) month in GAIMS, I got chance to work in 4(four) wards. During my practical I learnt many things. After completing GDA course ASDC SAKSHAM is arrange interview At Adani GAIMS Hospital Bhuj. I attended interview and I was selected for physiotherapy section. I was offered monthly salary Rs.10000/- and join the job. After joining this job, I am glad that now I am a working woman and more then that I can help my family financially. With this job my life has become better than before. I would like to thanks Adani Skill Development Centre to give me this Opportunity and for making me SAKSHAM.



22 years old Dhanabai ha
completed Self Employed tail
course from ASDC in the mon
of June 2018. Now she sta
her own tailoring business
home and doing stitch ladi
clothes.
At present she is earnin
Rs.6000/- Monthly.

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aksham Superhero's : Skill Development



Bhand Navin Devjibhai is very fond of financial autonomy and self-sufficiency, a principle of life which he has got by virtue of his skill development training at Adani Skill Development Centre (ASDC), Mundra. A Commerce graduate from Mundra village, in the year 2017 Navin had enrolled himself at ASDC for the IT-Basic Computer training. He was unemployed and lacked the minimum confidence of facing any job interview as per his qualification.

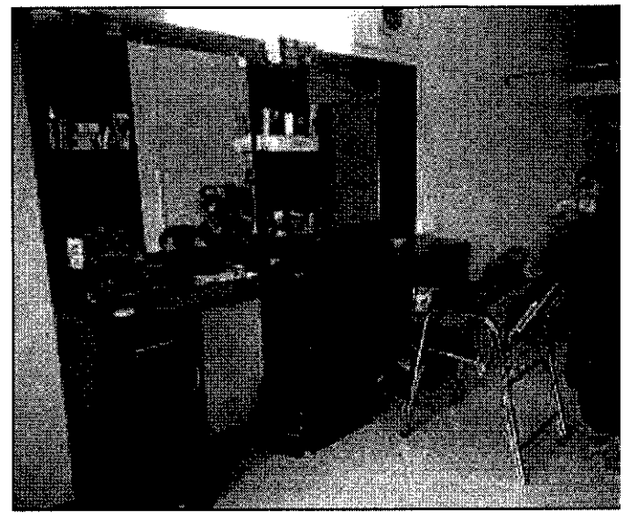
As part of the well-designed training curriculum at ASDC, the 21-year old youth learnt skills of public speaking, professional manners, facing interviews etc. along with core subject of IT basic computer. The training helped Navin immensely and fetched him a company job with lucrative Rs. 10,000/- per month salary. Happy with his financial autonomy, he is now in a comfortable position to support his parents and three brothers.



My name is Ashok Maheswari from shedata village, Mundra. My father is no more in this world so I was trying to find job for support to my family financially. One of my friends suggested me to visit Adani Skill Development Centre – Mundra and I have joined Checker cum RTG crane operator training for 3 months. After successfully my training I sent my resume in various port. One day I received call from aani port at katupalli in Chennai and I attended interview and I was selected for RTG crane Operator. And today my salary 20,000/- per month.

So, I can help my family financially. With this job my life has become better than before. I would like to thanks Adani Skill Development Centre to give me this Opportunity and for making me SAKSHAM.

Saksham Superhero's : Skill Development



Manisha Patel, from Mundra, has completed Std. 12. Her parents are laborers, earning minimum wages. Manisha had always been a bright student in school, wanting to learn new things. Feeling restricted in life, she dreamt of doing something different. She wanted to have a successful career and be recognized by society. Hence, when she was advised by a close friend to join ASDC's Beauty & Wellness course, which is an NSDC certified course, she grabbed the opportunity. She came to the course with a fresh mind and ready to absorb all the knowledge. She actively participated in all activities. She was full of curiosity and questions, and this attitude enhanced her skills. She was extremely happy when the trainer appreciated her enthusiasm upon completion of the training.

She was delighted to open her beauty parlor. She had also undergone extra training in specific soft skills and business manners in order to handle customers. With these skills, she manages customers like a pro and runs her salon smoothly. Her family members, including her in-laws, were initially hesitant to let her join the course but soon relented upon seeing her enthusiasm and zeal for learning. They are quite proud of what she has achieved in such a short time.

Manisha and Shree Beauty Parlor are synonymous with high-standard beauty and wellness services in the Mundra locality. Her quality services and reasonable prices have increased her popularity and helped in attracting more customers. Today, she earns Rs. 12,000-15,000 per month. Her trainer, Ms. Rekha says, "She and many other candidates who completed their training at ASDC are ambassadors of Saksham. They strive to learn and grow by beating all odds. I am proud to be given this opportunity to groom and create skilled beauticians who can handle the ever-increasing standards of beauty treatments in a city like Mundra. I wish them the very best!"

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Saksham Superhero's : Skill Development

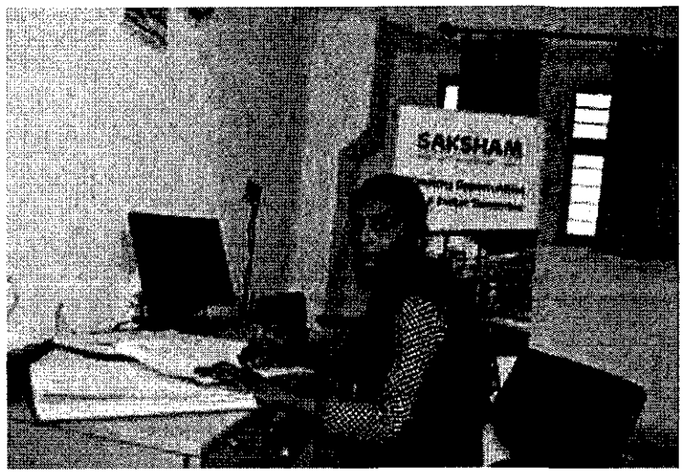
Lilbai koli- A youngest widow of the general duty assistant (GDA) batch from Adani skill development center (ASDC) Bhuj is an epitome of courage and confidence. She is 22 years old with a one and half year old baby, and lives in a Mirjapur village, Bhuj.

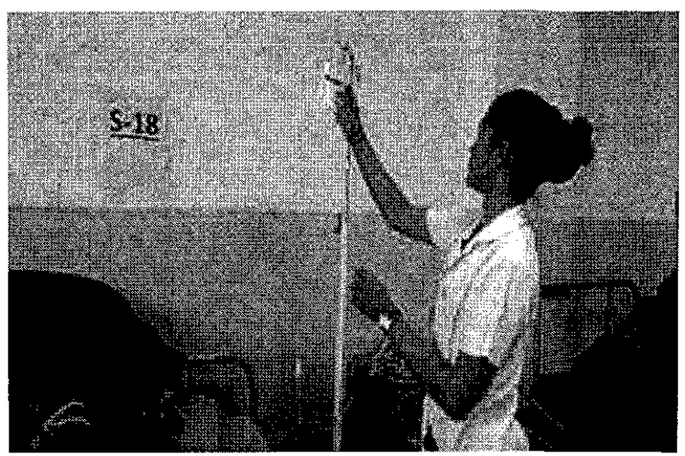
She is 12th pass with Arts stream and used to love drawing and painting as her hobby. Her parents work as laborers and her sister cooks at home. She got married in 2016 and lost her husband in 2018.The most tragic thing is that she didn't even know the exact reason of her husband's sudden death. Happiness is transient, she faced many problems starting with loosing her husband, becoming single parent and loosing financial support from her in-laws which resulted in returning to her parents home.

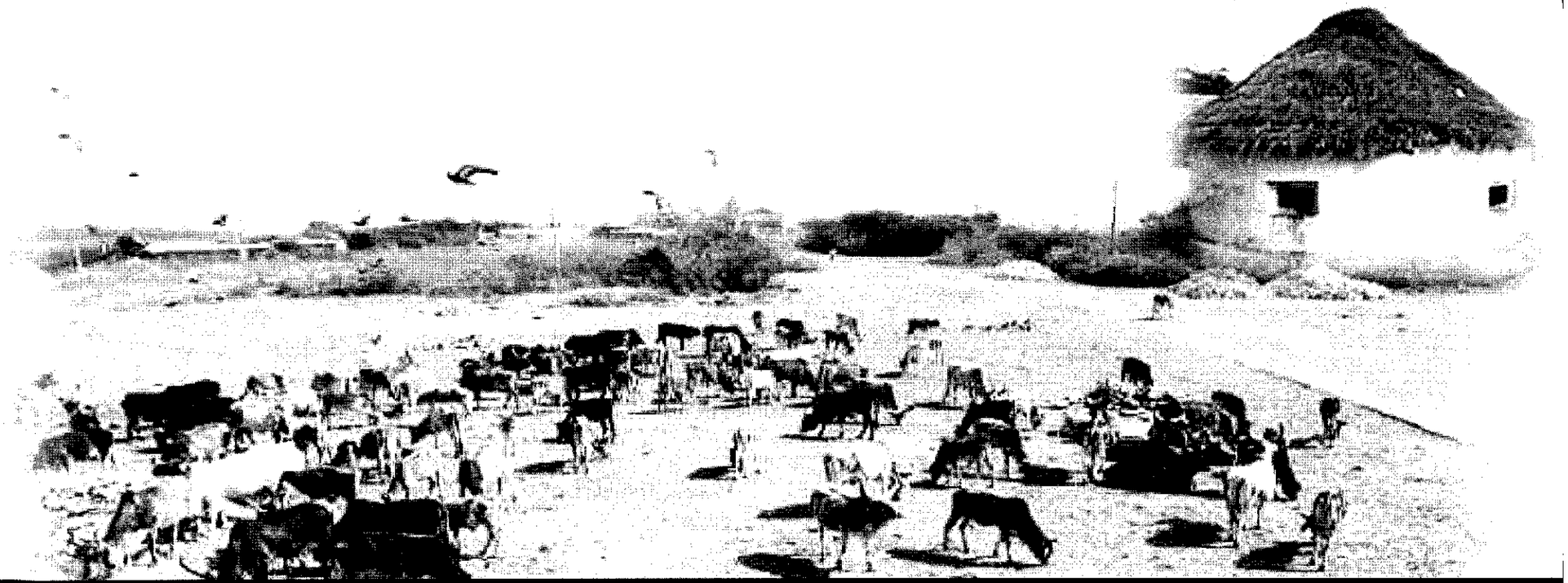
When asked about her future plan she says "Talking about remarriage is a taboo in our village and culture. I want to be strong enough to work hard and give my son a healthy and happy Life".

Presently, Lilmai is pursuing her ,On the Job Training in G.K General Hospital. A girl who has never seen hospital is now learning technicalities of patient care in emergency ward.

A young novice is all set to become a successful patient care assistant with a single goal in life i.e 'To become economically stable enough to educate her child'. Lilbai expresses huge gratitude to Adani Foundation and ASDC Bhuj for giving her opportunity to study GDA course and help her get the job so that she no longer have to depend on anyone's help for herself or her child's future.







Adani Cementation Private Limited (Lakhpat)

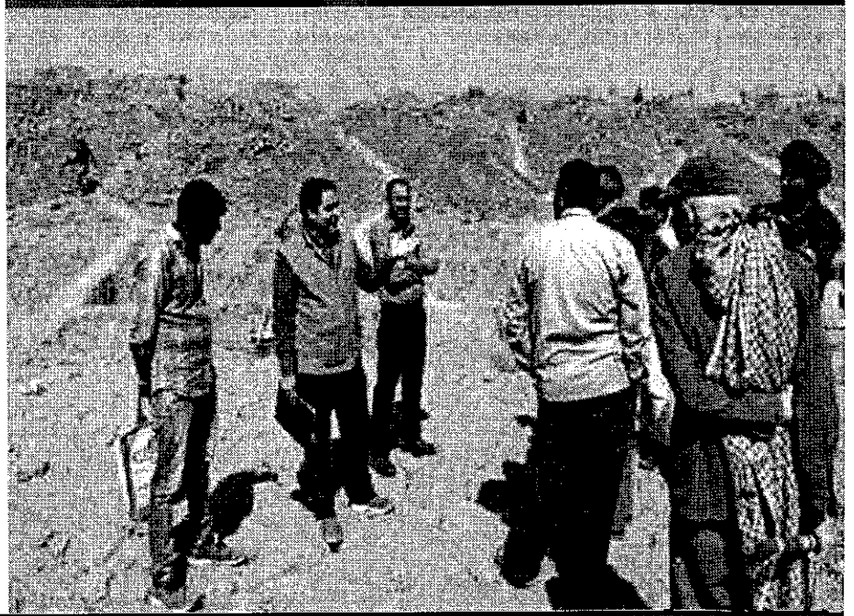
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Adani Cementation Private Limited (Lakhpat)

Adani Cementation Limited (ACL) proposes to setup an integrated cement project as Lakhpat Cement Works which includes Limestone Mine in 251.9 ha area, Cement Plant of rated production capacity of 10MMTPA Clinker and 3MMTPA of OPC/ PPC/ PSC/ COMPOSITE CEMENT in three phases, and a berthing jetty of 15MMTPA traffic capacity in phase wise manner in Taluka Lakhpat of District Kutch (Gujarat).

Project Public hearing will be in month of May 2019. For Smooth Execution of the Project we have started Participatory Rural Appraisal and Village Development Committee formation at three nearest villages (Koriyani, Kapurashi and Mundhvay) of our upcoming cement plant.





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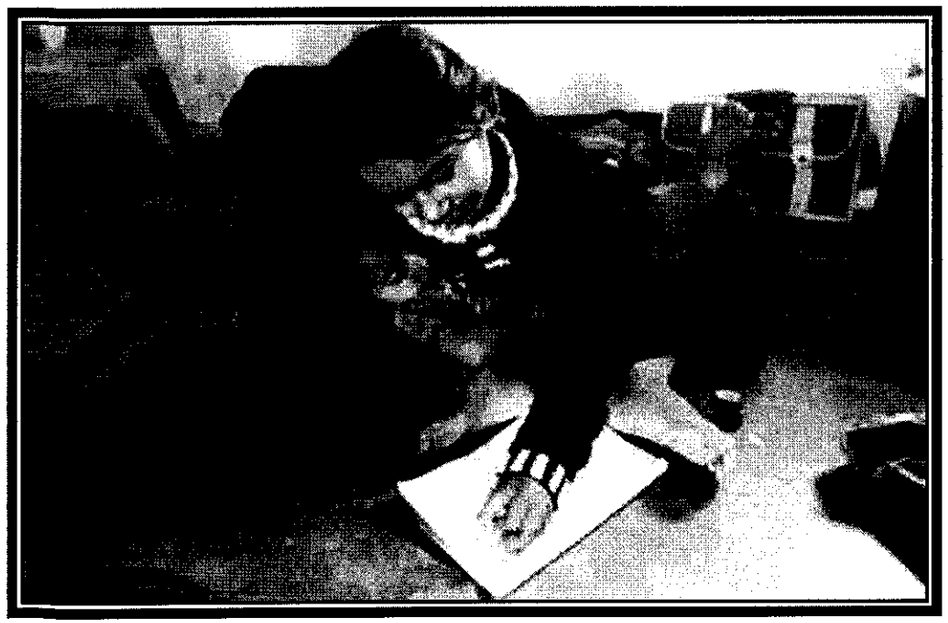
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Adani Cementation Private Limited (Lakhpat)

Kutchh is the biggest district in India and Lakhpat is far away from Bhuj which is main city of Kutchh. Health facilities are very poor as District hospital is around 150 Kms Away. Main livelihood is animal husbandry and daily wedge labour. Except GMDC , no big industrial set up is in Taluka.

Critical Issues are as under

1. Poor Health Facilities
2. Quality of Primary Education
3. Infrastructure of School
4. Livelihood options
5. Fodder and water Scarcity
6. Malnourishment





Adani Foundation will make five years plan to mitigate the issues with priories suggested by Village Development Committees. Detailed PRA including Demographic survey is taken up and submitted.

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Adani Green Energy (MP)Limited (Nakhtrana)

Adani Green Energy (MP) Limited (Nakhtrana)





Adani Green Energy(MP) Limited (AGEMPL) proposes to setup an integrated wind energy project as Green Energy Works which includes Limestone 750 Mw, Through approx. 1250 windmill at Dayapar to Nakhtrana in District Kutch (Gujarat).

For Smooth Execution of the Project we have started Participatory Rural Appraisal and Village Development Committee formation at three nearest villages (Ratadiya, Muru and Ambara) of our upcoming Wind Energy Project.

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Adani Green Energy (MP)Limited (Nakhtrana)

Kutchh is the biggest district in India and Ratadiya (Nakhtrana) is 70 Km away from Bhuj which is main city of Kutchh. Health facilities are very poor as District hospital is around 70 Km Away. Main livelihood is Agriculture, animal husbandry and daily wedge labour. In Nakhatrana, No big industrial set up is in Taluka.

Critical Issues are as under

1. Poor Health Facilities
2. Quality of Primary Education
3. Infrastructure of School
4. Livelihood options
5. water Scarcity
6. Malnourishment





Adani Foundation will make five years plan to mitigate the issues with priories suggested by Village Development Committees. Detailed PRA including Demographic survey is taken up and submitted.

Pleasure to share that

Adani Foundation have received

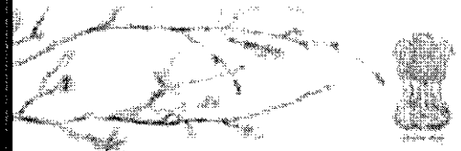
appreciation letter from

Mr. Vijay Rupani (Chief Minister,

Government of Gujrat) for

commendable work for Project

Swavlamban in District Kutchh



વિજય રૂપાણી

મુખ્યમંત્રી, ગુજરાત રાજ્ય

Appreciation/2015/2016

તા. ૨૬/૦૧/૨૦૧૬

સ્નેહી શ્રી પંક્તિબેન,

નમસ્કાર.

વિશ્વ દિવ્યાંગ દિનની ઉજવણી અને અદાણી ફાઉન્ડેશન મુંદરા દ્વારા સ્વાવલંબન પ્રોજેક્ટના દિવ્યાંગાભિમુખ વિવિધ-કાર્યક્રમ અને પ્રવૃત્તિઓનો CD સહ અહેવાલ પ્રાપ્ત થયો. ધન્યવાદ.

સમાજમાં નિરાધાર-અસહાય અને દિવ્યાંગ વ્યક્તિઓનો હાથ પકડી, હામ અને સહકાર આપી, એમને જીવનની મુખ્યધારામાં લાવવાની ધરપત આપવી એ જ સાચી સેવા.

સુરક્ષા અને સહયોગમાં સરકાર તો ખડેપગે રહે જ છે ત્યારે સમાજસેવી સંસ્થાઓની સંવેદનશીલ સક્રિયતા સોનામાં સુગંધનું કાર્ય કરે છે. સૌને ધન્યવાદ. લાભાર્થી અને સ્પર્ધામાં વિજયી સૌ દિવ્યાંગોને પણ અભિનંદન.

આપનો,

(વિજય રૂપાણી)

To,
Smt. Panktiben Shah, *CSR Head*
Adani Foundation
Adani House, Port Road, Mundra, Kutch- 370 421.
Email: info@adanifoundation.com

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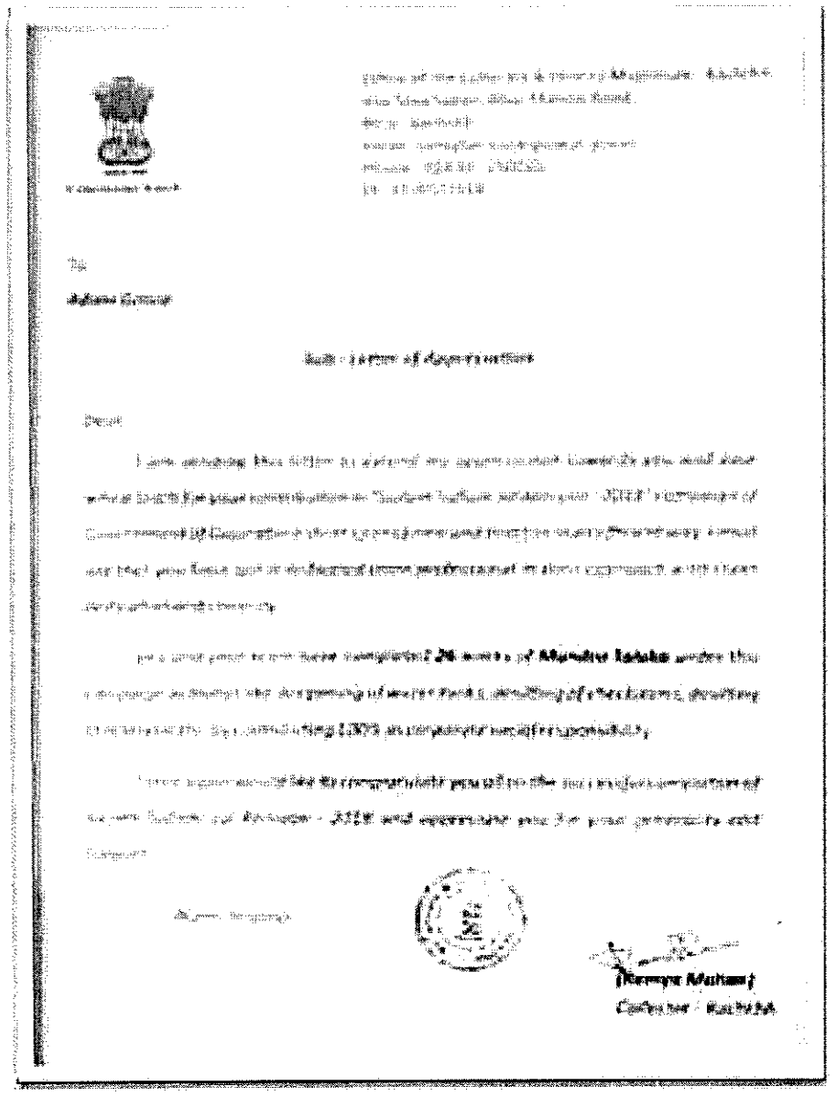
Awards and Accolades

We are glad to announce our latest accolade- the Eminent Award 2018 platinum category presented at the Ek Kaam Desh Ke Naam award ceremony on 25th March , 2019 at New Delhi. The award was bestowed upon Adani Ports and SEZ Ltd, Mundra, for outstanding achievement in Corporate Social Responsibility, specifically " Adani Vadil Swasthaya Yojana - Health card to senior citizen ". The award was presented by Sh. Anil Baijal - Retired IAS & 21st Lieutenant Governor of New Delhi and was received by the Community health team of Adani Foundation, the CSR arm of the Adani Group.

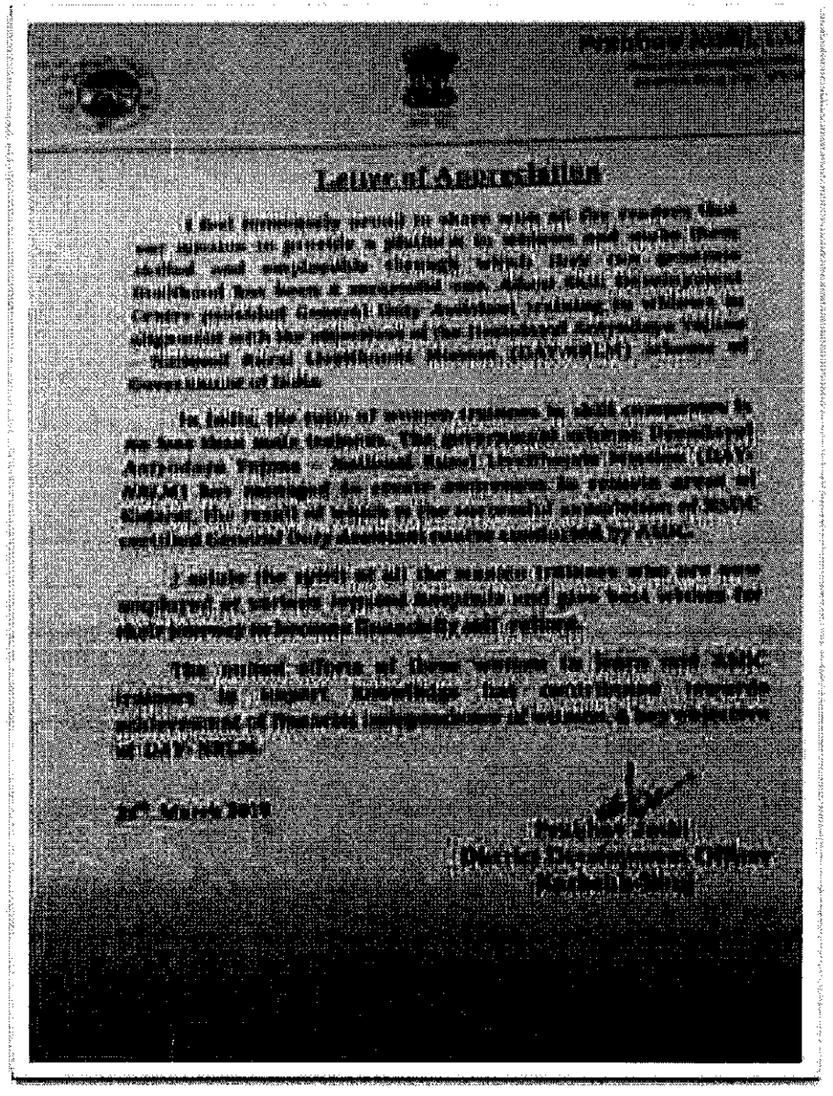




Awards and Accolades



Letter of Appreciation



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Awards and Accolades

જિલ્લા સમાજ સુરક્ષા અધિકારીની કચેરી

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મુન્દ્રેશ્વર ગામે અદાણી ગ્રુપના ચેરમેનના

જન્મદિનની અનોખી ઉજવણ





આયુષ્માન ભારત યોજના તળે ભુજોડીમાં મેડિકલ કેમ્પ યોજાયો



તાલુકા હેલ્થ ઓફિસ મુન્દ્રા દ્વારા ઓરી અંગે શાળાના આચાર્યઓનો વર્કશ



ભુજના ડો. આંબેડકર કન્યા છાત્રાલયને આર.ઓ. પ્લાન્ટ મળ્યો

જીકે હોસ્પિ.માં કાલે માહિતી સેતુ કેન્દ્ર ખુલ્લું મુકાશે

સરકારી યોજનાઓ વિશે વિનામૂલ્યે માહિતી અને ફોર્મ આપવામાં આવશે

મુન્દ્રા તાલુકામાં પ્રા. શિક્ષણન ઉર્ધ્વીકરણ અર્થે કરાર કરાયા



માંડવીમાં ગણિત-વિજ્ઞાન પ્રદર્શનમાં ૬૫ શાળાના છાત્રો દ્વારા એકસો વિવિધ કૃતિ પેશ કરાઈ



શેખડીયા ગામનો ગ્રીન વીલેજ બનાવવાના કાર્યનો પ્રારંભ

ધોરણ ૧૦ માં ૭૩.૬૭ ટકા પરિણામ સાથે ગોધરા કેળવણી મંડળ પ્રથમ

No	Core Area	Beneficiaries	Remarks
1	Education	5602	Uthhan, Labour School, School Enrollment
2	Adani Vidya Mandir	387	School Students
3	UDAAN	33932	116 Institute Visited
4	Adani Skill Dev. Center	2482	Mundra and Bhuj
5	Community health Mundra	58531	MHCU, Medical Camps, Senior Citizen
6	Community health Bhuj	36417	Health Camps, Mahiti Setu, patient care
7	SLD Fisherman	3280	Water, Education, Mangroves etc.
8	SLD Agriculture	1232	Drip Irrigation, Bio gas, tissue
9	SLD Women Empowerment	132	Saheli mahila gruh udyog – 12 SHG
10	Rural Infra. Development	81098	Pond deepening, AKBTPL, Labours work
11	Swachhagraha	3711	Mundra, Bhuj, Anjar and Gandhidham
12	Suposhan Mundra	17025	Adolescent, Children and RPA
13	Suposhan Bitta	6450	Adolescent, Children and RPA
14	Lakhpat	512	Cattle owner for fodder

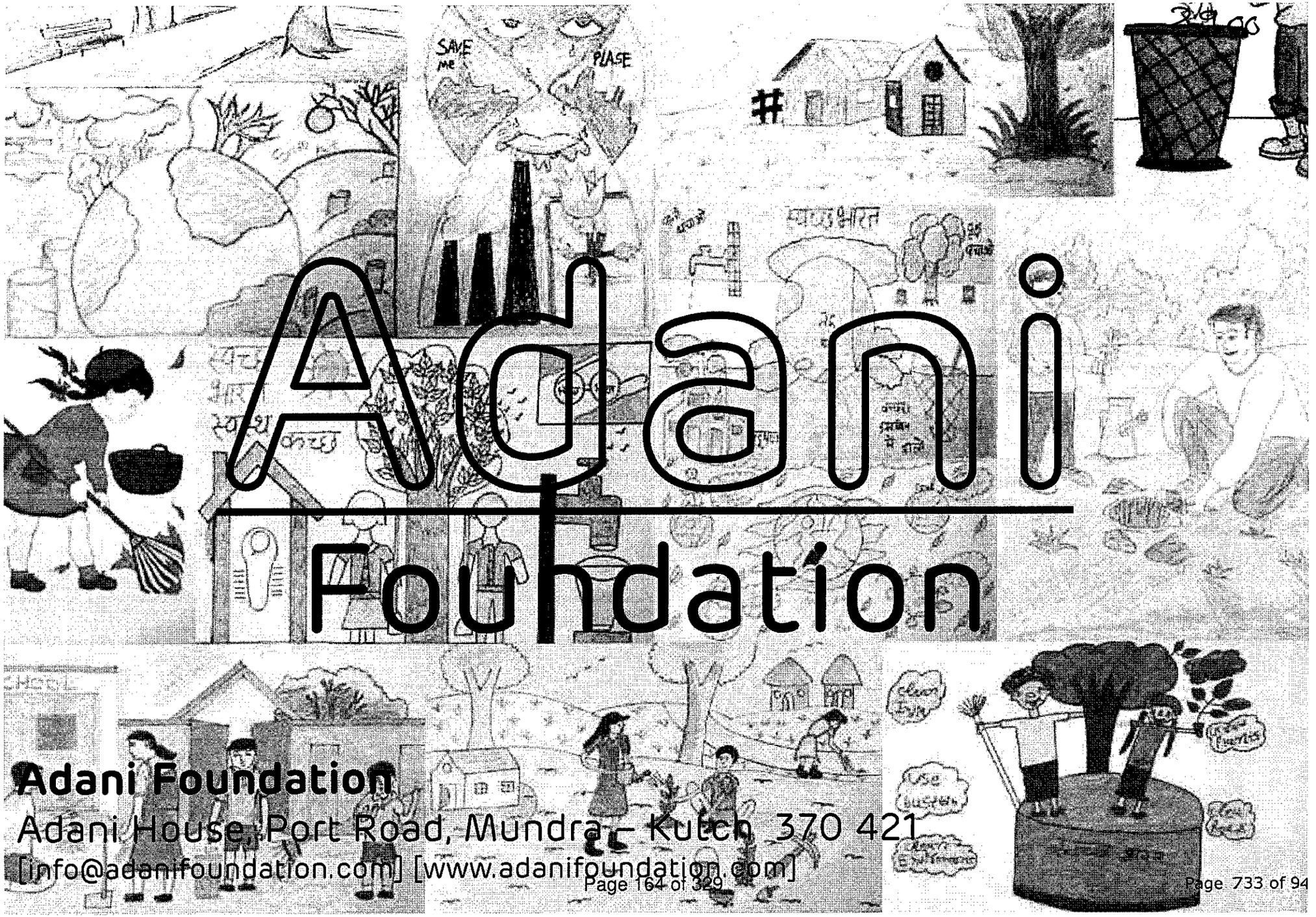
Total Beneficiaries : 250791

2598 2899

Financial Overview

Adani Foundation -Mundra				
Executive Summary-Budget Utilization up to March-19				
				(Rs. In Lacs)
Sr. No.	Budget Line Item	Approved Budget 2018-19	Budget Utilizaton 2018-19	% of utilization
A	Admin Expense	67.55	55.44	82.07%
B.	Education	67.85	59.11	87.12%
C.	Community Health	243.21	203.88	83.83%
D.	Sustainable Livelihood Development	505.87	624.68	123.49%
E	Rural Infrastructure Development	326.34	231.81	71.03%
TOTAL AF CSR Budget :		**1210.82**	**1174.93**	**97.04%**
F.	Adani Vidya Mandir - Bhadreshwar	143.15	133.88	93.53%
GRAND TOTAL_MUNDRA CSR WORKS 2018-19		**1353.97**	**1308.81**	**96.66%**
G.	Project Udaan_Mundra	342.82	315.63	92.07%
GRAND TOTAL_MUNDRA CSR+ PROJECT UDAAN		**1696.79**	**1624.44**	**95.74%**

The Utilization will change slightly after receiving data upto first week of April 2019 due to few GRN is pending



Adani Foundation
Adani House, Port Road, Mundra – Kutch 370 421
[info@adanifoundation.com] [www.adanifoundation.com]

ANNEXURE – 4

POLLUCON LABORATORIES PVT. LTD.
Environmental Auditors, Consultants & Analysts.
Cleaner Production / Waste Minimization Facilitator

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Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

"HALF YEARLYENVIRONMENTAL MONITORING REPORT"

FOR

adani™

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH, MUNDRA – 370 421

MONITORING PERIOD:
OCTOBER 2018 TO MARCH 2019

PREPARED BY:

Pollucon

POLLUCON LABORATORIES PVT.LTD.

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,
NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT-395007.
PHONE/FAX – (+91 261) 2455 751, 2601 106, 2601 224.
E-mail: pollucon@gmail.comweb: www.polluconlab.com**

TC - 5945 **ISO 9001:2015** **ISO 14001:2015** **OHSAS 18001:2007**

POLLUCON LABORATORIES PVT. LTD.
Environmental Auditors, Consultants & Analysts.
Cleaner Production / Waste Minimization Facilitator

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MARINE WATER MONITORING SUMMARY REPORT

RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.07	8.01	8.21	8.18	8.12	8.09	8.16	8.1	8.21	8.19	8.13	8.05	IS3025(P11)83Re.02
2	Temperature	oC	30.4	30.2	30.5	30.4	30.1	29.9	30	29.9	30.2	30	30.1	29	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	284	252	264	224	256	270	224	251	191	244	210	234	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4	3	5	3	4	BDL *	7.2	BDL*	4.8	BDL*	5.2	BDL*	IS 3025 (P44)1993Re.03Editi on2.1
5	Dissolved Oxygen	mg/L	6.4	6.1	6.2	5.9	6.1	5.8	6.2	5.9	6	5.8	6.1	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	34.4	34.1	34.8	34.2	34.9	34.6	34.5	34.7	35.4	35.7	35.6	35.9	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5520 D
8	Nitrate as NO_3	µmol/L	5.8	5	8.58	7.79	6.3	4.68	18.51	10.77	10.22	8.53	8.4	6.3	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	1.4	1	1.78	1.25	1.24	1.1	1.55	1.27	0.56	0.42	1.33	1.08	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.64	2.15	2.23	2.04	2.96	2.14	3.83	3.35	2.82	2.51	2.64	2.42	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	1.9	1.5	2.67	2.41	2.3	2.2	2.66	2.39	2.27	1.45	2.12	1.8	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	9.84	7.15	12.59	11.08	10.50	7.92	18.51	15.38	13.6	11.46	12.37	9.86	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	15	6	14	12	18	14.2	17	12	20	16	13	8	PLPL-TPH
14	Total Dissolved Solids	mg/L	34712	34519	36212	35844	35920	35624	35690	35734	36218	36594	36730	37434	IS3025(P16)84Re.02
15	COD	mg/L	14	10	18	12	15	6	24	7.0	27	19.0	23.6	11.4	APHA(22nd Edi) 5520-D Open Reflux
A	**Flora and Fauna**														
16	Primary productivity	mgC/L /day	1.26	1.12	1.66	1.26	3.6	2.8	4.5	4	8.32	5.62	8.55	5.4	APHA (22nd Edi) 10200-J
B	**Phytoplankton**														
17.1	Chlorophyll	mg/m^3	2.06	1.69	2.21	2.11	2.7	2.2	2.67	2.15	3.38	2.79	2.64	2.33	APHA (22nd Edi) 10200-H

POLLUCON LABORATORIES PVT. LTD. SURAT-7

H. T. Shah
Lab Manager

Dr. Arun Bajpai
Lab Manager (Q)

PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY, OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,
NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT-395007. PHONE: [0261] 2635750, 2635751
EMAIL: pollucon@gmail.com , WEBSITE: www.pollucon.com

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17.2	Phaeophytin	mg/m^3	1.9	1.3	1.49	1.57	1.96	1.84	2.24	1.92	2.93	2.51	1.86	1.60	APHA (22nd Edi) 10200-H
17.3	Cell Count	No. x 10^3/L	131	111	212	124	270	146	203	122	249	95	207	85	APHA (22nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	**Coscino discus** *Nitzschia Rhizosole nia Navicula Biddulphi a* --	**Navicula** *Pleurosig ma Nitzschia* -- -- --	**Rhizosol enia sp.** *Navicula sp. Biddulphi a sp. Cheatocer ous sp. Ceratium* -- --	**Nitzschi a sp.** *Synedra sp. Cyclotella sp.* -- -- -- --	Thallasios ira sp. Navicula sp. Biddulphi a sp. --	Nitzschia sp. Rhizosole nia sp. -- --	Rhizosole nia sp. Navicula sp. Thallasios ira sp. Cosmariu m	Coscinodi scus sp. Nitzschia sp. -- --	*Rhizosole nia sp. Cheatocer ous sp. Coscinodi scus sp.* --	*Nitzschia sp. Synedra sp. Fragillaria sp.* --	*Rhizosole nia sp. Navicula sp. Coscinodi scus sp. Thallasion ema sp.*	*Nitzschia sp. Navicula sp.* -- --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	53		66		46		61		55		48		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Foraminiferans Polychaetes Gastropods --		Polychaete Bivalves Ostracodes Gastropods		Gastropods Decapods Crustaceans		Copepods Mysids Bivalves --		Foraminiferans amphipods Gastropods		Polychaetes Gastropods Crustaceans		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/100 m^3	6.6		7.25		6.2		4.8		3.9		5.6		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1300		1840		1880		1840		1760		1820		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22nd Edi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2.4 (2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. Arun Bajpai
Lab Manager (Q)

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RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018	NOVEMBER 2018	DECEMBER 2018	JANUARY 2019	FEBRUARY 2019	MARCH 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.48	0.64	0.42	0.56	0.69	0.71	FCO:2007
2	Phosphorus as P	µg/g	246	212	256	278	311	264	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	5.35	5.18	4.9	5.2	4.98	5.24	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	190	210	164	170	235	270	AAS 3111B
5.3	Manganese as Mn	µg/g	1780	1698	1430	1286	1384	1258	AAS APHA 3111 B
5.4	Iron as Fe	%	5.1	4.82	5.2	4.9	5.32	4.89	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	53	20.4	34	27	47	24.8	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	49	37	49	33	30	31.6	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	318	348	230	310	291	270	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	3.8	1.9	2.6	3	2.8	1.98	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Polychaetes Decapods --	Mysids Crustaceans Decapods Polychaetes	Crustaceans Polychaetes --	Gastropods mollusca Decapods	Polychaetes Crustaceans --	Polychaetes Crustaceans --	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Nematodes Bryozoans --	Hydrozoan Gastrotriches ---	Bryozoans -- --	-- -- --	Foraminiferans Nematodes --	Foraminiferans Hydrozoans --	APHA (22nd Edi) 10500-C
6.3	Population	no/m2	382	645	616	821	794	853	APHA (22nd Edi) 10500-C

POLLUCON LABORATORIES PVT. LTD. SURAT-7

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RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.15	8.09	8.19	8.12	8.2	8.16	8.19	8.15	8.17	8.14	8.15	8.1	IS3025(P11)83 Re.02
2	Temperature	oC	30.3	30	30.6	30.4	30.4	30.2	30	29.8	30.2	30	30.3	30	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	254	240	328	290	272	218	216	228	186	246	230	263	IS3025(P17)84 Re.02
4	BOD (3 Days @ 27 °C)	mg/L	3	BDL*	4	BDL*	3	BDL*	5.0	BDL*	3.9	BDL*	5.3	BDL*	IS 3025 (P44)1993Re.03 Edition2.1
5	Dissolved Oxygen	mg/L	6.4	6.2	6.2	5.9	6.6	6.1	6.1	5.9	6.2	5.8	6	5.7	IS3025(P38)89 Re.99
6	Salinity	ppt	34.1	33.8	34.4	34.1	34.7	34.5	34.3	34.5	35.6	35.8	35.4	35.7	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5 520D
8	Nitrate as NO_3	µmol/L	8.5	7.2	7.55	6.34	5.8	6.4	8.16	5.87	7.2	6.29	7.96	5.84	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	1	0.6	1.23	1.16	1.5	0.8	0.98	0.69	0.58	0.81	0.84	0.99	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.4	1.8	9.28	8.98	11.4	8.2	3.89	3.6	2.6	2.4	2.7	2.5	IS3025(P34)88 Cla.2.3
11	Phosphates as PO_4	µmol/L	2.45	1.6	2.78	2.14	2.56	2.4	2.39	2.07	2.4	1.74	2.3	1.86	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	11.9	9.6	18.06	16.49	18.70	15.40	13.03	10.16	10.37	9.5	11.5	9.33	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	6	2	12	4	15	BDL*	18	BDL*	23	BDL*	16	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34608	34416	35731	35296	36012	35940	35842	35964	36728	36943	36432	36936	IS3025(P16)84 Re.02
15	COD	mg/L	12	BDL*	14	BDL*	12	BDL*	20.0	BDL*	17.0	6.8	24.8	8.0	APHA(22nd Edi) 5520-D Open Reflux
A	**Flora and Fauna**														
16	Primary productivity	mgC/ L/day	1.57	1.3	2.07	1.68	2.6	1.8	5.4	4	7.98	5.26	7.65	4.72	APHA (22nd Edi) 10200-J
B	**Phytoplankton**														
17.1	Chlorophyll	mg/ m^3	1.6	0.968	2.25	1.33	1.94	1.2	2.42	1.98	3.4	2.8	3.12	2.31	APHA (22nd Edi) 10200-H
17.2	Phaeophytin	mg/ m^3	2.35	1.01	1.76	1.54	1.68	0.99	1.8	1.54	3.0	2.13	1.4	0.8	APHA (22nd Edi) 10200-H
17.3	Cell Count	No. x 10^3/L	150	106	198	134	172	80	203	99	231	87	219	74	APHA (22nd Edi) 10200-H

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17.4	Name of Group Number and name of group species of each group	--	**Cheatoc erous** *Nitzschia Biddulphi a Thallasion ema Coscinodi scus Cyclotella*	**Melosira** *Navicula Fragillaria* -- -- --	**Biddulph ia sp.** *Nitzschia sp. Cheatocer ous sp. Coscinodi scus sp. Fragillaria sp.* -- --	**Nitzschi a sp.** *Navicula sp. Rhizosole nia sp.* -- -- -- --	**Nitzschi a sp.** Thallasios ira sp. Cheatocer ous sp. Biddulphi a sp.	Nitzschia sp. Thallasiosi ra sp. -- --	*Navicula sp. Bacteriast ram Cosmariu m Biddulphi a sp.*	*Nitzschia sp. Synedra sp.* -- --	*Thallasion ema sp. Fragillaria sp. Closteriu m sp. Synedra sp.*	*Nitzschia sp. Biddulphia sp. Synedra sp.* --	*Rhizosole nia sp. Biddulphi a sp. Navicula sp. Thallasion ema sp.*	*Thallasio nema sp. Nitzschia sp. Synedra sp.* --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10 ^{3}/ 100 m^3	48		57		65		71		58		51		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Crustaceans Gastropods Polychaetes --		Hydrozoa Bivalves Foraminiferans Crustaceans		Gastropods Crustaceans Chaetognathes		Copepods Gastropods Cyclops --		Chaetognathes Polychaetes Foraminiferans		Polychaetes Gastropods Bivalves		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/10 0 m^3	4.94		5.57		5.8		5.1		4.78		4.29		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1450		1620		1680		1640		1560		1620		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22ndEdi)9 221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Ed I.2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK – N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018	NOVEMBER 2018	DECEMBER 2018	JANUARY 2019	FEBRUARY 2019	MARCH 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.56	0.84	0.51	0.62	0.72	0.68	FCO:2007
2	Phosphorus as P	µg/g	214	232	220	278	319	246	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	5.18	5.18	4.9	5.2	5.19	4.84	AAS APHA 3111 B
5.2	Total Chromium as Cr+3	µg/g	164	152	184	190	213	201	AAS 3111B
5.3	Manganese as Mn	µg/g	1698	1366	1230	1350	1320	1298	AAS APHA 3111 B
5.4	Iron as Fe	%	5.06	5.1	4.92	5.1	4.83	4.94	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	38	27	32	40	20	27.3	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	46	33	46	28	37	34.6	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	260	218	240	298	278	204	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	2.9	3.1	2.1	3.4	1.9	2.32	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Polychaetes Chaetognaths Mysids	Echinoderms Bivalves Polychaete worms	Echinoderms Gastropods --	Gastropods Crustaceans --	Polychaetes Bivalves --	Crustaceans Gastropods --	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Copepods Ostracodes --	Nematodes --- ---	Copepods -- --	Ostracodes -- --	Foraminiferans -- --	Nematodes Foraminiferans --	APHA (22nd Edi) 10500-C
6.3	Population	no/m²	250	499	528	645	733	850	APHA (22nd Edi) 10500-C

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RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLAND - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.11	8.07	8.25	8.12	8.18	8.11	8.14	8.12	8.19	8.16	8.13	8.06	IS3025(P11)83Re.02
2	Temperature	oC	30.2	30	30.3	30.2	30.5	30.4	30.2	30.1	30.3	30.1	30.2	30	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	318	364	348	306	298	252	256	271	196	219	203	226	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	BDL*	BDL*	6	BDL*	4	BDL*	5.0	BDL*	5.9	BDL*	4.2	BDL*	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.2	5.8	6.1	5.7	6.4	6.2	6.1	6.0	6	5.8	6.1	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	33.9	33.7	34.6	34.3	35.2	35	34.9	35.1	35.4	35.7	35.6	35.9	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	6.6	4.9	9.09	8.64	4.8	5.1	6.41	5.69	9.1	4.5	7.2	6.0	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	1.2	0.8	1.33	1.12	1.7	1.9	0.86	0.63	0.73	0.86	0.84	0.92	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.8	1.7	2.25	1.95	3.4	3.6	3.16	2.91	2.7	2.4	2.4	2.1	IS3025(P34)88Cla 2.3
11	Phosphates as PO_4	µmol/L	2.59	1.8	3.21	2.78	2.8	2.6	2.7	2.4	1.76	1.36	1.62	1.21	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	10.6	7.4	12.68	11.72	9.90	10.60	10.42	9.23	12.53	7.74	10.46	9	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	24	10	17.4	12	19	BDL*	16	11.0	18.4	BDL*	15.3	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34418	34356	35218	35078	36118	35678	35670	35834	36679	36830	36516	37293	IS3025(P16)84Re.02
15	COD	mg/L	BDL*	BDL*	14	BDL*	16	10	19.0	8.0	21	BDL*	22	BDL*	APHA(22nd Edi) 5520-D Open Reflux
A	**Flora and Fauna**														
16	Primary productivity	mgC/L /day	1.23	1.08	1.98	1.64	2.84	2.76	4.2	3.8	8.3	6.4	7.2	5.17	APHA (22nd Edi) 10200-J
B	**Phytoplankton**														
17.1	Chlorophyll	mg/m^3	1.97	1.13	2.93	1.01	2.46	2.3	3.76	2.26	3.1	2.46	2.92	2.21	APHA (22nd Edi) 10200-H
17.2	Phaeophytin	mg/m^3	1.59	0.865	1.22	0.43	1.8	1.2	2.2	1.3	2.35	1.5	2.18	0.5	APHA (22nd Edi) 10200-H

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17.3	Cell Count	No. x 10^3/L	141	66	204	72	190	84	161	73	224	96	197	59	APHA (22nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	**Biddulphia** *Melosira* *synedra* *Navicula* *Nitzschia* **Cheatoc erous**	**Navicula** *Nitzschia* *Biddulphia* *Melosira* -- --	**Biddulphia sp.** *Pleurosigma sp.* *Nitzschia sp.* *Cheatoceros sp.* *Cyclotella sp.* *Diplones* --	**Synedra sp.** *Coscinodiscus sp.* *Navicula sp.* -- -- -- --	Nitzschia sp. Cheatoceros sp. Rhizosolenia sp. Amphipora sp.	Navicula sp. Thallasiosira sp. Guinardia --	*Coscinodiscus sp.* Rhizosolenia sp. Nitzschia sp. *Thallasiosira sp.*	*Navicula sp.* *Thallasiosira sp.* -- --	*Thallasionema sp.* *Nitzschia sp.* *Rhizosolenia sp.* *Coscinodiscus sp.*	*Synedra sp.* *Biddulphia sp.* *Navicula sp.* --	*Biddulphia sp.* *Navicula sp.* *Thallasiosira sp.* *Coscinodiscus sp.*	*Nitzschia sp.* *Synedra sp.* *Biddulphia sp.* --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	58		63		50		64		79		59		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Copepods Polychaetes Crustaceans --		Cephalopods Ostracodes Bivalves Crustaceans		Foraminiferans Ctenophores Ostracods		Polychaete Gastropods Crustaceans --		Polychaetes Crustaceans Bivalves		Polychaetes Bivalves --		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/100 m^3	8.1		8.7		6.2		5.6		6.1		5.85		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1700		1980		1880		1820		1860		1780		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22ndEdi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edl.2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF SEDIMENT ANALYSIS [M3 RIGHT SIDE OF BOCHA CREEK - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018	NOVEMBER 2018	DECEMBER 2018	JANUARY 2019	FEBRUARY 2019	MARCH 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.52	0.46	0.54	0.48	0.69	0.72	FCO:2007
2	Phosphorus as P	µg/g	208	218	240	290	312	230	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	5.1	4.9	4.86	5.2	4.97	5.12	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	174	198	130	168	218	150	AAS 3111B
5.3	Manganese as Mn	µg/g	1540	1614	1346	1240	1475	1136	AAS APHA 3111 B
5.4	Iron as Fe	%	4.9	4.2	4.82	5.1	4.96	5.14	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	46.8	30.2	36	42	53	32	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	51.6	29	46	35	27	39	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	296	250	234	310	219	250	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	3.3	2.6	2.9	2.2	1.7	2.16	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Amphipods Isopods Polychaetes	Polychaete worms Bivalves Chaetognathes	Polychaete Chaetognathes Bivalves	Crustaceans Polychaete --	Crustaceans Gastropods --	Gastropods Polychaetes --	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Copepods Foraminiferans --	Nematodes Hydrozoan ---	Copepods -- --	Nematodes -- --	Nematodes hydrozoans --	Gastropods Polychaetes --	APHA (22nd Edi) 10500-C
6.3	Population	no/m^2	279	557	587	704	853	824	APHA (22nd Edi) 10500-C

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RESULTS OF MARINE WATER [M4 JUNA BANDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.18	8.05	8.17	8.06	8.07	8.03	8.1	8.08	8.14	8.13	8.13	8.1	IS3025(P11)83Re.02
2	Temperature	oC	30	29.9	30.7	30.5	30.8	30.4	30.2	30.1	30.1	29.9	30.2	30	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	296	272	338	299	264	226	248	272	208	234	217	243	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4	BDL*	3	BDL*	4	BDL*	5.2	BDL*	6.4	BDL*	5.8	BDL*	IS 3025 (P44)1993Re.03 Edition2.1
5	Dissolved Oxygen	mg/L	6.5	6	6.2	5.9	6.6	6.8	6.2	5.8	6.1	5.7	6.2	5.8	IS3025(P38)89Re.99
6	Salinity	ppt	34.3	34.1	34.2	33.9	34.8	34.4	35	35.2	35.7	35.9	35.6	36	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	7.8	6.2	11.45	9.91	10.2	9.4	13.37	11.67	10.77	9.56	8.52	5.46	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	3.4	2	1.47	1.23	1.60	1.5	0.96	0.78	0.78	1.12	0.83	0.94	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.75	2.1	2.46	2.27	2.40	2.8	3.43	3.2	2.9	2.6	2.6	2.4	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	1.95	1.6	2.14	1.82	2.31	2.2	1.96	1.59	1.19	1.18	1.32	1.27	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	13.95	10.3	15.38	13.41	14.20	13.70	17.75	15.65	14.49	13.31	11.94	8.76	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	16	4	18	5	10	BDL*	14	BDL*	20	BDL*	17	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34692	34460	35384	35130	35816	35718	35946	36218	36734	36984	36581	37134	IS3025(P16)84Re.02
15	COD	mg/L	14	BDL*	12	BDL*	14	BDL*	18.0	6.0	23.0	10.0	19.0	8.3	APHA(22nd Edi) 5520-D Open Reflux
A	Flora and Fauna														
16	Primary productivity	mgC/L/day	2.25	1.35	2.36	1.71	3.64	2.9	4.5	3.3	8.43	5.58	7.42	4.38	APHA (22nd Edi) 10200-J
B	Phytoplankton														
17.1	Chlorophyll	mg/m^3	1.55	1.02	1.86	1.14	2.8	2.62	3.2	2.6	3.25	2.8	2.79	2.2	APHA (22nd Edi) 10200-H
17.2	Phaeophytin	mg/m^3	0.94	0.64	1.44	0.88	1.68	1.52	2.4	1.1	2.1	2.2	1.33	0.96	APHA (22nd Edi) 10200-H

H. T. Shah
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17.3	Cell Count	No. x 10^3/L	146	87	178	84	204	106	146	73	193	67	179	64	APHA (22nd Edi) 10200-H
17.4	Name of Group Number and name of group / species of each group	--	**Nitzschia** *Navicula* *Coscinodiscus* *Rhizosolenia* *Thallasiosira* --	**Nitzschia** *Pleurosigma* *Navicula* -- -- --	**Navicula sp.** *Biddulphia sp.* *Synedra sp.* *Rhizosolenia sp.* *Cyclotella sp.* -- --	**Thallasiosira sp.** *Nitzschia sp.* *Pleurosigma sp.* -- -- --	Gyrosigma sp. Cheatoceros sp. Fragillaria sp. Pleurosigma sp.	Nitzschia sp. Rhizosolenia sp. Thallasiosira sp. --	*Navicula sp.* Biddulphia sp. Coscinodiscus sp. Rhizosolenia sp.	*Nitzschia sp.* *Thallasiosira sp.* Synedra sp. --	*Rhizosolenia sp.* *Cheatoceros sp.* *Pleurosigma sp.* *Biddulphia sp.*	*Synedra sp.* *Biddulphia sp.* *Navicula sp.* --	*Thallasiosira sp.* *Nitzschia sp.* *Coscinodiscus sp.* *Pleurosigma sp.*	*Synedra sp.* *Navicula sp.* *Cheatoceros sp.* --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	67		59		72		64		81		73		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Gastropods Decapods --		Gastropods Bivalves Crustaceans Oligocheata		Foraminiferans Ctenophores Polychaetes		Gastropods Crustaceans Polychaete --		Foraminiferans Ostracods Polychaetes		Gastropods Polychaetes Decapods		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/100 m^3	5.87		6.05		6.9		5.5		6.2		4.94		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1600		1870		1820		1840		1840		1860		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22ndEdi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018	NOVEMBER 2018	DECEMBER 2018	JANUARY 2019	FEBRUARY 2019	MARCH 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.48	0.64	0.52	0.68	0.56	0.67	FCO:2007
2	Phosphorus as P	µg/g	224	178	240	310	259	218	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	5.24	5.3	5.12	4.9	5.2	5.1	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	154	167	180	192	174	140	AAS 3111B
5.3	Manganese as Mn	µg/g	1590	1630	1346	1484	1376	1198	AAS APHA 3111 B
5.4	Iron as Fe	%	5.14	5.2	4.98	4.78	5.1	4.6	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	58	74	42	60	31	39	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	44	44	52	39	45	33	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	256	310	230	296	330	274	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	4.2	1.8	2.1	3.2	2.4	1.96	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Polychaetes Isopods Mysids	Bivalves Decapods Polychaete worms	Decapods Gastropods --	Gastropods Mysids --	Polychaetes Gastropods --	Crustaceans Polychaetes --	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Nematodes Bryozoans --	Foraminiferans Nematodes ---	Foraminiferans Bryozoans --	Nematodes Bryozoans --	Foraminiferans -- --	Nematodes Bryozoans --	APHA (22nd Edi) 10500-C
6.3	Population	no/m^2	294	528	556	673	824	882	APHA (22nd Edi) 10500-C

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RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.19	8.08	8.15	8.1	8.24	8.17	8.12	8.09	8.16	8.13	8.1	8.06	IS3025(P 11)83Re .02
2	Temperature	oC	30.5	30.3	30.4	30.2	30.6	30.3	31.1	30	30.2	30	3.01	30	IS3025(P9)84Re. 02
3	Total Suspended Solids	mg/L	369	332	356	304	312	294	228	251	182	218	250	276	IS3025(P 17)84Re .02
4	BOD (3 Days @ 27 °C)	mg/L	5	BDL*	4	BDL*	5	BDL*	6.2	BDL*	8.3	BDL*	12.8	BDL*	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.4	6	6.2	5.8	6.2	6	6.1	5.9	6.2	6.0	6.1	5.9	IS3025(P38)89Re .99
6	Salinity	ppt	34.5	34.1	34.3	34.1	34.6	34.3	34.8	35.1	35.5	35.9	35.6	35.8	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	10.4	6.2	9.37	7.79	7.4	6.2	8.2	7.2	3.45	2.12	6.84	4.7	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	5.1	3.4	1.96	1.57	2.1	2.4	1.5	1.3	1.47	0.87	1.36	1.94	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.8	2.4	3.71	3.34	2.7	2.9	3.6	3.3	1.75	1.59	1.58	1.35	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.36	1.8	2.67	2.14	2.85	2.45	2.1	1.8	1.04	1.49	1.3	1.5	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	18.3	12	15.04	12.71	12.20	11.50	13.41	11.95	6.67	4.6	9.78	6.99	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	12	6	16	8	18	BDL*	11	BDL*	18	BDL*	14.3	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34814	34518	35810	35334	35511	35273	35710	35994	36394	36996	36534	36840	IS3025(P16)84Re .02
15	COD	mg/L	16	BDL*	13	BDL*	15	BDL*	21.0	10.0	26.0	7.0	15.0	BDL*	APHA(22nd Edi) 5520-D Open Reflux
A	**Flora and Fauna**														
16	Primary productivity	mgC/L /day	1.55	1.21	1.95	1.32	2.46	2.1	4.1	2.8	7.42	5.62	8.1	5.17	APHA (22nd Edi) 10200-J
B	**Phytoplankton**														
17.1	Chlorophyll	mg/m^3	1.94	1.12	2.13	1.25	2.2	1.98	2.9	2.10	3.24	2.60	3.4	2.74	APHA (22nd Edi) 10200-H
17.2	Phaeophytin	mg/m^3	2.18	0.7	0.96	0.7	1.6	0.86	1.8	1.1	2.45	1.44	2.77	1.97	APHA (22nd Edi)

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															10200-H
17.3	Cell Count	No. x 10^3/L	150	106	192	106	202	124	193	89	240	73	210	60	APHA (22nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	**Rhizosolenia** *Melosira Nitzschia Biddulphia Coscinodiscus* **Cyclotella**	**Pleurosigma** *Navicula Rhizosolenia* -- -- --	**Cyclotella sp.** *Nitzschia sp. Skeletonema sp. Cheatocerous sp. Pleurosigma sp. Biddulphia sp.* --	**Navicula sp.** *Rhizosolenia sp. Synedra sp. Fragillaria sp.* -- -- --	Thallasios ira sp. Coscinodiscus sp. Cyclotella sp. Ceratizam	Navicula sp. Biddulphia a sp. Gyrosigma a sp. --	*Thallasios ira sp.* Nitzschia sp. Rhizosolenia sp. Coscinodiscus sp.	*Navicula sp.* Biddulphia a sp. Thallasios ira sp.	*Synedra sp. Coscinodiscus sp. Biddulphia a sp. Navicula sp.*	*Nitzschia sp. Pleurosigma sp. Skeletonema sp.* --	*Nitzschia sp. Pleurosigma sp. Biddulphia a sp. Coscinodiscus sp.*	*Thallasios ira sp. Skeletonema sp. Nitzschia sp.* --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	51		56		38		63		52		60		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Hydrozoans Polychaetes Cheatocerous --		Polychaetes Decapods Crustaceans Fish Larve		Ostracods Polychaetes Foraminiferans		Polychaete Foraminiferans Ostracodes Decapods		Polychaetes Bivalves Amphipods		Foraminiferans Ostracodes Bivalves		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/100 m^3	9.6		9.3		5.6		5.9		4.3		3.95		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1650		1980		1820		1860		1720		1740		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22ndEdi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018	NOVEMBER 2018	DECEMBER 2018	JANUARY 2019	FEBRUARY 2019	MARCH 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.7	0.74	0.52	0.68	0.82	0.63	FCO:2007
2	Phosphorus as P	µg/g	216	283	210	296	319	270	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	5.2	5.18	4.9	5	4.86	5.1	AAS APHA 31 11 B
5.2	Total Chromium as Cr^{+3}	µg/g	158	163	170	192	218	158	AAS 3111 B
5.3	Manganese as Mn	µg/g	1710	1599	1248	1336	1492	1206	AAS APHA 31 11 B
5.4	Iron as Fe	%	5	4.92	5.1	4.97	5.16	4.82	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	62	34.6	26	48	40	21	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	56.4	50.2	64	42	33	48.4	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	344	256	296	310	347	203	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	4.6	2.7	2	3.6	3.2	1.2	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	0.01	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Hydrozoa Gastropods Mysids	Amphipods Mysids Bivalves	Gastropods Bivalves Echinoderms	Gastropods Bivalves --	Gastropods Brachyurans --	Bivalves Gastropods --	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Bruchyrans Nematodes --	Hydrozoan Foraminiferans ---	Nematodes -- --	Foraminiferans -- --	Nematodes -- --	Foraminiferans Brachyurans --	APHA (22nd Edi) 10500-C
6.3	Population	no/m2	397	469	557	616	733	850	APHA (22nd Edi) 10500-C

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RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.37	8.24	8.3	8.16	8.31	8.24	8.19	8.16	8.13	8.11	8.15	8.10	IS3025(P11)83Re.02
2	Temperature	oC	30.4	30.2	30.5	30.3	30.8	30.5	30.6	30.4	30.2	30.1	30.3	30	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	342	296	370	308	348	314	270	286	208	231	274	296	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	7	3	8	2	5	3	7.4	BDL*	5.6	BDL*	5.9	BDL*	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.6	6.2	6.4	6.1	6.6	6.1	6.2	5.9	6.1	5.7	6.2	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	34	33.8	34.8	3	34.3	34.2	34.7	34.9	35.4	35.6	35.5	35.8	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	34.5	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	7.9	5.2	6.68	5.23	6.2	5.4	7.2	6.8	5.78	4.23	8.34	6.9	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	1.6	1.2	1.57	1.47	1.2	1.6	1.39	0.78	1.24	1.47	1.56	1.73	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.8	2.4	2.98	2.41	3.1	2.4	3.5	3.1	2.36	2.08	2.51	2.3	IS3025(P34)88Cla 2.3
11	Phosphates as PO_4	µmol/L	2.46	2.15	1.76	1.44	2.1	1.84	2.5	1.6	1.3	1.48	1.58	1.74	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	12.3	8.8	11.23	9.11	10.50	9.40	12.24	10.81	9.38	7.78	12.41	10.93	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	28	14	21	10	18	BDL*	14.8	BDL*	16	BDL*	9.4	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34327	34218	35930	35634	35227	35108	35698	35846	36274	36480	36570	36984	IS3025(P16)84Re.02
15	COD	mg/L	22	15	25	11	18	10	26	12.0	21	7.0	15	BDL*	APHA(22ndEdi) 5520-D Open Reflux
A	**Flora and Fauna**														
16	Primary productivity	mgC/L /day	1.75	1.14	2.58	1.91	2.94	2.5	4.23	3.78	7.31	4.77	7.87	5.62	APHA (22nd Edi) 10200-J
B	**Phytoplankton**														
17.1	Chlorophyll	mg/m^3	1.72	1.26	2.52	2.4	2.82	2.24	2.41	2.02	2.69	2.31	2.5	2.28	APHA (22nd Edi) 10200-H
17.2	Phaeophytin	mg/m^3	1.86	0.502	1.49	1.03	2.36	1.96	1.86	1.3	2.27	2.12	1.2	1	APHA (22nd Edi) 10200-H

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17.3	Cell Count	No. x 10^3/L	151	97	178	104	270	130	187	99	201	87	231	76	APHA (22nd Edi) 1020O-H
17.4	Name of Group Number and name of group species of each group	--	**Biddulphia** *Navicula Cheatocerous Nitzschia* ***Melosira*** *Gyrosigma*	**Navicula** *Synedra Melosira* -- -- --	**Navicula sp.** *Cyclotella sp. Biddulphia sp. Surirella sp. Cheatoceros sp.* --	**Fragillaria sp.** *Rhizosolenia sp. Navicula sp.* -- -- --	Thallasiosira sp. Nitzschia sp. Coscinodiscus sp. Biddulphia sp.	Navicula sp. Cheatoceros sp. Gyrosigma sp. --	*Thallasiosira sp. Biddulphia sp. Synedra sp. Pleurosigma sp.*	*Nitzschia sp.* Gyrosigma sp. *stauroneis* --	*Cheatoceros sp. Rhizosolenia sp. Biddulphia sp. Navicula sp.*	*Nitzschia sp. Fragillaria sp. Navicula sp.* --	*Cheatoceros sp. Rhizosolenia sp. Coscinodiscus sp. Thallasiosira sp.*	*Nitzschia sp. Gyrosigma sp. Fragillaria sp.* --	APHA (22nd Edi) 1020O-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	44		56		68		63		51		59		APHA (22nd Edi) 1020O-G
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Bivalves Decapods --		Copepods Mysids mollusca Echinoderms		Siphonophores Gastropods Chaetognathes		Gastropods mollusca Crustaceans --		Polychaetes Bivalves Ostracods		Gastropods Copepods Bivalves		APHA (22nd Edi) 1020O-G
18.3	Total Biomass	ml/100 m^3	7.1		7.8		6.1		5.15		3.7		3.45		APHA (22nd Edi) 1020O-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1820		1740		1860		1800		1840		1820		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22nd Edi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.29	8.06	8.26	8.12	8.24	8.17	8.21	8.17	8.16	8.14	8.15	8.12	IS3025(P11)83Re .02
2	Temperature	oC	30.5	30.2	30.3	30.1	31	30.8	30.9	30.6	30.1	29.9	30.2	30	IS3025(P9)84Re. 02
3	Total Suspended Solids	mg/L	298	242	318	276	382	319	264	283	204	276	228	263	IS3025(P17)84Re .02
4	BOD (3 Days @ 27 °C)	mg/L	4	3	6	BDL*	3	BDL*	5.2	BDL*	7.8	BDL*	5.9	BDL*	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.4	5.6	6.3	5.9	6.4	6	6.2	6.1	6.6	6.2	6.1	5.8	IS3025(P38)89Re .99
6	Salinity	ppt	34.3	34.1	34.4	34.1	34.1	33.9	34.5	34.7	35.3	35.7	35.6	35.9	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5520D
8	Nitrate as NO_3	µmol/L	7.2	6	8.76	7.01	5.72	3.98	6.68	5.59	5.81	4.42	6.94	4.8	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	1.9	1.6	1.14	0.88	0.68	0.52	1.06	0.98	1.14	1.08	1.33	1.14	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	2.4	1.8	1.69	1.43	2.32	1.8	3.74	2.63	1.9	1.65	1.81	1.42	IS3025(P34)88Cla .2.3
11	Phosphates as PO_4	µmol/L	2.68	1.95	2.46	1.87	1.9	1.72	2.28	2.63	1.07	2.47	1.24	1.37	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	11.5	9.4	11.59	9.32	8.72	6.30	11.49	9.21	8.85	7.15	10.08	7.36	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	30	20	28	20	24	17	14	BDL*	19	BDL*	15.2	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34772	34596	35618	35213	35418	34832	35684	35840	36320	36619	36498	37348	IS3025(P16)84Re .02
15	COD	mg/L	20	10	18	BDL*	13	BDL*	19	7	25	6	19.8	7	APHA(22nd Edi) 5520-D Open Reflux
A	Flora and Fauna														
16	Primary productivity	mgC/L /day	1.28	1.19	2.25	1.93	3.1	2.9	4.36	3.93	7.2	6	7.87	5.06	APHA (22nd Edi) 10200-J
B	Phytoplankton														
17.1	Chlorophyll	mg/m³	2.14	1.12	2.54	1.05	2.84	1.84	2.9	2.41	3.2	2	2.76	2.2	APHA (22nd Edi) 10200-H
17.2	Phaeophytin	mg/m³	2.4	1.04	0.64	0.32	1.7	1.1	2.2	1.49	2.9	1.9	2	1.6	APHA (22nd Edi) 10200-H

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17.3	Cell Count	No. x 10^3/L	154	89	184	96	260	170	201	73	226	84	251	79	APHA (22nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	**Rhizosolenia** *Melosira* *Navicula* *Nitzschia* **Coscinodiscus** --	**Guinardia** *Synedra* *Nitzschia* -- -- --	**Navicula sp.** *Thallasiosira sp.* *Cyclotella sp.* *Synedra sp.* *Coscinodiscus sp.* --	**Nitzschia sp.** *Rhizosolenia sp.* *Synedra sp.* -- -- --	Navicula sp. Melosira sp. Thallasiosira sp. Rhizosolenia sp.	Nitzschia sp. Cheatoceros sp. Fragillaria sp. --	Biddulphia sp. *Nitzschia sp.* Pleurosigma sp. *Thallasiema sp.*	Navicula sp. *Gyrosigma sp.* Synedra sp. --	*Rhizosolenia sp.* *Biddulphia sp.* *Thallasiosira sp.* *Coscinodiscus sp.*	*Synedra sp.* *Nitzschia sp.* *Thallasiosira sp.* --	*Biddulphia sp.* *Coscinodiscus sp.* *Thallasiosira sp,* *Gyrosigma sp.*	*Nitzschia sp.* *Pleurosigma sp.* *Fragillaria sp.* --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	49		60		76		65		59		42		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Copepods Isopods Mysids		Copepods Gastropods Bivalves Crustaceans		Ctenophores Ostracods Gastropods		Crustaceans Gastropods Decapods --		Copepods Polychaetes Bivalves		Crustaceans Ostracods Copepods		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/100 m^3	6.55		8.15		6.92		5.6		4.8		4.95		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1925		2120		1860		1920		1960		1940		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22ndEdi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edl. 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK – N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018	NOVEMBER 2018	DECEMBER 2018	JANUARY 2019	FEBRUARY 2019	MARCH 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.51	0.56	0.48	0.59	0.64	0.69	FCO:2007
2	Phosphorus as P	µg/g	270	332	290	318	370	252	APHA(22nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	**Heavy Metals**								
5.1	Aluminum as Al	%	5.28	5.16	4.96	4.84	4.7	4.93	AAS APHA 3111 B
5.2	Total Chromium as Cr^{+3}	µg/g	216	298	280	230	248	218	AAS 3111B
5.3	Manganese as Mn	µg/g	1680	1534	1346	1276	1424	1240	AAS APHA 3111 B
5.4	Iron as Fe	%	5.14	4.85	5.1	5.2	4.86	4.92	AAS APHA(22nd Edi)3111 B
5.5	Nickel as Ni	µg/g	48	68	21	33	57	23.6	AAS APHA(22nd Edi)3111 B
5.6	Copper as Cu	µg/g	51	62.4	28	48	33	42.8	AAS APHA(22nd Edi)3111 B
5.7	Zinc as Zn	µg/g	286	324	260	271	302	268	AAS APHA(22nd Edi)3111 B
5.8	Lead as Pb	µg/g	4.7	3.2	2.18	3.3	2.8	1.9	AAS APHA(22nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	**Benthic Organisms**								
6.1	Macrobenthos	--	Crustaceans Polychaetes Chaetognaths	Polychaete worms Bivalves Crustaceans	Polychaete Crustaceans Gastropods	Gastropods Echinoderms --	Gastropods Polychaetes --	Polychaetes Crustaceans --	APHA (22nd Edi) 10500-C
6.2	MeioBenthos	--	Copepods Bryozoans --	Nematodes Hydrozoan --	-- -- --	Nematodes -- --	Copepods Foraminiferans --	Copepods Nematodes --	APHA (22nd Edi) 10500-C
6.3	Population	no/m^2	265	411	559	647	824	794	APHA (22nd Edi) 10500-C

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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.19	8.06	8.24	8.11	8.17	8.15	8.12	8.09	8.2	8.17	8.15	8.1	IS3025(P11)83Re.02
2	Temperature	oC	30.1	30	30.4	30.3	30.3	30.2	30.1	30	30.1	30	30.2	30	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	382	316	364	304	319	287	246	281	199	218	236	253	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	7	5	6	BDL*	4	BDL*	5.0	BDL*	6.7	BDL*	5.4	BDL*	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.6	5.9	6.5	BDL*	6.6	6.4	6.1	5.9	6.1	5.9	6.2	5.8	IS3025(P38)89Re.99
6	Salinity	ppt	34.3	33.8	34.8	34.3	35.1	34.7	34.9	35.1	35.3	35.5	35.4	35.6	APHA (22nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22nd Edi)5520 D
8	Nitrate as NO_3	µmol/L	13.4	8.2	9.09	8.76	10.4	9.6	8.1	7.14	5.75	4.38	6.2	4.63	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	2.6	2	1.78	1.43	1.96	1.54	1.14	0.88	0.96	1.18	1.28	1.34	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	4.4	3.6	3.82	2.77	2.6	1.2	3.99	3.71	2.72	1.91	2.5	2.14	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.5	2.4	1.82	1.29	2.16	1.75	2.13	1.81	1.84	1.36	1.7	1.46	APHA(22nd Edi) 4500 C
12	Total Nitrogen	µmol/L	20.4	13.8	14.69	12.96	14.96	12.34	13.23	11.72	9.43	7.47	9.98	8.11	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	35	24	28	16	16	BDL*	10	BDL*	8	BDL*	14.6	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34718	34448	35218	34972	35767	35415	35634	35410	36184	36474	36314	36679	IS3025(P16)84Re.02
15	COD	mg/L	28	22	27	BDL*	16	10	18	11.0	23	6.0	19.6	7.4	APHA(22nd Edi) 5520-D Open Reflux
A	**Flora and Fauna**														
16	Primary productivity	mgC/L /day	1.58	1.03	2.48	1.8	2.64	2.28	5.63	3.82	7.29	5.89	7.43	4.95	APHA (22nd Edi) 10200-J
B	**Phytoplankton**														
17.1	Chlorophyll	mg/m³	1.9	1.57	1.62	1.78	2.4	1.96	3.6	2.70	3	2.54	3.6	2.79	APHA (22nd Edi) 10200-H
17.2	Phaeophytin	mg/m³	1.1	0.58	1.28	0.42	1.7	1.02	2.24	1.92	2.56	1.13	2.16	1.74	APHA (22nd Edi)

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															10200-H
17.3	Cell Count	No. x 10^3/L	157	99	176	80	284	110	230	181	201	97	223	76	APHA (22nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	**Nitzschia** *Thallasiosira Coscinodiscus Synedra Rhizosolenia* --	**Nitzschia** *Navicula Fragillaria* -- -- --	**Navicula sp.** *Thallasiosira sp. Coscinodiscus sp. Biddulphia sp. Rhizosolenia sp. Nitzschia sp. Navicula sp.*	**Nitzschia sp.** *Fragillaria sp. Synedra sp. Gyrosigma sp.* -- -- --	**Rhizosolenia sp.** Nitzschia sp. Thallasiosira sp. --	**Cheatoceros sp.** Biddulphia sp. Cyclotella sp. --	*Navicula sp. Cheatoceros sp. Thallasionema sp.* --	*Rhizosolenia sp. Skeletonema sp.* -- --	*Cheatoceros sp. Nitzschia sp. Rhizosolenia sp. Coscinodiscus sp.*	*Navicula sp. Pleurosigma sp. Synedra sp.* --	*Nitzschia sp. Thallasiosira sp. Coscinodiscus sp. Navicula sp.*	*Nitzschia sp. Rhizosolenia sp.* -- --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	45		51		62		58		62		55		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Bivalves Polychaetes Decapods Foraminiferans		Polychaetes Gastropods Nematodes Mysids		Lamellibranches Ctenophores Polychaetes		Gastropods molluscan Bivalves --		Gastropods molluscans Bivalves		Gastropods Copepods Mysids		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/100 m^3	5.7		6.6		5.92		4.3		5		2.95		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	1800		1760		1860		1820		1720		1860		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22ndEdi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER 2018		NOVEMBER 2018		DECEMBER 2018		JANUARY 2019		FEBRUARY 2019		MARCH 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.25	8.11	8.24	8.05	8.35	8.17	8.19	8.14	8.17	8.13	8.15	8.12	IS3025(P11)83Re.02
2	Temperature	oC	30.3	30	30.1	29.8	30.6	30.3	30.2	30	30.2	29.9	30.2	30	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	296	236	286	244	252	257	210	232	213	256	228	249	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	4	2	3	BDL*	BDL*	BDL*	5.0	BDL*	6.8	BDL*	4.5	BDL*	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.8	6	6.3	5.8	6.4	6.2	6.0	5.8	6.4	5.7	6.1	5.8	IS3025(P38)89Re.99
6	Salinity	ppt	34.5	34.3	34.3	34.1	34.8	34.5	34.4	34.5	35.4	35.6	35.5	35.7	APHA (22ndEdi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22ndEdi)5520D
8	Nitrate as NO_3	µmol/L	13.2	9.2	11.72	8.7	8.9	7.1	7.86	6.65	2.84	1.87	2.27	1.63	IS3025(P34)88
9	Nitrite as NO_2	µmol/L	3.4	2.8	1.98	1.74	1.15	2.45	1.49	1.1	0.43	0.37	0.68	0.89	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH_3	µmol/L	4.6	4	3.39	2.87	4.6	3.9	3.85	3.54	2.37	1.99	2.2	1.93	IS3025(P34)88Cla.2.3
11	Phosphates as PO_4	µmol/L	2.95	2.16	2.36	1.82	2.5	2.41	2.23	1.86	0.98	0.9	0.84	0.72	APHA(22ndEdi) 4500 C
12	Total Nitrogen	µmol/L	21.1	16	17.09	13.31	14.65	12.45	13.21	11.29	5.64	4.23	5.15	4.45	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	32	10	25	12	16	10	14	BDL*	18.2	BDL*	13.5	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	34983	34649	35860	35648	35117	34992	35528	35664	36520	36796	36718	36984	IS3025(P16)84Re.02
15	COD	mg/L	20	8	18	BDL*	10	BDL*	19	8	27	8	22.6	7	APHA(22ndEdi) 5520-D Open Reflux
A	**Flora and Fauna**														
16	Primary productivity	mgC/L /day	1.71	1.57	2.11	2.04	3.2	2.6	5.1	3.3	7.09	4.6	5.62	3.37	APHA (22nd Edi) 10200-J
B	**Phytoplankton**														
17.1	Chlorophyll	mg/m³	1.99	1.51	2.17	1.8	2.9	2.3	3.2	2.6	3.8	2.85	3.27	2.67	APHA (22ndEdi) 10200-H
17.2	Phaeophytin	mg/m³	1.6	1.44	1.6	1.46	2.2	1.96	2.5	1.5	2.7	1.4	2.56	1.54	APHA (22ndEdi) 10200-H

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17.3	Cell Count	No. x 10^3/L	173	90	198	112	230	170	217	213	213	96	236	81	APHA (22nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	**Rhizosolenia** *Nitzschia Melosira Cyclotella Cosmarium* --	**Amphiprora** *ceratium Nitzschia* -- -- --	**Rhizosolenia sp.** *Nitzschia sp. Synedra sp. Biddulphia sp. coratizum sp. Melosira sp.*	**Nitzschia sp.** *Navicula sp. Fragillaria sp.* -- -- --	**Rhizosolenia sp.** Navicula sp. Thallasiosira sp, Coscinodiscus sp.	**Nitzschia sp.** Cyclotella sp, Cheatoceros sp. --	*Thallasiosira sp. Rhizosolenia sp. Coscinodiscus sp.* --	*Navicula sp. Synedra sp. Fragillaria sp.* --	*Coscinodiscus sp. Rhizosolenia sp. Thallasiosira sp. Synedra sp.*	*Synedra sp. Navicula sp. Gyrosigma sp.* --	*Coscinodiscus sp. Rhizosolenia sp. Fragillaria sp. Synedra sp.*	*Navicula sp. Pleurosigma sp. Biddulphia sp.* --	APHA (22nd Edi) 10200-H
C	**Zooplanktons**														
18.1	Abundance (Population)	noX10^3/ 100 m^3	43		40		58		45		64		53		APHA (22nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Foraminiferans Chaetognaths Gastropods --		Polychaetes Bivalves Crustaceans Copepods		Bivalves Gastropods Crustaceans		molluscan Crustaceans Gastropods --		Polychaetes molluscans		Polychaetes Foraminiferans Bivalves		APHA (22nd Edi) 10200-G
18.3	Total Biomass	ml/100 m^3	5.1		5.6		3.2		4.4		3.9		3.4		APHA (22nd Edi) 10200-G
D	**Microbiological Parameters**														
19.1	Total Bacterial Count	CFU/ml	2100		1870		1860		1850		1720		1820		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22ndEdi)9221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)

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RESULTS OF ETP WATER OUTLET

SR NO	PARAMETERS	UOM	RESULTS OF ETP WATER OUTLET						GPCB Limit	TEST METHOD
			03/10/2018	11/05/2018	04/12/2018	04/01/2019	05/02/2019	04/03/2019		
1	Colour	Co-pt	70	50	60	50	70	80	**100**	IS3025(P4)83Re.02
2	pH	--	7.1	7.52	8.4	7.3	8.1	7.45	**6.5 TO 8.5**	IS3025(P11)83Re.02
3	Temperature	°C	32.4	30.8	31.2	30.8	31.6	31.9	**40**	IS3025(P9)84Re.02
4	Total Suspended Solids	mg/L	34	25	39	52	72	64	**100**	IS3025(P17)84Re.02
5	Total Dissolved Solids	mg/L	1024	1712	1698	1318	1560	1921	**2100**	IS3025(P16)84Re.02
6	COD	mg/L	88	92	76	94	84	68	**100**	APHA(22nd Edi) 5520-D Open Reflux
7	BOD (3 Days @ 27 °C)	mg/L	26	18	20	24	20	19	**30**	IS 3025 (P44)1993Re.03Edition2.1
8	Chloride as Cl	mg/L	429	510	529	399	489	596	**600**	IS3025(P32)88Re.99
9	Oil & Grease	mg/L	3.8	2.4	3.2	2.4	4	7.8	**10**	APHA(22nd Edi)5520D
10	Sulphate as SO_4	mg/L	72	110	98	112	156	172	**1000**	APHA(22nd Edi)4500 SO_4 E
11	Ammonical Nitrogen as NH_3	mg/L	2.7	3.4	4.6	3.2	5.2	7.2	**50**	IS3025(P34)88Cla.2.3
12	Phenolic Compound	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	**1**	IS3025(P43)92Re.03
13	Copper as Cu	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	**3**	AAS APHA(22nd Edi)3111 B
14	Lead as Pb	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	**0.1**	AAS APHA(22nd Edi)3111 B
15	Sulphide as S	mg/L	1.8	1.4	1.1	1.4	1.8	1.2	**2**	APHA(22nd Edi) 4500-S
16	Cadmium as Cd	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	**2**	AAS APHA(22nd Edi)3111 B
17	Fluoride as F	mg/L	0.75	0.65	0.45	0.5	0.6	0.5	**2**	APHA(22nd Edi) 4500 F D SPANDS

*Below detection limit

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RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI PORT – T1 TERMINAL NR.MARINE BUILDING								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/10/2018	84.33	43.68	13.61	20.68	0.70	BDL*	BDL*
2	05/10/2018	92.48	57.62	21.29	42.31	0.41	BDL*	BDL*
3	09/10/2018	89.64	39.44	14.36	35.61	0.39	BDL*	BDL*
4	12/10/2018	72.66	29.46	16.42	30.44	0.33	BDL*	BDL*
5	16/10/2018	87.60	48.35	24.29	39.35	0.57	BDL*	BDL*
6	19/10/2018	79.45	37.40	10.44	38.26	0.31	BDL*	BDL*
7	23/10/2018	86.30	45.39	19.44	32.51	0.17	BDL*	BDL*
8	26/10/2018	97.29	59.24	17.55	43.24	0.72	BDL*	BDL*
9	30/10/2018	88.40	40.27	18.42	27.50	0.49	BDL*	BDL*
10	02/11/2018	88.55	38.64	14.30	23.51	0.31	BDL*	BDL*
11	06/11/2018	96.60	58.46	20.32	35.65	0.36	BDL*	BDL*
12	09/11/2018	78.56	37.57	11.56	29.26	0.22	BDL*	BDL*
13	13/11/2018	85.61	49.23	19.60	32.49	0.52	BDL*	BDL*
14	16/11/2018	73.92	31.56	13.60	24.26	0.48	BDL*	BDL*
15	19/11/2018	95.34	52.32	15.66	30.52	0.11	BDL*	BDL*
16	21/11/2018	84.38	35.35	18.48	36.63	0.34	BDL*	BDL*
17	26/11/2018	79.37	42.60	8.64	28.49	0.87	BDL*	BDL*
18	28/11/2018	90.41	39.34	12.52	33.60	0.27	BDL*	BDL*
19	03/12/2018	85.65	48.24	9.69	31.71	0.27	BDL*	BDL*
20	05/12/2018	97.52	42.64	14.54	27.73	0.46	BDL*	BDL*
21	10/12/2018	87.38	50.67	22.71	33.25	0.87	BDL*	BDL*
22	12/12/2018	79.44	34.36	12.31	39.39	0.70	BDL*	BDL*
23	17/12/2018	92.47	44.25	21.34	42.65	0.50	BDL*	BDL*
24	19/12/2018	86.58	57.39	20.39	35.92	0.82	BDL*	BDL*
25	24/12/2018	99.55	40.66	11.31	32.48	0.76	BDL*	BDL*
26	26/12/2018	87.39	37.57	25.61	40.25	0.96	BDL*	BDL*
27	31/12/2018	83.56	55.37	13.62	45.38	0.18	BDL*	BDL*
28	02/01/2019	92.66	57.55	23.42	45.76	0.63	BDL*	BDL*
29	07/01/2019	88.35	39.59	15.59	43.59	0.90	BDL*	BDL*
30	09/01/2019	98.30	42.31	12.50	35.83	1.00	BDL*	BDL*

Continue ...

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RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI PORT – T1 TERMINAL NR. (MARINE BUILDING)								
Sr.No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
31	15/01/2019	89.40	52.44	10.24	38.64	0.37	BDL*	BDL*
32	16/01/2019	96.32	48.20	22.45	32.49	1.02	BDL*	BDL*
33	21/01/2019	86.50	36.54	14.53	46.55	0.23	BDL*	BDL*
34	23/01/2019	99.53	58.38	27.52	39.49	0.81	BDL*	BDL*
35	28/01/2019	83.64	46.55	16.25	29.43	0.97	BDL*	BDL*
36	30/01/2019	95.43	54.30	24.80	36.29	1.10	BDL*	BDL*
37	04/02/2019	76.51	32.38	13.59	39.36	0.30	BDL*	BDL*
38	06/02/2019	81.53	44.53	16.74	37.67	0.54	BDL*	BDL*
39	11/02/2019	94.37	56.48	19.88	43.45	0.74	BDL*	BDL*
40	13/02/2019	84.64	50.26	8.64	36.83	0.50	BDL*	BDL*
41	18/02/2019	90.58	33.20	11.26	38.65	0.78	BDL*	BDL*
42	20/02/2019	95.32	53.43	22.43	35.47	0.61	BDL*	BDL*
43	25/02/2019	74.60	41.65	12.48	24.27	0.93	BDL*	BDL*
44	27/02/2019	91.64	49.19	25.67	33.50	0.69	BDL*	BDL*
45	04/03/2019	77.51	42.43	22.73	36.48	0.60	BDL*	BDL*
46	06/03/2019	84.37	36.79	12.58	44.26	0.49	BDL*	BDL*
47	11/03/2019	74.36	38.23	18.22	41.63	0.39	BDL*	BDL*
48	13/03/2019	92.49	56.28	20.55	38.68	0.78	BDL*	BDL*
49	18/03/2019	69.46	32.42	15.30	35.38	0.23	BDL*	BDL*
50	20/03/2019	86.27	44.29	24.20	39.55	0.48	BDL*	BDL*
51	25/03/2019	78.30	40.25	13.64	25.41	0.63	BDL*	BDL*
52	27/03/2019	81.21	46.18	27.20	45.39	0.52	BDL*	BDL*
	TEST METHOD	**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Below detection limit

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Lab Manager

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RESULT OF AMBIENT AIR QUALITY MONITORING

NEAR FIRE STATION								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/10/2018	89.34	47.50	26.40	36.30	0.79	BDL*	BDL*
2	05/10/2018	97.69	50.58	14.61	33.49	0.62	BDL*	BDL*
3	09/10/2018	84.65	36.56	21.62	39.37	0.23	BDL*	BDL*
4	12/10/2018	79.35	33.44	11.60	26.46	0.52	BDL*	BDL*
5	16/10/2018	80.30	39.46	20.61	25.62	0.63	BDL*	BDL*
6	19/10/2018	93.67	45.63	18.39	41.32	0.45	BDL*	BDL*
7	23/10/2018	77.34	30.36	10.37	30.32	0.38	BDL*	BDL*
8	26/10/2018	92.63	53.57	24.25	37.20	0.90	BDL*	BDL*
9	30/10/2018	82.46	34.56	16.36	24.42	0.36	BDL*	BDL*
10	02/11/2018	82.31	36.74	12.98	18.49	0.21	BDL*	BDL*
11	06/11/2018	91.53	48.35	18.29	30.25	0.55	BDL*	BDL*
12	09/11/2018	89.32	40.58	16.35	34.62	0.46	BDL*	BDL*
13	13/11/2018	78.42	39.63	10.56	20.63	0.41	BDL*	BDL*
14	16/11/2018	85.72	35.66	17.52	28.76	0.45	BDL*	BDL*
15	19/11/2018	67.93	41.20	7.52	24.67	0.24	BDL*	BDL*
16	21/11/2018	57.81	24.50	8.52	32.37	0.53	BDL*	BDL*
17	26/11/2018	83.55	45.66	21.64	36.77	0.73	BDL*	BDL*
18	28/11/2018	61.33	23.64	19.22	27.51	0.47	BDL*	BDL*
19	03/12/2018	96.35	55.70	14.35	36.29	0.69	BDL*	BDL*
20	05/12/2018	79.66	33.89	17.64	25.53	0.30	BDL*	BDL*
21	10/12/2018	82.41	37.65	20.41	22.53	0.60	BDL*	BDL*
22	12/12/2018	92.39	53.56	16.67	29.48	0.53	BDL*	BDL*
23	17/12/2018	65.68	30.62	25.59	35.81	0.89	BDL*	BDL*
24	19/12/2018	80.47	42.85	23.46	30.35	0.78	BDL*	BDL*
25	24/12/2018	68.64	29.51	22.45	28.25	0.62	BDL*	BDL*
26	26/12/2018	91.18	51.20	10.51	38.29	0.57	BDL*	BDL*
27	31/12/2018	89.48	36.53	7.58	34.42	0.36	BDL*	BDL*
28	02/01/2019	74.69	46.32	26.55	40.53	0.98	BDL*	BDL*
29	07/01/2019	68.37	29.46	17.61	32.36	0.65	BDL*	BDL*
30	09/01/2019	78.50	35.37	23.58	28.65	0.72	BDL*	BDL*

Continue ...

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RESULT OF AMBIENT AIR QUALITY MONITORING

NEAR FIRE STATION								
Sr.No.	Date of Sampling	Particulate Matter (PM10) $\mu g/m^3$	Particulate Matter (PM 2.5) $\mu g/m^3$	Sulphur Dioxide (SO2) $\mu g/m^3$	Oxides of Nitrogen (NO2) $\mu g/m^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH_4 mg/m^3	Benzene as C_6H_6 $\mu g/m^3$
31	15/01/2019	85.60	48.62	19.31	41.26	0.87	BDL*	BDL*
32	16/01/2019	91.57	42.65	20.48	35.64	0.70	BDL*	BDL*
33	21/01/2019	60.43	24.50	8.68	38.54	0.45	BDL*	BDL*
34	23/01/2019	72.13	45.66	10.48	31.24	0.71	BDL*	BDL*
35	28/01/2019	67.50	36.32	18.20	25.50	0.44	BDL*	BDL*
36	30/01/2019	90.27	50.25	21.31	29.49	0.78	BDL*	BDL*
37	04/02/2019	54.78	23.55	7.58	32.49	0.60	BDL*	BDL*
38	06/02/2019	60.44	30.50	19.51	27.57	0.46	BDL*	BDL*
39	11/02/2019	86.36	52.23	24.57	37.57	0.97	BDL*	BDL*
40	13/02/2019	78.68	45.66	16.24	29.86	1.05	BDL*	BDL*
41	18/02/2019	69.34	28.43	15.61	24.35	0.87	BDL*	BDL*
42	20/02/2019	82.37	46.53	14.41	31.78	1.01	BDL*	BDL*
43	25/02/2019	59.81	31.49	18.59	21.28	0.52	BDL*	BDL*
44	27/02/2019	66.30	38.39	11.56	40.26	0.98	BDL*	BDL*
45	04/03/2019	73.28	39.55	19.19	40.30	0.50	BDL*	BDL*
46	06/03/2019	63.47	29.67	17.07	28.45	0.66	BDL*	BDL*
47	11/03/2019	55.35	26.78	21.26	38.75	0.36	BDL*	BDL*
48	13/03/2019	86.46	51.45	25.49	43.47	0.74	BDL*	BDL*
49	18/03/2019	51.44	20.46	8.68	25.32	0.44	BDL*	BDL*
50	20/03/2019	75.32	34.26	16.39	33.31	0.78	BDL*	BDL*
51	25/03/2019	58.68	27.36	20.57	22.50	0.39	BDL*	BDL*
52	27/03/2019	62.81	30.54	12.87	39.53	0.76	BDL*	BDL*
	TEST METHOD	**IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)**	**Gravimetric-CPCB - Method (Vol.I,May-2011)**	**IS:5182(Part II):Improved West and Gaeke**	**IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO2)**	**NDIR Digital Gas Analyzer**	**SOP: HC: GC/GCMS/Gas analyzer**	**IS 5182 (Part XI):2006/CPCB Method**

*Below detection limit

H. T. Shah
Lab Manager

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Cleaner Production / Waste Minimization Facilitator

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RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/10/2018	62.57	31.51	18.73	24.53	0.40	BDL*	BDL*
2	05/10/2018	84.35	44.38	11.35	29.67	0.55	BDL*	BDL*
3	09/10/2018	79.63	35.34	16.22	31.22	0.20	BDL*	BDL*
4	12/10/2018	57.24	27.55	13.52	22.43	0.46	BDL*	BDL*
5	16/10/2018	72.80	38.44	10.83	30.58	0.41	BDL*	BDL*
6	19/10/2018	67.89	30.42	8.65	25.69	0.26	BDL*	BDL*
7	23/10/2018	58.64	23.50	12.37	19.40	0.33	BDL*	BDL*
8	26/10/2018	71.58	38.63	15.62	26.19	0.50	BDL*	BDL*
9	30/10/2018	65.65	29.38	9.61	20.60	0.22	BDL*	BDL*
10	02/11/2018	63.77	27.26	7.64	16.26	0.14	BDL*	BDL*
11	06/11/2018	80.35	43.62	12.46	20.25	0.33	BDL*	BDL*
12	09/11/2018	70.43	33.23	6.81	23.70	0.17	BDL*	BDL*
13	13/11/2018	69.32	30.45	8.46	18.64	0.50	BDL*	BDL*
14	16/11/2018	56.38	23.51	11.37	22.48	0.29	BDL*	BDL*
15	21/11/2018	53.45	20.65	13.47	26.83	0.42	BDL*	BDL*
16	26/11/2018	73.64	39.29	16.50	19.53	0.64	BDL*	BDL*
17	28/11/2018	58.42	26.88	17.26	21.24	0.37	BDL*	BDL*
18	03/12/2018	80.24	44.50	6.56	25.71	0.39	BDL*	BDL*
19	05/12/2018	68.32	29.36	19.59	21.60	0.21	BDL*	BDL*
20	10/12/2018	76.34	31.67	13.64	18.65	0.33	BDL*	BDL*
21	12/12/2018	61.25	38.82	10.19	24.61	0.44	BDL*	BDL*
22	17/12/2018	58.35	24.35	8.92	27.60	0.61	BDL*	BDL*
23	19/12/2018	89.32	48.62	12.48	20.37	0.56	BDL*	BDL*
24	24/12/2018	63.57	24.69	17.55	17.69	0.65	BDL*	BDL*
25	26/12/2018	82.68	46.31	14.46	22.68	0.73	BDL*	BDL*
26	31/12/2018	67.87	31.29	9.56	30.23	0.48	BDL*	BDL*
27	02/01/2019	65.56	37.35	9.64	30.34	0.77	BDL*	BDL*
28	07/01/2019	76.51	34.58	11.41	27.70	0.57	BDL*	BDL*
29	09/01/2019	69.32	30.75	18.67	20.46	0.85	BDL*	BDL*
30	15/01/2019	70.20	39.63	7.54	15.63	0.38	BDL*	BDL*

Continue ...

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RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
31	16/01/2019	81.27	32.56	13.61	23.92	0.66	BDL*	BDL*
32	21/01/2019	74.35	29.57	10.41	33.55	0.55	BDL*	BDL*
33	23/01/2019	91.39	51.53	8.51	24.72	0.36	BDL*	BDL*
34	28/01/2019	62.34	27.51	14.41	17.66	0.50	BDL*	BDL*
35	30/01/2019	85.45	33.57	19.30	26.62	0.41	BDL*	BDL*
36	04/02/2019	62.47	26.37	10.36	28.69	0.84	BDL*	BDL*
37	06/02/2019	70.53	37.52	13.37	23.74	0.73	BDL*	BDL*
38	11/02/2019	54.68	22.38	16.50	25.49	0.40	BDL*	BDL*
39	13/02/2019	63.59	34.24	19.38	18.69	0.65	BDL*	BDL*
40	18/02/2019	58.64	24.86	17.53	17.60	1.09	BDL*	BDL*
41	20/02/2019	76.49	33.48	11.36	22.70	0.48	BDL*	BDL*
42	25/02/2019	53.40	23.43	15.19	29.27	0.76	BDL*	BDL*
43	27/02/2019	84.28	45.30	7.54	26.54	0.47	BDL*	BDL*
44	04/03/2019	65.65	35.33	14.52	33.49	0.64	BDL*	BDL*
45	06/03/2019	54.35	25.62	21.54	21.75	0.82	BDL*	BDL*
46	11/03/2019	66.24	33.69	15.65	24.40	0.53	BDL*	BDL*
47	13/03/2019	50.22	23.47	18.39	28.52	0.26	BDL*	BDL*
48	18/03/2019	56.86	27.55	11.85	32.50	0.62	BDL*	BDL*
49	20/03/2019	70.42	41.22	12.36	25.79	0.33	BDL*	BDL*
50	25/03/2019	51.28	24.52	17.50	34.57	0.54	BDL*	BDL*
51	27/03/2019	75.59	39.62	8.91	29.50	0.34	BDL*	BDL*
	TEST METHOD	IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO2)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

*Below detection limit

H. T. Shah
Lab Manager

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RESULT OF AMBIENT AIR QUALITY MONITORING

CT-3 DG HOUSE								
Sr.No.	Date of Sampling	Particulate Matter (PM10) µg/m³	Particulate Matter (PM 2.5) µg/m³	Sulphur Dioxide (SO2) µg/m³	Oxides of Nitrogen (NO2) µg/m³	Carbon Monoxide as CO mg/m³	Hydrocarbon as CH_4 mg/m³	Benzene as C_6H_6 µg/m³
1	02/10/2018	71.67	26.35	15.66	28.39	0.53	BDL*	BDL*
2	05/10/2018	63.62	38.23	19.61	37.34	0.29	BDL*	BDL*
3	09/10/2018	75.64	33.71	11.66	26.32	0.57	BDL*	BDL*
4	12/10/2018	50.32	20.45	8.28	18.35	0.42	BDL*	BDL*
5	16/10/2018	65.70	30.50	12.41	34.55	0.50	BDL*	BDL*
6	19/10/2018	57.40	27.35	16.21	21.31	0.22	BDL*	BDL*
7	23/10/2018	68.20	41.62	6.56	24.70	0.26	BDL*	BDL*
8	26/10/2018	85.46	50.32	13.32	29.36	0.69	BDL*	BDL*
9	30/10/2018	73.38	25.68	10.24	16.37	0.50	BDL*	BDL*
10	02/11/2018	73.41	40.26	8.40	13.59	0.40	BDL*	BDL*
11	06/11/2018	85.32	45.44	11.45	23.61	0.44	BDL*	BDL*
12	09/11/2018	54.62	26.44	14.54	17.58	0.15	BDL*	BDL*
13	13/11/2018	64.31	35.26	20.22	28.40	0.31	BDL*	BDL*
14	16/11/2018	50.35	20.40	6.62	14.65	0.25	BDL*	BDL*
15	19/11/2018	86.12	48.66	18.57	35.26	0.18	BDL*	BDL*
16	21/11/2018	75.86	31.62	15.45	30.62	0.30	BDL*	BDL*
17	26/11/2018	69.43	38.44	19.29	25.51	0.57	BDL*	BDL*
18	28/11/2018	79.63	34.51	9.63	19.67	0.66	BDL*	BDL*
19	03/12/2018	60.76	31.66	12.66	20.84	0.23	BDL*	BDL*
20	05/12/2018	81.62	34.64	9.27	17.63	0.58	BDL*	BDL*
21	10/12/2018	70.60	29.42	18.85	30.45	0.47	BDL*	BDL*
22	12/12/2018	55.90	42.87	6.55	36.55	0.80	BDL*	BDL*
23	17/12/2018	85.78	39.39	13.69	31.61	0.55	BDL*	BDL*
24	19/12/2018	93.82	53.63	10.68	26.39	0.66	BDL*	BDL*
25	24/12/2018	88.60	37.28	8.62	21.66	0.52	BDL*	BDL*
26	26/12/2018	77.17	33.44	16.61	32.60	0.86	BDL*	BDL*
27	31/12/2018	94.32	52.47	19.51	38.46	0.26	BDL*	BDL*
28	02/01/2019	98.69	51.52	15.40	35.33	0.69	BDL*	BDL*
29	07/01/2019	82.58	36.46	7.22	39.28	1.03	BDL*	BDL*
30	09/01/2019	92.38	46.84	9.21	24.57	0.64	BDL*	BDL*

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RESULT OF AMBIENT AIR QUALITY MONITORING

CT-3 DG HOUSE								
Sr.No.	Date of Sampling	Particulate Matter (PM10) $\mu g/m^3$	Particulate Matter (PM 2.5) $\mu g/m^3$	Sulphur Dioxide (SO2) $\mu g/m^3$	Oxides of Nitrogen (NO2) $\mu g/m^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH_4 mg/m^3	Benzene as C_6H_6 $\mu g/m^3$
31	15/01/2019	76.30	56.32	13.38	21.60	0.29	BDL*	BDL*
32	16/01/2019	85.32	38.24	11.35	29.25	0.86	BDL*	BDL*
33	21/01/2019	79.66	33.64	23.37	42.71	0.32	BDL*	BDL*
34	23/01/2019	87.64	55.74	16.34	36.89	1.07	BDL*	BDL*
35	28/01/2019	75.60	42.17	21.59	40.35	0.74	BDL*	BDL*
36	30/01/2019	80.47	39.31	20.36	33.33	0.42	BDL*	BDL*
37	04/02/2019	69.64	29.50	20.40	37.40	0.41	BDL*	BDL*
38	06/02/2019	75.62	40.55	6.61	32.65	0.96	BDL*	BDL*
39	11/02/2019	59.32	34.51	13.64	29.51	0.85	BDL*	BDL*
40	13/02/2019	94.53	55.49	11.58	43.90	0.37	BDL*	BDL*
41	18/02/2019	80.96	36.46	8.78	20.43	0.90	BDL*	BDL*
42	20/02/2019	72.68	30.66	18.42	28.33	0.55	BDL*	BDL*
43	25/02/2019	66.25	33.56	21.57	33.73	0.94	BDL*	BDL*
44	27/02/2019	76.83	39.48	14.18	30.29	0.89	BDL*	BDL*
45	04/03/2019	85.32	49.45	10.49	27.52	0.56	BDL*	BDL*
46	06/03/2019	74.82	32.44	7.65	23.47	0.71	BDL*	BDL*
47	11/03/2019	67.63	30.42	23.43	36.48	0.62	BDL*	BDL*
48	13/03/2019	55.68	33.68	15.70	32.52	0.69	BDL*	BDL*
49	18/03/2019	62.49	24.37	21.37	42.50	0.32	BDL*	BDL*
50	20/03/2019	90.41	39.39	19.49	30.56	0.44	BDL*	BDL*
51	25/03/2019	83.32	44.24	24.26	38.37	0.74	BDL*	BDL*
52	27/03/2019	69.45	35.46	16.25	34.33	0.55	BDL*	BDL*
	TEST METHOD	IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO2)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

*Below detection limit

H. T. Shah
Lab Manager

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RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	T1 TERMINAL NR.MARINE BUILDING					
		Result [Leq dB(A)]					
	Sampling Date & Time	16/10/2018	16/11/2018	14/12/2018	04/01/2019	25/02/2019	18/03/2019
1	6:00-7:00	67.2	67.3	63.1	68.4	65.8	68.1
2	7:00-8:00	66.5	66.4	68.7	65.2	69.4	62.8
3	8:00-9:00	63.9	62.4	69.1	66.8	61.4	63.4
4	9:00-10:00	66.5	64.5	62.8	70.2	62.5	69.9
5	10:00-11:00	61.7	61.6	65.8	62.8	68.4	72.4
6	11:00-12:00	66.2	64.3	70.4	68.3	65.2	74.1
7	12:00-13:00	68.7	65.7	69.7	63.7	60.4	70.1
8	13:00-14:00	70.6	68.2	65.7	62.9	67.4	66.4
9	14:00-15:00	71.9	72.5	63.1	68.5	63.4	68.4
10	15:00-16:00	70.3	67.9	62.8	65.1	62.4	62.8
11	16:00-17:00	62.3	62.9	68.4	70.3	68.1	65.6
12	17:00-18:00	64.7	65.6	65.5	71.8	61.4	68.8
13	18:00-19:00	64.6	64.6	69.1	69.4	60.8	64.1
14	19:00-20:00	63.6	65.7	62.8	62.8	69.4	63.4
15	20:00-21:00	64.9	67.7	65.0	65.1	70.6	68.9
16	21:00-22:00	70.1	73.0	66.7	62.5	72.4	66.8
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	T1 TERMINAL NR.MARINE BUILDING					
		Result [Leq dB(A)]					
1	Sampling Date & Time	16/10/2018 & 17/10/2018	16/11/2018 & 17/11/2018	14/12/2018 & 15/12/2018	04/01/2019 & 05/01/2019	25/02/2019 & 26/02/2019	18/03/2019 & 19/03/2019
2	22:00-23:00	69.5	67.8	63.8	63.1	63.1	65.1
3	23:00-00:00	66.5	64.4	65.7	61.8	65.3	60.8
4	00:00-01:00	64.4	66.9	64.1	65.1	66.3	68.4
5	01:00-02:00	61.9	61.6	62.8	68.7	62.4	67.4
6	02:00-03:00	58.3	60.8	63.7	65.4	62.7	68.4
7	03:00-04:00	66.1	65.6	63.9	62.9	68.3	65.1
8	04:00-05:00	62.8	60.8	69.8	69.4	65.3	62.5
9	05:00-06:00	64.7	66.6	62.7	68.5	66.2	66.1
Night Time Limit*		70 Leq dB(A)					

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RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
	Sampling Date & Time	12/10/2018	20/11/2018	04/12/2018	16/01/2019	04/02/2019	11/03/2019
1	6:00-7:00	62.0	62.3	65.4	62.5	68.4	68.1
2	7:00-8:00	63.8	61.2	66.3	68.4	62.1	62.7
3	8:00-9:00	69.2	69.3	66.9	72.4	65.4	65.1
4	9:00-10:00	67.5	69.1	67.4	74.1	73.1	65.9
5	10:00-11:00	63.4	62.5	63.2	70.4	64.1	68.2
6	11:00-12:00	61.8	64.5	62.4	69.9	68.1	63.7
7	12:00-13:00	68.1	70.7	67.4	63.4	62.4	65.4
8	13:00-14:00	62.5	61.7	65.3	60.4	68.4	62.8
9	14:00-15:00	61.1	61.5	62.5	62.4	62.4	69.1
10	15:00-16:00	67.1	64.9	68.4	64.5	69.4	67.1
11	16:00-17:00	69.0	71.4	68.3	65.1	61.4	63.4
12	17:00-18:00	67.7	67.2	68.7	63.4	60.4	69.1
13	18:00-19:00	64.6	65.4	64.3	62.5	62.7	71.1
14	19:00-20:00	64.7	66.3	62.7	63.4	68.4	68.1
15	20:00-21:00	65.2	63.3	65.8	65.2	64.3	65.2
16	21:00-22:00	61.4	64.5	63.6	66.8	61.5	68.1
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
1	Sampling Date & Time	12/10/2018 & 13/10/2018	20/11/2018 & 21/11/2018	04/12/2018 & 05/12/2018	16/01/2019 & 17/01/2019	04/02/2019 & 05/02/2019	11/03/2019 & 12/03/2019
2	22:00-23:00	68.0	68.4	64.1	63.2	67.3	65.1
3	23:00-00:00	59.8	60.1	63.4	59.4	64.2	68.7
4	00:00-01:00	67.6	66.3	62.1	60.3	65.3	59.4
5	01:00-02:00	60.8	59.6	60.4	60.3	62.1	60.8
6	02:00-03:00	62.8	65.8	68.4	65.3	67.3	63.1
7	03:00-04:00	65.6	65.1	63.4	62.3	66.3	62.4
8	04:00-05:00	64.9	67.5	65.4	60.2	63.9	60.4
9	05:00-06:00	60.8	58.7	67.1	62.4	61.5	60.8
Night Time Limit*		70 Leq dB(A)					

H. T. Shah
Lab Manager

POLLUCON LABORATORIES PVT. LTD. SURAT-7

Dr. Arun Bajpai
Lab Manager (Q)

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RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	02/10/2018	13/11/2018	18/12/2018	02/01/2019	15/02/2019	01/03/2019
1	6:00-7:00	65.0	62.6	60.3	60.3	62.5	65.4
2	7:00-8:00	67.7	68.1	63.4	63.4	68.4	62.8
3	8:00-9:00	67.1	68.7	62.3	62.3	68.1	68.1
4	9:00-10:00	73.0	71.8	67.4	67.4	63.4	72.1
5	10:00-11:00	72.4	71.3	65.6	65.6	72.4	71.5
6	11:00-12:00	64.6	62.8	68.4	68.4	70.4	69.4
7	12:00-13:00	60.3	59.5	70.4	70.4	70.9	65.2
8	13:00-14:00	65.5	69.0	65.3	65.3	68.1	62.8
9	14:00-15:00	64.4	67.4	69.4	69.4	62.4	62.8
10	15:00-16:00	62.5	65.3	69.7	69.7	65.1	62.1
11	16:00-17:00	71.1	72.8	67.3	67.3	62.8	65.1
12	17:00-18:00	69.9	72.0	65.3	65.3	66.8	69.1
13	18:00-19:00	70.9	70.0	63.8	63.8	69.4	63.4
14	19:00-20:00	63.1	60.9	64.3	64.3	62.1	65.1
15	20:00-21:00	57.9	56.0	67.4	67.4	68.4	61.8
16	21:00-22:00	64.9	62.4	63.8	63.8	68.2	60.4
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
1	Sampling Date & Time	02/10/2018 & 03/10/2018	13/11/2018 & 14/11/2018	18/12/2018 & 19/12/2018	02/01/2019 & 03/01/2019	15/02/2019 & 16/02/2019	01/03/2019 & 02/03/2019
2	22:00-23:00	67.8	69.5	60.4	67.4	60.4	62.5
3	23:00-00:00	66.8	64.4	65.1	68.3	65.1	65.1
4	00:00-01:00	64.3	66.8	65.4	63.2	65.4	65.7
5	01:00-02:00	63.8	64.0	61.8	60.1	61.8	60.8
6	02:00-03:00	62.3	61.2	63.4	60.4	63.4	60.7
7	03:00-04:00	62.0	61.2	62.4	62.4	62.4	62.4
8	04:00-05:00	61.3	60.1	65.7	65.3	65.7	58.1
9	05:00-06:00	61.3	63.8	67.1	63.6	67.1	61.8
Night Time Limit*		70 Leq dB(A)					

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RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	CT-3 DG HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	05/10/2018	23/11/2018	21/12/2018	10/01/2019	27/02/2019	07/03/2019
1	6:00-7:00	56.7	56.0	58.1	62.7	58.4	61.2
2	7:00-8:00	59.2	59.2	60.1	65.2	60.4	68.7
3	8:00-9:00	62.2	65.1	59.7	61.4	69.7	65.2
4	9:00-10:00	65.4	66.7	63.4	60.8	64.0	64.3
5	10:00-11:00	66.1	67.3	65.7	65.2	61.5	63.8
6	11:00-12:00	65.3	65.6	69.7	63.1	62.4	69.9
7	12:00-13:00	69.1	71.3	65.1	61.8	61.8	62.7
8	13:00-14:00	69.8	71.4	62.4	65.9	64.7	62.3
9	14:00-15:00	64.3	65.6	68.7	68.2	62.8	65.1
10	15:00-16:00	61.8	62.5	68.4	67.4	61.8	65.4
11	16:00-17:00	65.4	67.4	67.1	64.3	63.4	65.3
12	17:00-18:00	66.8	64.5	65.8	63.5	61.8	68.1
13	18:00-19:00	60.8	62.2	63.8	65.5	67.4	64.2
14	19:00-20:00	64.7	62.1	66.1	66.1	61.9	62.8
15	20:00-21:00	59.2	62.5	69.1	61.4	65.1	65.1
16	21:00-22:00	67.0	67.5	65.8	65.2	62.4	63.4
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	CT-3 DG HOUSE					
		Result [Leq dB(A)]					
1	Sampling Date & Time	05/10/2018 & 06/10/2018	23/11/2018 & 24/11/2018	21/12/2018 & 22/12/2018	10/01/2019 & 11/01/2019	27/02/2019 & 28/02/2019	07/03/2019 & 08/03/2019
2	22:00-23:00	62.0	60.9	68.7	65.1	65.1	63.1
3	23:00-00:00	64.7	66.9	65.1	59.8	59.8	68.4
4	00:00-01:00	58.7	60.5	62.8	57.4	57.4	64.1
5	01:00-02:00	64.5	66.3	68.4	60.4	60.4	60.4
6	02:00-03:00	63.2	66.0	64.9	61.4	61.4	62.8
7	03:00-04:00	66.3	66.0	69.1	58.7	58.7	64.7
8	04:00-05:00	66.1	67.7	67.5	58.1	58.1	66.1
9	05:00-06:00	59.0	58.2	68.2	60.4	60.4	63.7
Night Time Limit*		70 Leq dB(A)					

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RESULT OF STACK MONITORING

SR. NO.	TEST PARAMETERS	UNIT	STD. LIMIT	THERMIC FLUID HEATER (BITUMEN-01)	THERMIC FLUID HEATER (BITUMEN-02)	HOT WATER SYSTEM-1	HOT WATER SYSTEM-2	TEST METHOD
				OCTOBER 2018				
1	Particulate Matter	mg/Nm^3	**150**	19.37	--	16.83	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	3.94	--	5.91	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	23.70	--	34.60	--	IS:11255 (Part-VII):2005
				NOVEMBER 2018				
1	Particulate Matter	mg/Nm^3	**150**	23.54	--	19.63	14.28	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	2.93	--	6.68	4.86	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	28.49	--	39.45	32.79	IS:11255 (Part-VII):2005
				DECEMBER 2018				
1	Particulate Matter	mg/Nm^3	**150**	20.40	--	16.38	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	3.89	--	5.44	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	31.19	--	35.67	--	IS:11255 (Part-VII):2005
				JANUARY 2019				
1	Particulate Matter	mg/Nm^3	**150**	24.57	--	--	18.33	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	4.70	--	--	5.67	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	34.60	--	--	38.27	IS:11255 (Part-VII):2005
				FEBRUARY 2019				
1	Particulate Matter	mg/Nm^3	**150**	18.75	16.51	20.62	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	5.22	4.81	6.60	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	32.35	28.65	38.65	--	IS:11255 (Part-VII):2005
				MARCH 2019				
1	Particulate Matter	mg/Nm^3	**150**	16.83	--	24.62	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	**100**	4.64	--	5.66	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	**50**	30.44	--	35.59	--	IS:11255 (Part-VII):2005

*Below detection limit
Results on 11 % O_2 Correction when Oxygen is greater than 11 %. And 12% CO_2correction when $CO_2$is less thsn 12%

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Minimum Detection Limit [MDL]

Ambient Air Parameters		
Sr. No.	**Test Parameter**	**MDL**
1	Particulate Matter (PM10) ($\mu g/m^3$)	10
2	Particulate Matter (PM 2.5) ($\mu g/m^3$)	10
3	Sulphur Dioxide (SO_2) ($\mu g/m^3$)	5
4	Oxides of Nitrogen ($\mu g/m^3$)	5
5	Hydrogen Sulphide as H_2S ($\mu g/m^3$)	6

Stack Parameters		
Sr.No.	**Test Parameter**	**MDL**
1	Particulate Matter (mg/Nm^3)	10
2	Sulphur Dioxide (ppm)	1.52
3	Oxides of Nitrogen (ppm)	2.65
4	Carbon Monoxide (mg/Nm^3)	0.1
5	Haydro Carbon NMHC (ppm)	1.0

Sea Water Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	pH	--	2
2	Temperature	°C	2
3	Total Suspended Solids	mg/L	2
4	BOD (3 Days @ 27 °C)	mg/L	1
5	Dissolved Oxygen	mg/L	0.1
6	Salinity	ppt	1
7	Oil & Grease	mg/L	2
8	Nitrate as NO_3	µmol/L	0.5
9	Nitrite as NO_2	µmol/L	0.01
10	Ammonical Nitrogen as NH_3	µmol/L	0.2
11	Phosphates as PO_4	µmol/L	0.5
12	Petroleum Hydrocarbon	µg/L	1
13	Total Dissolved Solids	mg/L	10
14	COD	mg/L	3
15	Primary productivity	mgC/L/day	0.1
16	Chlorophyll	mg/m^3	0.1
17	Phaeophytin	mg/m^3	0.1
18	Cell Count	No. x 10^3/L	1

Sea Sediment Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	Organic Matter	%	0.1
2	Phosphorus as P	µg/g	1
3	Petroleum Hydrocarbon	µg/g	1
4	Aluminum as Al	%	0.1
5	Manganese as Mn	µg/g	1
6	Mercury as Hg	µg/g	0.1

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STP Water parameter(mg/L)		
Sr. No.	**Test parameter**	**MDL**
1	pH	2
2	Total Suspended Solids (mg/L)	2
3	BOD (3 days @ 270 C) (mg/L)	1
4	Residual Chlorine (mg/L)	0.2
5	Fecal Coliform (MPN INDEX/100 mL)	1.8

ETP Water Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	Colour	Co-pt	2
2	pH	--	2
3	Temperature	°C	2
4	Total Suspended Solids	mg/L	2
5	Total Dissolved Solids	mg/L	10
6	COD	mg/L	3
7	BOD (3 Days @ 27 °C)	mg/L	1
8	Chloride as Cl	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate as SO_4	mg/L	1
11	Ammonical Nitrogen as NH_3	mg/L	0.2
12	Phenolic Compound	mg/L	0.005
13	Copper as Cu	mg/L	0.01
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.1
16	Cadmium as Cd	mg/L	0.002
17	Fluoride as F	mg/L	0.05

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"HALF YEARLY ENVIRONMENTAL MONITORING REPORT"

FOR

adani™

BORE HOLE WATER
ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH, MUNDRA – 370 421

MONITORING PERIOD:
OCTOBER 2018 TO MARCH 2019

PREPARED BY:

Pollucon

POLLUCON LABORATORIES PVT.LTD.

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TC - 5945 ISO 9001:2015 ISO 14001:2015 OHSAS 18001:2007

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RESULTS OF BORE HOLE WATER

SR. NO	TEST PARAMETERS	UNIT	RESULTS			TEST METHOD
			LIQUID TERMINAL PUMP HOUSE-1	LIQUID TERMINAL NEAR ENCLOSURE – 3	NEAR LIQUID TERMINAL ETP OFFICE	
	GPS Location		N 22° 44.554' E 069° 41.453'	N 22° 44.554' E 069° 41.453'	N 22° 44.554' E 069° 41.453'	
	Sampling Date		31/12/2018	31/12/2018	31/12/2018	
1	pH	--	7.42	8.14	7.79	IS3025(P11)83Re.02
2	Salinity	ppt	12.45	1.28	17.33	APHA 2520B
3	Oil & Grease	mg/L	BDL*	BDL*	2.4	APHA(22ndEdi)5520D
4	Hydrocarbon	mg/L	BDL*	BDL*	BDL*	GC/GC-MS
5	Lead as Pb	mg/L	0.094	0.96	0.031	AAS APHA(22ndEdi)3111 B
6	Arsenic as As	mg/L	BDL*	BDL*	BDL*	AAS APHA 3114 B
7	Nickel as Ni	mg/L	BDL*	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
8	Total Chromium as Cr	mg/L	BDL*	BDL*	BDL*	AAS 3111B
9	Cadmium as Cd	mg/L	0.014	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
10	Mercury as Hg	mg/L	BDL*	BDL*	BDL*	AAS APHA- 3112 B
11	Zinc as Zn	mg/L	2.10	BDL*	0.072	AAS APHA(22ndEdi)3111 B
12	Copper as Cu	mg/L	BDL*	0.84	BDL*	AAS APHA(22ndEdi)3111 B
13	Iron as Fe	mg/L	9.8	0.74	0.25	AAS APHA(22ndEdi)3111 B
14	Insecticides/Pesticides	mg/L	Absent	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	1.02	1.05	0.9	--

*BDL: Below Detection Limit

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SR. NO	TEST PARAMETERS	UNIT	RESULTS		TEST METHOD
			LIQUID TERMINAL PUMP HOUSE-2	LIQUID TERMINAL PUMP HOUSE-3	
	GPS Location		N 22° 44.554' E 069° 41.453'	N 22° 44.554' E 069° 41.453'	
	Sampling Date		31/12/2018	31/12/2018	
1	pH	--	7.80	7.97	IS3025(P11)83Re.02
2	Salinity	ppt	1.26	6.54	APHA 2520B
3	Oil & Grease	mg/L	BDL*	2.0	APHA(22ndEdi)5520D
4	Hydrocarbon	mg/L	BDL*	BDL*	GC/GC-MS
5	Lead as Pb	mg/L	0.075	0.14	AAS APHA(22ndEdi)3111 B
6	Arsenic as As	mg/L	BDL*	BDL*	AAS APHA 3114 B
7	Nickel as Ni	mg/L	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
8	Total Chromium as Cr	mg/L	BDL*	BDL*	AAS 3111B
9	Cadmium as Cd	mg/L	0.044	0.058	AAS APHA(22ndEdi)3111 B
10	Mercury as Hg	mg/L	BDL*	BDL*	AAS APHA- 3112 B
11	Zinc as Zn	mg/L	1.84	0.17	AAS APHA(22ndEdi)3111 B
12	Copper as Cu	mg/L	0.92	BDL*	AAS APHA(22ndEdi)3111 B
13	Iron as Fe	mg/L	7.2	1.10	AAS APHA(22ndEdi)3111 B
14	Insecticides/Pesticides	mg/L	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	0.98	0.95	--

*BDL: Below Detection Limit

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Borehole Water Parameters			
SR. NO.	**TEST PARAMETERS**	**UNIT**	**MDL**
1	pH	--	2
2	Salinity	mg/L	0.5
3	Oil & Grease	mg/L	2
4	Hydrocarbon	mg/L	0.01
5	Lead as Pb	mg/L	0.01
6	Arsenic as As	mg/L	0.001
7	Nickel as Ni	mg/L	0.02
8	Total Chromium as Cr	mg/L	0.025
9	Cadmium as Cd	mg/L	0.002
10	Mercury as Hg	mg/L	0.005
11	Zinc as Zn	mg/L	0.06
12	Copper as Cu	mg/L	0.01
13	Iron as Fe	mg/L	0.1
14	Insecticides/Pesticides	mg/L	0.1

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ANNEXURE – 5

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Details of Greenbelt development at APSEZ, Mundra

LOCATION	Total Green Zone Detail Till Up to March - 2019				
	Area (In Ha.)	Trees (Nos.)	Palm (Nos.)	Shrubs (SQM)	Lawn (SQM)
SV COLONY	69.53	32480.00	7298.00	68327.00	95019.00
PORT & NON SEZ	79.87	139992.00	19205.00	74210.78	61295.18
SEZ	114.72	227835.00	17302.00	220583.60	28162.03
MITAP	2.48	8168.00	33.00	3340.00	4036.00
WEST PORT	86.04	186827.00	51342.00	24112.00	22854.15
AGRI PARK	8.94	17244.00	1332.00	5400.00	2121.44
SOUTH PORT	14.25	25530.00	3470.00	3882.00	3327.26
Samundra Township	55.63	52481.00	11818.00	20078.07	46571.67
Productive Farming (Vadala Farm)	23.79	27976.00	0.00	0.00	0.00
TOTAL (APSEZL)	**455.23**	**718533.00**	**111800.00**	**419933.45**	**263386.73**

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Details of Mangrove Afforstation done by APSEZ

Sl. no.	Location	Area (ha)	Duration	Species	Implementation agency
1	Mundra Port	24.0	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
2	Mundra Port	25.0	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
3	Luni/Hamirmora (Mundra, Kutch)	160.8	2007 - 2015	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
4	Kukadsar (Mundra, Kutch)	66.5	2012 - 2014	Avicennia marina	GUIDE, Bhuj
5	Forest Area (Mundra)	298.0	2011 - 2013	Avicennia marina	-
6	Jangi Village (Bhachau, Kutch)	50.0	2012 - 2014	Avicennia marina	GUIDE, Bhuj
7	Jakhau Village (Abdasa, Kutch)	310.6	2007-08 & 2011-13	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
8	Sat Saida Bet (Kutch)	255.0	2014-15 & 2016-17	Avicennia marina & Bio diversity	GUIDE, Bhuj
9	Dandi Village (Navsari)	800.0	2006 - 2011	Avicennia marina, Rhizophora mucronata, Ceriops tagal	SAVE, Ahmedabad
10	Talaza Village (Bhavnagar)	50.0	2011-12	Avicennia marina	SAVE, Ahmedabad
11	Narmada Village (Bhavnagar)	250.0	2014 - 2015	Avicennia marina	SAVE, Ahmedabad
12	Malpur Village (Bharuch)	200.0	2012-14	Avicennia marina	SAVE, Ahmedabad
13	Kantiyajal Village (Bharuch)	50.0	2014-15	Avicennia marina	SAVE, Ahmedabad
14	Devla Village (Bharuch)	150.0	210-16	Avicennia marina	SAVE, Ahmedabad
15	Village Tala Talav (Khambhat, Anand)	100.0	2015 - 2016	Avicennia marina	SAVE, Ahmedabad
16	Village Tala Talav (Khambhat, Anand)	38.0	2015 - 2016	Avicennia marina	GEC, Gandhinagar
17	Aliya Bet, Village Katpor (Hansot, Bharuch)	62.0	2017-18	Avicennia marina & Rhizophora spp.	GEC, Gandhinagar
Total Mangrove Plantation:		**2889.90 Ha**			

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ANNEXURE – 6

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Date: 01.10.2018

APSEZ/MARINE/CG/04

The Commander
(For Regional Pollution Response Officer)
Headquarter Coast Guard Region (NW)
Gandhinagar

Sub: **Annual Updating of Oil Spill Contingency Response Plan (Tier 1) – APSEZ, Mundra**

Dear Sir,

The Oil Spill Contingency Plan was approved vide your letter no 7563 dated 07th November 2016.

The annual updating of Oil Spill Contingency Plan was done on 01 Oct 2018. The details of changes incorporated are mentioned below:

Sl No	Amendment	Page No
1	Shore line resources updated	26
2	Annex 3- Tug details updated	75
3	Annex 4- Contact details of APSEZ personnel updated	78

The above is for your kind information and updating your records.

Thanking you,

Yours faithfully,

For Adani Ports and SEZ Ltd

Capt Anubhav Jain
Head– Marine Services
E Mail; ANUBHAV.JAIN@ADANI.COM
Mob: +91 8980015245

Capt. Anubhav Jain
AGM - Marine & PFSO
Adani Ports & SEZ Ltd.
Mundra - Kutch - Gujarat

CC: The Commanding Officer, Indian Coast Guard Station, Mundra

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adani™

OIL SPILL CONTINGENCY RESPONSE PLAN TIER 1

(To be used in conjuction with OSRA Vol-1 and Vol-2)

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
POST BAG NO. 1
NAVINAL ISLAND
MUNDRA 370 421
PH. : (02838) 289221 / 289371
FAX : (02838) 289170 / 289270

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All documents so distributed will be controlled documents & identified by a unique control number as per Oil Spill Contingency Response plan.

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

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Section 02: Amendment Records

AMENDMENT RECORD SHEET							
Sr. No.	**Section**	**Sub-section**	**Page No.**	**Revision No.**	**Revision Date**	**Description of Revision**	**Approved**
1.	Annex 3		75			Location of Oil Spill Equipment mentioned	Approved
2.	Annex 15		91			List of recycler approved by state of Gujarat	Approved
3.			96			Contingency Planning Compliance Checklist	Approved
4	Annex 16		92		29.08.2017	List of agency for support & guidance for rescue & rehabilitation of oiled bird & mangroves management during oil spill	Approved
5	03	3.6	45		29.08.2017	Additional information added	Approved
6	02	2.6	26		01.10.2018	Shore line resources updated	Approved
7	Annex 3		75		01.10.2018	Tug details updated	Approved
8	Annex 4		78		01.10.2018	Contact details of APSEZ personnel updated	Approved

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Section 03: Strategy

1 Introduction

1.1 Authorities and responsibilities
1.2 Coordinating committee
1.3 Statutory requirements
1.4 Mutual aid agreements
1.5 Geographical limits of plan
1.6 Interfaces with ROSDCP and NOSDCP

2 Risk assessment

2.1 Identification of activities and risks
2.2 Types of oil likely to be spilled
2.3 Probable fate of spilled oil
2.4 Development of oil spill scenarios including worst case discharge
2.5 Shoreline sensitivity mapping
2.6 Shoreline resources, priorities for protection
2.7 Special local considerations

3 Response strategy

3.1 Philosophy and objectives
3.2 Limiting and adverse conditions
3.3 Oil spill response in offshore zones
3.4 Oil spill response in coastal zones
3.5 Shoreline oil spill response
3.6 Storage and disposal of oil and oily waste

4 Equipment

4.1 Marine oil spill response equipment
4.2 Inspection, maintenance and testing
4.3 Shoreline equipment, supplies and services

5 Management

5.1 Crisis manager and financial authorities
5.2 Incident organization chart
5.3 Manpower availability (on-site, on call)
5.4 Availability of additional manpower
5.5 Advisors and experts – spill response, wildlife and marine environment
5.6 Training / safety schedules and drill / exercise programme

6 Communications

6.1 Incident control room and facilities
6.2 Field communications equipment
6.3 Reports, manuals, maps, charts and incident logs

Action and operations

7 Initial procedures

- **7.1** Notification of oil spill to concerned authorities,
- **7.2** Preliminary estimate of response tier
- **7.3** Notifying key team members and authorities
- **7.4** Manning Control Room
- **7.5** Collecting information (oil type, sea / wind forecasts, aerial surveillance, beach reports)
- **7.6** Estimating fate of slick (24, 48, 72 hours)
- **7.7** Identifying resources immediately at risk, informing parties

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- **8.1** Assembling full response team
- **8.2** Identifying immediate response priorities
- **8.3** Mobilizing immediate response
- **8.4** Media briefing
- **8.5** Planning medium-term operations (24, 48 and 72 hour)
- **8.6** Deciding to escalate response to higher tier
- **8.7** Mobilizing or placing on standby resources required
- **8.8** Establishing field command post communications

9 Control of operations

- **9.1** Establishing a Management team with experts and advisors
- **9.2** Updating information (sea, wind, weather forecasts, aerial surveillance, beach reports)
- **9.3** Reviewing and planning operations
- **9.4** Obtaining additional equipment, supplies, manpower
- **9.5** Preparing daily incident log and management reports
- **9.6** Preparing operations accounting and financial reports
- **9.7** Preparing releases for public and press conferences
- **9.8** Briefing local and government officials

10 Termination of operations

- **10.1** Deciding final and optimal levels of beach clean-up
- **10.2** Standing down equipment, cleaning, maintaining, replacing
- **10.3** Preparing formal detailed report
- **10.4** Reviewing plans and procedures from lessons learnt

Data Directory

Maps / Charts

1. Coastal facilities, access roads, telephones, hotels etc.

2. Coastal charts, currents, tidal information (ranges and streams), prevailing winds
3. Risk locations and probable fate of oil
4. Shoreline resources for priority protection
5. Shoreline types
6. Sea zones and response strategies
7. Coastal zones and response strategies
8. Shoreline zones and clean up strategies
9. Oil and waste storage / disposal sites
10. Sensitivity Maps/ Atlas

Lists

1. **Primary Oil spill Equipment:** booms, skimmers, spray equipment, dispersant, absorbents, oil storage, Radio communications etc. (Manufacturer, type, size, location, transport, contact, delivery time, cost and conditions)
2. **Auxiliary Equipment:** Tugs and work boats, aircraft, vacuum trucks, tanks and barges, loaders and graders, plastic bags, tools, protective clothing, communication equipment etc. (Manufacturer, type, size, location, transport, contact, delivery time, cost and conditions)
3. **Support Equipment:** Aircraft, communications, catering, housing, transport, field sanitation and shelter etc. (Availability, contact, cost and conditions)
4. **Sources of Manpower:** Contractors, local authorities, caterers, security firms (Availability, numbers, skills, contact, cost and conditions)
5. **Experts and Advisors:** Environment, safety, auditing (Availability, contact, cost and conditions)
6. **Local and National Government contacts:** Name, rank and responsibility, address, telephone, fax, telex.

Data

1. Specifications of oils commonly traded
2. Wind and weather
3. Information sources

Annexures

Annexure 1	Initial Oil Spill Report
Annexure 2	POLREP Report
Annexure 3	List of resources available
Annexure 4	List of Telephone numbers of Expert and advisors
Annexure 5	Responsibilities: Marine Officer / SPM Officer
Annexure 6	Responsibilities: Marine Manager / On Scene Commander
Annexure 7	Responsibilities: SPM Pilot
Annexure 8	Responsibilities: HOD – Marine
Annexure 9	Oil Spill Progress report
Annexure 10	Emergency response Log
Annexure 11	Classification of oils
Annexure 12	Response Guidelines
Annexure 13	Site Specific Health and Safety Plan.
Annexure 14	Indian Chart 2079
Annexure 15	List of recycler approved by state of Gujarat
Annexure 16	List of agency for support & guidance for rescue & rehabilitation of oiled bird & mangroves management during oil spill

Strategy

1. Introduction

The movement of Petroleum/ Petroleum-products from the production centre in middle east to Adani Ports and SEZ Ltd and various other ports in Gulf of Kutch is handled through ships at sea and to refineries using pipe lines on ground. Like any other port, Adani Port is very much vulnerable to oil spill disaster arising due to collision, leakage or grounding of vessels in sea and damage to pipelines on ground.

This action plan prepared by Adani Ports and SEZ Ltd, Mundra is to combat the oil spill (LOS-DCP) is in accordance with the NOS-DCP, International Petroleum Industry Environmental Conservation Association (IPIECA).

1.1 Authorities and responsibilities

Adani Ports and SEZ Limited

APSEZL has responsibility for dealing with oil spillages which occur within port limit if the estimated quantity of product lost is 700 tons or less.

Should the spill migrate to other areas, the Coast Guard Monitor will assume the position of On Scene Commander and will direct the response effort. In both cases, APSEZL will act and deploy their resources as required by the relevant On Scene Commander.

This operational version of Oil Spill Contingency Response Plan for the Adani Ports and SEZ Ltd, Mundra is intended for use by all such personnel like Marine Personnel, Tug Masters and all others as indicated in the Spill Response Organization who may be involved in the response to oil spills which may occur within Adani Port Limits.

This plan has been prepared as per the stipulation of Ministry of Environment and Forest Clearance (MoEF) and Coast Guard Requirements.

Gujarat Maritime Board

While responsibility for oil spill contingency remains with conservator of the port – Gujarat Maritime Board Port Officer, this plan (Tier 1) demonstrates the readiness of Adani Port for mitigating oil spill incidents.

Port Conservator will monitor and provide the necessary assistance required for administering the oil spill operation within the port limit.

Indian Coast Guard

The Indian Coast Guard has a statutory duty to protect the maritime and other national interests of India in the Maritime Zones of India and to prevent and control marine pollution. Coast Guard is also the Central Co-coordinating Authority for marine pollution control in the country. The Indian Coast Guard is responsible for implementation and enforcement of the relevant marine pollution laws.

The National Oil Spill Disaster Contingency Plan stipulates the organizational and operational details to effectively combat a national oil spill contingency. The plan promotes the development of Regional and Local Contingency Plans in the three Coast Guard Regions.

The Coast Guard Monitor will assume the role of On Scene Commander in the event that any oil spill involving PLL operations exceeds 700 tons.

Gujarat Pollution Control Board

The Gujarat Pollution Control Board is responsible for, and control, waters up to 5 km from the shoreline. They require to be advised of all pollution incidents.

Ministry of Environment, Gujarat

The Ministry requires to be informed of all pollution incidents.

Emergency Response Team

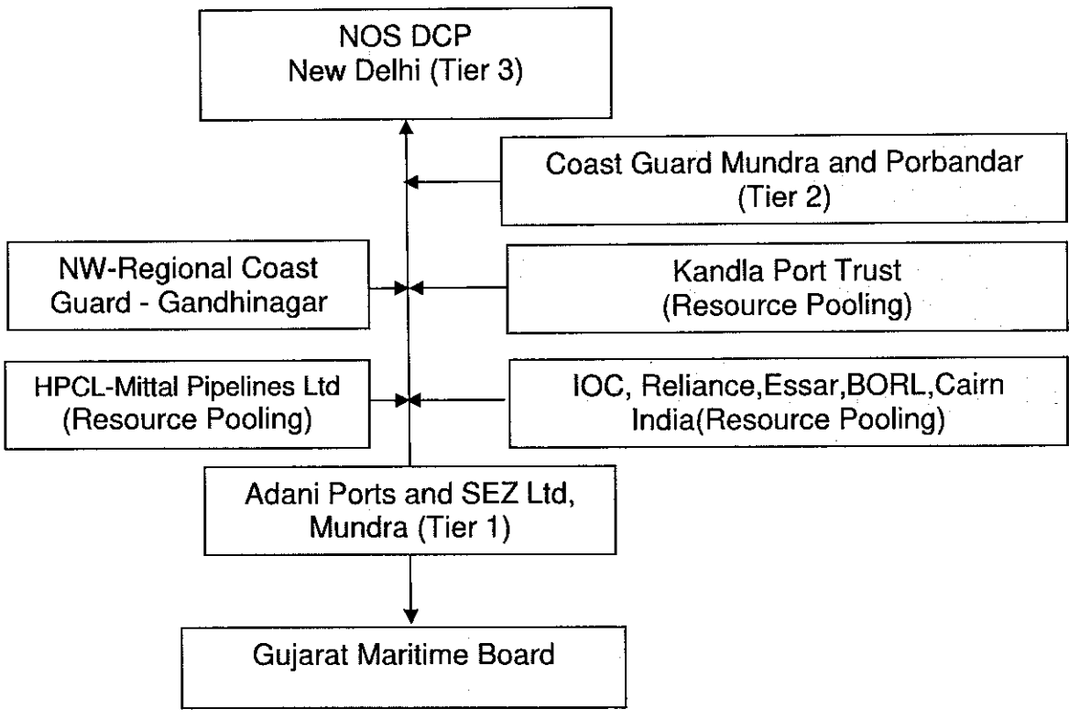
Emergency Response Team (ERT) is the nomenclature used to describe the command and control team established for an oil spill incident at the jetty or in the jetty approaches, with representatives of organisations attending as described in section 2.4.

The ERT will convene at the Terminal Control Room, under the chairmanship of the Terminal Manager, and will consist of a Management Team and a Support Team as noted in section 2.3.

It is a strategic plan to quickly call on additional resources in a systematic manner firstly from Adani port and subsequently from other ports.

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1.2 Coordinating Committee



1.3 Statutory requirements

The Indian Government is a signatory to the International Convention on Oil Pollution Preparedness, Response and Co-operation which came into force in May 94. Under the NOSDCP, it is obligatory for a port to have a Local Oil Spill Contingency Plan to combat oil spills within port limits.

This oil spill contingency response plan (Tier 1) is the response plan in accordance with the facilities available at Adani Port only.

This plan is prepared in accordance with:

a) Marine Environmental Impact Assessment of SPMs, COTs and connecting pipelines of APSEZL at Mundra dated February 2001, prepared by National Institute of Oceanography, Mumbai.

b) Report on Risk assessment study and On-site disaster management Plan for SPMs, COTs and connecting Pipelines of Adani Ports and Special Economic Zone Limited, by TATA AIG Risk Management Services Limited, dated February 2001.

c) HAZOP study report of SPM Terminal pipeline project by Intec Engineering, dated 26/02/2004.

d) IPIECA guide to Contingency planning for oil spills on water.

e) Oil spill risk assessment and contingency plan study done by M/s Environ Software Pvt. Ltd. (Copy enclosed)

1.4 Mutual aid agreements

APSEZL signed MOU with HPCL Mittal Pipelines Limited, Mundra operating in the region of Gulf of Kutch to have mutual aid agreement for the purpose of assisting each other within stipulated time frame with best combination of resources to combat and overcome any large and worst spill with the intent of maximizing the availability of the private, public and government sector response resources during oil spills where assistance is requested by another member.

As per agreement, the member agencies of the affected member state or province may directly request cascadable response resources located in oil handling agencies operating in the region of Gulf of Kutch.

1.5 Geographical limits of plan

Adani Ports and SEZ Ltd, Mundra is situated at the North head of Gulf of Kutch which is at the west coast of India. Ships calling Adani Port therefore have to traverse across the GOK. This oil spill contingency response plan (Tier 1) is applicable for the following:

1) Loading and Unloading of liquid cargo at the Multi-purpose terminal jetty at the Adani Port.

2) Unloading of the crude oil the vessels at the single point mooring (SPM) to offload 70,000 to 3,00,000 DWT.

3) Bunkering operations carried out within the port limits.

4) Any spill that occurs from any source within port limit (including West Basin, South Basin and LNG Terminal) whether at berths, anchorages or in the channel.

APSEZL falls within the area jurisdiction of The Commander, No.1 Coast Guard District (Gujarat), located at Porbandar. Mundra has a full-fledged Indian Coast Guard Station. The Port limit of APSEZL, Mundra is shown in enclosed chart in annexure 14.

1.6 Interface with ROSDCP and NOSDCP

For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in operation since 1996. The NOSDCP brings together the combined resources of the various organizations and departments, Coast Guard, Ports and Oil handling Agencies, and related industries, to provide a level of preparedness to the threat posed to the marine environment by oil spills.

The NOSDCP sets out a clear definition of the responsibilities of the major participants, such as the Coast Guard, various ministries and departments, ports and oil industry.

The national oil spill contingency plan hierarchy outlined in Figure 1 consists of NOSDCP at the apex level to coordinate significant or disaster type spills, the Regional Oil Spill Disaster Contingency plan (ROSDCP) to coordinate spill in the Gulf of Kutch, utilizing the resources available within the region.

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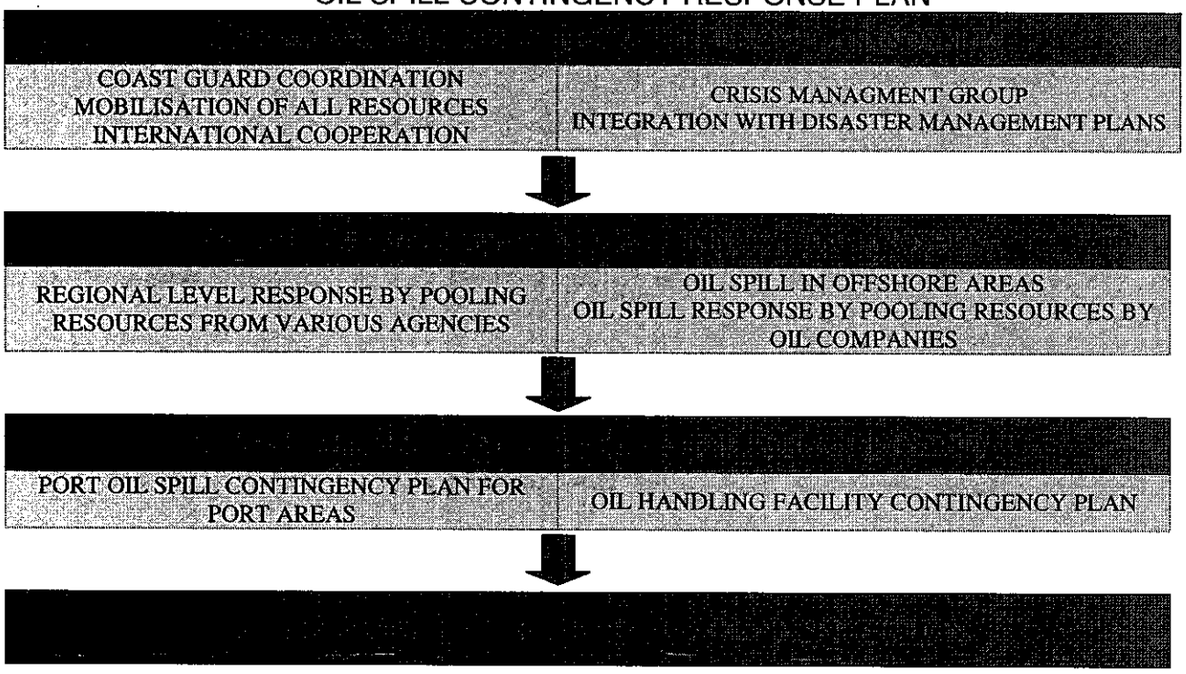


Figure 1 - Contingency Plan hierarchy

The aim of Local Contingency Plan - for the Mundra Port, is to outline arrangements for responding to oil spills in the coastal and shoreline areas, with the aim of protecting against environmental pollution as a result of oil spill or, where this is not possible, minimise the effect and respond the oil spill in an environment friendly manner and dispose the collected oil/debris in according to the existing laws/regulations/orders in force. CONTINGENCY PLAN FOR SHORELINE PROTECTION
ISTRICT OIL SPILL CONTINGN

2 Risk Assessment

The number of vessels calling annually at APSEZL is more than 3000 including Chemical and oil tankers. The threat of oil spill is much high in Gulf of Kutch and is very oil spill sensitive area. A marine national park is located in the Southern shore of GOK. There is a popular beach spot on the Northern shore namely Mandvi. Lastly, as GOK is a closed system, any oil spilled will arrive to the shores.

2.1 Identification of activities and risks

The scenario of the spill are classified under two categories :

- Oil Spill at Mundra Port Multi-Purpose Terminals
- Oil Spill at SPM

The oil spill could occur due to various reasons at any of the APSEZL's marine facilities (SPMs, Basins/ berths, anchorage or approach channel) within the new Mundra Port limit. The spills beyond these areas are not covered in this plan. Both the categories are discussed in detail

Accidental oil spill at Multipurpose terminals/ Basins/ berths, anchorage or approach channel is possible from overflow of slop tanks, bunker tanks, reception facility and road tankers (generally a low pressure operation).

Accidental oil spill at the SPM may be due to hose puncture while unloading, failure of swivel joint of SPM or Leakage of Crude Oil at PLEM or from the submarine pipeline.

Following risks are being addressed to mitigate incident of oil pollution:

- Connection of hoses with established work instructions for use of blank flanges, drip trays etc.
- Thorough understanding of use of OSD and limitations of vessel surging due to slack mooring ropes in given weather conditions.
- Monitoring of ships pump room atmosphere, display of fire notices and acknowledging accidental explosion through the use of IMO ship / shore check list.
- Spillage of F.O. during bunkering operations by using bunkering check list
- Ballast discharge contamination or malfunction of ship's sea side valves by prohibiting such operations without written permission of the port.
- Non use of reception facility of the port by ships on cost plus basis.

Operational leakage

Spill due to floating hose failure at SPM: (183 t, at pumping rate of 10000 m^3/h of crude oil for 75 sec): (Spill points - S1 at HMEL SPM & S2 at Mundra SPM)

Crude oil pumping rate from the tanker to the shore tanks will be varying between 5000 m^3/hr and 10000 m^3/hr. In the present study, the maximum pumping rate of 10000m^3/hr has been considered to assess the risk on a higher side. The Safety Break Away Coupling in the crude oil transfer hose will be activated within a few seconds in the event of hose rupture or hose failure. Again for the sake of assessing higher risk, a response time of 60 sec – 75 sec (worst case scenario) is considered to estimate the amount of oil that would spill at the SPM. Thus the quantity of crude oil spill has been estimated to be a maximum of 183 tons in the event of hose failure or rupture.

Spill due to rupture of sub-sea crude oil pipeline from SPM to shore tanks: (384 tons of crude oil, at pumping rate of 10000 m^3/hr for 60 sec): Spill point S3 taken at midpoint of the pipeline from HMEL SPM to LFP)

Crude oil pumping rate from the tanker will be in the range of 5000 m^3/hr to10000 m^3/hr. In the present study, to assess the maximum risk, pumping rate of 10000 m^3/hr has been considered. The minimum wall thickness of sub-sea crude oil pipeline is 15.6 mm and the maximum thickness is 24 mm. Moreover all along, 5 inches concrete cladding (weight coating) is provided on the surface of the pipeline. Crude oil pipelines designed, constructed and laid as per the international norms are safe and leakages are extremely rare during their designed life. However, a rupture of size 1 cm x 12.7 cm has been assumed for assessing the quantum of oil spill through sub-sea pipeline.

The maximum manifold pressure will be 12 kg/cm^2 and crude oil will be pumped to the shore tanks without any boosting device in-between. As the level in the tanker depletes, discharge pressure would also be reduced. Moreover, with the flow distance the crude oil pressure inside the pipe drops. For the sake of assessing the amount of oil spill in case of rupture of sub-sea pipeline, an average pressure of 10 kg/cm^2 and a water column height of 35 m have been considered.

Accordingly the quantity of Crude oil spill has been estimated using the formula given by

$Q = C_d A (2gH)^{1/2}$

Where,

Q = quantity of spill (m^3/s)

C_d = coefficient of discharge (0.9)
A = Area of rupture (m^2) (1 cm x 12.7 cm)
H = Net head (m) (6.5 kg/cm^2 = 65 m)

This would give a value of 0.04 m^3 of crude oil per sec spilling out of the pipeline through the rupture as the pump will be in operation.

The availability of solenoid operated hydraulic shutoff valves in the sub-sea pipeline, which will get activated in less than 15 seconds time as soon as the pressure falls, will limit the amount of oil leaked in case of pipe rupture and consequent drop inside the pipeline. However 60 sec response time has been considered for quantification of oil spill. Accordingly the quantity of Crude oil spill has been estimated to be 2.4 m^3 before the pump discharge valve closes. However, there will be high pressure inside the pipeline initially and the oil inside the pipeline will start leaking into the waters through the hole as the pressure inside the pipe line is higher than the outside pressure, even after the valve is closed and pumping is stopped. Even after the pipeline inside pressure equalises the outside static pressure acting on the rupture, oil continues to start leaking as the density difference between the oil and water; oil being lighter and LFP is higher in elevation compared to the pipeline elevation. Two factors need to be considered here; the specific gravity of the crude oil inside the pipeline is less than 1 whereas the sea water specific gravity is more than 1. Also depending on the location of the hole/leak, there will always be a static head of sea water acting on the leak when the oil tries to flow out and sea water trying to flow in to occupy the place vacated by the leaked oil. Hence all the oil in the pipeline will not leak and there would be an equilibrium point reached when there would be no more oil leaking from the hole as the sea water pressures effectively blocks the oil leak. Also, the leak would be attended to within the stipulated time as per the standard maintenance procedures followed by the organisation. For the purpose of this study and as a worst case scenario before the leak is repaired by the established maintenance procedures, it is assumed that a maximum of 5% of the pipeline oil volume would leak and though it would be a continuous leak, this total quantity is taken to be instantaneous for the purpose of the study.

The pipeline length is approximately 10 km (from SPM to LFP) and the pipeline size is 42" NB. The pipeline volume works out to be approximately 8662 m^3 or 7622 t.
Hence the total oil leaked due to rupture in sub-sea pipeline will be 2.15 t + 5% of pipeline volume of oil in t (0.05 x 7622 =381 t) which works out to be a maximum of 383.45 t, say 384 t of crude oil.
For the purpose of simulation studies, this spill on the pipeline is assumed to have taken place at the midway point from HMEL SPM to LFP (designated as spill point **S3** in the report) and is taken on the sub-sea pipeline from HMEL SPM to LFP. As the pipeline from HMEL SPM to LFP and the Mundra SPM to LFP run very close only one leak point in the pipeline is studied as it gives a representative oil spill study for the pipeline leakage scenario.

Spill due to collision at SPM: (Spill points S1 & S2)

Crude Oil is received at SPM by ocean tankers having capacity between 90,000-360,000 metric tons. Crude Oil is pumped to shore tanks through pipeline/s from the SPM. In the present scenario, collision of the vessel at the SPM or tanker route with another vessel enroute to other terminals can cause partial damage to the vessels cargo tanks (not more than 3 nos. of cargo tanks) leading to a maximum oil spill of about 700 tons to 25,000 tons of crude oil. In the present study, the probable quantity of crude oil spill due collision at SPM is considered as 700 tons at the minimum and as 25,000 tons at the maximum.

Spill due to collision or grounding in the tanker route: (Spill point S4)

Tankers are expected to call at the SPMs frequently depending upon the demand for the refineries for the crude oil. These tankers may meet accidents like collision with other vessels or grounding in the vicinity of the SPM. In case of such accidents, the spillage may vary depending on the size of the tanker and the extent of damage and number of cargo tanks ruptured etc. In the present study the probable quantity of spill in the tanker route considered for modelling is 25000 tons at a point which lies on the tanker route to SPM not exactly within Mundra port limit; but a spill point is taken along the tanker route in the Gulf but close to the Mundra port limit.

Spills at the berths (applicable to berths at West Basin, South Basin, East Basin, North Basin, LNG berth and existing cargo berths of Mundra port.)

Oil spills can take place at the berths in the basins during the loading / unloading as well as berthing and traversing operations. The likely spill scenarios are discussed below:

a) **Spills during the navigation of the vessel along the approach channel: (Spill point S7 for West Basin)**
The spill location can be anywhere in the path. One location along the approach path has been selected for carrying out for model runs.

b) **Spills around the jetty (in the maneuvering basin / turning circle): (Spill point S6 for West Basin and Spill point S10 for South Basin)**
This can occur due to tug boat impacting the vessel and grounding of the vessel. One location around the jetty at the turning circle has been considered for the computational runs

c) **Spills at the berths: (Spill point S5 for West Basin, Spill point S9 for South Basin, Spill point S13 for East Basin, Spill point S14 for North Basin, Spill point S8 for LNG jetty, Spill point S11 for MMPT 1 and Spill point S12 for MICT / AMCT berth locations)**

During the loading/unloading operations spills may take place due to one or more of the following: –

Hose/ loading arm leakage (liquid products handled at the liquid berth), overflow on the vessel deck, vessel grounding at the jetty, vessel colliding with jetty, fire and explosion on the vessel or at the jetty, during bunkering operations etc.

Spills along approach Channel / Route

Vessels to the port berths follow the Deep Water route in Gulf of Kutch and Pilot boards at Pilot Boarding Ground "A" or "B", subject to tide and the berth allotted to the tanker.

While the risk of grounding is low, it cannot be wholly eliminated; the most likely causes are steering or propulsion system failure or navigational error, any of which could result in grounding on the channel margins. Given that the bed of the Gulf is rocky at some places the likelihood of any significant hull damage cannot be ruled out. In a general case scenario, weld fractures in the forward bunker tanks could give rise to a release of approximately 10 Tons of diesel oil and in a worst case scenario extensive damage to the bunker tanks may occur which would cause a spill of 500 to 700 t of FO spill.

Collision

The risk of collision while transiting the channel is negligible given the reason that port authorities use sophisticated ship tracking and navigational systems as the Gulf traffic has increased. These systems would ensure that the chances of any collision are remote or non-existent when ships / marine craft traverses / transits through the channel. However, even if any collision occurs, it is beyond reasonable

doubt that such an incident would result in the fore part rather than the parallel mid-body of the vessel and the loss of integrity of hull plating of a cargo tank is most unlikely. A spill quantity of 700 t can be the maximum in such a scenario.

Berthing Incident

Oil and/ or liquid chemical spill can occur as a result of hull coming in contact with the corners of the jetty structure during ship berthing or un-berthing maneuvers. Such incidents are generally due to failure of a

vessel's main propulsion or steering systems, loss of control onboard on support tug in attendance or Master error or wrong judgment.

The potential spill quantities involved depend on the vessel type and the location and extent of the impact damage; hull damage to a 20000 DWT – 80000 DWT tanker / vessel in way of a forward or aft wing tank, for example, could give rise to a release of some 500 Tons of product. The potential spill quantity, should hull plating be ruptured in way of an aft wing diesel oil bunker tank can, historically, be up to 100 Tons.

Tug Impact

There are well-documented incidents where cargo or bunker oil has been released as a result of hull impact damage by tugs. This can occur when tugs are approaching a vessel underway prior to berthing, or when coming alongside a moored vessel prior to un-berthing. The potential spill quantities again depend on the location and extent of the impact damage but can be over 20 tons for Diesel oil and 100 Tons for cargo (FO) oil. Spills from this cause are considered to be of low likelihood but the risk is acknowledged.

Loading Arms / Flexible hoses

The operation of loading arms / flexible hoses can lead to minor releases of oil. Common sources are vent valves, swivel joints and hydraulic lines. Such spillage seldom exceeds 0.1 Tons.

Cargo Tank Overflow

Cargo tank overflows can occur on board loading vessels; spills of this nature can be due to instrumentation failure, tank valve mismanagement or operator error. The spill quantity is a function of the flow rate and also the number of tanks being loaded at the time of the incident. Some of the oil and/or chemical will be retained on deck but, in a worst case scenario, up to 3 tons could escape overboard.

Hull Failure

The incidence of oil pollution due to hull failure is low and some 84% of the incidents attributed to this cause by ITOPF involved spill quantities of less than 7 tons; these spills were caused mainly by minor hull fractures and weld failures. The potential for more serious incidents with spill quantities in excess of 700 tons must however is acknowledged.

Fire and Explosion

Fires and explosions on board ship represent a safety hazard with the risk of pollution as a secondary impact. Most tankers engaged for trading will be equipped with inert gas systems. Given the controls, which are imposed and enforced by APSEZL authorities in respect of the oxygen content of cargo tanks, the risk of fire and/or explosion in the cargo spaces must be regarded as minimal, insofar as cargo transfer operations are concerned.

Strict monitoring and control of the main cargo pump room atmosphere will minimize the fire and explosion risks associated with this space.

Fires resulting from uncontrolled smoking in the accommodation, unauthorized hot work such as welding, and engine room fires can spread rapidly if not dealt with swiftly and can give rise to incidents of a very serious nature.

While the likelihood of fire or explosion occurring on board vessels berthed at the Mundra port berths is low, the risk is nevertheless acknowledged. Such an incident could give rise to a spillage of 700 tons or more.

Bunkering – spillage of fuel oil

Bunkering at the port may sometimes give rise to spills due to hose failure and / or bunker tank overflow etc. in spite of the strict regulatory supervision of the port operations. These spills could be as small as a few kgs to a maximum of 500 t of FO.

As can be seen from the spill scenarios mentioned above, the spills range from extremely negligible quantities to enormous quantities in rare catastrophic events. The simulation of oil spills does not vary significantly in various scenarios except for the magnitude of impact zone and the quantity involved in such impacts. Though the software is intended to be used for specific scenarios so as to get the trajectory and other weathering information; in this study, a few hypothetical scenarios have been simulated and computations carried out considering the worst-case scenarios of oil spills at the different likely locations in the domain.
Based on the above deliberations, the following scenarios for computations have been selected for carrying out modeling studies for the oil spill trajectory and weathering processes.

Computational Scenarios:

Spill Locations	**Pre-monsoon (Jan)**	**Monsoon (July)**	**Post monsoon (Nov)**
SPM			
Crude oil spill of 183 t at the pumping rate of 10000 m^3/hr (for 75 sec release) at the SPMs (due to Hose failure) Spill points: **S1** and **S2** During spring and neap tide conditions (tide conditions : PF and PE)	▪	▪	•
Instantaneous crude oil spill of 700t at the SPMs Spill points: **S1** and **S2**	▪	▪	•
Instantaneous crude oil spill of 25000t at the SPMs -- Spill points: **S1** and **S2**	▪	▪	•
Pipeline Leakage			
Crude oil spill of 384 t at the pumping rate of 10000 m^3/hr (for 60 sec release) along the pipeline corridor at a select (midway) point of subsea pipeline in the pipeline routes. -- Spill point: **S3**	▪	▪	•
Tanker route			
Instantaneous crude oil spill of 25000t along the tanker route at select location. Spill point: **S4**	▪	▪	•

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West Basin (berths)			
100 tons (due to Berthing incident/ collision) at the West Basin berths (FO) Spill point: **S5**	▪	▪	•
50 Tons (due to Berthing incident/ collision (diesel oil tanks) at the West Basin berths (HSD) Spill point: **S5**	▪	▪	•
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berths -- Spill point: **S5**	▪	▪	•
In the maneuvering basin: o 20 Tons of HSD oil due to Tug Impact (HSD) o 100 Tons of FO due to Tug Impact Spill point: **S6**	▪	▪	•
Along the vessel route at one location: Instantaneous oil spill of 700t along the tanker route at a select location.(FO): Spill point: **S7**	▪	▪	•
LNG Berth			
100 tons (due to Berthing incident/ collision) at the LNG berth (FO) -- Spill point: **S8**	▪	▪	•
50 Tons (due to Berthing incident/ collision (diesel oil tanks)) at the LNG berth (HSD) – Spill point: **S8**	▪	▪	•
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth-- Spill point: **S8**	▪	▪	•
South Basin (Berths)			
100 tons (due to Berthing incident/ collision) at the South Basin berths (FO) -- Spill point: **S9**	▪	▪	•
50 Tons (due to Berthing incident/ collision (diesel oil tanks) at the South Basin berths(HSD) – Spill point: **S9**	▪	▪	•
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth -- Spill point: **S9**	▪	▪	•
At the turning circle: o 20 Tons of HSD oil due to Tug Impact o 100 Tons of FO due to Tug Impact Spill point: **S10**	▪	▪	•
At the existing MMPT 1 Berth: **: Spill Point S11**			
100 tons (due to Berthing incident/ collision) at the berth(FO) -- Spill point: **S11**	▪	▪	•
50 Tons (due to Berthing incident/ collision (diesel oil tanks)) at the berth (HSD) – Spill point: **S11**	▪	▪	•
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth	▪	▪	•

At the existing MICT / AMCT Berths: : Spill point S12			
100 tons (due to Berthing incident/ collision) at the (FO) - Spill point **S12**	▪	▪	•
700 Tons due to Hull Failure / Fire / Explosion (FO) at the berth - Spill point **S12**	▪	▪	•
At the East Basin: Spill point S13			
100 tons (due to Berthing incident/ collision) at the East Basin berth (FO) - Spill point **S13**	▪	▪	•
At the North Basin: Spill point S14			
100 tons (due to Berthing incident/ collision) at the North Basin berth (FO) - Spill point **S14**	▪	▪	•

2.2 Types of oil likely to be spilled

Mundra Port mainly deals with Vegetable oils, Furnace oil, Naphtha, Methanol, High Speed Diesel, Super Kerosene Oil and other light oils at its Multi-Purpose terminal. The vessels calling at the port (or the designated anchorage areas) may spill fuel, diesel or a minimal quantity of lubricating oils. The SPM is being used to discharge crude oils from tankers.

At Berths:

- Vegetable oils,
- Furnace oil,
- Naphtha,
- Methanol,
- High Speed Diesel,
- Super Kerosene Oil,
- Carbon Black Feed Stock (CBFS),
- Motor Spirit,
- Other light oils

At SPM:

- Crude oil

At anchorages or within port limits:

- Fuel oil,
- Diesel oil,
- Minimal quantity of lubricating oil.

2.3 Probable fate of spilled oil

APSEZL is all weather, commercial port with geographical and hydrological advantages on the West Coast of India, in the Gulf of Kutch. Tidal range is between +0.37 m during Neaps and + 6.40 m during springs. Tidal streams flow 070^0 – 250^0 at an average rate of 3 kts and 4-5 kts during spring tides.

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It has been observed from the modeling study that during pre-monsoon season, the spills occurring at the APSEZL marine facilities move towards the southern / southwestern part of the Gulf of Kutch nearer to the facilities depending on tide phase.

The spills taking place at the APSEZL marine facilities move towards northern coast of Gulf of Kutch during monsoon season and affect the coast near Mundra, Kandla etc.
During post - monsoon season, the spills taking place at the APSEZL marine facilities move towards south / southwest and affect the islands /coast on southern side of the Gulf of Kutch.

The surface or subsurface oil spill consists of slick floating on the water surface, which partially dissolves in the water and partially evaporates into the atmosphere. There is a continuous exchange between the suspended and surface oil (floating oil). The assumption made in deriving the governing equations is that the thickness of the oil layer is negligible in comparison with the water depth.

In addition to the location, size and physico-chemical properties of the spill, other major factors affect the fate of the oil slick are governed by complex interrelated transport (turbulence) and weathering processes (evaporation, emulsification and dissolution). The spilled oil spreads and moves by the forces of winds and currents. A small portion of hydrocarbons begin to go into solution in the underlying water column, but most of the oil is lost through evaporation into the atmosphere. In the present model, all these processes are considered in the transport of Oil Slick.

Out of the above mentioned oils the vegetable or light oils do not pose any significant threat to the environment.

The spilled 'persistent' crude oil (or fuel oil) undergoes a number of physical and chemical changes known as "weathering". The major weathering processes are spreading, evaporation, dispersion, emulsification, dissolution, oxidation sedimentation and biodegradation.

> *The term persistent is used to describe those oils which, because of their chemical composition, are usually slow to dissipate naturally when spilled into the marine environment and are therefore likely to spread and require cleaning up. Non-persistent oils tend to evaporate quickly when spilled and do not require cleaning up. Neither persistence nor non-persistence is defined in the Conventions. However, under guidelines developed by the 1971 Fund, an oil is considered non-persistent if at the time of shipment at least 50% of the hydrocarbon fractions, by volume, distill at a temperature of 340°C (645°F), and at least 95% of the hydrocarbon fractions, by volume, distill at a temperature of 370°C (700°F) when tested in accordance with the American Society for Testing and Materials Method D86/78 or any subsequent revision thereof."*

a) **Spreading**: is one of the most significant processes during early stages of a spill is initially due to gravity. The oil spreads as a coherent slick and the rate is influenced by its activity. After a few hours, the slick begins to break-up and after this stage, spreading is primarily due to turbulence. Wind and wave actions also tend to fragment the slick, breaking it up into islands and windrows.

b) **Evaporation**: The rate and extent of evaporation depends primarily on the volatility of the oil. In general, oil components with a boiling point below 200 D C evaporate within 4 to 16 hours in tropical conditions. Spills of refined products such as kerosene and gasoline evaporate completely and light crude lose up to 40 % of its volume within a few hours. In contrast, heavy crude and fuel oils undergo little evaporation.

c) **Dispersion**: Waves and turbulence act on the slick to produce droplets of oil of different sizes. Small droplets remain in suspension while the larges ones rise to the surface. The rate of dispersion mainly depends on the nature of the oil and the sea state. Oils which remain fluid can spread unhindered by other weathering processes can disperse completely in moderate sea conditions within a few days. Viscous oils tend to form thick lenses on the water surface with slow tendency to disperse, which can persist for several weeks.

d) **Emulsification**: Several oils have tendency to absorb water to form water-in-oil emulsions thereby increasing the volumes of the emulsified mass by a factor of 3 to 4. The arte at which the oil is emulsified is largely a function of sea state though viscous oils absorb water slowly. In turbulent sea conditions, low viscosity oils can incorporate as high as 80 % water by volume within 2 to 3 hours.

e) **Dissolution**: The heavy components of crude oil are virtually insoluble in sea water while lighter compounds are slightly soluble. Hence levels of dissolved PHc rarely exceed 1 mg/l following a spill. Therefore, dissolution, does not make a significant contribution to the removal of oil from the sea surface.

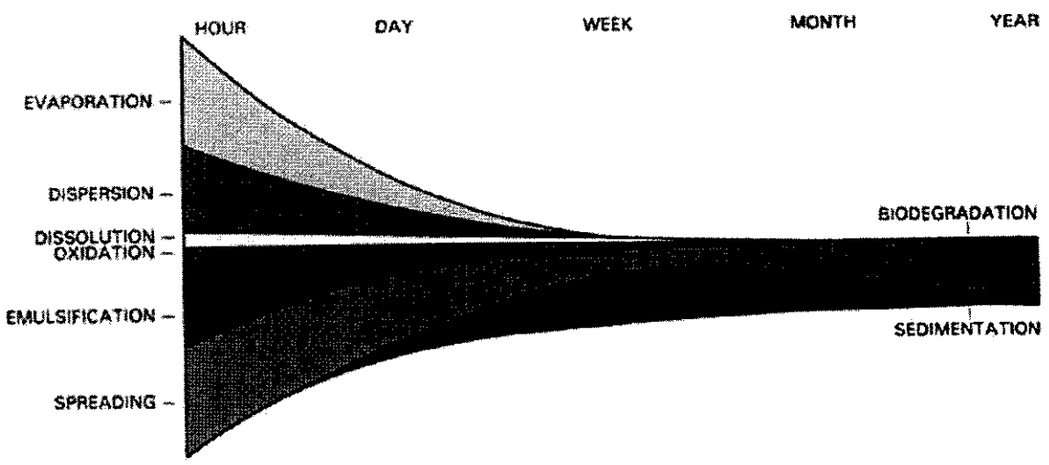
f) **Sedimentation**: Very few oils are sufficiently heavy to sink in sea water. However, the weathered residue gets mixed up with the suspended substances in water and may sink. This process becomes significant when water-in-oil emulsions attain specific gravity near to one and therefore need very little suspended substances to exceed the specific gravity of sea water (1.025).

g) **Oxidation:** Hydrocarbon molecules react with oxygen and either breaks down into soluble products or combine to form persistent tars. Many of these oxidation reactions are promoted by sunlight and their effect on overall dissipation is minor in relation to other weathering processes.

h) **Biodegradation** : Sea water contains a range of marine bacteria, moulds and yeasts which can use oil as source of carbon and energy. The main factors affecting the rate of biodegradation are temperature and the availability of oxygen and nutrient, principally compounds of nitrogen and phosphorous. Each type of micro-organism tends to degrade a specific group of hydrocarbons and whilst a range of bacteria exists between them which are capable of degrading most of the wide variety of compounds in crude oil, some components are resistant to attack.

Because the micro-organisms live in sea water, biodegradation can only take place at an oil/water interface. At sea, the creation of oil droplets, either through natural or chemical dispersion, increases the interfacial area available for biological activity and so enhances degradation.

The processes of spreading, evaporation, dispersion, emulsification and dissolution are most important during the early stages of a spill whilst oxidation, sedimentation and biodegradation are long-term processes, which determine the ultimate fate of oil. Fig.3.1 shows schematic diagram of weathering processes with time.



Schematic diagram of weathering processes with time

It should be appreciated that throughout the lifetime of an oil slick, it continues to drift on the sea surface, independent of these processes. The actual mechanism governing movement is complex but experience shows that oil drift can be predicted by taking into account wind-induced effects and surface water currents. These can be calculated using mathematical modeling to determine the oil spill trajectory. The wind-induced effect is normally taken as 1-3% of the wind velocity, and the current effect as 110% of the current velocity. Reliable prediction of slick movement is clearly dependent upon the availability of good wind, tide and current data.

An understanding of the way in which weathering processes interact is important in forecasting their combined effect in changing the characteristics of different oils and the lifetime of slicks at sea. In order to predict such interactions, numerical models have been developed, based on theoretical and empirical considerations.

Accidental oil spills as indicated in 'Oil Spill Scenario' in section 2.1 of this plan might occur in the area of SPM. On the basis of the data modeled, the results indicate that

a) about 38 % of hydrocarbons are lost by evaporation, 2.8 % by emulsification and 0.75 % by dissolution within 5 hours;
b) the quantum of dissolved oil increases up to initial 5 hours and thereafter decreases as lighter (more soluble) hydrocarbons evaporate;
c) after 50 hour, no oil dissolves;
d) the trend of emulsified oil is similar to that of evaporated oil but emulsification occurs at a slow rate;
e) the radius of oil slicks increases to nearly 1400 m at the end of 148 hours; and
f) the maximum PHc concentration in water is about 39 µg/l.

The spill trajectories clearly reveal the dominance of wind in deciding the location of landfall of the weathered oil. Thus during June-August, the spill will be preferentially transported in the north east direction under the influence of south west winds while during October-November, and possible up-to February, the oil will be predominantly carried to the southern shore. It is also evident that under the influence of the southwest winds, the oil will be deposited on the northern shore within 60 hours, while it might take about 80 hours to reach the southern shore during north east winds.

2.4 Development of oil spill scenarios including worst case discharge

The scenario of the spill are classified under two categories:

1. Oil Spill at Mundra Port Multi-Purpose Terminals/ Basins
2. Oil Spill at SPM

Oil Spill at Mundra Port Multi-Purpose Terminals/ Basins

a) Leak during cargo transfer operations Minor (250 liters)

This can occur at the start of cargo operations, during operation due to leakage in pipes, expansion joints, and at the time of disconnection of hose at manifold. However, such instances are remote on implementation of International Safety Management by Ships and Quality Management systems by Port.

b) Slop tank / bunker tank overflow at, Jetty / Ship Minor (250 - 1000 ltrs.)

This source of pollution is purely of an accidental nature. The ship is expected to be ship shape with good trained crew and this has been emphasized to the Master of the vessel at the time of cargo transfer / bunkering. Based on a rate of 20 cbm/hr. and reaction time of 1 min, and hose content of 150 ltrs., likely spill is only 250 litres. A ship shore check list for cargo operations and bunkering is employed. A joint declaration is made by Marine Staff and Chief Officer / Master and enforced by Marine Manager. This results in good ship / shore co-ordination.

c) Spill during berthing (tug impact) Moderate (3000 liters)

Accidental contact with tugs or another marine structure is a possibility but quantum is not going to be significant because of Fendering system employed and training given to tug crews. Also with concept of double hull tanker the entire cargo compartments are protected by another hull, thus cargo spillage due to impact of tug is remote.

d) Grounding / Hull Damage :

APSEZL operates dry cargo & liquid cargo berths. Tankers mainly carry Furnace oil, Naphtha, Methanol, High Speed Diesel, Super Kerosene Oil and Vegetable oil. Oil transfer operations at the jetty are supervised by Liquid terminal staff. Manifold area has receptacle facilities to prevent accidental spills at connection / disconnection time. Berthing is done under controlled conditions and spill due to contact damage to underwater oil tanks is very remote. Radio officer controls movement of vessels in and around the berth and traffic presently is insignificant to pose any collision damage risk. Under water sea bed characteristic is soft sand. The berth area of about 500^2 m is surveyed monthly for any changes and underwater obstructions; hence grounding resulting into oil spill is very remote.

Oil Spill at SPM

a) Hose Puncture while unloading:

In such an event, crude oil, about 10670 Kgs may spill onto water. On spillage the oil slick will be carried away at a distant location depending upon water current and wind direction. The trained crew of the maintenance vessel patrolling the area during unloading, would control the oil slick movement by using booms and subsequently, the oil will be collected by the skimmer.

b) Failure of Swivel joint of SPM:

In this event about 17780 Kgs of crude oil may spill onto water. In this case the leakage may be detected visually by the personnel monitoring the operation from the ship tanker or by the detectors provided on the SPM.

c) Leakage of Crude oil at PLEM or from the submarine pipeline:

This case will occur at least 20 m below the water surface, oil being lighter than water will travel upward and float on to water. By the time oil water reaches the sea water surface, the oil droplets may start undergoing "weathering process" and it may form emulsion along with water.

d) Ship Collision Frequency :

Based on the statistical data and its analysis carried out by National Institute of Oceanography, the probability of this type of accident is about one in every seven years for the traffic projection and hence, this case is ignored.

e) Ship Grounding Frequency :

Based on the statistical data and its analysis carried out by National Institute of Oceanography, the probability of this type of accident is about one in eleven years for the traffic projection and hence, his case is also ignored. Also with concept of double hull tanker the entire cargo compartments are protected by another hull, thus cargo spillage due to grounding is remote.

2.5 Shoreline sensitivity mapping

Gulf of Kutch is a typical semi-enclosed basin where the tidal forces interact with the open ocean waters of the sea, across its western open boundary at Okha. The currents of the region are tidal-driven and the water column is vertically well mixed. These features make the numerical modeling task easier, as a 2-D hydrodynamic model is sufficient to accurately reproduce the tides and currents for the study region in the Gulf of Kutch at Mundra.

The model domain of longitudes of 68° 50' 56.7" E and 70^0 27' 36.9'' E and the latitudes of 22°14' 58.8" N and 23° 01' 49.1'' N is selected for carrying out sensitivity analysis and predicting the fate and transport of oil spill that may take place at APSEZL's SPMs, Basins, berths and tanker route near Mundra coast in Gulf of Kutch.

The bottom roughness in the Gulf of Kutch varies due to the variation of bed sediment grain sizes. The bed consists of various sizes of clay, sand, silt and rocky soils. In the present study a uniform Manning's roughness coefficient has been used for numerical runs of hydrodynamic processes. The filled contours of Chezy's roughness coefficient are shown in Fig. A.1.4. The same roughness coefficient has been used to predict tides and tidal velocities in the Mundra area for prediction of oil spill trajectory.

The interpolated Chezy's coefficient calculated based on Manning's roughness and total water depth is shown in Fig.A1.4. The sensitivity analysis has been carried out with various Manning's value, which is the combined effect of d_{50} sediment size and bed configuration, to calibrate the model with respect to the tide data of March and October 1994, at Sikka. The computational runs were continued with various sets of various bed roughness values till computed and measured tide levels are within the acceptable limit.

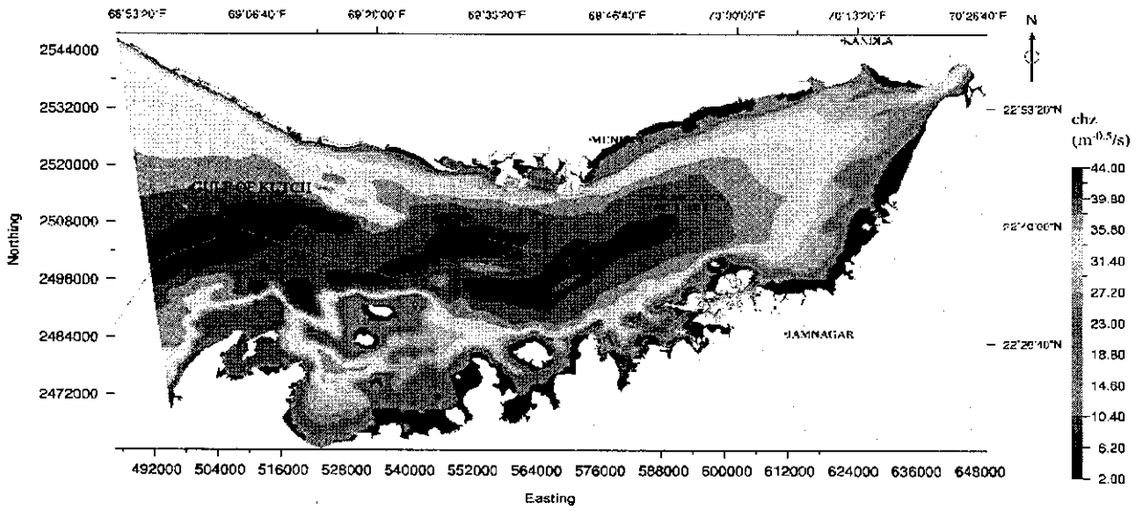


Fig.A1.4 Chezy's coefficient

For Shoreline sensitivity mapping refer Volume 2 (Annexure-V, VI and VII) of Oil Spill Risk Assessment.

2.6 Shoreline resources, priorities for protection

The SPMs and the Marine facilities (Existing Berths, South Basin, West Basin, North Basin, East Basin and LNG Berth etc.) are located in the Northern side of Gulf of Kutch at Mundra. VLCCs bring Crude oil and unload at the two SPMs which are connected to the Shore tanks by means of Submarine pipelines. The Crude unloaded at these SPMs is pumped through Submarine pipeline to Shore tank farm area.

Various Marine craft / solid cargo/ liquid cargo vessels traverse through the Gulf waters to berth at the various Terminals / Berths located in the new Mundra port limit. The general layout of the various facilities like SPMs, terminals etc. within the Mundra port limit area are shown in Fig.1.1 to Fig.1.4 in chapter 1. There is a probability of spillage at SPMs, along the sub-sea pipelines and tanker route during unloading operations and transportation. Apart from these operations at the SPMs, loading / unloading operations at the different berths of the Mundra port – South Basin, West Basin, North Basin, East Basin, LNG jetty and existing berths also may give raise to accidental spills at the berth locations. The spills at these locations may affect the shore and other facilities along the coast of Gulf of Kutch. The coast of Mundra has tidal flats, sand bars and not much in the way of mangroves. The mangroves, Marine Park / Marine Sanctuary etc. are on the Southern side of Gulf of Kutch. As it was observed that the spills occurring at the various locations of the APSEZL Marine facilities may reach the Coast on the Northern side as well as on the Southern side of the Gulf depending upon the season, there is a need to protect the environment in the event of an oil spill at any of the APSEZL Marine facilities.

Shoreline Resources available with APSEZL, Mundra for deployment during shoreline cleanup/ emergent situation:

Item	Quantity
Oil Spill Dispersants	15000 liters
Sorbent pads	2000 nos.
Portable dispersant storage tank: 1000 ltr capacity	1 no.
Portable pumps	2 nos.
Oil discharge hose, 3", 2 x 10 m	1 set
Tanker Trucks	04 nos.
Mini Vacuum Pump (30 m3 / hr)	05 nos.
Sorbent Boom Pack(12.5cm x 4 M)	500 mtr
Slurry Pump (60 m3 / hr)	01 no.
Start Tank with capacity 10000 liter(10 m^3)	02 nos.
OSD Applicator- Oil Dispersant Spry Unit(20 ltr) for use on beach and inter tidal zones	02 nos.

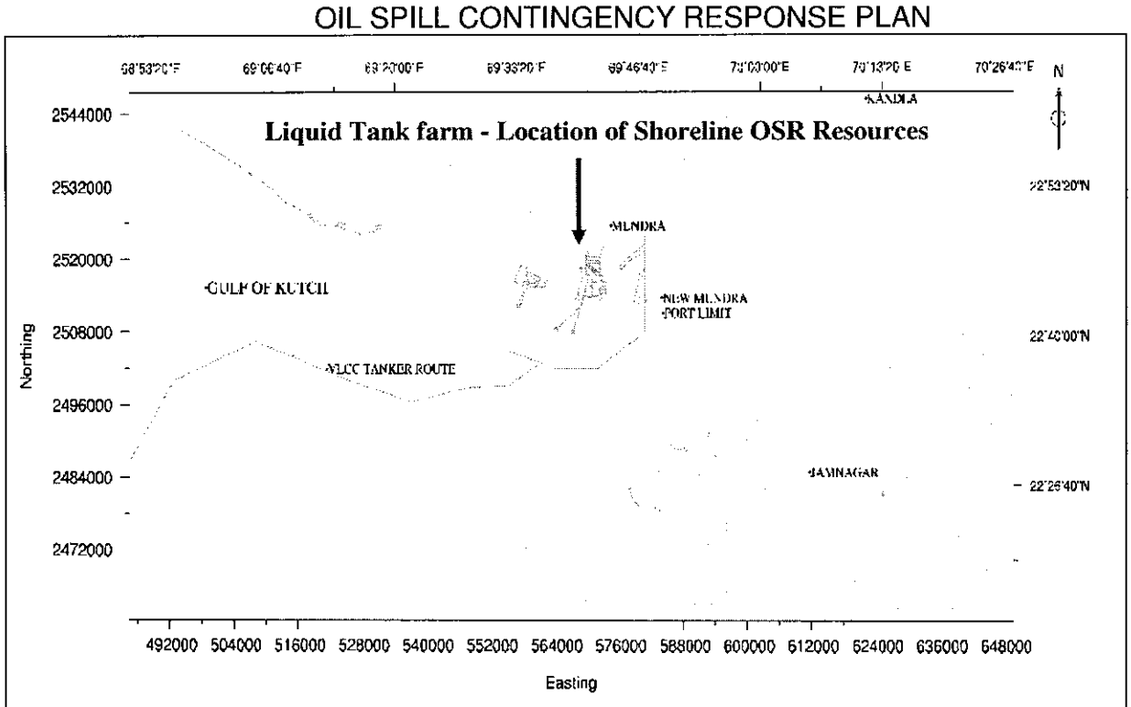


Fig.1.1 :General Arrangement of the marine facilities at Mundra port showing the VLCC route and facilities within the new Mundra port limit considered for carrying out the oil spill risk assessment studies.

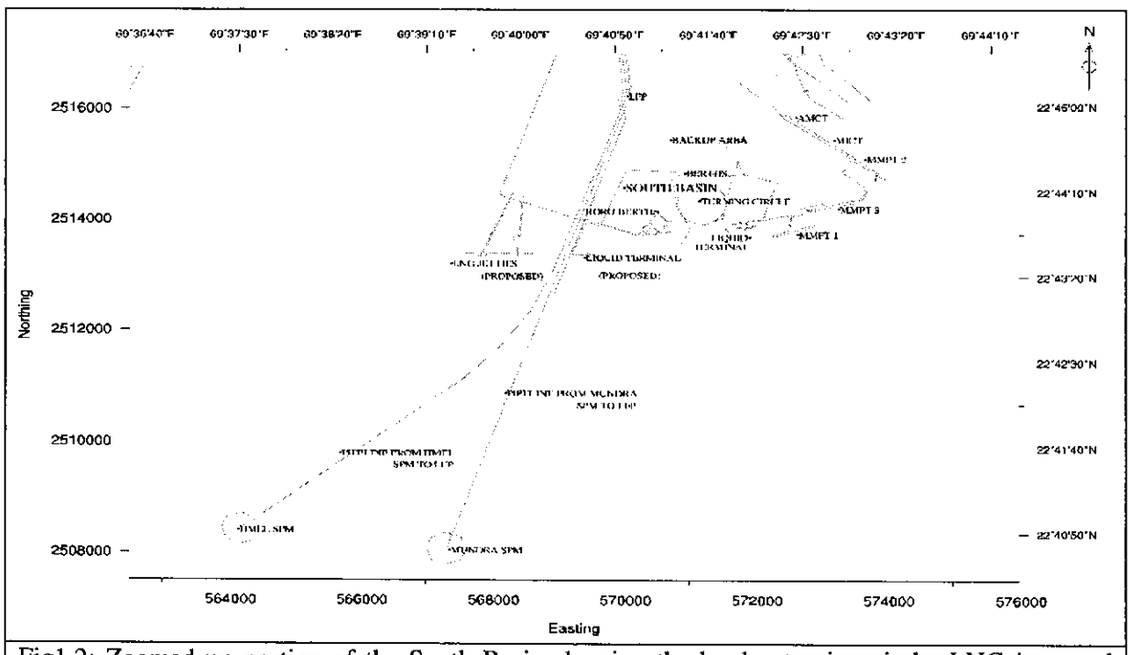


Fig1.2: Zoomed up portion of the South Basin showing the berths, turning circle, LNG jetty and existing berths as well as SPMs.

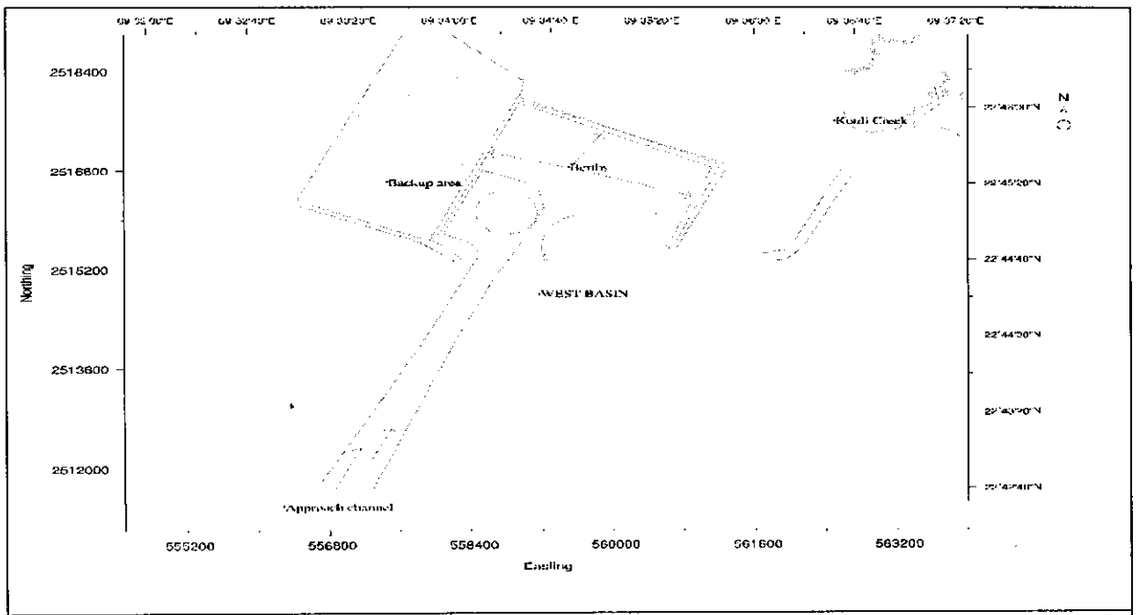


Fig.1.3 Zoomed up portion of the West Basin showing the berth locations and the approach channel for the vessels

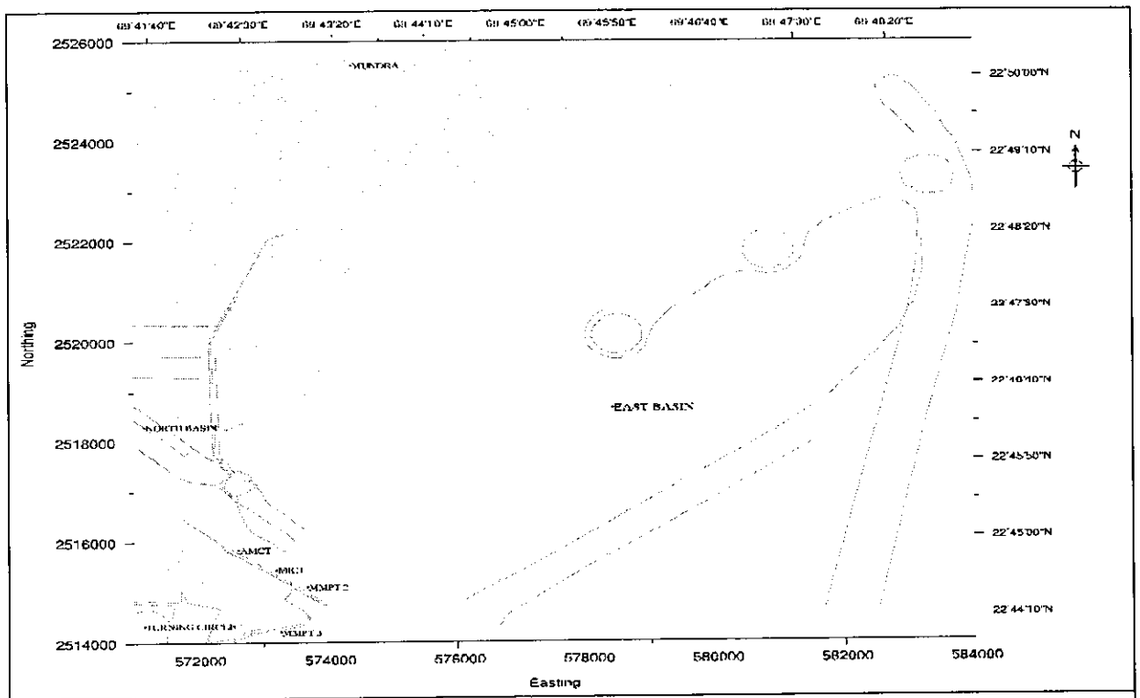


Fig.1.4 Zoomed up portion showing the East Basin & North Basin

Marine resources in Gulf of Kutch

Phytoplankton

Phytoplanktons are vast array of minute and microscopic plants passively drifting in natural waters and mostly confined to the illuminated zone. In an ecosystem these organisms constitute primary producers forming the first link in the food chain. Phytoplankton long has been used as indicators of water quality. Some species flourish in highly eutrophic waters while others are very sensitive to organic and/or chemical wastes. Some species develop noxious blooms, sometimes creating offensive tastes and odours or anoxic or toxic conditions resulting in animal death or human illness. Because of their short life cycles, plankton responds quickly to environmental changes. Hence their standing crop in terms of biomass, cell counts and species composition are more likely to indicate the quality of the water mass in which they are found. Generally, phytoplankton standing crop is studied in terms of biomass by estimating chlorophyll and primary productivity, while in terms of population by counting total number of cells and their generic composition. When under stress or at the end of their life cycle, chlorophyll in phytoplankton decomposes to phaeophytin as one of the major products.

Phytopigments

During April 2010, the phytoplankton pigments viz. chlorophyll a (1.7 – 2.4 mg/m3; av 1.9 mg/m3) and phaeophytin (0.3 – 1.2 mg/m3; av 0.7 mg/m3) varied considerably. In October 2010, chlorophyll a ranged from 2.0 – 4.2 mg/m3 (av 3.1 mg/m3) and phaeophytin from 0.7 - 1.1 mg/m3 (av 0.7 mg/m3) (Tables 8.1 and 8.2). The average concentration (mg/m3) of chlorophyll a off Vadinar during different sampling events (2010) is listed in Table 8.1:

Table 8.1: Average chlorophyll a (mg/m3) off Vadinar (April 2010 to October 2010)

Area	Pathfinder	Nearshore	ESSAR DP	IOC SPM	ESSAR SPM	Salaya Creek	Gulf
April 2010	2.4	2.1	1.9	1.4	2.0	2.0	1.7
Oct 2010	2.1	4.2	2.8	4.1	2.0	-	3.7

The values of phaeophytin during the present monitoring period are given in Tables 8.2, while, the average concentrations (mg/m3) between different sampling events (April 2010 and October 2010) are listed in Table 8.2.

Table 8.2: Average phaeophytin (mg/m^3) off Vadinar (April 2010 to October 2010)

Month	Pathfinder	Nearshore	ESSAR DP	IOC SPM	Essar SPM	Salaya Creek	Gulf
April 2010	1.2	0.6	0.8	0.3	0.6	0.8	0.6
Oct 2010	1.1	0.9	1.1	0.9	0.7	-	0.8

Phytoplankton population

As is generally the case with Coastal waters, the phytoplankton population density (68-332 nox10^3/l; av 186 no x 10^3/l) and generic diversity (11-30 no; av 18 no) varied over a wide range and in a random manner during April 2010 (Table 8.3). In October 2010 the phytoplankton population density ranged from 100-789.6 nox10^3/l (av 329.4 no x 10^3/l) and generic diversity ranged from 12-25 no (av 19 no) (Table 8.4) off Vadinar.

Table 8.3: Average phytoplankton population density (no x 10^3/l) and total genera (no) off Vadinar (April 2010 to October 2010)

Month	Pathfinder		Nearshore		ESSAR DP		IOC SPM	
	Cell count (nox10^3/l)	Total genera (no.)	Cell count (nox10^3/l)	Total genera (no.)	Cell count (nox10^3/l)	Total genera (no.)	Cell count (nox10^3/l)	Total genera (no.)
Apr-10	216.2	19	200.5	17	192.7	15	127.7	18
Oct 2010	203.1	19	446.6	20	323.6	23	360.4	18

Month	Essar SPM		Salaya Creek		Gulf	
	Cell count (nox10^3/l)	Total genera (no.)	Cell count (nox10^3/l)	Total genera (no.)	Cell count (nox10^3/l)	Total genera (no.)
Apr-10	124	16	198.5	18	211	15
Oct 2010	260	16	-	-	487.6	14

The above results indicated wide temporal and spatial fluctuations in the standing stock of phytoplankton between April 2010 and October 2010 off Vadinar. In general, the coastal waters revealed high average cell counts during October 2010 as compared to previous data. The generic diversity of phytoplankton during April 2010 widely varied with the dominance of genera such as Nitzschia (17.7%), Guinardia (16.7%), Skeletonema (9.1%), Thalassiosira (7.4%), Hemiaulus (7.2%), Navicula (6.1%), Rhizosolenia (4.5%), Biddulphia (3.4%) and Leptocylindrus (3.4%). In October 2010, the dominant phytoplankton genera were Leptocylindrus (57.6%), Guinardia (13.9%), Nitzschia (8.1%) and Chaetoceros (7.2%)

Mangroves

According to one estimate the dense mangrove cover of Narara Bet is spread over an area of 5.5 km^2. The mangrove area has increased in recent years due to extensive plantations made by the Forest Department. Mangrove cover and mudflat areas (km^2) in Jamnagar, Lalpur, Khambalia and Kalyanpur Talukas estimated based on satellite data are given in Table 8.4 below:

Table 8.4: Mangrove areas (km^2) along Jamnagar coast

Taluka	Mangroves (Dense)	Mangroves (Sparse)	Tidal mudflats
Jamnagar	12.03	23.91	83.53
Lalpur	1.96	3.95	50.50
Khambalia	3.86	11.48	101.94
Kalyanpur	0.04	0.01	0.78

*Singh H.S., 2000. Mangrove in Gujarat, GEER foundation

Mangroves at Vadinar

The intertidal expanse in the vicinity of Dargah ranged in 1 – 1.2 km. Lower intertidal zone was muddy with dense algal growth. The mid and upper intertidal zone sustained mangrove vegetation of ~ 500 m width. The zone around HTL was dominated by a sandy beach with ~ 5 m width and a narrow beam at the backshore. The distribution of mangroves at Vadinar during the present monitoring (April 2010) is given in Table 8.5 below:

Table 8.5: Distribution of mangroves at Vadinar (Dargah - North side)

	Location	Species	% FQ	Density	Height (m)	DBH (cm)	Seedling (no/m^2)
D1	22° 26'42.6''N 69° 42' 07.8''E	*A. marina*	100	Sep-67 -38	0.5 - 3.5	<2.6 - 6	0 - 2
D2	22° 26' 50.5''N 69° 41' 52.9''E	*A. marina*	40	0 - 5 -2	0.5 - 1.5	<2.5 - 4	0 - 1
Vadinar (Dargah - south side; afforested area)							
D3	22° 26' 30.8''N 69° 42' 05.6''E	*A. marina*	100	(20 - 75) -50	1.0 - 2.3	<1.5 - 5	0 - 15

As evident from above data, the stand density of *A.marina* at two locations (D1 and D2) along North-east of Vadinar Dargah varied from nil to 67 plants/100 m^2 with higher density of plants noticed at location D1. Frequency of occurrence ranged from 40 - 100% in the mid and upper intertidal zones. The height varied from 0.5 to 3.5 m. Mostly the plants were dwarf (av 1 m) with occasional tall plants of 3.5 m. Diameter at Breadth Height (DBH) varied from <2.5 to 6 cm. The seedling density was poor and varied from 0 - 2 no/m^2. The mid intertidal segment was the popular feeding site for flocks of flamingos.

The upper intertidal expanse along South-west of Vadinar Dargah (D3) showed good growth of afforested mangroves (Table 8.5). The density of mangroves ranged from 20 - 75 plants/100 m^2 with an average of 50 plants/100 m^2. The plant height varied from 1.0 to 2.3 m and the DBH ranged from <1.5 to 5 cm. The seedling density was low (0-15 no/m^2), however, better than that noticed along North-east of Vadinar - Dargah (D1 & D2). Present results are comparable with earlier monitoring studies (2007 - 2009).

Mangroves at Narara

The intertidal expanse along the IOCL pipeline corridor varied from 2000 - 2200 m. The mangroves vegetation from upper intertidal region was observed to be healthy, dominated by *A.marina* on both sides of the pipeline corridor. Four locations (N1 to N4) were selected for monitoring of mangroves at Narara as detailed in below given Table 7.6.

Table 8.6: Distribution of mangroves at Narara

	Location	Species	% FQ	Density	Height (m)	DBH (cm)	Seedling (no/m^2)
N1	22° 27' 56.8''N 69° 43' 43.2''E	*A.marina*	100	20-45 (38)	2-3	3-8	0-85
		C.tagal	10	0.7*	-	-	-
		R.mucronata	5	0.2*	-	-	-
N2	22° 27' 59.1''N 69° 43' 21.3''E	*A.marina*	100	60-90 (85)	2-4	25-12	0-7
N3	22° 28' 03.5''N 69° 43' 27.4''E	*A.marina* *R mucronata*	100 3	28-85 (50)	0.5-2.5 -	<15-7 -	0-55 -
N4	22° 28' 07.2''N 69° 43' 24.6''E	*A.marina*	100	30-130 (80)	0.5-3.5	<2.0- 3.5	0-10

* no/500 m^2

As can be noticed in the above table, the plant density of *A.marina* varied from 20 - 130 plants/100 m^2 with a frequency of occurrence of 100% at Narara. The species like *Ceriops tagal* (7 plants/500 m^2) and *Rhizophora mucronata* (2 plants/500 m^2 - 3 plants/100 m^2) were rarely noticed. The locations N2 (85 plants/100 m^2) and N4 (80 plants/100 m^2) revealed better average density of *A.marina* as compared to the rest. The height of *A.marina* varied from 0.5 to 4 m with N2 and N4 locations indicating better plant height than the rest. The DBH varied from <1.5 to 12 cm at the monitoring locations. The seedling density ranged from 0 - 85 no/m^2 with N1 and N3 locations sustained better seedling density than the rest. Few new plants (30 - 45 cm in height) of *C.tagal* and *R.mucronata* were noticed at the EOL pipeline corridor during the present monitoring.

Sand dune vegetation

The narrow beach of ~ 5 m width around HTL along Narara Bet is marked with berm of ~ 1.5-2 m width, followed by back shore sandy zone. Occasional shrubs of *Salicornia brachiata* and *Suaeda maritima* are observed on the backshore sandy zone. The sand dune flora is more predominant on berm and immediate back shore zone of ~5 m width. Sand dune flora is represented by seven species viz; *Crassa sp, Cyperus arenarius, Launea sp, Suaeda maritima, Salicornia brachiata,* unidentified *Poaceae* member and unidentified *Fabaceae* member.

Seaweeds and Seagrasses

Seaweeds, which are known as a source of food, fodder and manure, are mostly found attached to various substrata like sandy, muddy and coralline sediments as well as rocky areas and play a significant role in enriching the sea by adding dissolved organic matter, nutrients and detritus besides serving as nursery areas for the larvae and juveniles of innumerable marine organisms. Some green Seaweeds are edible, red algae are the important source of agar and some of the brown algae are used for manufacturing algin and alginic acid. Seaweeds are also used to produce some bioactive compounds.

The algal zone of Narara Bet is confined to 1.2-2.5 km width. A total of 62 species of algae and 3 species of sea grasses are recorded from this region. Among them *Lyngbya, Caulerpa, Cladophora, Ulva, Cystoceira, Dictyota, Hydroclathrus, Padina, Sargassum, Acanthopora, Amphiroa, Champia, Centraceros, Gracilaria, Hypnea* and *Polysiphonia* were common with the dominance of *Padina* and *Gracilaria* at the lower reef flat. The open mudflats of Narara Bet are dominated by algae like *Enteromorpha, Ulva, Lyngbya* and *Polysiphonia*, while, the upper sandy shore and mangrove areas are associated with *Enteromorpha* and *Ulva*. Seagrasses such as *Halophila ovata* and *Halodule uninervis* are common in patches on sandy regions of the reef, while, *Halophila beccarii* occasionally occurred on mudflats along the tidal channels.

Open mudflats near Dargah and Narara pipeline corridor supported growth of twelve marine algae dominated by Enteromorpha spp (Table 8.7). The biomass of Enteromorpha estimated at ~ 4 kg/m2.

Table 8.7: Marine algal flora along Narara/Vadinar

Sr. No.	Species	% FO*	ES*
1	*Enteromorpha clathrata*	100	D
2	*Enteromorpha intestinalis*	100	D
3	*Caulerpa racemosa*	50	C
4	*Ulva fasciata*	100	D
5	*Ulva lactuta*	100	D
6	*Ulva reticulate*	90	D
7	*Codium elongatum*	30	O
8	*Sargassum ilicifolium*	45	C
9	*Sargassum tenerimmum*	60	CD
10	*Gracilaria corticata*	55	C
11	*Gracillaria verrucosa*	85	C
12	*Polysiphonia platycarpa*	20	O

*%FO: Percentage Frequency Occurrence, ES: Ecological Status, D: Dominant (% FO = 80-100), CD: Co-dominant (% FO = 60-79), C: Common (% FO = 40-59), O: Occasional (% FO = 20-39).

The intertidal zone of Kalubhar Tapu harbours 47 species of marine algae and three species of seagrasses. The reef areas of this island are dominated by *Dictyota*, *Gracilaria*, *Padina*, *Hydroclathrus*, *Ulva* and *Hypnea*. The open mudflats and sandy areas at the upper intertidal are preferred by *Enteromorpha*, *Ulva*, *Lyngbya* and *Polysiphonia*. The sandy region of the reef flat supported seagrasses like *Halophila* and *Halodule*.

Zooplankton

The zooplankton standing stock in terms of biomass and population density during April 2010 (Table 8.8) varied from 0.2 to 121.2 ml/100m^3 (av 3.3 ml/100m^3) and 2.2-722.7 x 10^3/100m^3 (av 39 x 10^3/100m^3), respectively while during October 2010 the zooplankton biomass and abundance ranged from 0.2 to 12.0 ml/100m^3 (av 3.5 ml/100m^3) and 2.5-157.8 x 10^3/100m^3 (av 48.4 x 10^3/100m^3) respectively suggesting normal secondary production off Vadinar during the monitoring period.

The average zooplankton biomass (ml/100m^3), population density (nox10^3/100m^3) and total groups (no) off Vadinar during the monitoring period varied in accordance with the data presented in Table 8.8.

Table 8.8: Average values of zooplankton (A) biomass (ml/100m^3) (B) Population density (nox10^3/100m^3) and (c) total groups (no) off Vadinar (April 2010 – October 2010)

Area		Pathfinder	Nearshore	ESSAR DP	IOC SPM	Essar SPM	Salaya Creek	Gulf
April 2010	A	8.3	1.1	1.1	0.9	1.4	2.5	3.5
	B	89.9	24.6	14.4	22.7	12.7	20.4	37.4
	C	17	15	12	16	13	16	17
Oct 2010	A	4	3.9	1.5	3	5.7	-	2.1
	B	57.4	55.9	23.5	30.5	83.1	-	32.8
	C	13	11	10	10	9	-	7

The overall zooplankton standing stock was low and highly variable off Vadinar which could be due to high patchiness and seasonal variability in their distribution apart from high grazing pressure at higher trophic levels.

During April 2010, 24 faunal groups were identified in the coastal waters off Vadinar during the monitoring period while 17 faunal groups were present in the samples of October 2010. The most common faunal groups were copepods (40.5%), decapod larvae (19%), gastropods (22.5%), lamellibranchs (10.7%), and foraminiferans (2.1%) in April 2010. In addition to the above, groups like chaetognaths, siphonophores, *Lucifer* sp, polychaetes, ctenophores, medusae, amphipods, ostracods, mysids, heteropods, isopods, stomatopod larvae, appendicularians and fish larvae were also frequently noticed but in less numbers during April 2010. During October 2010, the dominant groups were copepods (93.6%) and decapod larvae (4.8%). In general, the coastal waters off Vadinar revealed a moderate production of zooplankton associated with random fluctuations and seasonal changes.

Macro benthos

The organisms inhabiting the sediment are referred as benthos. Depending upon their size, benthic animals are divided into three categories, macrofauna, microfauna and meiofauna and macrofauna. Benthic community responses to environmental perturbations are useful in assessing the impact of anthropogenic perturbations on environmental quality. Macrobenthic organisms which are considered for the present study are animals with body size larger than 0.5 mm. The presence of benthic species in a given assemblage and its population density depend on numerous factors, both biotic and abiotic.

Intertidal macrofauna

During April 2010, Intertidal macrofauna was studied along 5 transects viz. 1 transect (Transect I) at Kalubhar Island and 4 transects at Narara Bet. Several locations were sampled along each transect between the HTL and the LTL viz; High Water (HW), Mid Water (MW) and Low Water (LW). The intertidal macrofaunal standing stock in terms of population density (50-7800 no/m^2, av 2292 no/m^2) and biomass (0.1-37.2 g/m^2; wet wt, av. 9.2 g/m^2; wet wt) varied widely During the post monsoon, only the first three transects were sampled. In October 2010, the intertidal macrofaunal standing stock in terms of population density ranged from 0-3625 no/m^2 (av 1185 no/m^2) and biomass from 0-67.8 g/m^2; wet wt (av. 14.6 g/m^2; wet wt). These results are compared with historical data in Table 8.9.

Table 8.9 Average of intertidal macro benthos off Vadinar during April 2010 to October 2010, (A) Biomass (g/m^2) (B) Population density (no/m^2) and (C) Total groups

Transect		I	II	III	IV	V
April 2010	A	11.2	4.2	13.7	10.7	6.1
	B	3983	1172	1292	2401	2614
	C	5	3	6	6	3
Oct 2010	A	11.9	16.8	15.1	-	-
	B	1495	904	1156	-	-
	C	5	7	5	-	-

Overall, the intertidal region sustained good faunal standing stock and diversity and the contribution of major faunal components are comparable over the past many years at Narara Bet/Kalubhar.

Subtidal macrofauna

Subtidal macrofauna was studied at 13 stations in the coastal system off Vadinar during April 2010 and at 10 stations during October 2010. The distribution of subtidal faunal standing stock in terms of biomass (0.3 - 41.0 g/m^2; av 8.0 g/m^2 wet wt) and population density (150-8925 no/m^2; av 1902 no/m^2) during April 2010. In October 2010 the biomass ranged from 0.3 – 23.9 g/m^2 (av 7.1 g/m^2; wet wt) and population density ranged from 125-14975 no/m^2 (av 2282 no/m^2) The current data is listed (April 2010 – Oct 2010) in Table 8.10.

Table 8.10 Average of subtidal macrobenthos off Vadinar during April 2010 to October 2010, (A) Biomass (g/m^2) (B) Population density (no/m^2) and (C) Total groups

Area		Pathfinder	Nearshore	ESSAR DP	IOC SPM	ESSAR SPM	Salaya Creek	Gulf
April 2010	A	11.2	2.9	2.0	6.1	1.3	15.5	6.4
	B	3833	338	388	694	2375	1553	1865.5
	C	7	3	4	6	5	6	4
Oct 2010	A	12.1	7.7	1.9	4.9	1.8	-	10.6
	B	5019	2967	400	1169	181	-	1652
	C	8	5	4	4	2	-	7

The macrobenthic population was dominated by polychaetes (50.1%), amphipods (18.5%), pelecypods (8.2%), decapod larvae (7.4%), tanaids (3.6%) and foraminiferans (3.2%) during April and by polychaetes (76.3%), amphipods (12.3%) and pelecypods (5%) during October 2010.

Corals and associated biota

Live corals at the Narara and Kalubhar reefs are mainly confined to the lower littoral (reef flat) and shallow subtidal zones (< 8 m). They are absent at the upper reef flat probably because of high rate of sedimentation and long exposure during low tide.

Narara Bet

The eastern segment of Narara Bet represents a formation of vast mud flat, which resulted in significant negative influence on the live coral population. Many regions along the reef flat on the western side are exposed during low tide for prolonged periods because of which the distribution of live corals was poor. In all 30 and 22 Scleractinian species have been identified in the intertidal and subtidal zones respectively of Narara Bet with *Montipora, Goniopora, Porites, Favia, Favites, Goniastrea, Platygyra, Cyphastrea, Pseudosiderastrea, Turbinaria, Leptastrea* and *Symphyllia* as the dominant genera.

In general, the live coral density decreased with depth. The live corals were absent beyond 8 m (CD). However, the subtidal area at Narara sustained good coral populations within 5 m (CD). Distance-wise corals were rich within 250 m towards the sea from the LTL. The corals of the genera *Montipora, Porites, Favites, Goniastrea, Goniopora, Cyphastrea, Leptastrea, Favia* and *Turbinaria* dominated the subtidal area.

Kalubhar

In general, Kalubhar reef sustained relatively healthy live corals at the lower intertidal and subtidal (<7 m depth) zones as compared to the population at the Narara reef. The north and north-west regions of Kalubhar had better coral density and diversity as compared to the east and south-east regions because of high sedimentation of the reef flat and the subtidal zones. Overall, 30 and 7 species of Scleractinians in the intertidal and subtidal zones respectively at Kalubhar have been identified. The corals at Kalubhar were mainly represented by genera *Montipora, Favia, Favites, Porites, Goniastrea, Goniopora, Cyphastrea, Platygyra,* and *Symphyllia* and *Turbinaria.* The live corals were absent at the reef edge of 50 m width due to total exposure for longer period whereas their coverage increased (90 to 100%) at the reef slope below 1 m depth.

A rich reef associated flora and fauna was noticed at Kalubhar. The common and dominant seaweed genera were *Sargassum*, *Gelidiella*, *Acanthophora*, *Ulva*, *Caulerpa*, *Codium*, *Dictyota*, *Padina*, *Halymenia*, *Enteromorpha*, and *Gracillaria*. Varieties of sponges were associated with coral boulders. The fauna consisted of coelenterates (*Zoanthus* sp., *Discosoma* sp., *Stoichactis*, *giganteum*, *Cerianthus* sp. and variety of corals), annelids (various polychaetes), echiuroid (*Ikedella misakiensis*), crustaceans (amphipods, isopods, *Acetes* sp., shrimps and crabs), molluscs (*Octopus* sp., *Sepia* sp., *Loligo* sp., gastropods, bivalves, nudibranchs etc.) echinoderms and variety of reef fishes.

Fishery

Gujarat ranks number one position in marine fish production in India. The Gulf contributes about 22% to the fish production of the state. The share of the Jamnagar District is between 5 and 14% (av 10%) to the State's total marine fish landings. The important fish landing centres in the vicinity of IOCL SPM area which falls under Khambalia zone are Vadinar, Bharana, Nana Amla and Salaya which together contributed about 6823 t, 8253 t and 5330 t of fish landings in 2006-07, 2007-08 and 2008-09 respectively to the total landings of the Jamnagar District. Similarly, the important fish landing centres in the vicinity of Sikka which falls under Jamnagar zone are Sachana, Baid, Sarmat, Bedi and Sikka which together contributed about 4768 t, 5122 t and 5848 t of fish landings in 2006-07, 2007-08 and 2008-09 respectively. Within the Jamnagar zone, the major landings (98%) were from Sachana (32%), Baid (27%), Sikka (19.7%) and Bedi (18.9%) during the last 3 years. Within the Khambalia zone, the major landings (81-89%) were at Salaya during the period 2006-09. On an average the Khambalia zone (56.5%) contributed to about 13% higher fish landings than Jamnagar zone (43.5%) for the last 3 years. However, the landings at Sikka (1.3%) and Vadinar (0.5%) to the total landings of the district were negligible during the period 2006-2009.

Reptiles and mammals

The reptiles are mainly represented by marine turtles Chelonia mydas and Lepidochelys olivacea which breed and spawn on the sandy beach along the Sikka-Vadinar coast as well as on the islands.

Dolphin (*Dolphinus delphis*) and whale (*Balanoptera* sp) are common in the Gulf. Though occurrence of Dugong (*Dugong dugon*) in the Gulf particularly along the Jamnagar coast has been reported, there are no recent sightings.

The resources discussed above likely to be threatened are tidal flats, Phytoplankton, Phytopigments, Mangroves, seaweeds and seagrasses, Zooplankton, Macrobenthos, Corals and associated biota, salt works fishing activities and other vocational related to marine sensitive areas in the coast of Vadinar and Sikka.

It has been observed from the modeling study that during pre-monsoon season, the spills occurring at the APSEZL marine facilities move towards the southern / southwestern part of the Gulf of Kutch nearer to the facilities depending on tide phase.

The spills taking place at the APSEZL marine facilities move towards northern coast of Gulf of Kutch during monsoon season and affect the coast near Mundra, Kandla etc.

During post - monsoon season, the spills taking place at the APSEZL marine facilities move towards south / southwest and affect the islands /coast on southern side of the Gulf of Kutch.

2.7 Special local considerations

Considering the distant proximity of various other installations with the port of Mundra, in case of a tier 1 spill, no other special considerations are deemed to be required apart from an active spill response close to the port facility itself.

3 Response strategy

3.1 Philosophy and objectives

This plan is intended to assist APSEZL in dealing with an accidental release or discharge of oil. Its primary purpose is to set in motion the necessary actions to stop or minimize the discharge and to mitigate its effects. Effective planning ensures that the necessary actions are taken in a structured, logical and timely manner.

This plan guides the HOD– Marine and his Duty Staff through the decisions which will be required in an incident response. The tables, figures and checklists provide a visible form of information, thus reducing the chance of oversight or error during the early stages of dealing with an emergency situation.

For this plan to be effective, it must be:

- familiar to those APSEZL staff with key response functions;
- regularly exercised; and,
- Reviewed and updated on a regular basis.

This plan uses a tiered response to oil and chemical pollution incidents. The plan is designed to deal with Tier One spillage. The products handled are likely to pose a greater fire and safety, rather than an environmental risk; there may thus be additional factors involving the safety of personnel, which will take precedence over the pollution response. In this case, reference must be made to the APSEZL Emergency Procedures Manual. The salvage and casualty management of any vessel that poses a threat of pollution is priority considerations.

During oil spill response activities, account must be taken of the following:

- site hazard information
- adherence to permit procedures
- spill site pre-entry briefing
- boat safety
- APSEZL safety manual and material safety data sheets
- Personal protective equipment needs
- heat stress
- decontamination

3.2 Limiting and adverse conditions

APSEZL is situated in natural protected Gulf of Kutch and there are less incidences of heavy wind or any other factor affecting operation.

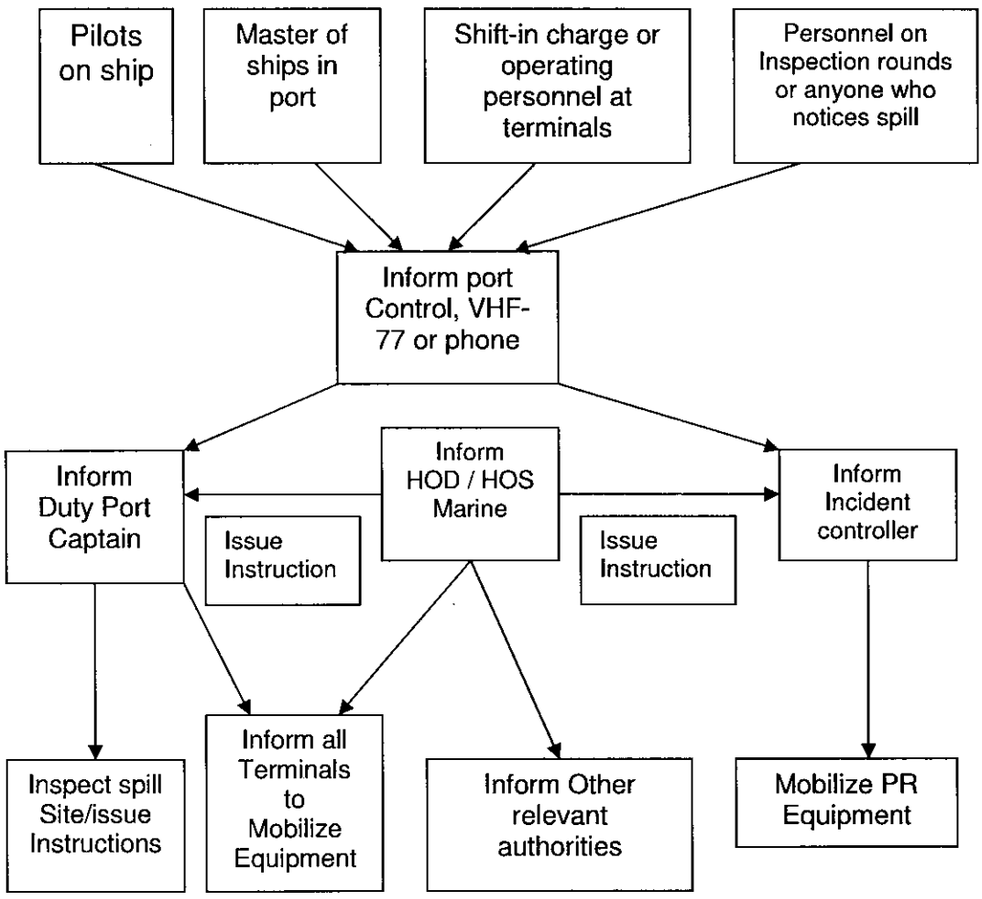
3.3 Oil spill response in offshore zones

SPM handles (unloading) crude oil and pumps it to shore tank farm area through sub-sea pipeline. The impact of such spills on marine environment is on the higher side. Hence, oil spill equipments are required for combating oil in case of such spills at the marine facilities at Mundra.

Based on the oil spill modeling study, it has been observed that crude oil spill of 700 tons (Tier-I) will spread over an area having radius of around 400 m within 4hr. APSEZL has already having facilities for combating a Tier-1 spill.

3.4 Oil spill response in coastal zones

Contingency Chart to deal with Oil Spill



On-site Crisis Management Group – Action Group

In an emergency, the personnel available at or near the incident site play vital role. This concept is made use of in nominating the Key Persons. It is necessary to nominate a functionary as the Incident Controller who is invariably a shift-in-charge of the facility. The Incident Controller tackling the emergency in real times requires the support from various other services i.e. Fire & Safety, Medical Services covering communication, transport and personal functions etc. A key person for each of these services therefore, is nominated.

Overall in charge of these activities is **Chief Operating Officer – Mundra Port.** The different functional coordinators, designated, will co-ordinate with Chief Controller in their respective functional areas. It is suggested that key personal chart be developed, giving the names, designation, telephone nos. of top level personnel who will act as coordinators in different disciplines/services. The duties and the responsibilities of various Key Persons and Coordinators need to be written down on a chart and should be made available across the organization at the site / location.

Roles & Responsibilities

Incident Control Officer – (HOS – Marine / Duty Port Captain)

- Directs and co-ordinates all field operations at the scene of the accident
- Assess incident/crisis at site, nature, location, severity, casualties, resource requirement
- Classifies incident - Advises Exe. Controller, Civil Defence, Dy. Conservator, Traffic Manager - regarding crisis severity status and emergency level, wind direction, temperature, casualties and resource requirements.
- **Conducts initial briefing to Chairman**
- Activates elements of the terminal emergency plan/ site response actions
- Protect port personnel and the public
- Directs security/fire fighting/oil spillage/gas leakage/vessel accidents/natural calamities, cargo operations shutdown
- Search for casualties and arrange first aid and hospitalization
- Brief or designate a person to brief, personnel at the incident scene
- Determine information needs and inform Crisis Management Group
- Coordinates all functional heads in field operations group to take action
- Manages incident operations to mitigate for re-entry and recovery
- Coordinate search and rescue operations
- Arrange evacuation of non-essential workers to assembly points –outside port
- Arranges tugs, mooring boats and pilot(s) for sailing vessel(s)
- Co-ordinates actions, requests for additional resources and periodic tactical and logistical briefings with Site Emergency Coordinator
- Coordinate incident termination and cleanup activities
- Instructs various emergency squads as necessary

Site Emergency Coordinator – (Senior Pilot and Duty Radio Officer)

- Direct operations from the emergency control center with assistance from Crisis Management Group
- Take over central responsibility from the Site incident controller (SIC)
- Decide level of crisis and whether to activate off site emergency plan
- Instruct SIC to sound appropriate alarm
- Direct the shutting down, evacuation and other operations at the port
- Monitor on site and off site personal protection, safety and accountability

- Monitor that causalities if any are given medical aid and relatives informed
- Exercise direct operational control of the works outside the affected works
- Monitor control of traffic movements within the port
- Coordinate with the senior operating staff of the fire, police and statutory authorities
- Issue authorized statements to the news media
- Review and assess possible developments to determine the most probable course of events
- Authorize the termination of the emergency situation by sounding the all clear siren-continuous long single tone siren for one minute
- Control rehabilitation of affected areas after emergency
- Arrange for a log of the emergency

Fire Coordinator – (HOS - Fire / HOS -Safety)
(Under the direction of the Incident Control Officer)

- Announces fire incident point over the public address system and evacuates workers to the assembly points
- Informs fire station immediately and leads fire fighting team to the incident location
- Informs SIC if external fire tender / fire-fighting equipment / materials/mutual aid is required
- If necessary, arranges and activates other fire-fighting equipment
- Arranges safety equipment e.g. fire suits, protective gloves and goggles, breathing apparatus
- In liaison with Civil Engineering Department, ensures that adequate water pressure is maintained in the fire hydrant system/at the area supply
- Maintains adequate records

HOS - Security / Duty Security Officer

- Directs, gate security and facilitates evacuation, transport, first aid, rescue
- Controls the entry of unauthorized persons and vehicles-disperses crowd
- Permits the entry of authorized personnel and outside agencies for rescues operations without delay. Liaises with State police
- Allows the entry of emergency vehicles such as ambulances without hindrances
- Ensures that residents within port area are notified about disaster and instructs to evacuate if necessary
- Ensure that all people are aware of the assembly points, where the transportation vehicles are available
- Ensure that the people are as per the head count available with the assembly point section of that area
- Liaise with the Chief Medical Officer to ensure first aid is available at the assembly points
- Carry out a reconnaissance of the evacuated area before declaring the same as evacuated and report to SIC.

Medical Superintendent

- Direct medical team
- Set up casualty collection centre arrange first aid posts
- Arrange for adequate medicine, antidotes, oxygen, stretchers etc
- Contact and cooperate with local hospitals and ensure that the most likely injuries can be adequately treated at these facilities e.g. burns
- Advise Chief Emergency Controller on industrial hygiene and make sure that the facility personnel are not exposed to unacceptable levels of toxic compounds

- Make arrangements for transporting and treating the injured
- Inform the hospitals of the situation in case of a toxic release and appraise them of the antidotes necessary for the treatment
- Maintain a list of blood groups of each employee with special reference to rare blood groups
- Liaise with Govt. Hospitals/Red Cross

Marine Pollution Coordinator – Manager (Marine / pollution control)

- Minimizes the impact of an accident on the environment for which it would develop methodologies to control hazardous spills
- Monitors cooperation with emergency response squads to conduct the actual cleanup work during and after the emergency.

- In case of fire and specially if the fire involves toxic/flammable materials, to ensure responsible actions for containing the run off fire water and other water from the damaged units
- Determines the level of contamination of the site as a result of the accident
- During cyclones/floods arranges sand bags and transfers important plans and documents to higher levels

Traffic Coordinator – Duty Port Captain

- Directs operation staff
- Prepares vessels to vacate from berth
- Arranges to protect cargo in vicinity from damage
- Arranges to segregate and shift cargo in sheds
- Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area
- Coordinates with ship owners / agents/C & F agents/stevedores

Communications Officer – (Duty Port Captain / Marine Control In-charge)

- Ensure telephone operator/signal room advises entire emergency team
- On receipt of instructions from the chief Incident controller, notifies the fire brigade/police/hospitals/district collector/mutual aid partners
- Keep the switchboard open for emergency calls and transmit the same to the concerned personnel effectively
- Refrain from exchanging any information with authorized persons unless authorized to do so by the Chief Incident Controller
- Maintains contact with other vessels through VTMS

Chief Emergency Controller – (Head - HSE)

- Inform district emergency authorities-District Collector, Medical officer-Coast Guard Pollution control -Inspector of factories-Inspector of Dock Safety & Health,
- Activate the off site plan if necessary
- Liaise with Jt. Secy./Director MOST (Ministry of Shipping) or relevant Govt. authority
- Inform the media

Civil Coordinator – (HOS – Environment cell / HOS - Estate)

- Inform Gujarat Pollution Control Board and other environmental agencies about the incident for getting necessary guidance
- Instruct the contractors to carry out urgent civil works if required
- Hire the barges for collecting the spilled oil, if required

Marine Engineering Coordinator – (HOS – SPM / Diving Team in-charge)

- Organise the tugs for combating the pollution
- Start the rigging of pollution combating equipment on tugs/launches
- Hire additional crafts if required

HOD- Corporate affairs:

- Collect detailed information periodically and liaise with press about the incident
- Arrange transport facilities, if required
- Inform local authorities/District Collector about the incident (as per EAP)

HOS - Legal & HOD - Estate:

- Issue notice under Major Port Trusts Act, Indian Ports Act(Prevention & Control of Pollution) Rules, etc; to the defaulting master/owner/agent
- Arrange for settlement of claims related to the pollution(as per EAP)

3.5 Shoreline oil spill response

Most oil spills reach the shorelines and cause visible oil pollution which is particularly sensitive to public opinion. The selection and correct application of clean up techniques are therefore essential. When an oil spill occurs on open water the optimal solution is to intercept and recover the oil before it reaches the shoreline. This is because:-

- The environmental damage is normally less critical in the open water environment
- The logistics of oil removal becomes more complex in the varied natural environment of coastlines compared with the open sea.
- The costs of oil recovery increases dramatically when oil reaches sensitive shorelines compared with open water operations.

Experience has shown that it is very difficult to avoid some oil reaching the shorelines. Mechanical equipment and chemical treatment at sea are often insufficient to recover all oil spilled at sea. When the oil reaches the shoreline, a number of different parameters specific for this particular situation have to be taken into consideration:-

- Quantity of oil
- Characteristics of the oil (for instance, toxicity and viscosity)
- Prevailing on-site conditions (weather, season, tides, temperature)
- Shoreline type or combination of types (cliffs, pebble, sand, marsh)
- Special Considerations

The four main steps in a shoreline clean-up operation are:

Step 1: Assessment

- Determine the need to clean, setting priorities in line with this contingency plan
- Determine required degree of clean-up for each area in accordance with priorities
- Attain agreement between clean-up team, ecological experts, government authorities

Step 2: Select Clean-up Method

- Choose method appropriate to type of shoreline, access, degree of oiling
- Minimize damage caused by choice of clean-up technique, degree of clean-up
- Address conflicts of interest (e.g. needs of amenity use versus environment or response speed versus aggressiveness)

Step 3: Clean-up Operations

- Monitor clean-up, confirm choices made above, re-evaluate if necessary
- Minimize disturbance of shoreline features
- Minimize collection of un-oiled debris, sediments

Step 4: Termination / Monitoring

- Ongoing assessment of clean-up operations
- Determine when clean-up objectives have been met
- Post-spill monitoring to confirm recovery of shoreline features, biota

The four main methods for shoreline clean-up are as follows:-

A. Pumping and Skimming Techniques

- Applicable to shorelines that are heavily oiled.
- Often the first step in cleaning a heavily contaminated shoreline.
- Preferred option because it results in fluid wastes that are relatively free of sediments and debris, which are more easily dealt with in disposal.
- Pumping and skimming techniques can also be used in conjunction with flushing techniques.

B. Flushing Techniques

- Use water or steam to flush oil from the beach, and direct it to a recovery location.
- Applicable to heavily contaminated beaches, and substrates that are relatively impermeable (e.g., mud and saturated beaches, boulders, and man-made structures) that will not allow the flushed oil to penetrate the beach surface.
- Typically carried out in conjunction with a skimming operation. The flushed oil is directed down-slope to skimmers positioned at the water's edge, with booms deployed around the skimmers to prevent any loss of the water.
- Options of using low or high pressure water, and of using ambient temperature water versus warm water or steam.
- Low pressure, cold water is generally the least effective, particularly with sticky oils and emulsions, but is least harmful on the environment.
- High pressure water and heated water and steam are more effective, but may remove and/or kill beach-dwelling organisms.

C. Sediment Removal Techniques

- Applicable to a variety of shoreline types, and in particular, when the shoreline is heavily contaminated, though likely to cause the greatest environmental impact
- The requirements are access for the heavy equipment required for transporting away oily debris and sediments for disposal and a surface which is able to support heavy equipment
- An important factor to consider is the depth of oil penetration
- Important to limit the depth of material removed in order to minimise disturbance to the beach, and to minimise disposal requirements
- The best option is to use manual labour to pick up the oily sediment and mechanical means to transport it away

D. Biodegradation Techniques

- Generally refers to "active" bioremediation, where nutrients and/or microorganisms are applied to enhance natural degradation
- Generally suitable for areas that are lightly oiled, especially lightly oiled salt marshes and tidal flats where the use of equipment could increase the environmental effects by forcing oil into the substrate
- It can also be used as a final clean-up step following more active efforts

The shoreline clean-up operation is normally not an emergency operation as is the case with an oil spill on open water. A clean-up project can last many weeks or months depending on the amount of oil spilled. Many wrong decisions can be made in planning and carrying out a shoreline clean-up operation. The contingency plan must be used in combination with consulting experts with experience of shoreline clean up. The agencies such as NIO, NEERI, Ports and Oil companies have experts with experience which is relevant for the specific oil spill situation and they should be consulted prior undertaking shoreline clean-up.

3.6 Storage and disposal of oil and oily waste

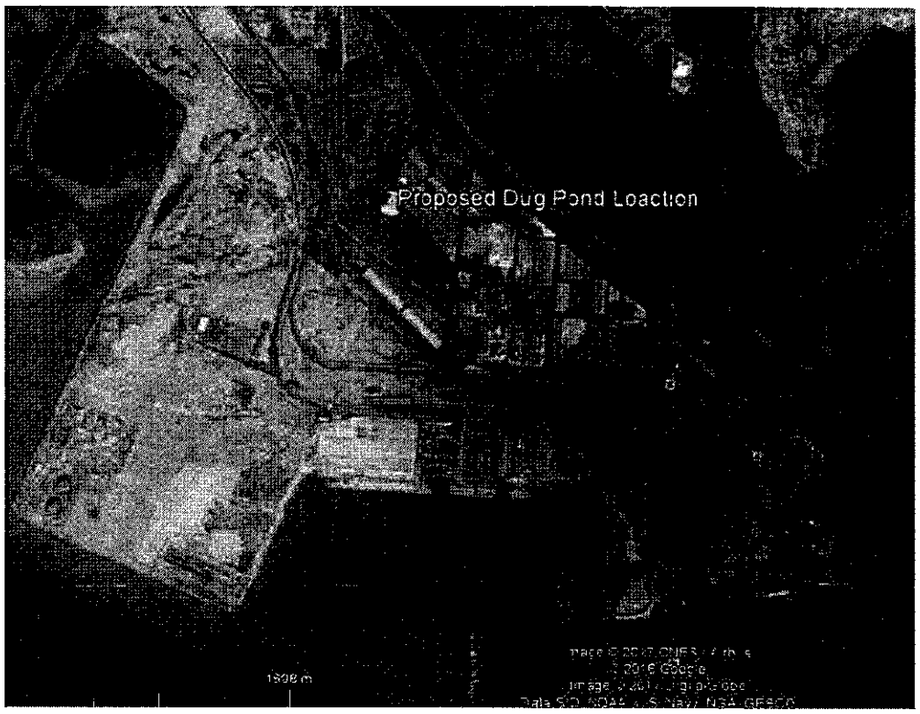
After the natural degradation by coagulation and evaporation of oil on water, residual oil and waste material collected during a Tier 1 response will be disposed off by in-situ or terrestrial burning.

	Type of material	Separation methods	Disposal methods
LIQUIDS	Non-emulsified oils	Gravity separation of free water	Use of recovered oil as fuel or refinery feedstock
	Emulsified oils	Emulsion broken to release water by ; - Heat treatment - Emulsion breaking chemicals - Mixing with sand	Use of recovered oil as fuel or refinery feedstock. Burning Return of separated sand to source.
SOLIDS	Oil mixed with sand	Collection of liquid oil leaching from sand during temporary storage Extraction of oil from sand by washing with water or solvent Removal of solid oil by sieving	Use of recovered oil as fuel or refinery feedstock. Direct disposal Stabilization with inorganic material. Degradation through land farming or composting. Burning
	Oil mixed with cobbles, pebbles or shingle	Collection of liquid oil leaching from beach material during temporary storage Extraction of oil from beach material by washing with water or solvents	Direct disposal. Burning
	Oil mixed with wood, plastics, sea weeds, sorbents	Collection of liquids leaching from debris during temporary storage Flushing of oil from debris with water	Direct disposal. Burning. Degradation through land farming or composting for oil mixed with sea weeds or natural sorbents.
	Tar balls	Separation from sand by sieving	Direct disposal Burning

Location for Dug Pond for temporary storage of oily water:

To store the contaminated oily water, temporary dug pond will be excavated for storage of oily water. It is expected that 20 times volume of oil & water mixture will be generated if oil spill happen in the sea. Storage capacity of dug pond of volume 14000 m3 considering spill of level 1 (Tier-1) is required.

Location Identified for Dug Pond behind Maruti Yard (Lat. 22° 45.252'N , Long. 69° 41.093'E) is roposed.



- Size of Dug Pond to be provided : 100 mtr X 100mtr X 1.5mtr
- Total storage capacity (m3) : considering 20 times oily water @ 700 m3 = 14000 m3

Once the contaminated mixture of oil and water is stored, the same will be transferred via tanker to following location. Following are the steps require to be followed.

1. Oil Water Separator: Capacity 25 m3/hr.
2. Effluent Treatment Plant: Capacity 120 KLD
3. Parallely oil recyclers will be approached for the collection and transportation of the oily water.
4. Contaminated Soil / Sediments will be directly sent to the Treatment Storage and Disposal Facility (TSDF) site. List of Oil recyclers and TSDF sites are shown in Annexure – 15
5. Different types of equipment & manpower require for creating dug pond:

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Name of Equipment	**Quantity**	**Primary Responsibility of Equipment & Material**	**Secondary Responsibility**
Excavator	10 Nos.	Marine Dept.	MHS section (Dry Cargo) / Asset Department / Procurement
JCB Machines	10 Nos.	Marine Dept.	ES Civil / Asset Department / Procurement
Material			
HDPE Liners for dug pond	10600 Sq. mtr.	Marine Dept.	Stores & Procurement

In phase wise manner stored oily water will be treated at both the above facility to separate oil from water to the possible extent. Whereas, after recovery of oil from water, water confirming to the effluent discharge limit of oil (< 10 ppm) will be discharged in to sea.

Whereas in case oily water will not capable of treat at OWS & ETP will be dispose through sending it to registered recyclers, for which APSEZL have already done tie up with the registered recyclers as mentioned in **Annexure – 15**.

APSEZL have also done necessary tie up with various institutes/agency/NGO as mentioned in **Annexure – 16** for providing service for rescue & rehabilitation of oil socked birds as well as restoration of mangroves, when oil reaches to the sea shore and mangrove areas during oil spill. Mobile van / vehicle require for rescue of oil socked birds to transfer from affected area to treatment facility center.

4 Equipment

4.1 Marine oil spill response equipment

Detailed in Annexure 3

4.2 Inspection, maintenance and testing

The equipments are being kept in working condition. Routine inspection, maintenance and testing performed as per the stipulated requirements.

4.3 Shoreline equipment, supplies and services

The shoreline clean-up equipment which are essential for the oil removal operations at beaches are as follows:-

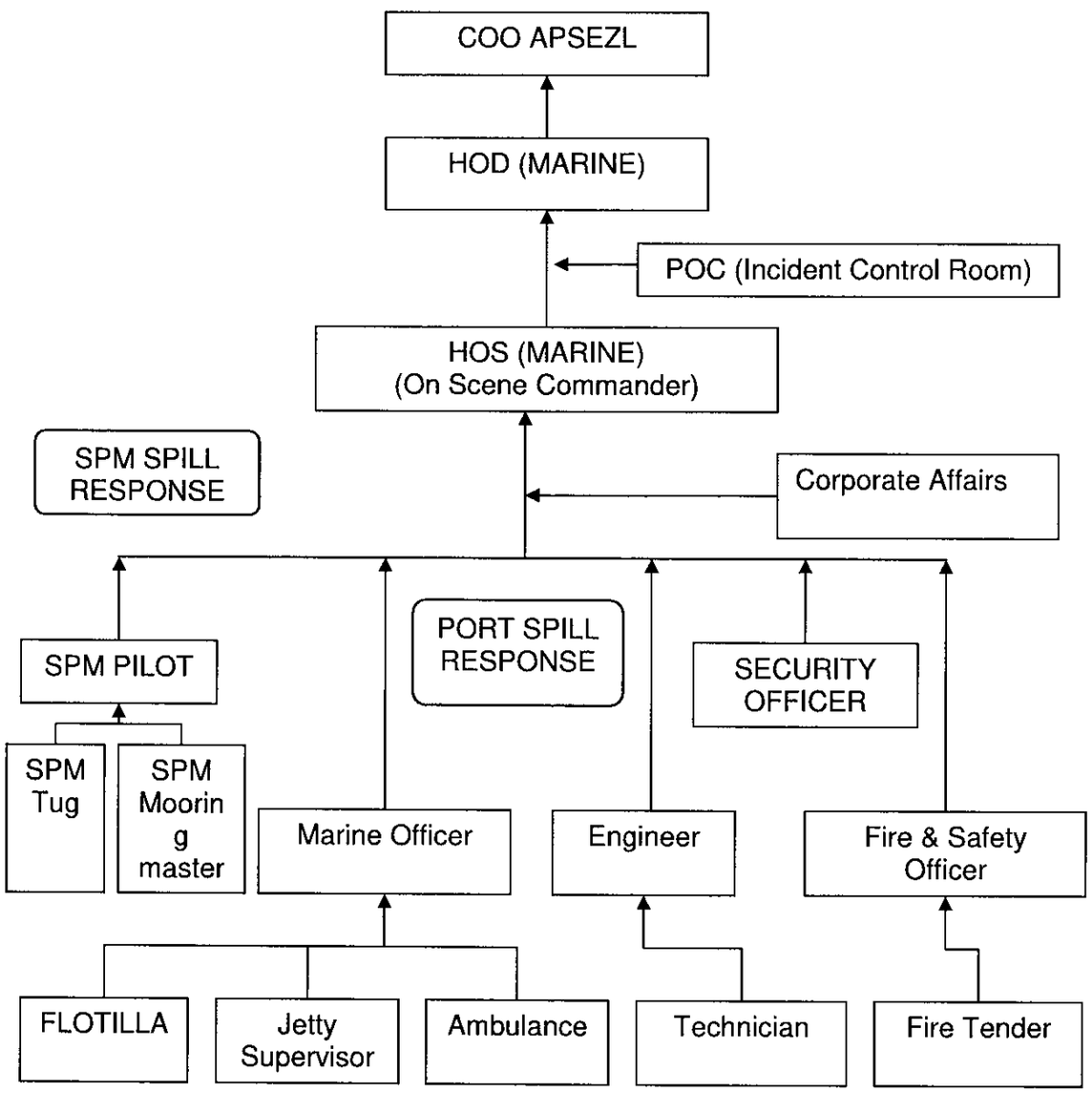
- Protective clothing for everybody (including boots and gloves), spare clothing.
- Cleaning material, rags, soap, detergents, and brushes.
- Equipment to clean clothes, machinery, etc., with jets of hot water.
- Plastic bags (heavy duty) for collecting oily debris.
- Heavy duty plastic sheets for storage areas especially for the lining of temporary storage pits.
- Spades, shovels, scrapers, buckets, rakes
- Ropes and lines
- Anchors, buoys
- Lamps and portable generators
- Whistles
- First Aid material.

5 Management

5.1 Crisis manager and financial authorities

The COO of APSEZL is the final authority of the oil spill response in case of a Tier 1 scenario. He is responsible for raising the level of the response if required and summoning additional help. The authority of all financial decisions rest with him.

5.2 Incident organization chart



5.3 Manpower availability (on-site, on call)

In an event of incident Kandla Port Trust, Gujarat Maritime Board, Gulf of Kutch Ports, District and Regional plans are deemed to have been implemented. Adani Ports and Special Economic Zone Limited (APSEZL) manpower and resources will be put at the disposal and will be deployed as required, provided APSEZL is the polluter and spill is within the Port Limits.

In the event of APSEZL not being the polluter and any event outside the port limit of Adani Port, APSEZL equipment will be subject to mutual assistance plan and it will be the responsibility of the above forum.

5.4 Availability of additional manpower

Similarly in the event of APSEZL being the polluter, additional manpower and supplies can be requested from the resources which are part of this forum.

A numbers of private parties have their labor force working round the clock in the port and on call these can be available.

5.5 Advisors and experts – spill response, wildlife and marine environment

APSEZL, being the nodal agency in this LOS-DCP, will function as the main agency. In the event of the emergency getting raised to higher tier, i.e. in case the incidence becomes a national disaster, the help and advice of Indian Coast Guard will be taken.

5.6 Training / safety schedules and drill / exercise programme

Training of all APSEZL staff who may get involved in implementing this plan is acknowledged. In house and external facilities (of ICG) are used periodically to impart training as per matrix below. Marine Manager has been appointed as training coordinator and custodian of oil pollution equipment. He shall organize training, drills and inspection of equipment as per the plan in force.

Training Module	Duration	Frequency	Participants	Remarks
IMO Model Course	2-5 days	Once	Key persons	By Maritime Training Institute
Oil Spill	1-5 days	Once every 5 years	Key persons	Coast Guard
Oil spill equipment	1-5 days	Once every Year	Managers	In house
Oil spillManagement course	1 day	Once every year	Managers & junior staff	In house for in-depth knowledge
Notification exercise	1-2 hours	6 months	Operational staff	Check systems & communication
Table top	2-6 hours	12 months	Managers	Interactive discussions
Incident	6-8 hours	12 months with others	All	Mock drill

Number of IMO Level-1 and IMO Level-2 qualified staff available with Adani Ports and SEZ Ltd, Mundra:
IMO Level-1 - 30
IMO Level-2 - 03

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6 Communications

6.1 Incident control room facilities
Detailed in Annexure 3

6.2 Field communication equipment
Detailed in Annexure 3

6.3 Reports, manuals, maps, charts and incident logs
A copy of the relevant manual is kept with HOD – Marine. Maps/ Charts of APSEZL are kept in Marine Control Tower and attached in Annexures

Action and operations

7 Initial procedures

7.1 Notification of oil spill to concerned authorities

The emergency (due to spill) should be initiated by the first person noticing it by activating the fire alarm from the nearest call-point or by contacting the fire control room immediately on the internal telephone or through mobile phone or through VHF Channel.

The SPM Pilot or On Scene Commander will report the spill to the Marine Control Room.

7.2 Preliminary estimate of response tier

The first few minutes after the incident / accident are invariably the most critical period in prevention of escalation. Therefore the person available at or near the incident site (and often responsible for carrying out that particular activity) on round the clock basis play a vital role in an emergency. The SPM Pilot or On Scene Commander will report the spill to the control room along with his estimate of the response tier.

7.3 Notifying key team members and authorities

Statutory First Information Report (FIR - given in annexure 1) is to be communicated by fastest means possible to President, GMB port and CG at Porbandar followed by full Pollution Report (POLREP – given in annexure 2). The report is to be updated, should the oil spill not be contained and likely to increase to Tier 2

7.4 Manning Control Room

Auxiliary control center is located at Port Operation Centre. Escalation of emergency if any is monitored here. Statutory reporting procedures of FIR and POLREP of developing situation and action taken are also sent from this center. The detail of the contacts to whom the information is to be given is placed at Annexure 4.

7.5 Collecting information (oil type, sea / wind forecasts, aerial surveillance, beach reports)

Marine Manager has the responsibility of arranging the collection of the relevant information which will help in mitigating the emergency

7.6 Estimating fate of slick (24, 48, 72 hours)

Considering the prevalent tidal stream, wind and weather conditions, section 8.3 is to be used in estimating the fate of the slick

7.7 Identifying resources immediately at risk, informing parties

Depending on the quantity of fluid spilled and the prevalent wind & weather conditions, the resources / facilities immediately at risk have to be identified by the On scene commander and the concerned parties informed.

8 Operations planning

8.1 Assembling full response team

On being appraised of the spill, the duty marine officer will inform the marine manager, who will, in turn initiate the assembly of the complete response team which essentially involves relaying information to all relevant personnel, parties and authorities and informing them of the initial response requirements.

8.2 Identifying immediate response priorities

Depending on the initial estimated response tier and the prevalent weather conditions, the marine manager, in consultation with the on scene SPM pilot / marine officer will identify the immediate resources at risk and the response priorities.

8.3 Mobilizing immediate response

The Manager - Marine will initiate the mobilization procedure of the spill equipment, resources and personnel depending on the scale of emergency at hand.

8.4 Media briefing

No other person is authorized to communicate with any external party by any means whatsoever unless expressly permitted by the HOD – Marine or COO, APSEZL.

8.5 Planning medium-term operations (24, 48 and 72 hour)

The HOD – Marine will plan the subsequent action to be taken in response to the tier 1 spill after the initial response is well under way and its consequences / effectiveness are duly evaluated.

8.6 Deciding to escalate response to higher tier

After carefully assessing the scenario and appraising the efficiency of the initial response in the prevalent conditions, the HOD – Marine will decide whether or not to escalate the response.

8.7 Mobilizing or placing on standby resources required

It is recommended that in case of a doubt (as the exact estimate of the quantity of oil spilled is quite difficult and the boundaries between the tiers will inevitably be blurred) it is important to be prepared to involve the next higher tier from the earliest moments. It is easier to stand down an alerted system than to try to escalate a response by calling up unprepared reserves at a late stage.

8.8 Establishing field command post communications

Communications between the Emergency Response Center/ Marine Control room and marine personnel during the response to any oil spillage will be primarily by VHF marine band radio on Channel 73 or 77

Communications between the Marine Control Room and other vessels will be established on VHF radio Channel 16 and will thereafter be conducted on Channel 73 / 77.

Use of cellular telephones will be minimized.

Communications between the Emergency Response Center/ Marine Control Room and external authorities and organizations will be undertaken by telephone and facsimile.

9 Control of operations

9.1 Establishing a Management team with experts and advisors

Detailed in Annexure **4**

9.2 Updating information (sea, wind, weather forecasts, aerial surveillance, beach reports)

The Marine Control Room is well equipped in assimilating data on weather and its forecasts. In case of a Tier 1 response, aerial surveillance and beach reports are not deemed to be essential

9.3 Reviewing and planning operations

Ongoing response and its influence in mitigating the situation will have to be constantly under review in order to contain the spill at the earliest.

9.4 Obtaining additional equipment, supplies, manpower

While deciding not to elevate the tier of the response the HOD- marine may still request additional resources from nearby port facilities which are essentially members of the common forum and are obliged to assist.

9.5 Preparing daily incident log and management reports

A complete report will be submitted by the Marine Manager to the HOD (Marine) every morning (in case the response extends to more than 1 day).
Format for the above report in Annexure 9

9.6 Preparing operations accounting and financial reports

The Port's accounting department will assess the expenditure incurred in the ongoing operation and submit a report to the President's office.

9.7 Preparing releases for public and press conferences

The COO's office, HOD – Marine and the Corporate communications cell will formulate the requisite press releases from time to time and hold press conferences.

9.8 Briefing local and government officials

The COO's office, HOD – Marine and the Corporate communications cell will formulate the requisite reports to brief local and government officials..

10 Termination of operations

10.1 Deciding final and optimal levels of beach clean-up

If at all a distant beach is affected, the COO APSEZL office will decide the optimal levels of cleanup in consultation with the conservator of the port – Gujarat Maritime Board Port Officer.

10.2 Standing down equipment, cleaning, maintaining, replacing

Considering the natural disintegration of the residual oil on water after the cleanup of the bulk amount, The HOD – Marine will decide when to stand down the response. The resources which have been used will have to be re-instated to the original condition by elaborate cleanup or replacement.

10.3 Preparing formal detailed report

The COO's office, HOD – Marine and the Corporate communications cell will formulate the requisite reports to brief local and government officials and media.

10.4 Reviewing plans and procedures from lessons learnt

A complete spill response report will be produced by the Marine manager providing comprehensive and all-inclusive details of the circumstances leading to the spill, initial response and consequent affect of the same, subsequent follow up, effect of prevailing weather, adverse situations, safety issues, difficulties faced and lessons learnt.
Requisite changes will be affected to this plan on basis of such report.

Such a report will also be prepared by the marine manager after each drill or training session and requisite modification(s) incorporated to the plan in order to enhance the overall efficacy of the same.

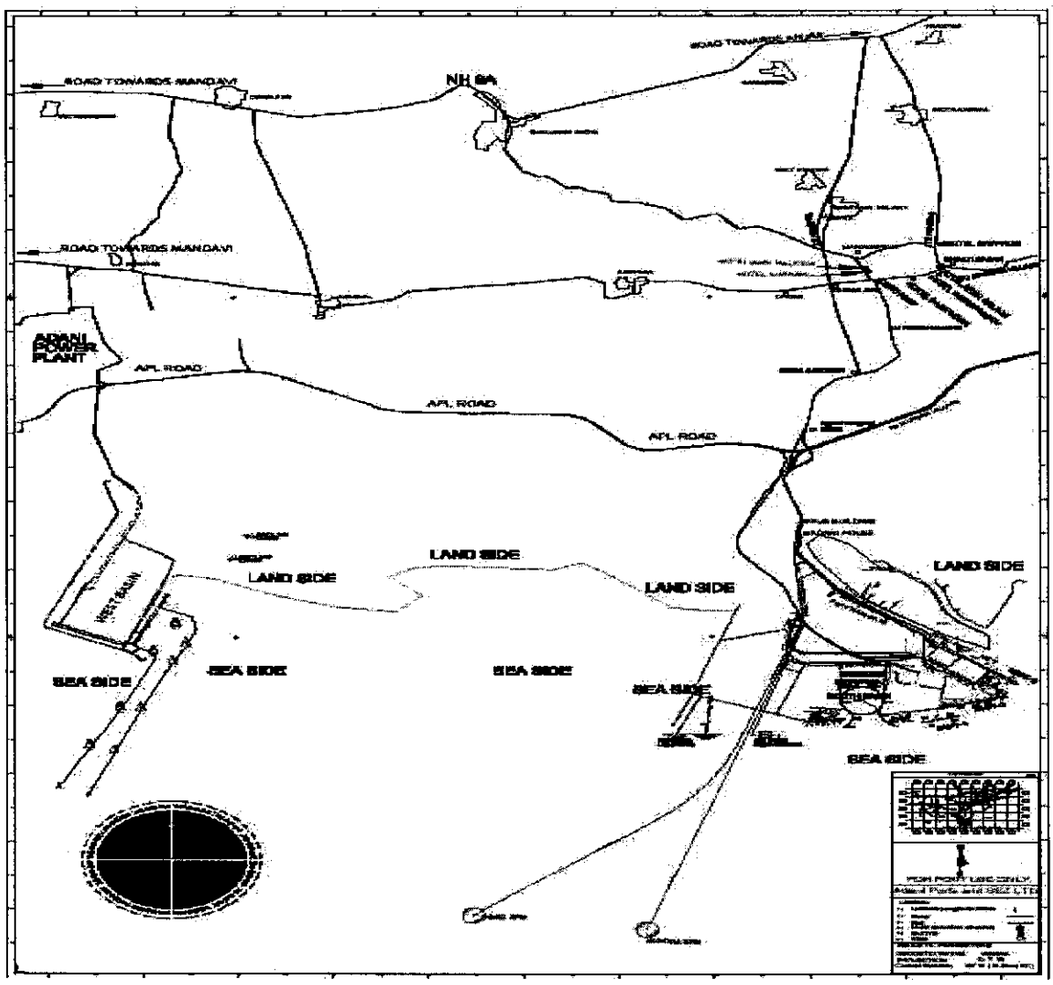
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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Data Directory

Maps / Charts

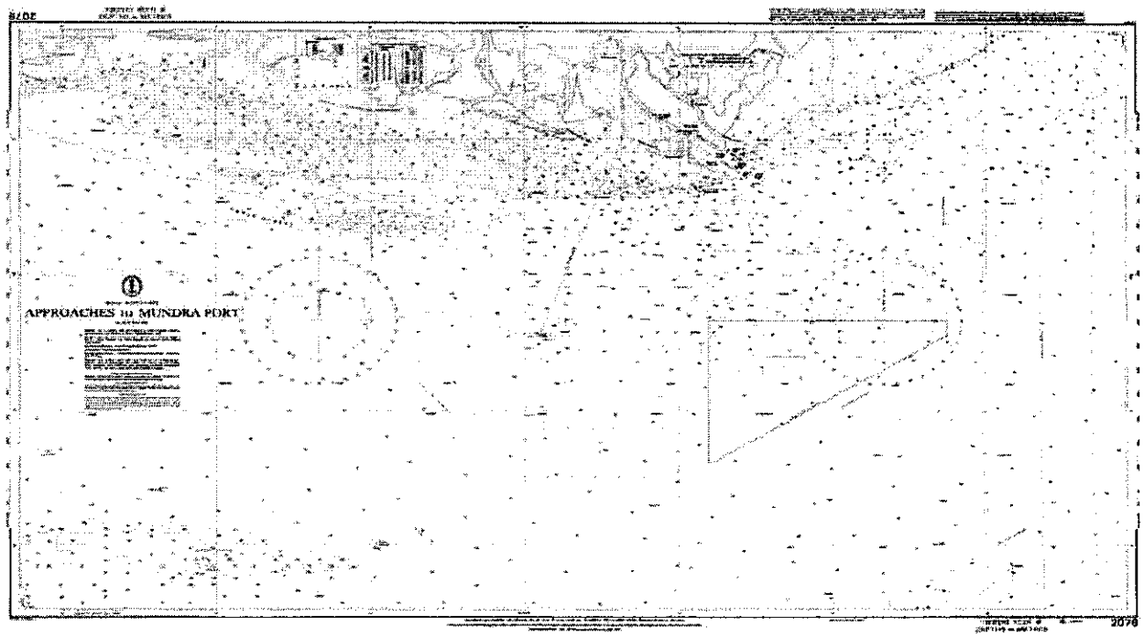
1. Coastal facilities, access roads, hotels etc.

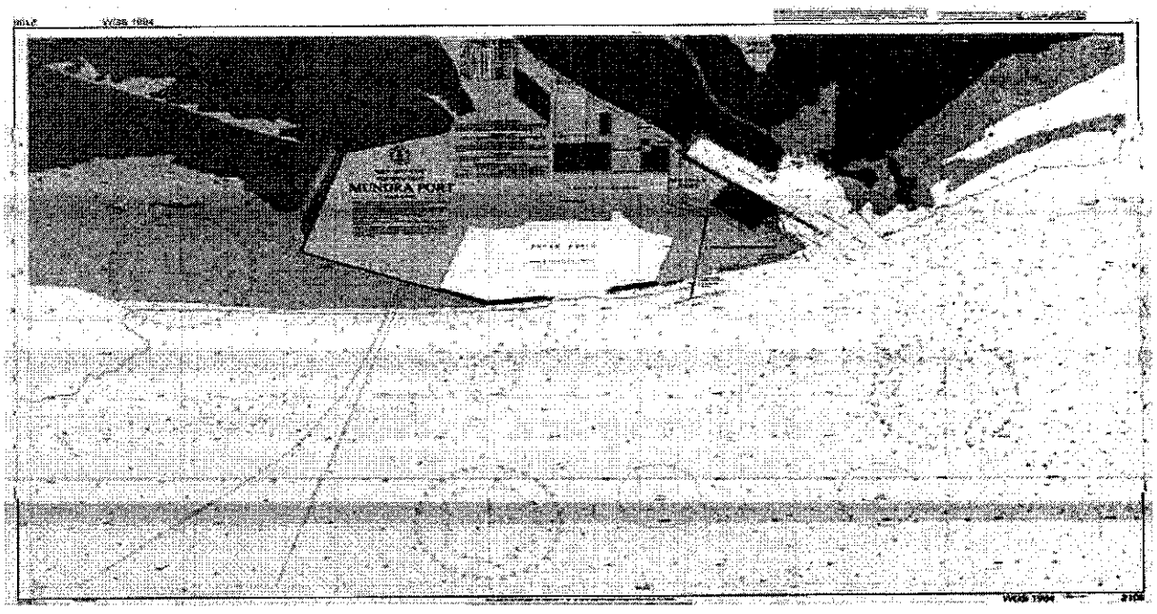


Telephones: Detailed in Annexure **4**

2. Coastal charts, currents, tidal information (ranges and streams), prevailing winds

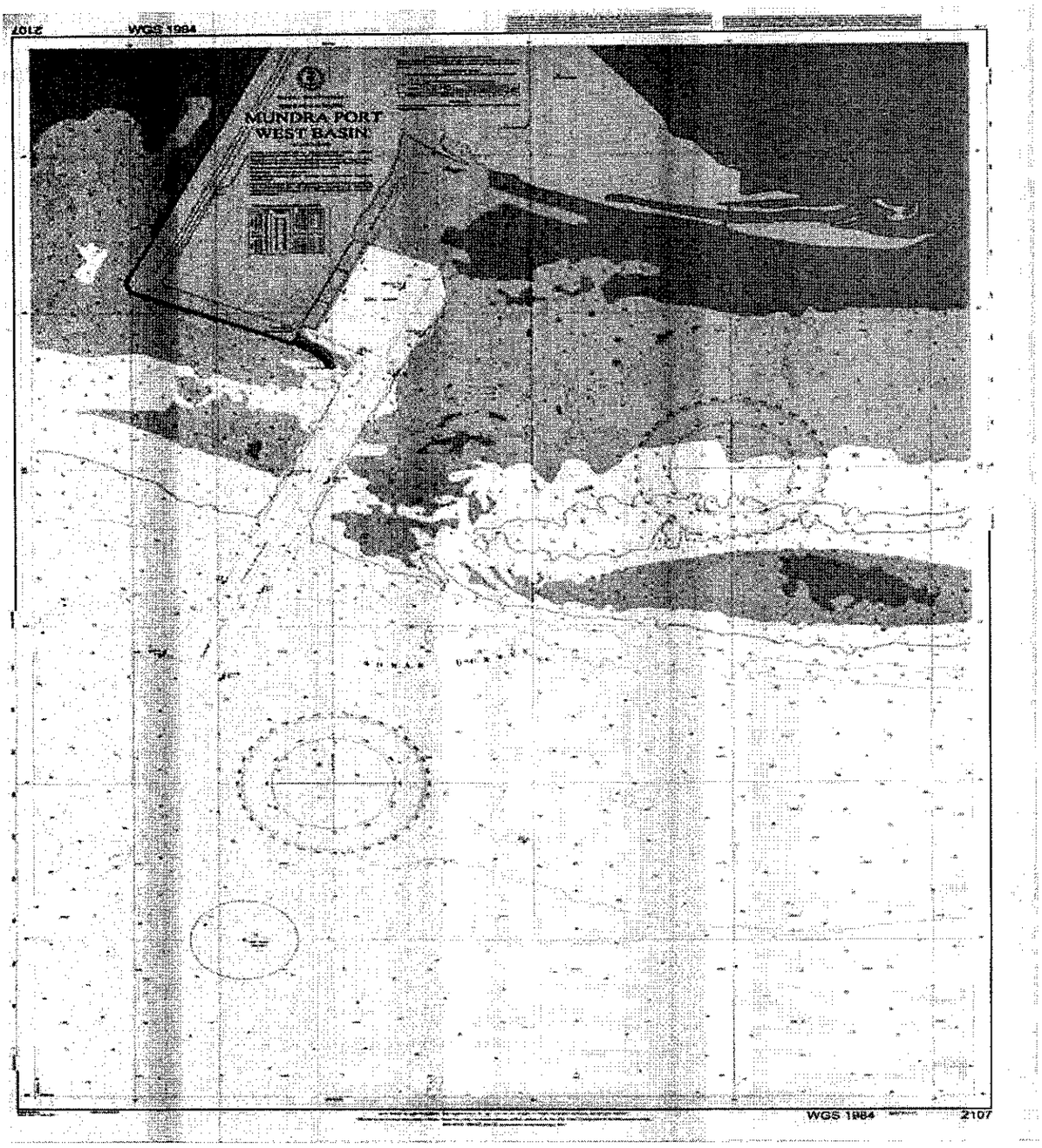
Currents, tidal information (ranges and streams) : Detailed in Annexure- II, Annexure- III and Annexure- IV (Volume 2) of Oil Spill Risk Assessment





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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN



3. Risk locations and probable fate of oil

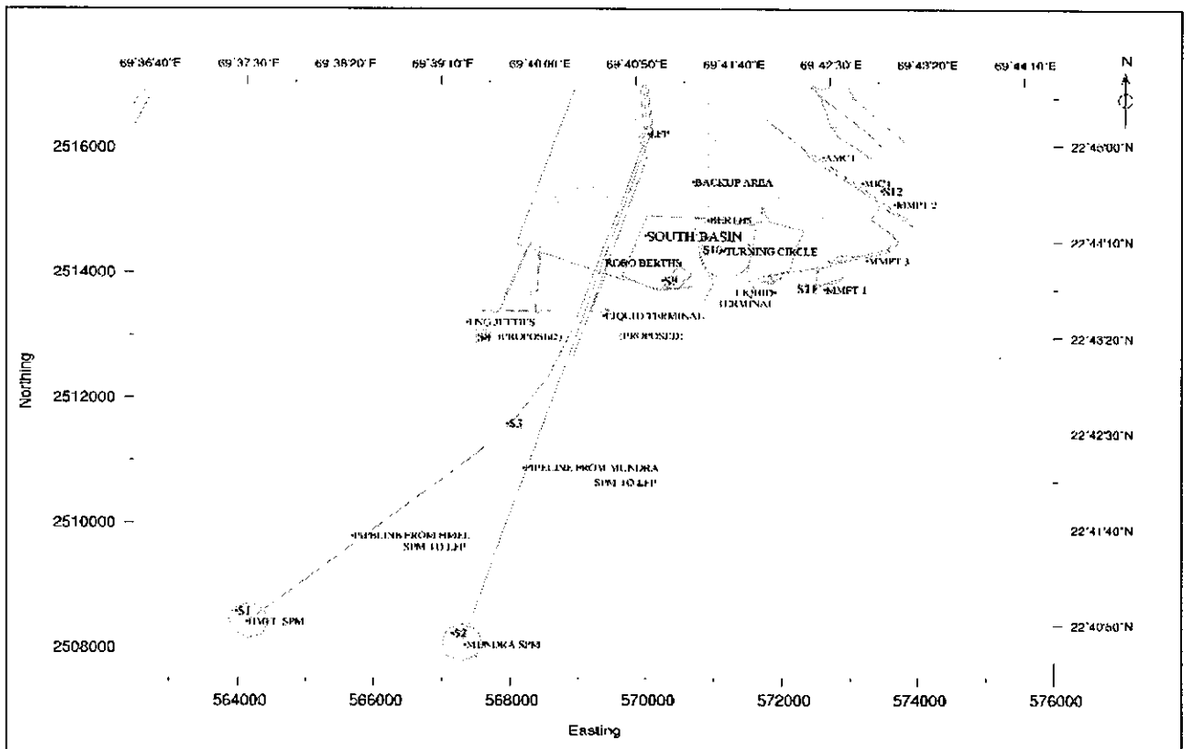


Fig.1: General layout of the Mundra port facilities of APSEZL showing the location of Spill Points for SPMs, South Basin berths, LNG jetty and existing berths

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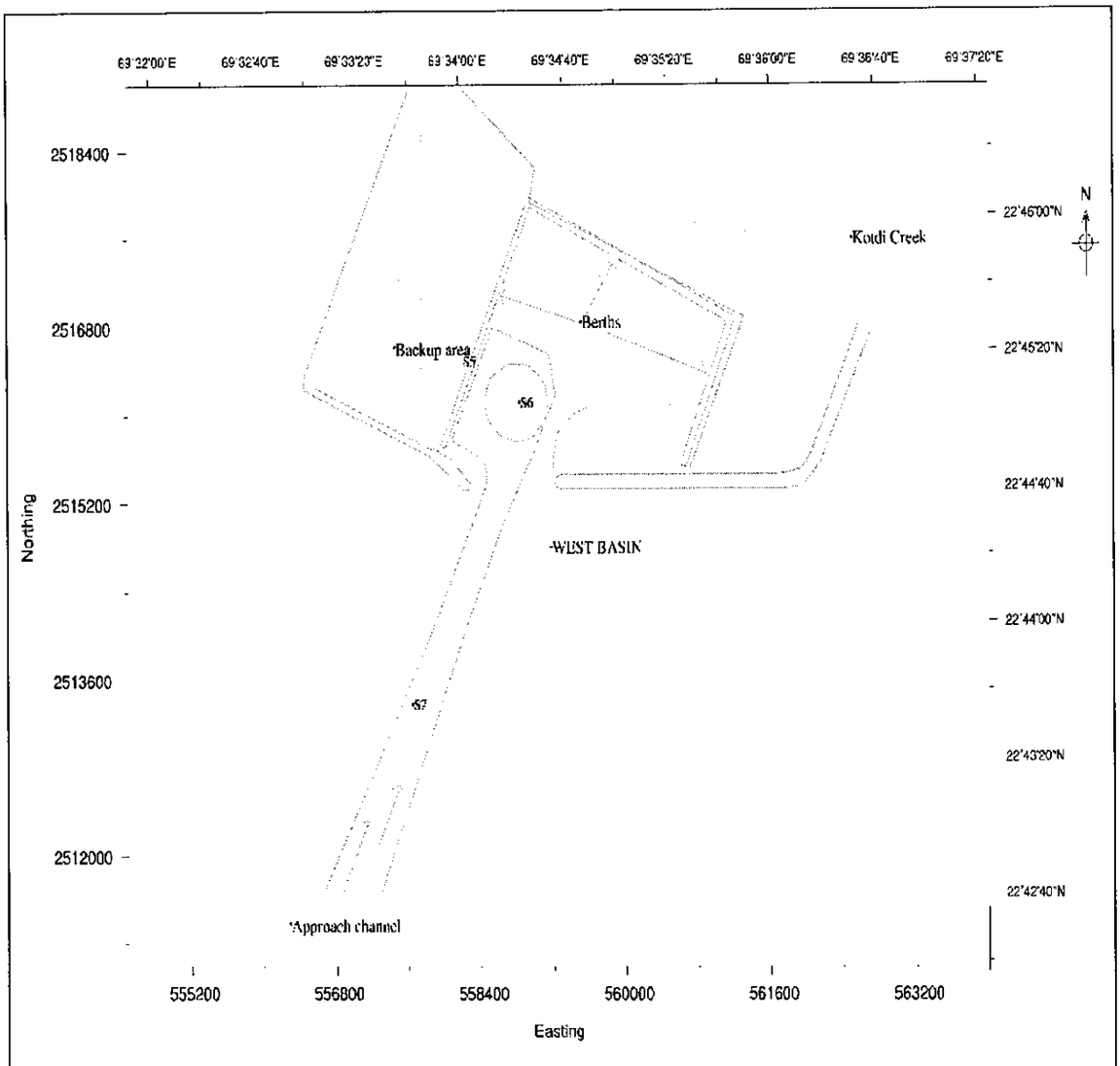


Fig.2: Zoomed up portion of Mundra port facilities of APSEZL showing the location of Spill Points for West Basin

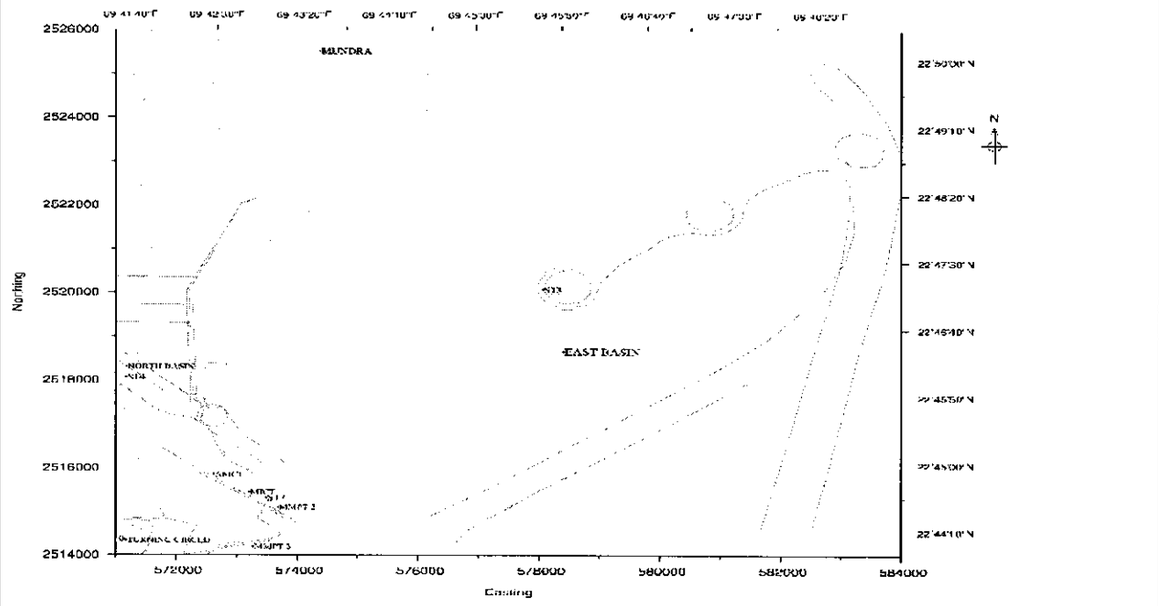
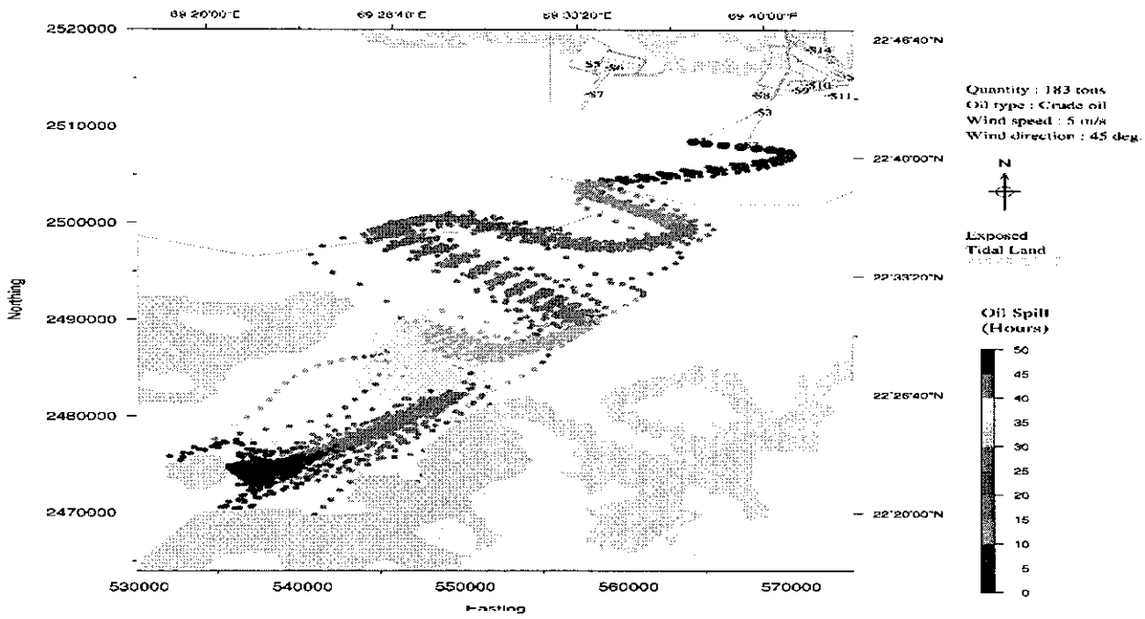
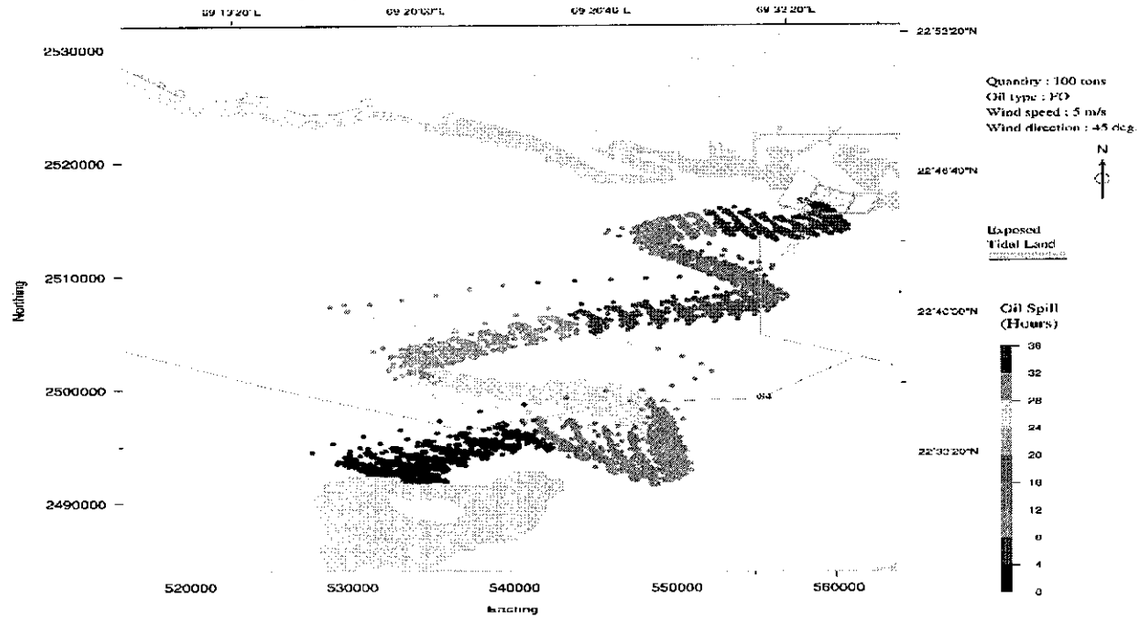


Fig.3: Zoomed up portion of Mundra port facilities of APSEZL showing the location of Spill Points for North Basin & East Basin



Oil Spill trajectory due to instantaneous crude oil leakage of 700 t (due to collision) at spill point S1 (HMEL SPM) after 50 hours during flood condition of the neap tide

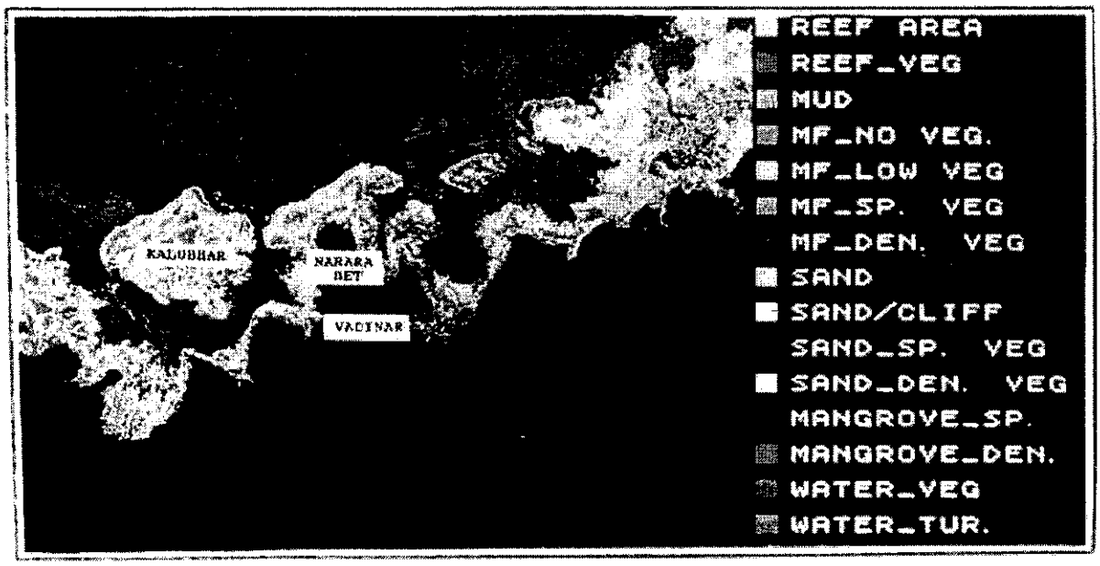
3011



Oil Spill trajectory due to instantaneous FO leakage of 700 t (due to hull failure/ fire / explosion) at typical berth location in the West Basin

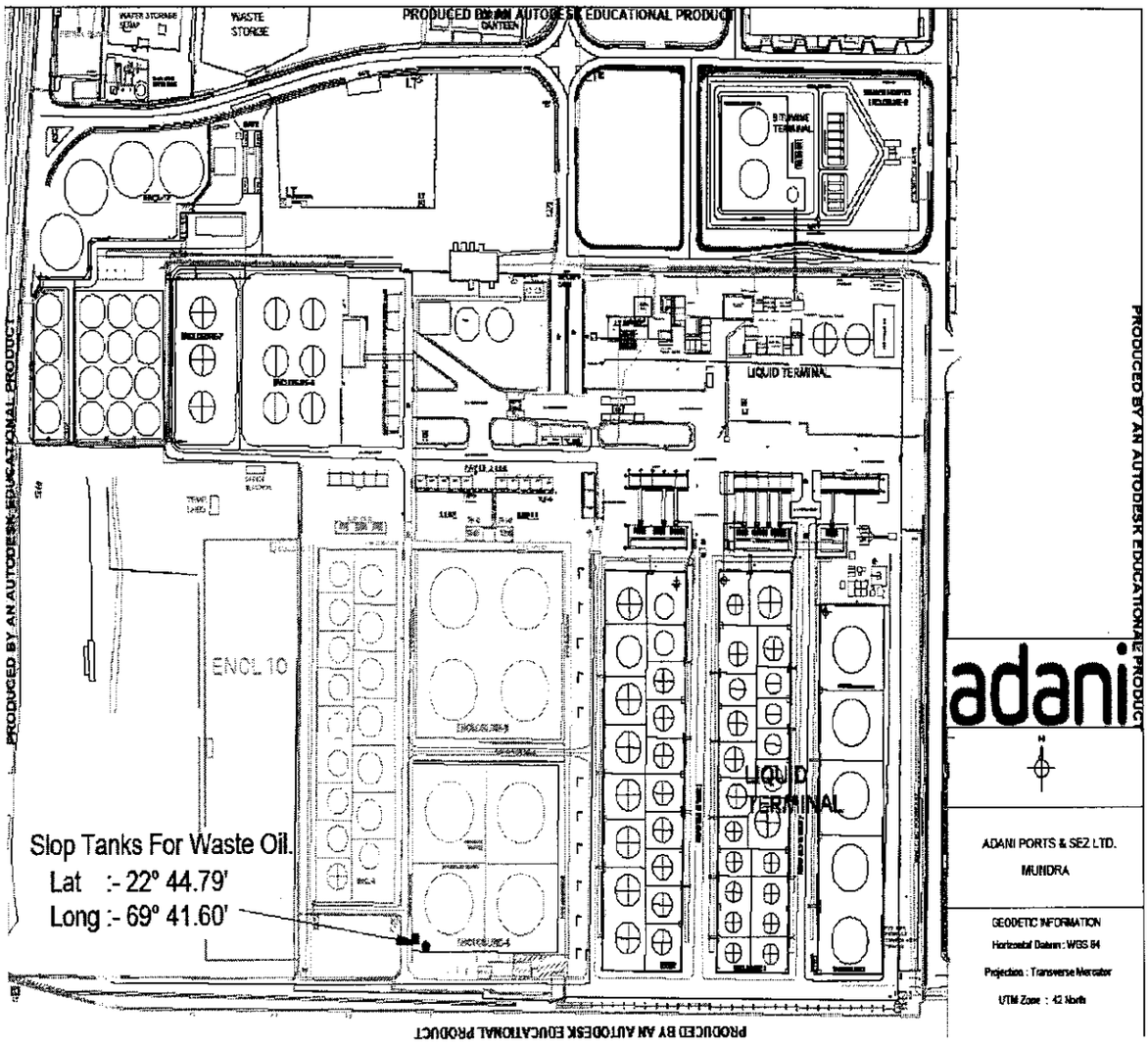
For Risk locations and probable fate of oil refer Annexure- V (Volume 2) of Oil Spill Risk Assessment.

Shoreline resources for priority protection



Oil and Waste Storage / Disposal sites

Oil and Waste storage / Disposal tank No. 46, 109 and 110 are available within Liquid Tank farm.



3013

Sensitivity Maps/ Atlas

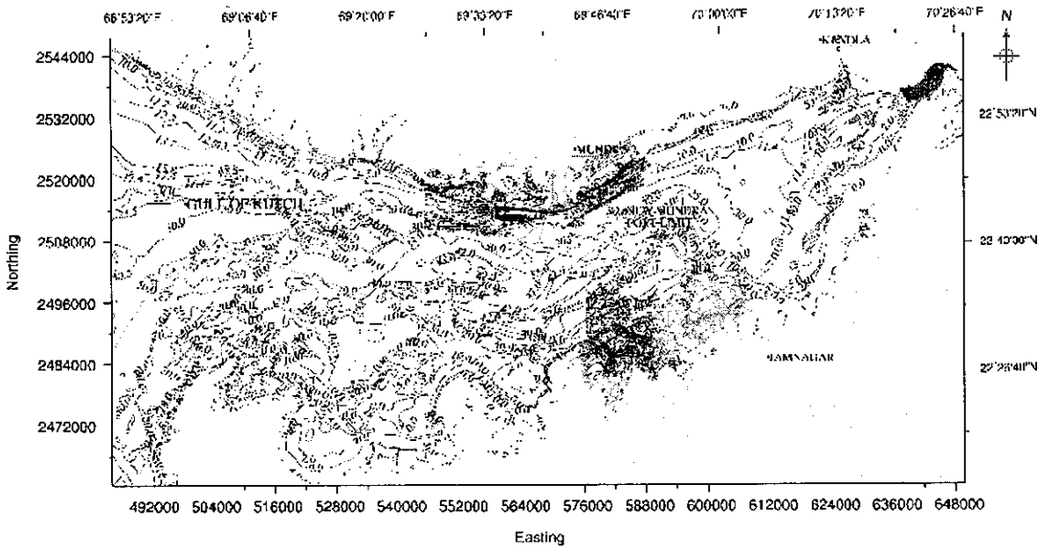


Fig.A1.1 Terrain features of study domain.

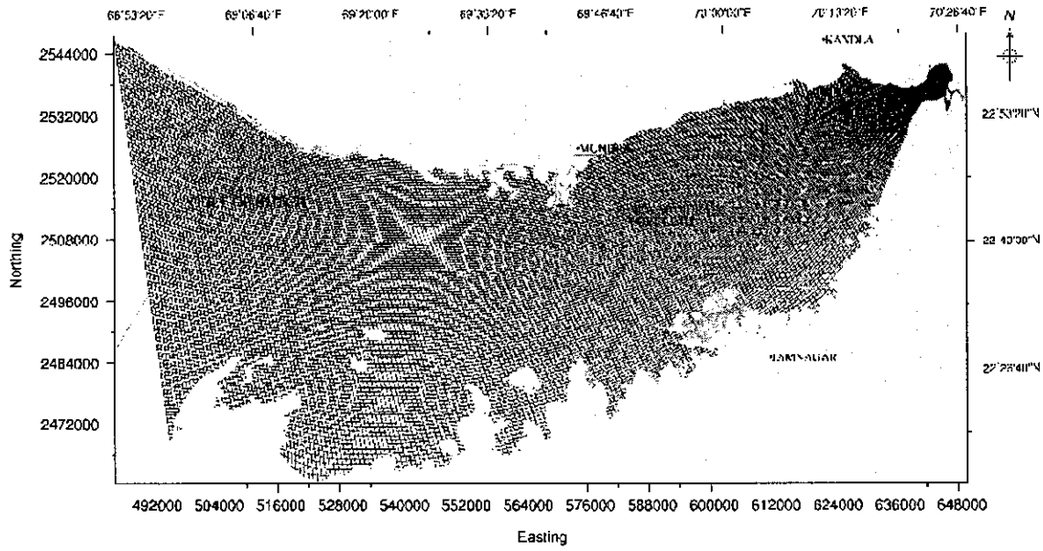


Fig.A1.2 Computational grid

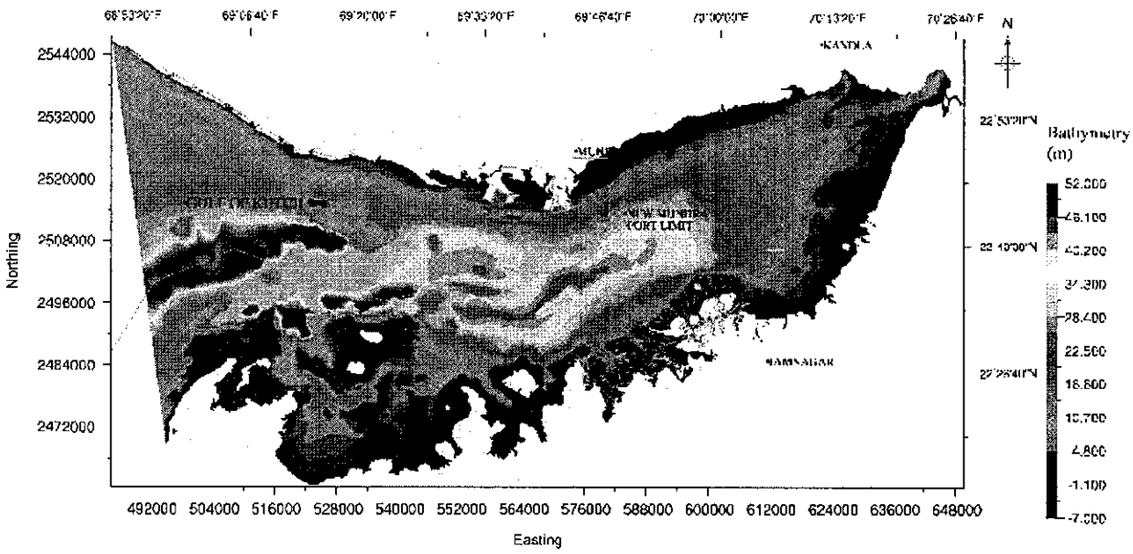


Fig.A1.3 Interpolated depth contours

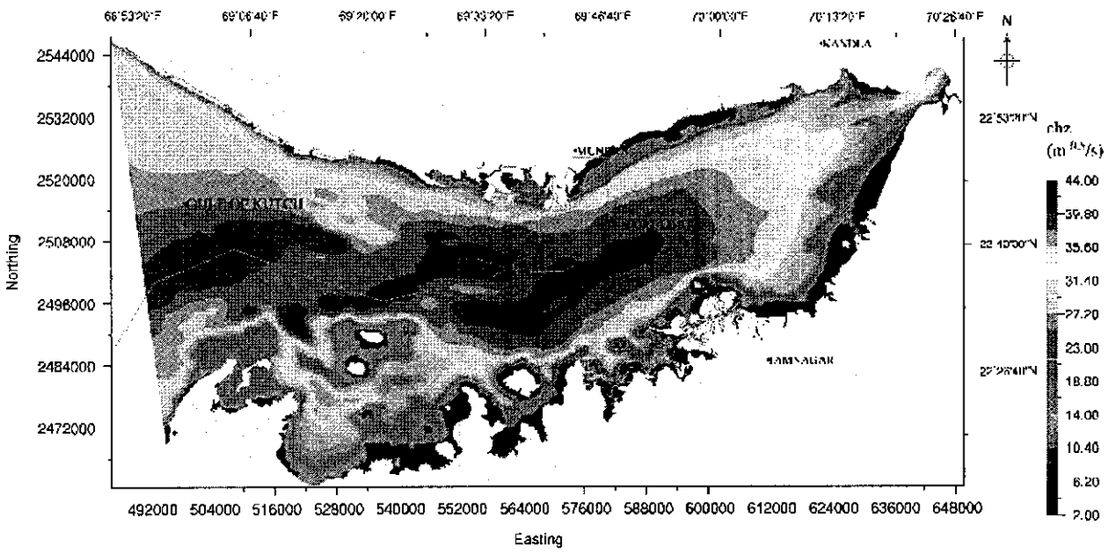


Fig.A1.4 Chezy's coefficient

3015

Table-3.1: Properties of Crude Oil, FO and Diesel

Sl. No	Chemical	Boiling Range (° C)	Specific Heat of Liquid (J/Kg ° K)	Heat of Evaporation (x 10^5 J/Kg)	Heat of Combustion (x 10^5 J/Kg)
1	Crude Oil	IBP - 700+	2385	3.4	425
2	HSD	200 - 350	2889	4.65	448
3	Fuel Oil	180 - 450	2500	3.4	452

The following characteristics of oil are used for modelling study:

(a) Crude Oil
Sp. Gr = 0.82 to 0.88
Surface Tension =3.0 e-03
Molar Volume =0.002
Viscosity: 275 CST at 37.8 deg C
Wax content: 12 – 19 %
Pour point of untreated crude: 30 deg C
Pour point of treated crude: 18 deg C

(b) FO
Sp. Gr = 0.92
Boiling point = > 260^0 C
Vapor pressure = < 0.1 psia at 21^0 C

(c) HSD
Sp. Gr = 0.86
Pour point = 6^0 C - 18^0 C
Vapor pressure = 2.12 to 26 mm Hg at 21^0 C

2. Wind and weather

Meteorological and Oceanographic Conditions

The met-ocean conditions have been previously ascertained at several stages in the course of various studies conducted in past in respect of Mundra port projects. Flow modeling for the Mundra port location has been covered in the model developed by Environ, India, who have developed the model for whole of Gulf as relevant to Mundra region. It has been observed during model studies that flow regime does not have significant changes due to the proposed developments. The following are the main hydo-meteorological parameters for planning and designing of the marine facilities described below.

Rainfall and Temperature

The Kutch is a semi-arid region with weak and erratic rainfall confined largely to June-October period. With a few rainfall days, the climate is hot and humid from April till October and pleasant during brief winter from December to February. Although the monthly mean maximum temperature recorded is 37°C during 2005, it occasionally exceeds 40°C. Rainfall alone forms the ultimate source of freshwater resource to the region. The average rainfall at Mundra is about 400 mm/year.

Lists

1. **Primary Oil spill Equipment:** booms, skimmers, spray equipment, dispersant, absorbents, oil storage, Radio communications etc.

   Detailed in Annexure **3**

2. **Auxiliary Equipment:** Tugs and work boats, aircraft, vacuum trucks, tanks and barges, loaders and graders, plastic bags, tools, protective clothing, communication equipment etc.

   Detailed in Annexure **3**

3. **Support Equipment:** Aircraft, communications, catering, housing, transport, field sanitation and shelter etc. (Availability, contact, cost and conditions)

   Not applicable

4. **Sources of Manpower:** Contractors, local authorities, caterers, security firms (Availability, numbers, skills, contact, cost and conditions)

   Refer Para 5.3

5. **Experts and Advisors:** Environment, safety, auditing (Availability, contact, cost and conditions)

   Detailed in Annexure **4**

6. **Local and National Government contacts:** Name, rank and responsibility, address, telephone, fax, telex.

   Detailed in Annexure **4**

Data

1. **Specification of Oils commonly traded**

At the liquid berth, the representative products that would be handled are petroleum products like FO/ HSD / SKO / MS / CBFS / CPO / Naphtha etc. Vessels calling at the port will be having FO and HSD for their propulsion requirements.. The products like MS, Naphtha etc are oils of non – persistent nature; they tend to evaporate fast and will not stay long on the surface of the sea waters. Hence spill studies have been carried out for FO and HSD spills at the berths.

At the SPMs, Crude oil unloading takes place.

Physical and Chemical Properties of products handled at the SPMs, Berths and of the propulsion fuels of the ships / tankers

Data on the properties for the hydrocarbons / products handled at the jetty is required for quantitative hazard identification and consequence calculations. The properties of the FO and HSD, the petroleum hydrocarbons likely to be spilled due to the operations at the jetty are given in Table-3.1.

Cyclones

Cyclonic disturbances strike North-Gujarat, particularly the Kachchh and Saurashtra regions, periodically. These disturbances generally originate over the Arabian Sea and sometimes the Bay of Bengal. Generally during June, the storms are confined to the area North of 15°N and East of 65°E. In August, the initial stages, they move along the northwest course and show a large latitudinal scatter. West of 80°E, the tracks tend to curve towards North. During October the direction of movement of a storm is to the West in the Arabian Sea. However, East of 70E some of the storms move North-Northwest and later recurves North East to strike Gujarat-North Mekran coast.

Wind

There are strong winds at times at Mundra Port. The month wise wind rose diagrams for the year 2012 and for the months of January and February of the year 2013 are given below. In the period lasting over months March to May the wind direction is generally SWW (225° - 250°) and velocity varies from 20 to 25 Knots. From June through August, the wind direction is predominantly SW and velocity varies from 25 to 30 Knots with short gusts going up to 35 to 40 Knots. Towards end of September and through October wind direction changes to NE with velocities ranging from 7 to 10 Knots. Direction remaining same the velocity varies 10 knots to 25 Knots in the period November to January. February is the calm period when wind direction is Southerly with velocity in the range of 7 Knots. Stormy weather may generate winds having velocity up to 100 Knots which should be taken as the worst case scenario for design of tall structures and heavy duty cranes.

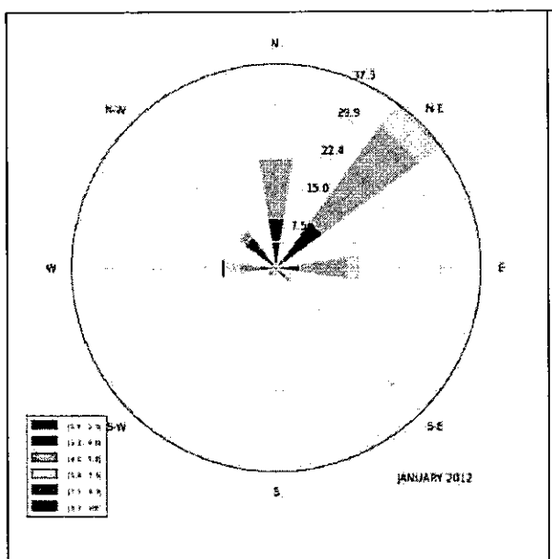


Fig.1.5 January 2012 winds

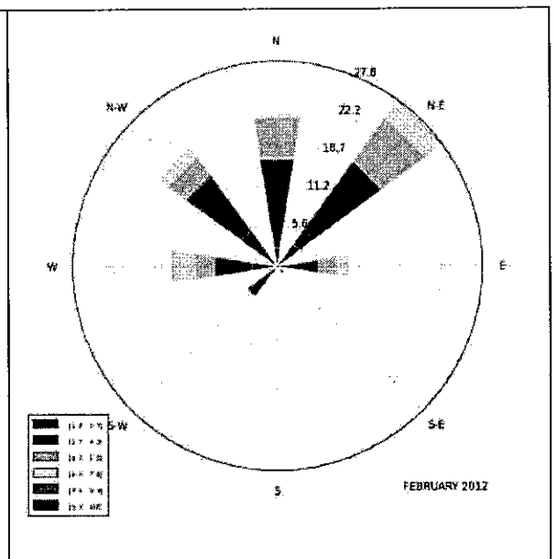


Fig.1.6 February 2012 winds

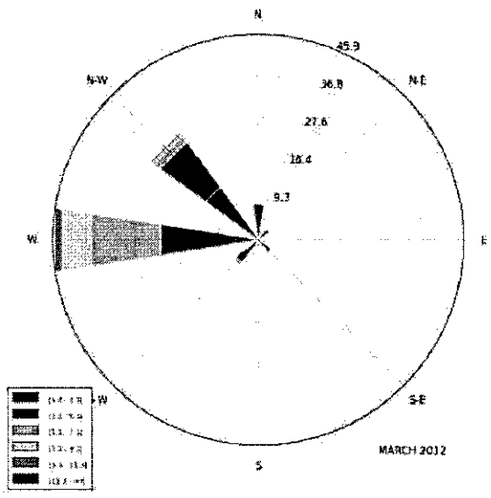


Fig.1.7 March 2012 winds

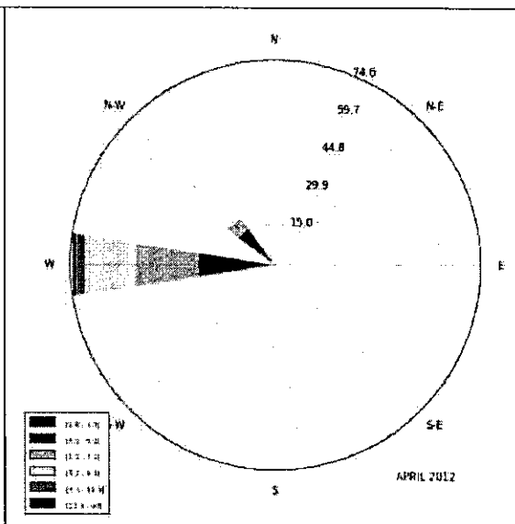


Fig.1.8 April 2012 winds

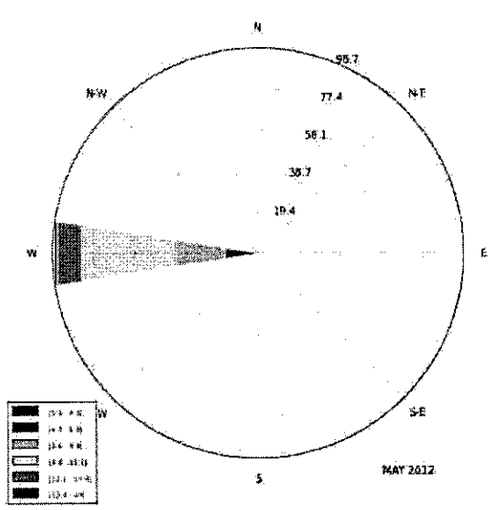


Fig.1.9 May 2012 winds

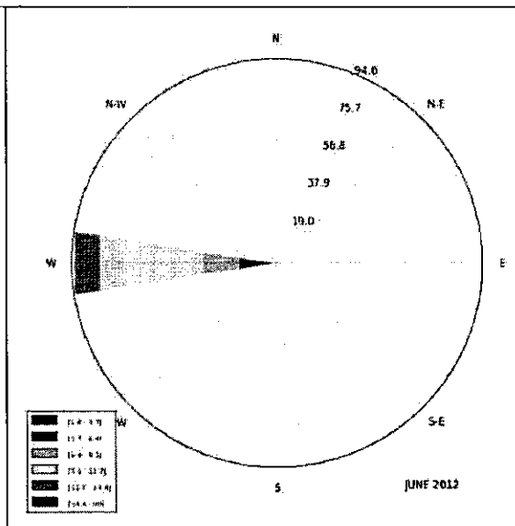


Fig.1.10 June 2012 winds

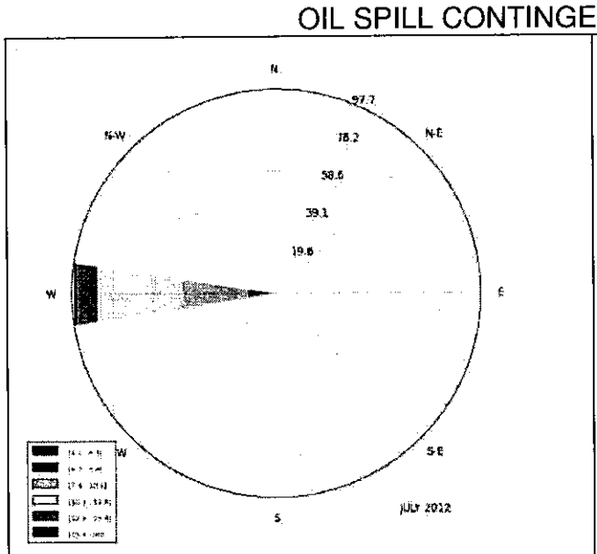


Fig.1.11 July 2012 winds

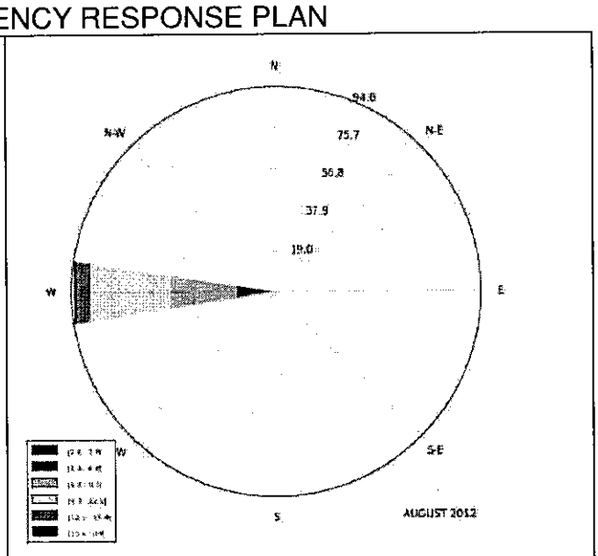


Fig.1.12 August 2012 winds

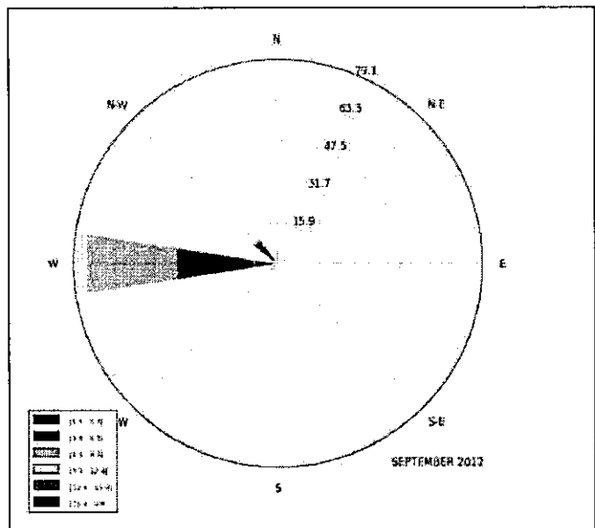


Fig.1.13 September 2012 winds

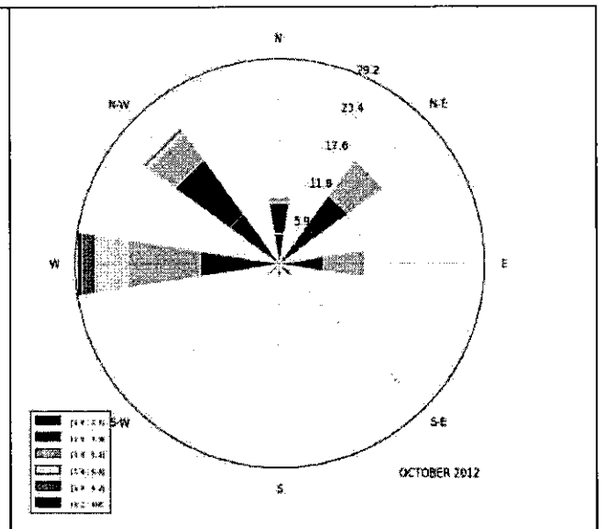


Fig.1.14 October 2012 winds

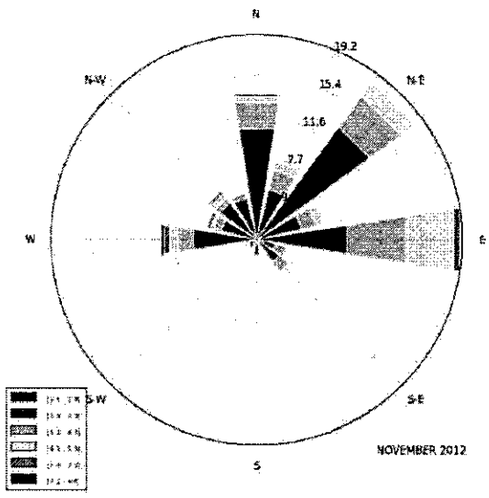


Fig.1.15 November 2012 winds

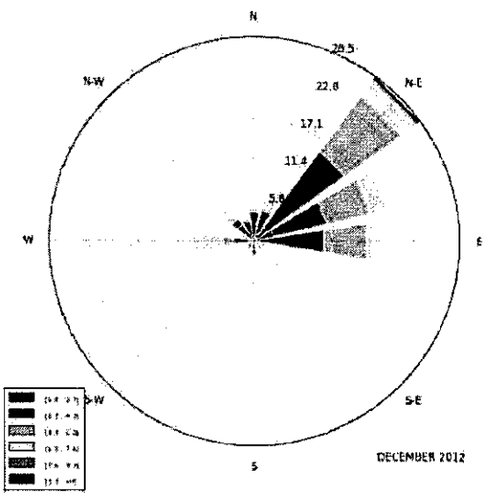


Fig.1.16 December 2012 winds

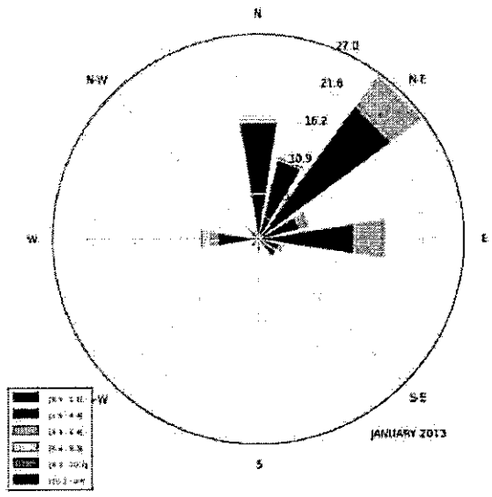


Fig.1.17 January 2013 winds

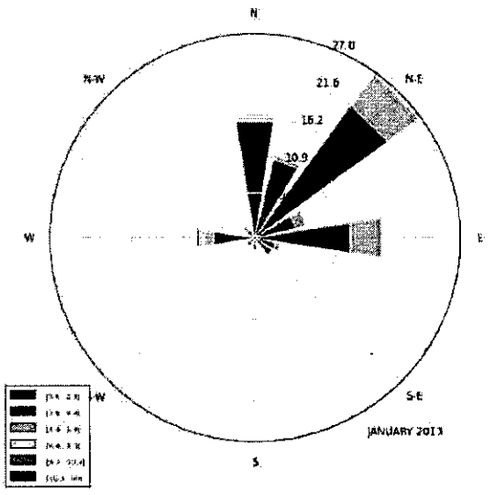


Fig.1.18 February 2013 winds
(Readings till Feb 18,2013)

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Tides

The tidal planes were assessed in 1998 and are as shown in Table below.
The Highest Astronomical Tide (HAT) is estimated to be about +6.4 m above chart datum (CD), and the Lowest Astronomical Tide (LAT) to be at 0.0 m CD.

Tide	Height (m) above CD
Mean High Water Springs	5.8
Mean High Water Neaps	4.6
Mean Low Water Neaps	2.1
Mean Low Water Springs	1.0

Currents

Currents in the approaches to the port are dominated by the tidal flows, with predictable variations over diurnal, monthly and annual time scales. Currents in this part of the Gulf flow parallel to the natural sea-bed contours. Currents can be relatively strong, with speeds in excess of 3.0 Knots reported at sometimes of the year. The Admiralty Chart shows currents off Navinal point to be 3.0 Knots East & West bound. It is observed that the currents are usually aligned with the bed contours and are stronger in deeper waters off the coast. The impact of future development over the existing coast-line can be determined by the change in current speed resulting from the proposed developments.

Waves

In past HR Wallingford (HRW) has studied the wave climate considering wave energy from locally generated waves and swell propagating in to the Gulf of Kutch from the Arabian Sea. The results of the study carried out by HRW are presented in the Table below.

Design Waves at Mundra

Direction Sector (°N)	Return Period (years)	Inshore Direction (°N)	Hs (m)	T2 (sec)
210	1	222	1.2	5.0
	5	222	1.4	5.3
	20	221	1.6	5.8
	100	221	1.8	6.1
240	1	226	1.5	5.4
	5	226	1.7	5.8
	20	225	1.8	6.1
	100	225	2.0	6.5
270	1	239	1.4	5.5
	5	236	1.7	6.3
	20	236	1.8	6.7
	100	235	2.0	7.4
300	1	240	0.8	5.2
	5	240	0.9	5.6
	20	239	1.0	6.2
	100	238	1.2	6.7

Atmospheric stability is an important factor for predicting the dispersion characteristics of gases/vapours into the surrounding environment. Change in atmospheric stability is a direct consequence of the vertical

temperature structure. The stability effects are mathematically represented through Pasqual parameters. The following stability classification is employed:

Stability Class	Atmospheric Condition
A	Very Unstable
B	Unstable
C	Slightly Unstable
D	Neutral
E	Stable
F	Very Stable

Condition of atmospheric stability is estimated by a suitable method that uses dispersion parameters viz., vertical temperature gradient, profile of the winds and roughness factor. The roughness factor for the Mundra area is small since it mainly comprises of plain land.

The following meteorological information has been taken in the calculations for the Mundra area (GMB-2010):

Average ambient temperature : 30°C
Average wind speed : Wind data for the whole year 2012 is available and is used
Stability condition : F (Very Stable)

3 Information sources

This plan is prepared in accordance with:

a) Marine Environmental Impact Assessment of SPMs, COTs and connecting pipelines of APSEZL at Mundra dated February 2001, prepared by National Institute of Oceanography, Mumbai.
b) Report on Risk assessment study and On-site disaster management Plan for SPMs, COTs and connecting Pipelines of Adani Ports and Special Economic Zone Limited, by TATA AIG Risk Management Services Limited, dated February 2001.
c) HAZOP study report of SPM Terminal pipeline project by Intec Engineering, dated 26/02/2004.
d) IPIECA guide to Contingency planning for oil spills on water.
e) Oil spill risk assessment and contingency plan study done by M/s Environ Software Pvt. Ltd. (Copy enclosed)

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ANNEXURES

INITIAL OIL SPILL REPORT		**ANNEXURE 1**
Particulars of person, office reporting		
Tel No.		
Date & time of incident		
Spill location		
Likely cause of spill		Witness
Initial response action		By
Any other information		

This FIR is to be sent to Marine Manager by fastest means of communication possible. It is an offence not to report oil pollution incident.

This FIR is to be followed by company's incident report also.

Following POLREP report to the Government through nearest CG information will also be required:

Identity of informant	
Time of FIR	
Source of spill	
Cause of spill	
Type of spill	
Colour code information (from CG)	
Radius of slick	
Tail	
Volume	
Quantity	
Weather	
Tide / current	
Density	
Layer thickness	
Air / Sea temp.	
Predicted slick movement	
Size of spill classification (Tier 1, 2 or 3)	

POLREP **ANNEXURE 2**

In case of an oil spill, APSEZ will provide information to Commandant Coast Guard District 1 Porbandar COMDIS 1 and Coast Guard Station Mundra in the following format:

SN.	Parameter	Data
1.	Identity of the informant	
2.	Time of information receipt	
3.	Source of Spill	
4.	Cause of Spill	
5.	Type of oil	
6.	Colour code information	
7.	Configuration	
8.	Radius	
9.	Tail	
10.	Volume	
11.	Quantity	
12.	Weathered or Fresh	
13.	Density	
14.	Viscosity	
15.	Wind	
16.	Wave Height	
17.	Current	
18.	Layer Thickness	
19.	Ambient air temperature	
20.	Ambient sea temperature	
21.	Predicted slick movement	
22.	Confirm Classification of spill size	

Additional Information :

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

LIST OF RESOURCES AVAILABLE **ANNEXURE 3**

Tugs Available for Oil Spill Containment

Name of Tug	Type	BHP	OSD	AFFF	Capacity (cubm/Hr)	BP
Dolphin No. 3	ASD	2200 X 2	3000 ltr	2000 ltr	1200	55
Dolphin No. 4	ASD	2200 X 2	3000 ltr	2000 ltr	1200	55
Dolphin No. 7	ASD	2200 X 2	3000 ltr	2000 ltr	1200	55
Dolphin No. 10	ASD	3000 X 2	3000 ltr	-	-	70
Dolphin No. 11	ASD (DSV)	2200 X 2	3000 ltr	2000 ltr	1200	55
Dolphin No. 14	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Dolphin No. 15	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Dolphin No. 16	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Dolphin No. 17	ASD	3000 X 2	3000 ltr	-	-	70
Dolphin No. 18	ASD	3000 X 2	3000 ltr	2000 ltr	1200	70
Khushboo	Fixed screw	401 X 2	-	-	-	10

Dolphin No. 3, 4, 7, 10, 11, 14, 15, 16, 17 & 18 are fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required. Dolphin No.3, 4, 7, 11, 14, 15, 16, 17 & 18 are fitted with a fire curtain and remote controlled fire monitors.

All above eleven Tugs have class notation as Harbour Tugs and are certified to work within the Harbour limits only.
Reception Facility : 12" pipe line, connected to a slop tank at chemical tank farm.

Dolphin 11 has fire fighting system of 1200 m3/hr along with 20 ton lifting "A" frame and diving support facility.

Location of Oil Spill Equipment: The Oil Spill Equipments are stored in SPM Store.

Resources / Equipment Available with APSEZL, Mundra

Item	Quantity
Canadyne Fence Boom (Reel model 7296/8496 with Power Pack, Towing bridles and Tow lines - 235 meter	1 no
Power pack with boom reel with hydraulic hoses	2 nos.
Power pack - 20 KV with boom reel with hydraulic hoses	2 nos.
Lamor Side Collector system (Recovery Capacity 123 m³/ hr) (Side collector LSC-3C/2300(01C02-P536). Oil transfer pump OT A 50 with oil transfer hose set	2 nos. 2 sets
Lamor Minimax 12 m³ skimmer	2 sets
Power pack for skimmers with hydraulic hoses	4 nos.
Power pack - 20 KV for skimmers with hydraulic hoses	1 no.
Floating tank (25 m³)	1 nos.
Foot pumps for floating tank	6 nos
Oil Spill Dispersants	5000 ltr
Portable dispersant storage tank: 1000 ltr capacity	1 no.
Portable pumps	2 nos.
Two – way hydraulic maneuvering panel	2 nos
Oil Containment Boom-Length 2000 metres, Height -1500 mm, Draft-900mm, Free Board-600mm	2000 mtr
Current Buster Boom-Fasflo -75 (for response in fast current)	2 Nos
Skimmer-KOMARA 15 Duplex Skimmer System with floating IMP 6 Pump.	4 Nos
12.5T Flexible Floating Storage Tank (PUA).	3 Nos
Diesel Driven Transfer Pump for Flex Barge	2 Nos
Site Hose Kit for the transfer Pump for the Flex Barge	2 Nos
3" & 2"Hose Adaptor for Transfer Pump and Hose	2 Nos
Shoreline Cleanup Equipment	
Mini Vac System	5 Nos
OSD Applicator- Oil Dispersant Spry Unit(20 Ltr) for use on Beach and Inter Tidal Zones	2 Nos
Startank with Capacity 10000 liter($10m^3$)	2 Nos
Sorbent Boom Pack(12.5cm x4 M)	500 mtr
Sorbent pad	2000 Nos

Facilities in the Marine Control room:

1. Tidal stream gauge: This can accurately read the prevalent rate of flow and direction of current.
2. Tide gauge: For accurately calculating the height of tide at any given time.
3. Wind gauge: For direction and speed of wind.
4. VHF sets (fixed and portable) with complete range of marine frequencies to be used for field operations.

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

LIST OF TELEPHONE NUMBERS OF EXPERT ADVISORS **ANNEXURE 4**

List of Important Telephone Numbers of Govt. Officials and other neighboring Organisations (Expert and Advisors) related to Spill Combating Plan

SN.	Company	Name and Designation	Telephone Numbers
1.	APSEZL, Mundra	Chief Operating Officer Head Marine Pollution Response Officer Port Control	02838-6272602838-255727 02838-255727 02838-255761 / 289170 (Fax) 02838-255739
2.	Kandla Port Trust	Chairman Dy. Conservator Harbor Master Signal Station	02836-233001 / 234601 02836-223585 / 220235 02836-270201 02836-270194 / 549
3	Indian Oil Corporation, Mundra	CM (Ops) Manager (Ops) Control Room	02838- 222194 02838- 222197 02838- 224444
4	Indian Oil Corporation, Vadinar	DGM (Ops) Manager Tech Services Port Control	02833-256527 02833-256464 02833-256555
5	Reliance Petroleum Ltd Jamnagar	Marine Chief Senior Port Captain Port Control	0288-4013607 0288-4013750 0288-4012600 / 4012610
6	The Commanding Officer Indian Coast Guard Station, Mundra	ICGS, Mundra Station Ops Officer	02838 - 271402 & 03 (Tel) 02838 – 271404 (Fax)
7	The Commander Coast Guard Region (North West), Gandhinagar	COMCG (NW) Regional Ops & Plans Officer	079-23243241 (Tel) 079-23243283 (Fax)
8	The Commander No.1 Coast Guard District (Guj), Porbandar	COMDIS-1 District Ops & Plans Officer	0286-2214422 (Tel) 0286-2210559 (Fax)
9	The Commander Coast Guard Region (West) Mumbai	COMCG (W) Regional Ops & Plans Officer	022-24376133 (Tel) 022-24333727 (Fax)
10	The Officer-in-Charge Coast Guard Pollution Response Team (West), Mumbai	PRT (W) Officer-in-Charge	022-23722438 (Tel) 022-23728867 (Fax)
11	Gujarat Maritime Board	Vice Chairman & CEO Chief Nautical Officer	079-23238346 / 23238363 079-23234716

12	Ministry of Environment Govt. of Gujarat	Director (Environment)	079-23252154 / 23251062 079-23252156 (Fax)
13	Gujarat Pollution Control Board	Environmental Engineer	079-232 22756 079-232 22784 (Fax)

List Of Important Telephone Numbers Of Adani Group Personnel

S.No.	Description / contact person / designation	Telephone Nos.	
		Landline	Mobile
01	Capt. Anubhav Jain, Head – Marine & PFSO, APSEZL	02838 - 255727	91 9925223674
02	Mr.Cherian Abraham, Dy. PFSO - (AICTPL)	91-2838 - 255733	9189800 48850
03	Capt. Kumar Paritosh, Dy. PFSO, ACMTPL	02838 – 255733	91 9879104839
04	Mr. Hari Govindan V , Dy.PFSO, MICT	91-2838 - 285072	91 9879104805
05	Marine control, APSEZL	02838 – 255333 / 255761	91 9825228673
06	Port Operation center, APSEZL	02838 –255762	91 9825000949
07	Port security Control, APSEZL	02838 – 289322	91 9825000933
08	Head - Security, APSEZL	02838 – 289947	91 90999 99262
09	Head - Health, safety & Environment, APSEZL	02838 - 255777	91 7574894383
10	Head - Fire Dept. APSEZL	02838 – 255857	91 7069083035
11	Occupational Health Centre	02838 - 255710	91 8980015070

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

	Marine Officer/ SPM Mooring master	**ANNEXURE 5**
Responsibilities	• Observe or receive report of oil or chemical spill incident • Initiate measures to prevent/ reduce further spillage • Maintain communication with other all vessels	
Step	**Actions**	**Additional Information**
Alert	(Marine Manager / On Scene Commander / SPM Pilot Tugs and other support/ response craft	*VHF Channel 73 / 77*
Initial Actions	Stop all cargo operations Ensure all safety precautions taken/observed Verify incident details Advise all relevant information to (Marine Manager / On Scene Commander / or SPM Pilot Initiate personal log Place tugs/other response craft on stand-by	*Liaise with Terminal Shift Engineer*
Further Actions	Brief (Marine Manager / On Scene Commander / SPM Pilot as necessary Mobilize response equipment/ personnel as directed by (Marine Manager / On Scene Commander / Maintain personal log of communications and events Act as instructed by (Marine Manager / On Scene Commander / SPM Pilot	
Final Actions	Submit personal log to HOD – Marine Attend debrief	

	MARINE MANAGER / On Scene Commander ANNEXURE 6	
Responsibilities	• Initially assess situation • Verify classification • Verify fate of spill • Verify resources immediately at risk, inform parties • Provide accurate situation reports to Radio Room/ HOD – Marine • Collect evidence and/ or statements • Liaise with HOD-Health, Safety, Environment & Fire • Liaise with incident vessel regarding status of oil spill (if applicable)	
Step	**Actions**	**Additional Information**
Alert	HOD – Marine	
Initial Actions	Proceed to incident location, assume role of On-Scene Coordinator Ensure all safety precautions have been taken Initiate response / Investigate cause/ source of spill Communicate all information to HOD – Marine Ensure samples of spilled oil taken Initiate personal log Take photographic evidence Collect evidence and take statements	*Stopped or ongoing*
Further Actions	Ensure resources are being deployed as required Provide co-ordination at-sea response Provide detailed situation reports to HOD- Marine Liaise with -Health, Safety Environment & Fire Department.	
Final Actions	Submit personal log to HOD – Marine Attend debrief	

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	SPM Pilot	ANNEXURE 7
Responsibilities	• Initially assess situation • Verify classification • Provide accurate situation reports to Radio Room/ OSC • Collect evidence and/ or statements • Liaise with incident vessel regarding status of oil spill (if applicable)	
Step	**Actions**	**Additional Information**
Alert	☐ Marine Control Room ☐ OSC ☐ Tugs and other support / response crafts	*VHF Channel 73 / 77*
Initial Actions	Assume role of On-Scene Coordinator Investigate cause/ source of spill Communicate all information to Marine Control Room Ensure samples of spilled oil taken Initiate personal log Take photographic evidence Collect evidence and take statements	*Stopped or ongoing*
Further Actions	Ensure resources are being deployed as required Provide co-ordination of the at-sea response Provide detailed situation reports to HOD – Marine	
Final Actions	Submit personal log to HOD – Marine Attend debrief	

	HOD – Marine	ANNEXURE 8
Responsibilities	• Confirm/ amend initial classification • Manage the APSEZL response • Authorize expenditure after consultation with COO APSEZL • Brief COO, APSEZL • Liaise with Coast Guard • Approve press statements for release	
Step	**Actions**	**Additional Information**
Alert	Coast Guard External organizations	
Initial Actions	Verify/ amend spill classification Ensure all safety precaution have been taken Confirm external organizations have been alerted Convene Emergency Response Team Predict slick movement Liaise with vessel Agents/ Owners as appropriate	
Further Actions	Chair the Emergency Response Team meetings Constantly review the strategy being employed and advise of changes where necessary Approve all expenditure commitments Brief President APSEZ Agree press statements with Corporate Relations Chief Confirm formal samples have been taken Advise Coast Guard if oil migrates outside of Local Area	
Final Actions **Final Actions (contd.)**	Terminate the clean-up Collate personal logs. Prepare the incident report. Hold full de-brief involving all members. Amend contingency plan as required. General Report to President	

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

OIL SPILL PROGRESS REPORT	ANNEXURE 9
Incident Name:	
Updated by:	
Date:	**Time (local):**
Summary of Incident Response Operations:	
Summary of Incident Response Resource Utilization:	
Number of Aircraft:	Number of Vessels:
Dispersant Used: Liters	Length of Booms in Use: m
Number of Recovery Devices:	Number of Storage Devices:
Sorbent Used: kg	Bio-remediation Used: kg
Number of Personnel:	Number of Vehicles:
Specialist Equipment:	
Oil Spill Balance Sheet:	
Total amount of oil spilled:	Tons
Total amount of oil recovered:	Tons
Outstanding amount of spilled oil:	Tons
Mass balance:	
Estimated Natural Weathering:	Tons
Mechanically agitated:	Tons
Chemically dispersed:	Tons
Skimmer recovered:	Tons
Sorbent recovered:	Tons
Manually recovered:	Tons
Bio-remediated:	Tons
Other:	Tons

Emergency Response Log	ANNEXURE 10
Page Number:	**Date:**
Name:	**Position:**
Contact Number	**Signature:**

Time	Activity Completed:

Control Room Officer **HOD – Marine**

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Classification of Oil

ANNEXURE 11

Group 1 oils

A: °API > 45 (Specific gravity < 0.8)
B: Pour point °C
C: Viscosity @ 10–20°C: less than 5 CSt
D: % boiling below 200°C: greater than 50%
E: % boiling above 370°C: between 20 and 0%

	A	B	C	D	E
Aasgard	48	-21	2 @ 10°C	58	14
Arabian Super Light	51	-39	2 @ 20°C		
Condensate	46	-18	2 @ 20°C	51	18
Cusiana	47	-43	2 @ 20°C	57	17
F3 Condensate	54	<-48	1 @ 10°C	81	0
Gippsland	52	-11	1.5 @ 20°C	63	8
Hidra	51	-42	2.5 @ 10°C	68	11
Terengganu condensate	71	-14	0.5 @ 20°C	>95	0
Widuri	49	-33	2@ 20°C	55	4
Condensate	58		0.5 @ 15°C	100	0
Kerosene	45	-55	2 @ 15°C	50	0
Naphta	55		0.5 @ 15°C	100	0

Group 2 oils

A: °API 35–45 (Specific gravity 0.8–0.85)
B: Pour point °C
C: Viscosity @ 10–20°C: between 4 Cst and semi-solid
D: % boiling below 200°C: between 20 and 50%
E: % boiling above 370°C: between 15 and 50%

Low pour point <6°C

	A	B	C	D
Arabian Extra Light	38	-30	3 @ 15°C	26
Azeri	37	-3	8 @ 20°C	29
Brent	38	-3	7 @ 10°C	27
Dirdgum	40	-15	4 @ 20°C	37
Dukhan	41	-49	9 @ 15°C	36
Liverpool Bay	45	-21	4 @ 20°C	42
Soleil (Sakhalin)	37	-27	4 @ 20°C	43
Rio Negro	35	-5	23 @ 10°C	29
Umm Shaif	37	-24	10 @ 10°C	34
Zakum	40	-24	6@ 10°C	36
Marine Gas oil (MGO)	37	-3	5 @ 15°C	

High pour point >5°C

Arzna	36	19	Semi-solid	25
Beatrice	38	18	32 @ 15°C	25
Bintulu	37	19	Semi-solid	24
Escravos	34	10	9 @ 15°C	35
Sarir	38	24	Semi-solid	24
Statfjord	40	6	7 @ 10°C	38

Group 3 oils

A: °API 17.5–35 (Specific gravity 0.85–0.95)
B: Pour point °C
C: Viscosity @ 10–20°C: between 8 CSt and semi-solid
D: % boiling below 200°C: between 10 and 35%
E: % boiling above 370°C: between 30 and 65%

Low pour point <6°C

	A	B	C	D	E
Alaska North Slope	28	-18	32 @ 15°C	32	41
Arabian Heavy	28	-40	55 @ 15°C	21	36
Arabian Medium	30	-21	25 @ 15°C	22	31
Arabian Light	33	-40	16 @ 15°C	25	45
Bonny Light	35	-11	25 @ 15°C	28	30
Iranian Heavy	31	-36	25 @ 15°C	24	46
Iranian Light	34	-32	15 @ 15°C	26	41
Oseberg	28	-17	20 @ 15°C	21	55
Sirtica	33	-12	18 @ 10°C	32	38
Thunder Horse	35	-27	10 @ 10°C	32	39
Tia Juana Light	32	-42	900 @ 15°C	24	45
Troll	35	-9	14 @ 10°C	24	35
IFO 180	18–20	10–30	1,500–3,000 @ 15°C		–

High pour point >5°C

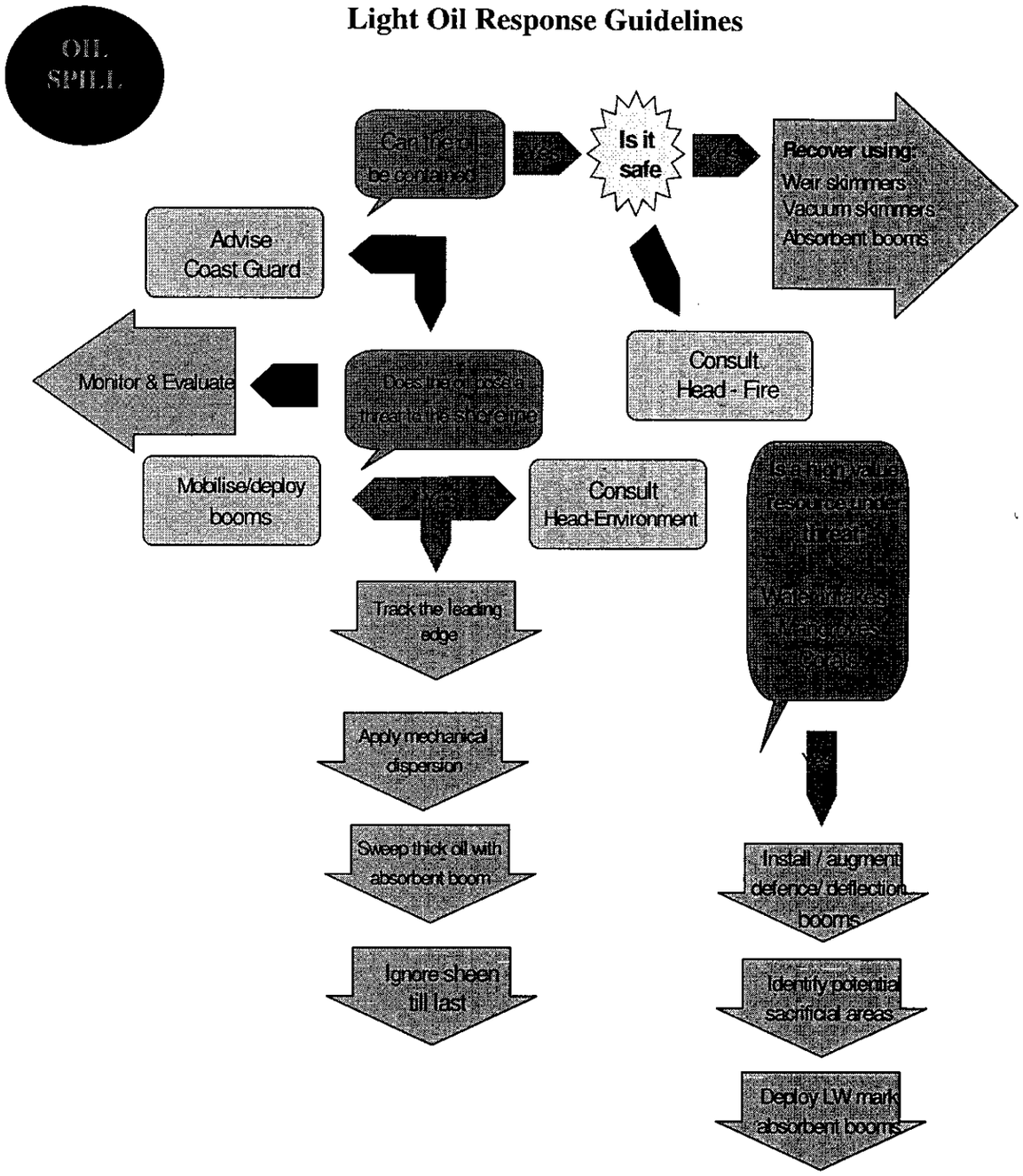
Cabinda	33	12	Semi-solid	18	56
Cano	33	21	Semi-solid	21	46
Gamba	31	23	Semi-solid	11	54
Handil	36	9	70 @ 15°C	21	53
Minas	35	18	Semi-solid	15	58

Group 4 oils

A: °API <17.5 (Specific gravity >0.95) or
B: Pour point >30°C
C: Viscosity @ 10–20°C: between 1500 CSt and semi-solid
D: % boiling below 200°C: less than 25%
E: % boiling above 370°C: greater than 30%

	A	B	C	D	E
Bachaquero 17	16	-29	3,000 @ 15°C	10	60
Boscan	10	15	Semi-solid	4	80
Cinta	13	21	Semi-solid	10	54
Handil	33	35	Semi-solid	21	33
Merey	17	-21	7,000 @ 15°C	7	70
Nile Blend	34	33	Semi-solid	13	59
Pilon	14	-3	Semi-solid	2	92
Shengli	24	21	Semi-solid	8	70
Taching	31	35	Semi-solid	12	49
Tia Juana Pesado	12	-1	Semi-solid	5	78
Widuri	33	46	Semi-solid	7	70
IFO 380	11–15	10–30	5,000–30,000 @ 15°C		

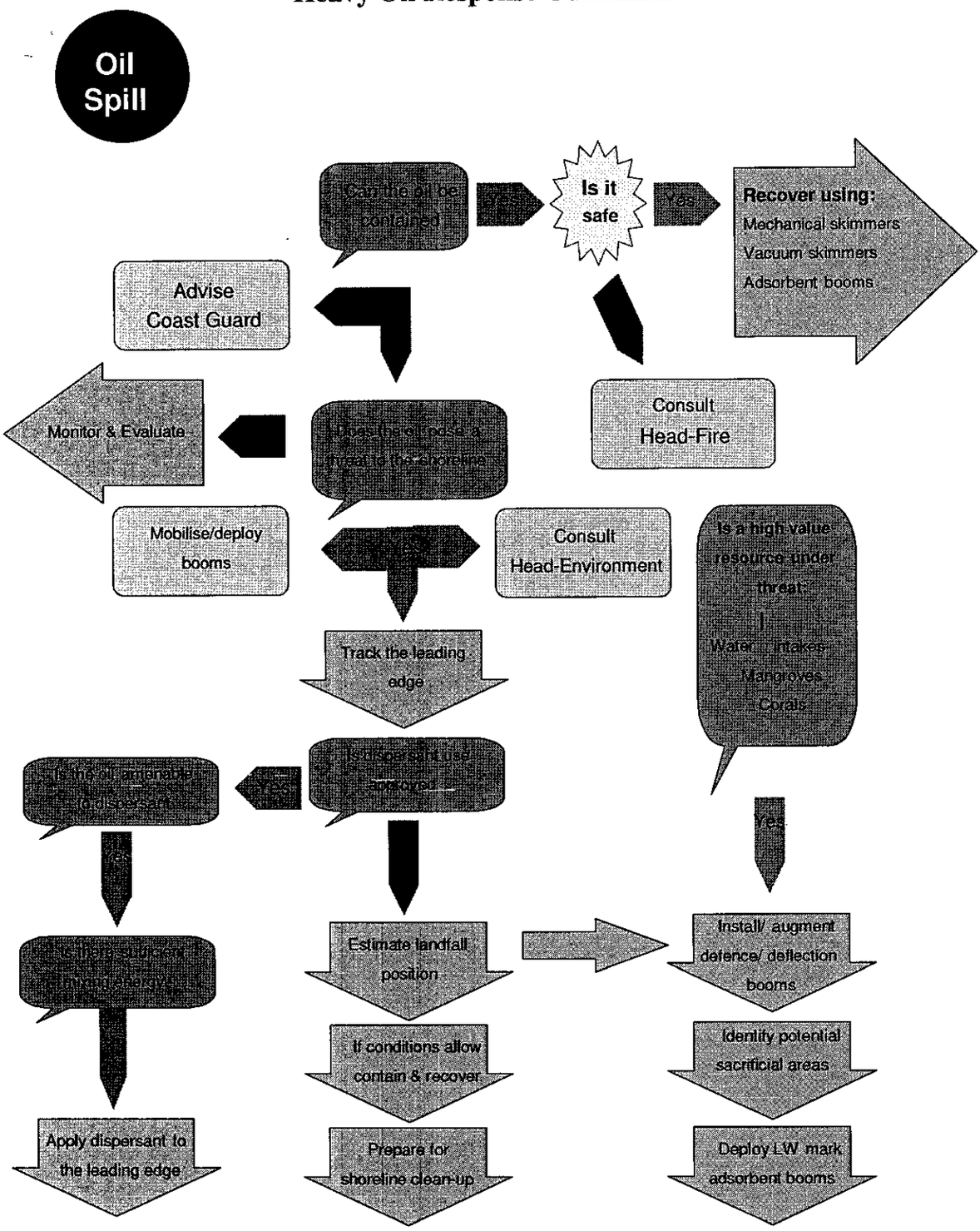
Light Oil Response Guidelines



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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

Heavy Oil Response Guidelines



Site Specific Health and Safety Plan *Assessment Form*					ANNEXURE 13
1. APPLIES TO SITE :					
2. DATE :		**3. TIME :**		**4. INCIDENT :**	
5. PRODUCT(S) :				(Attach MSDS)	
6. Site Characterization					
6a. Area	☐ Open water	☐ Inshore water	☐ River / Creek	☐ Salt marsh	☐ Mudflats
	☐ Shoreline	☐ Sand	☐ Shingle	☐ Intake Channel	
6b. Use	☐ Commercial	☐ Industrial	☐ Public	☐ Government	☐ Recreational
	☐ Residential	☐ Other			

7. Site Hazards			
	☐ Boat safety	☐ Fire, explosion, in-situ burn	☐ Slips, trips and falls
	☐ Chemical hazards	☐ Heat stress	☐ Steam and hot water
	☐ Drum handling	☐ Helicopter operations	☐ Tides
	☐ Equipment operations	☐ Lifting	☐ Trenches, excavations
	☐ Electrical hazards	☐ Motor vehicles	☐ Visibility
	☐ Fatigue	☐ Noise	☐ Weather
	☐ Others	☐ Overhead/buried utilities	☐ Work near water
	☐	☐ Pumps and hoses	

8. Air Monitoring									
	☐ O_2		☐ LEL		☐ Benzene		☐ H_2S	☐ Other	

9. Personal Protective Equipment			
☐ Foot Protection		☐ Coveralls	
☐ Head Protection		☐ Impervious suits	
☐ Eye Protection		☐ Personal Floatation	
☐ Ear Protection		☐ Respirators	
☐ Hand Protection		☐ Other	

10. Site Facilities		
☐ Sanitation	☐ First Aid	☐ Decontamination

11. Contact details :			
☐ Doctor		Phone	
☐ Hospital		Phone	
☐ Fire		Phone	
☐ Police		Phone	
☐ Other		Phone	

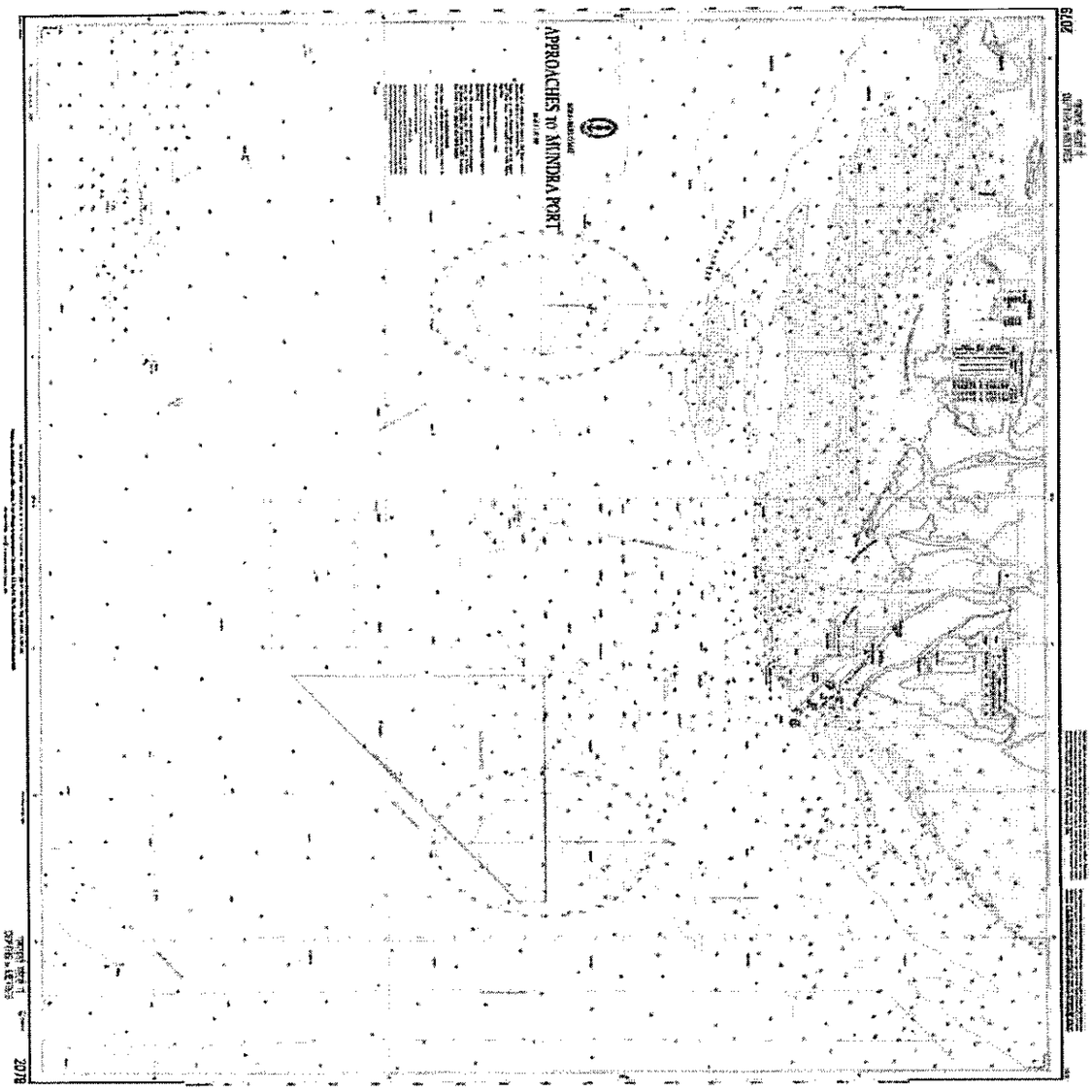
12. Date Plan Completed	
13. Plan Completed by	

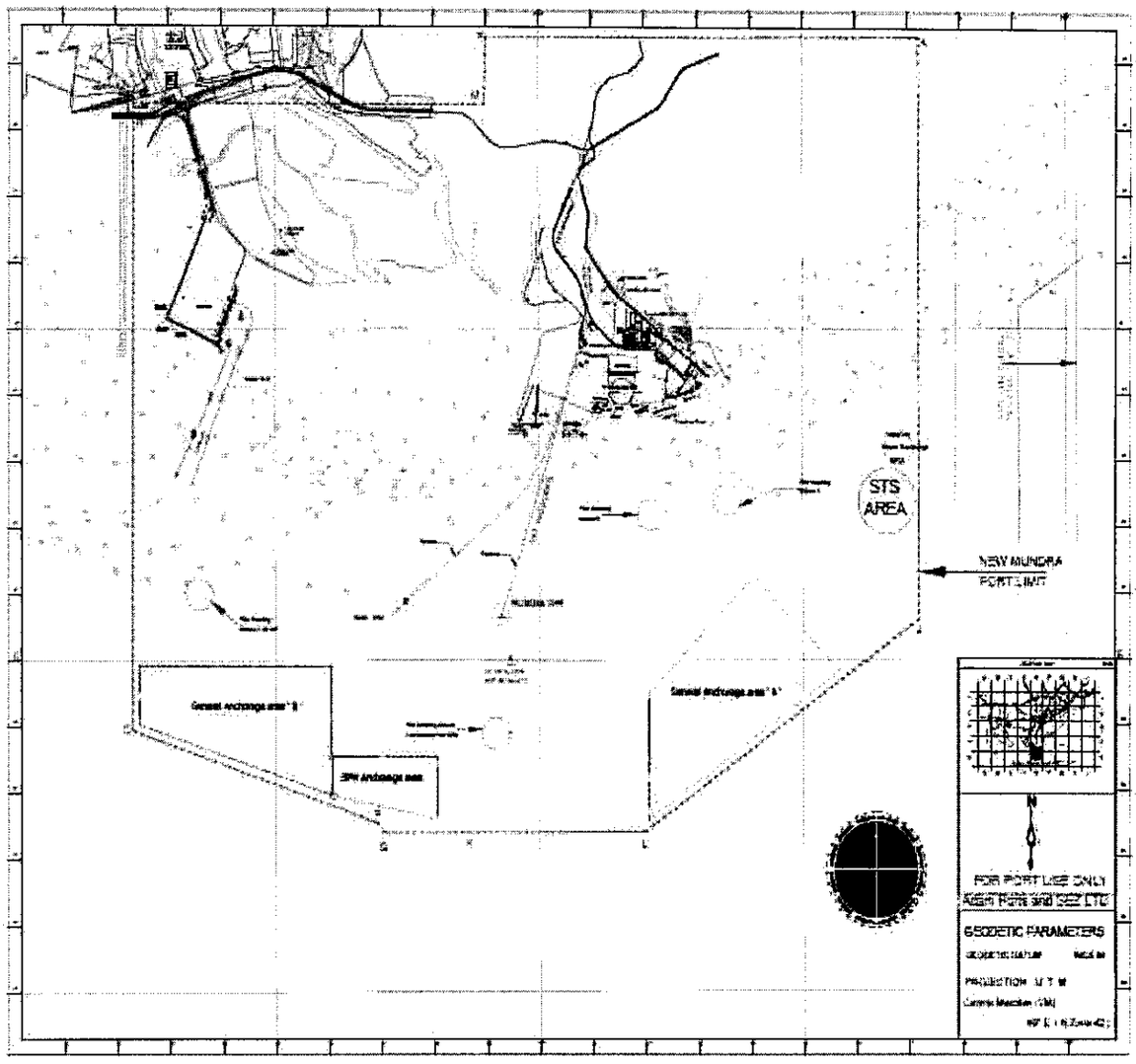
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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA

OIL SPILL CONTINGENCY RESPONSE PLAN

Indian Chart 2079	ANNEXURE 14




STS
AREA
NEW MUNDRA
PORT LIMIT
FOR PORT USE ONLY
GEODETIC PARAMETERS

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.
MUNDRA
OIL SPILL CONTINGENCY RESPONSE PLAN

List of recycler approved by state of Gujarat	ANNEXURE 15

LIST OF APPROVED VENDOR FOR COLLECTION & DISPOSAL OF OIL SPILL WASTE WATER AND OILY SOIL

Sr No.	Name of the party & Contact Detail	Date of Issue of Passbook alongwith validity	Capacity
1	M/s Jawrawala Petroleum, Plot No: 200/33, B/H Kashiram Textile Mill, Narol, Ahmedabad – 382405 Contact Detail - (079) - 25358099 (M) +91 9824045726	18/09/2012 to 17/09/2017	1. 4800 KLPA - Used Oil 2. 9000 KLPA – Waste Oil
2	M/s Reliance Barrel Supply co., 200/34, B/H-Kashiram Mill, Narol, Ahmedabad-382405 Contact Detail - (079) - 25356629 (M) +91 9824090021	03/09/2014 to 02/09/2019	1. 8280 KLA - Used Oil 2. 9000 KLA – Waste Oil
3	M/s Western India Petrochem Industry, Plot No-50, 51, GIDC Estate, Village Gozaria, Dist-Mehsana. Contact Detail - Tel:+91- 278- 420941 Fax:+91- 278- 429503	25/07/2014 to 24/07/2019	1. 3660 KLPA – Used oil 2. 11100 KLPA – waste oil
4	M/s Saurashtra Enviro Projects Pvt. Ltd.(SEPPL) 3rd Floor,K.G.Chambers, Udhana Darwaja, Ring Road, Surat, Gujarat, India-395002 Contact Detail - +91 261 2351248	TSDF Site	3,95,000 MT (Landfilling) + 7.50 Million Kcal/Hr. (Incineration)
5	M/s Bharuch Enviro Infrastructure Ltd, Ankleshwar Contact Detail - Phone 91-2646-253135 Fax 91-2646-222849	TSDF Site	23,00,000 MT (Landfilling) + 120 MT/Day (Incineration)
6	M/s Nandesari Environment Control Ltd. Nandesari, Vadodara, Contact Detail – Phone 265 – 2840818 Fax 265 – 2841017	TSDF Site	3,00,000 MT (Landfilling) + 700 Kg/Hr. (Incineration)

LIST OF AGENCY FOR SUPPORT & GUIDANCE FOR RESCUE & REHABILITATION OF OILED BIRD & MANGROVES MANAGEMENT DURING OIL SPILL	ANNEXURE 16

Sr No.	Name of the party & Contact Detail	Contact Person	Contact Detail	Activity
1	Gujarat Institute of Desert Ecology P.O Box No. #83, Opp. Changleshwar Temple, Mundra Road Bhuj - 370001 Gujarat – India.	Dr. Thivakaran	EMAIL: desert_ecology@yahoo.com FAX: 02832-235027 02832-235025	Restoration of Mangroves
2	Kalapoornasuri Karunadham Karunadham Hospital, At – Shedata, Bhuj, Kucth		(M) 9925020776	Rescue of oil socked birds / animals and medical treatment facility
3	Anchorwala Ahinshadham Bhagwan Mahavir Pashu Raksha Kendra, Pragpar, Mundra, Kutch.		Phone (02838) 22352	Rescue of oil socked birds / animals and medical treatment facility
4	**ASHA Foundation** C/182, Ashoknagar, Opposite ISRO Satellite, Ahmedabad – 380015, Gujrat, India.	Lalubhai	Phone: 09824037521 ,09879877281 Email: ashahmedabad@yahoo.co.in Website: www.ashafoundationindia.org	Rescue of oil socked birds / animals and medical treatment facility

Terms, definitions and abbreviations used in this plan

APSEZL	Adani Ports and Special Economic Zone Ltd.
COO	Chief Operating Officer
DGM	Deputy General Manager
DGS	Directorate General of Shipping
ENGR.	Engineer
ESD	Emergency Shut Down
FIR	First Information Report
FO	Furnace Oil
GMB	Gujarat Maritime Board
GPCB	Gujarat Pollution Control Board
HOD	Head Of Department
HQ	Head Quarters
HSD	High Speed Diesel
ICG	Indian Coast Guard
IMO	International Maritime Organization
IPMS	Integrated Port Management System
KPT	Kandla Port Trust
LWS	Low Water State
MCLS	Maximum Credible loss scenario
MMD	Mercantile Maritime Deptt.
MOEF	Ministry of Environment & Forest
MSDS	Material Safety Data Sheets
NOS DCP	National Oil Spill Disaster Contingency Plan
OSC	On Scene Commander
PLEM	Pipe line end manifold
POLREP	Pollution Report
PPE	Personal Protective Equipment
PR	Public Relations Officer
R/O	Radio Officer
SKO	Super Kerosene Oil

Certificate of Endorsement

(To be certified personally by an officer not below the post of Deputy Conservator of a port facility or the Installation Manager of an oil installation, or offshore installation, or equivalent legally responsible authority)

I hereby certify that:

1 The oil spill contingency plan for the facility under my charge has been prepared with due regard to the relevant international best practices, international conventions, and domestic legislation.

2. The nature and size of the possible threat including the worst case scenario, and the resources consequently at risk have been realistically assessed bearing in mind the probable movement of any oil spill and clearly stated.

3. The priorities for protection have been agreed, taking into account the viability of the various protection and clean-up options and clearly spelt out.

4. The strategy for protecting and cleaning the various areas have been agreed and clearly explained.

5. The necessary organization has been outlined, the responsibilities of all those involved have been clearly stated, and all those who have a task to perform are aware of what is expected of them.

6. The levels of equipment, materials and manpower are sufficient to deal with the anticipated size of spill. If not, back-up resources been identified and, where necessary, mechanisms for obtaining their release and entry to the country have been established.

7. Temporary storage sites and final disposal routes for collected oil and debris have been identified.

8. The alerting and initial evaluation procedures are fully explained as well as arrangement for continual review of the progress and effectiveness of the clean-up operation.

9. The arrangements for ensuring effective communication between shore, sea and air have been described.

10. All aspects of plan have been tested and nothing significant found lacking.

11. The plan is compatible with plans for adjacent areas and other activities.

12. The above is true to the best of my knowledge and belief.

13. I undertake to keep the plan updated at all times and keep the Indian Coast Guard informed of any changes through submission of a fresh certificate of endorsement.

Seal: Capt. Anubhav Jain
AGM - Marine & PFSO
Adani Ports & SEZ Ltd.
Mundra - Kutch - Gujarat

Signature:

Name: Capt. Anubhav Jain

Designation: Head - Marine

Organisation: Adani Ports and SEZ Ltd, Mundra

Place: Mundra

Date: 01 Oct 2018

Contingency Planning Compliance Checklist

Name of the Port/ Oil Handling Agency	Adani Ports and SEZ Limited, Mundra

	DESCRIPTION	Complied Yes/No	Remarks
Risk Assessment			
1.	Whether the facility produces / handles / uses / imports / stores any type of petroleum product.	Yes	**(Ref. OSCRP 2.2)**
2.	Whether risk assessment is done	Yes	**(Ref. OSCRP 2.0)**
3.	Who did the risk assessment	Yes	Environ Software (P) Ltd. & APSEZ
4.	Whether maximum volume of oil spill that can occur in the worst case scenario is considered.	Yes	**(Ref. OSCRP 2.4)**
5.	Whether relative measures of the probability and consequences of various oil spills including worst case scenario are taken into account.	Yes	**(Ref. OSCRP 2.4)**
6.	Whether all types of spills possible in the facility are considered including grounding, collision, fire, explosion, Rupture of hoses.	Yes	**(Ref. OSCRP 2.3 & 2.4)**
7	Please specify the list of oils considered for risk assessment	Yes	**(Ref. OSCRP 2.2)**
8	Whether the vulnerable areas are estimated by considering maximum loss scenario and weather condition	Yes	**(Ref OSCRP 2.1 Computational Scenarios)**
9	Whether impacts on the vulnerable areas are made after considering the marine protected areas ,population ,fishermen ,saltpans ,mangroves ,corals, and other resources within that area	Yes	**(Ref. OSCRP 2.6)**
10	Whether measures for reduction of identified high risk are included by reducing the consequences through spill mitigation measures	Yes	**(Ref. OSCRP 1.4, 2.3, 2.6. 3 & 5)**
11	Whether steps have been considered to reduce risks to the exposed population by increasing safe distances by acquiring property around the facility ,if possible	NA	All facilities developed within SEZ keeping safe distances from the exposed population.
12	Whether risk levels are established for each month after considering the probability with tide and current and consequences of each such spill	Yes	**(Ref. OSCRP 2.1 computational scenarios & 2.3)**
13	Whether prevention and mitigation measures are included in the plan	YES	**(Ref. OSCRP 4.0, 7.0, 8.0 & 9.0)**
14	Whether the spill may affect the shoreline.(length of the shoreline with coordinated)	Yes	**Ref. OSCRP 2.3 & 2.6)**
15	Whether time taken the oil spill to reach ashore in each quantity of spill in various month are mentioned in the plan	Yes	**(Ref. OSCRP 2.3)**
16	Whether sensitivity mapping has been carried out	Yes	**(Ref. OSCRP 2.5)**
17	Does the sensitivity mapping clearly identify the vulnerable areas along with MPAs, corals fishermen community, saltpans, mangroves and other socio-economic elements in the area	Yes	**(Ref. OSCRP 2.5 & 2.6)**

18	Do the sensitivity maps indicate area to be protected on priority	Yes	**(Ref. OSCRP 2.6)**
19	Does the maps indicate boom deployment locations	NA	Booms not deployed permanently
20	Whether any marine protected area will be affected	YES	**(Ref. OSCRP 2.5 & 2.6)**
21	Whether total number of fishermen likely to affected is mentioned in the plan	Yes	**(Ref. OSCRP 2.6)**
22	Whether any saltpan in the area is going to be affected	Yes	**(Ref. OSCRP 2.6)**
23	Whether any mangroves in the area will be affected by a spill	Yes	**(Ref. OSCRP 2.6)**
Preparedness			
24	whether any containment equipment is available	Yes	**(Ref. OSCRP Annex 3)**
25	Whether any recovery equipment is available	Yes	**(Ref. OSCRP Annex 3)**
26	Whether the facility is having any temporary storage capacity	Yes	**(Ref. OSCRP Annex 3)**
27	Whether location of the oil spill response equipment is mentioned in the plan	Yes	Has been included in Annex 3
28	Whether suitable vessels available for deploying the boom skimmer etc.	Yes	**(Ref. OSCRP Annex 3)**
29	Whether OSD held with facility	Yes	**(Ref. OSCRP Annex 3)**
30	Whether the OSD held with the facility is approved for use in Indian waters	Yes	
31	Whether the facility has MoU with other operator for tier -1 preparedness	Yes	**(Ref. OSCRP 1.4)**
32	Whether the list of oil spill response equipment available with each agency in deliberation	Yes	MoU document
33	Whether the facility has any MoU with private OSRO	NA	Port itself is equipped to deal with oil spill emergencies
34	Whether the procedure for evoking the mutual aid is clearly described in the plan	Yes	**(Ref. OSCRP 1.4)**
35	Whether additional manpower is available	Yes	**(Ref. OSCRP 5.4)**
36	Whether list of approved recyclers is mentioned in the plan	Yes	List of recycler approved by state of Gujarat is included in Annexure 15.
37	Whether NEBA (net environmental Benefit Analysis) has been undertaken	Yes	Before commissioning of any new project, various environmental aspects with their positive or adverse impact is considered under EIA Environment Impact Assessment stage.
38	**Whether the areas from priority protection have identify in the plan**	YES	**(Ref. OSCRP 2.5 & 2.6)**
39	Whether relevant authorities and stakeholder were consulted for NEBA and during the areas for property protection	Yes	Before commissioning of any new project Environment Impact Assessment & Public consultation is carried out, in which relevant authorities & stakeholders

			were consulted.
40	Whether district administration has been appraised of the risk impact of oil spills?	Yes	District Level Disaster Management Plan is prepared and regularly updated at district level by District Collector of Kutchh. Under DMP Oil spillage contingency is identified as risk. During preparation & updating of disaster management plan, District Level Authority organises & compiles information from various industries of kutchh. APSEZL is regularly participating in the same & providing necessary information to district level administration.
Action Plan			
41	Whether the plan outlines procedure for reporting of oil spill to coast guard	Yes	**(Ref. OSCRP 7.3)**
42	Whether the oil spill response action is clearly mentioned	Yes	**(Ref .OSCRP 3.1 to 3.6)**
43	Whether the action plan include all duties to be attended in connection with an oil spill	Yes	**(Ref. OSCRP 3.4)**
44	Whether the action plan includes key personnel by their name and designation viz. C/C, S/C	Yes	**Ref. OSCRP Annexure-4**
45	Whether alternate coverage is planned to take care of the absence of a particular person [in cases where action plan is developed basic names]	Yes	**(Ref. OSCRP 5)**
46	Whether the plan includes assignment of all key coordinators viz.the communication controller ,safety coordinator ,Emergency management team, Administration and communication coordinator and safety coordinator	Yes	**(Ref. OSCRP 3.4)**
47	Whether contact directory containing numbers of key response and management personnel is intimated in the plan	Yes	Ref. OSCRP Annexture-4
48	Whether approved recyclers are identified for processing recovered oil and oily debris	Yes	List of approved recycler of Gujarat state is included in annexure 15. Membership of common disposal facility for disposal of oily debris is also attached annexure 16.
49	Whether the shoreline likely to be affected is identified	Yes	**(Ref. OSCRP 2.5 & 2.6)**
50	Whether final report on the incident is submitted to CGHQ as per NOS-DCP 2014	NA	**No incident**
51	Whether the spill incident and its consequences	NA	**No incident**

	are informed to fishermen and other NGOs for environment protection through media		
	Training and exercises		
52	Whether mock fire /emergency response drills are specified in the plan	Yes	**(Ref. OSCRP 5.6)**
53	Whether the mock drills cover all types of probable oil spill	Yes	
54	Whether the plan mentions list of trained manpower	Yes	**(Ref. OSCRP 5.6)**
55	Whether record for periodic mock drill are maintained in a well-defined format	Yes	
56	Whether the plan updated according to the finding in mock-drills and exercises	Yes	
	DESCRIPTION		
57	What is the frequency of updation /review of contingency plan?	Yes	As Per NOSDCP 2015
58	Periodicity of joint exercises with mutual aid partner	Yes	
59	Frequency of mock-drills for practice	Yes	**(Ref. OSCRP 5.6)**
60	Whether the records for periodic mock drills are maintained in a well-defined format	Yes	**(Ref. OSCRP 5.6)**
61	Whether the plan is updated according to the finding of mock-drills and exercises	Yes	
62	Frequency of updation /review of contingency plan	Yes	As Per NOSDCP 2015

I, hereby ,declare that the all information appended above and true and correct to my knowledge of belief

Capt. Anubhav Jain
AGM - Marine & PFSO
Adani Ports & SEZ Ltd.
Mundra - Kutch - Gujarat

Date: 01 Oct 2018 Chief conservator /Installation manager

VERIFIED

Date: (District commander ICG)
or his representative

Date: (Regional commander ICG)
or his representative

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ANNEXURE – 7

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MOCK DRILL REPORT

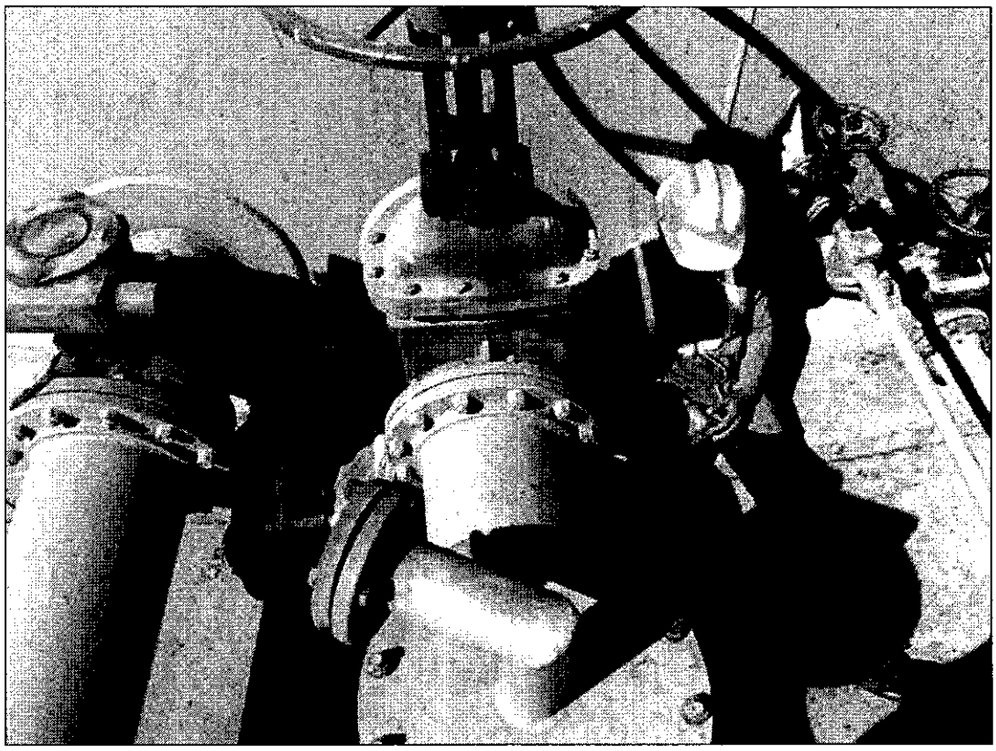
Date	:	25.01.2019
Time	:	11:45 AM
Location	:	Liquid Terminal – Enclosure-09 (Tank No. 117)
Type/Text of the Scenario	:	MTBE (Methyl Tert-Butyl Ether) leakage from the body valve of T – 117, catches fire and two person found unconscious due to inhalation

INTRODUCTION:

Loading in charge Mr. Jayesh Parmar observed leakage of MTBE and found that two people were unconscious at near body valve of T – 117 and simultaneously observed that fire has taken place in the area. He immediately informed Liquid Control In charge Mr. Vikas Dhole for ascertaining the situation.

Immediately POC, Fire and OHC were informed. POC subsequently intimated the same through message/ call to concern departments.

LOCATION (WITH PHOTOGRAPH):

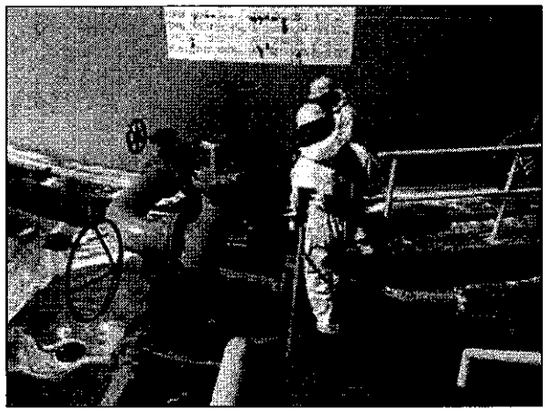


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MOCK DRILL REPORT

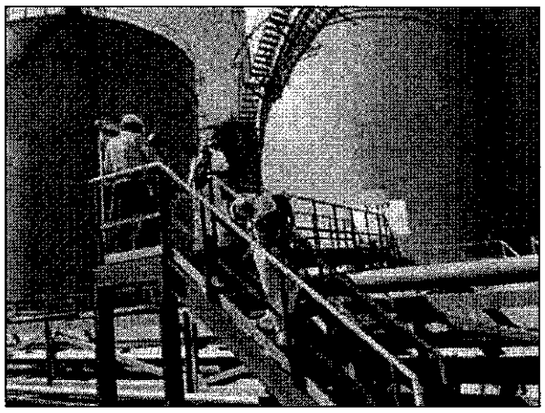
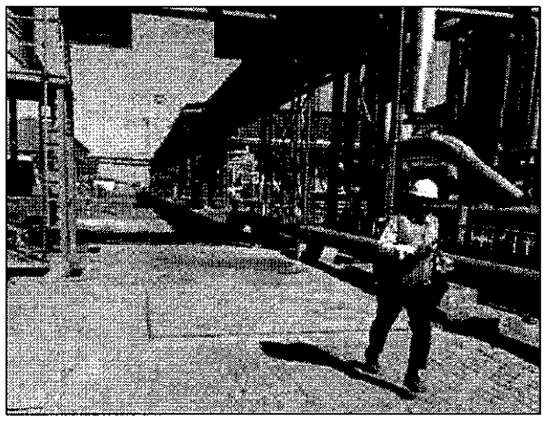
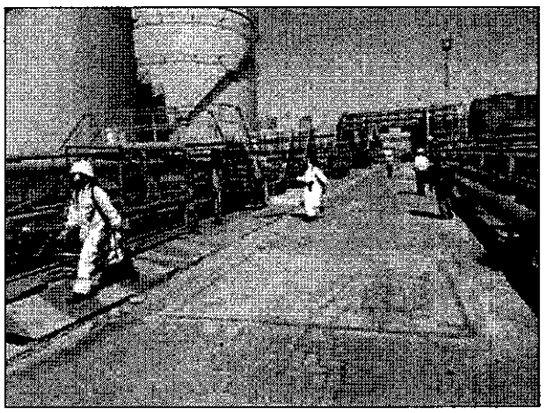
	
Ambulance reached at site	Security team reached at site
	
Emergency Spill kit mobilised at site	Maintenance staff reached at site
	
Fire Fighting by Fire Team	People Evacuated from the Liquid Terminal

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MOCK DRILL REPORT

SEQUENCE OF EVENTS WITH PHOTOGRAPHS:

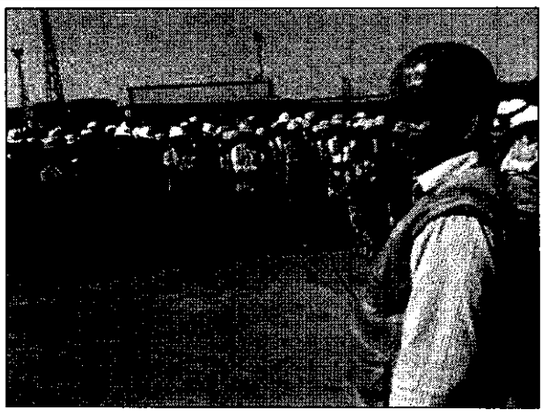
	
Incident Spot : Inside Liquid Terminal (Enclosure-09, Tank no. 117)	**First Responder informed to Incident Controller**
	
Incident Controller reached at site	**Emergency Declared by Incident Controller**
	
Fire team reached at site	**Fire team rescued the victim**

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MOCK DRILL REPORT

	
Observer – Manan Bhatt & K R Rao	Headcounting at Assembly point (Near Driver Canteen)
	
Briefing at Assembly Point by LT - HOS (Near Driver Canteen)	Briefing at Assembly point by LT - HOD (Near Driver Canteen)
	
Briefing at Assembly point by Fire, Safety & Security	De-Briefing Meeting

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MOCK DRILL REPORT

RESPONSE TIME:

#	Description		Exact Time
1.	First responder informed to Incident Controller	:	11:45 AM
2.	Incident controller comes on site	:	11:46 AM
3.	Declaration of Emergency	:	11:46 AM
4.	Security team reaching time at incident point	:	11:51 AM
5.	Fire Tender reaching time at incident Point	:	11:53 AM
6.	Ambulance reaching time at incident Point	:	11:54 AM
7.	Departure of Ambulance with patient	:	11:57 AM
8.	Ambulance reached at OHC	:	12:01 PM
9.	First person at Assembly Point	:	--
10.	Last person at Assembly Point	:	--
11.	Maintenance/ Rescue Arrangement at site	:	11:56 AM
12.	Corporate Affairs team reaching on site	:	NA
13.	Liaoning officer reached at site	:	--
14.	Audibility of the scenario on PA system	:	--
15.	Termination of Emergency	:	12:15 PM

Note: For more than one assembly point, please mention details for point 10 & 11.

COMMUNICATION & ACTIONS:

Action By	Information To / Action By	Remarks
First Responder	Information given to incident controller about situation / scenario.	
Site Incident Controller	Assess the site and declare emergency.	
Concern Department/ Area In-charge	Inform to POC, Security, Fire, Medical, Safety etc.	
Engineering Services	LT Maintenance team reached the site and assess the leakage from the body valve with coordination of incident controller. ES – E & I team reached at site and acted as per instruction of incident controller.	
Corporate Affairs	NA	
HR/ Admin	HR Team reached at the site and ensured head count along with Security Personnel. Admin team reached at assembly point to ensure proper evacuation of workforce upon instruction of incident controller.	
Safety	Discuss to mitigate catastrophic effects with incident controller and	

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MOCK DRILL REPORT

	ask for any add or services required like PPE's, Ambulance etc.	
OHC	Ensure the type of chemical exposure with incident controller and mobilize ambulance at OHC for further treatment.	
Security Control Room	Evacuated the workforce from the terminal and carried out check with the patrolling vehicle.	
Fire Control Room Inform	Immediately rescued the unconscious persons from the incident spot and handed over to ambulance. Immediate started the fire fighting from fixed firefighting system with coordination of incident controller.	

COMMUNICATION TO MUTUAL AID GROUP
(IF REQUIRED, AS AND WHEN MUTUAL AID IS CALLED) – Not Required.

To	By Whom/ Media	Standard	Performance
IOCL		2 min. after receiving information to Emergency Control Room	
HPCL			
JINDAL SAW			
ADANI POWER			
CGPL			
HMEL			

RESPONSE TIME PERFORMANCE OF ACTION

Agency	Standard Time	Performance	Rating (Max. 9/ Block) +VE Marks	-VE Marks
Ambulance	1-2 Min	2 Min	9	
Safety	4-5 Min	4 Min	9	
Fire Services	4-5 Min	3 Min	9	

A. <u>PERFORMANCE OF OHS & F SERVICES & RESCUE SERVICES</u>

Performance	Performance	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Turn out/ response time of Fire Team	Fire team reached at site within benchmark of response time.	3	
Turn out/ response time of OHC Team	OHC team reached at site within benchmark	3	

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MOCK DRILL REPORT

	of response time.		
Turn out/ response time of Safety Team and in coordination with incident controller mobilisation of personnel and resources.	Response time of Safety team is within benchmark and well coordinate with incident controller for mobilisation of personnel, resources, PPE's etc.	3	
Firefighting at the site	Rescued the affected person immediately with the staff available in the terminal. Started firefighting for controlling the fire with co – ordination of incident controller.	3	
Medical attention at the site	Reported to incident Controller and immediately unconscious persons shifted to OHC for the treatment.	3	
Rescue of person	Immediately rescue of casualties by fire team by using SCBA set.	3	

B. PERFORMANCE OF MAINTENANCE DEPARTMENT

Performance	Performance	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Power shut down/ cut off	As per guided by incident controller immediate power shut off by E & I Team.	3	
Immediate arrangements at the site	All arrangement were mobilised	3	
Mobilizing of personnel and resources	Maintenance team reached at site with tool kit and appropriate PPEs.	3	
Maintenance activities being carried out at the site	As per guided by incident controller, leak controlled by maintenance team with help of tool kit.	2	1

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MOCK DRILL REPORT

	One staff was observed without proper PPEs		
Clearing debris	NA	3	
Other arrangement at required to meet emergency	Provided as required by incident controller and support team.	3	

C. PERFORMANCE OF SECURITY SERVICES

Performance	Performance Rating	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Turnout of Security	Security team reached within time and barricade the area reported to incident controller for further update.	3	
Performance of security guards	Gates were opened for easy evacuation of workforce. Turnstile was not freed/ by-passed for speedy evacuation of workforce	2	1
Security officer's command & control	Security officers restrict the entry of unauthorized persons / also ensure that vehicles do not enter the gate.	3	
Area cordoned off	Immediate barricade the area for restrict to entry at scene by security team as guided by incident controller.	3	
Prevent unwanted/ unauthorized entry into this area	Security officers restrict the entry of unauthorized persons / also ensure that vehicles do not enter the gate also co-ordinate properly with incident controller.	3	
Closer of gates	Vehicle and man movement entry gates closed by security	3	

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MOCK DRILL REPORT

	guard		
Providing security coverage at main gate and directing concern person to the site	Round of the terminal with announcement was taken to ascertain that all the workforces have safely moved to assembly point.	3	

D. PERFORMANCE OF OPERATION/ CONCERN DEPARTMENT

Performance	Performance Rating	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Immediately pass the communication message through VHF / other available media to subordinates & emergency response team.	Communication / Information on emergency conveyed to all concern. Communication to emergency services at the site by incident controller was found lacking to some extent specially with fire services	1	2
Stopping of operation / like critical operations first & on priority basis	All operations stopped by incident controller.	3	
Emergency response of particular department at site	Response time of concern department found adequate. Fire extinguisher was immediately used at the site by LT Team and all the emergency services response time was good.	3	
Support for evacuation of people at site and head count along with HR/ Admin	Evacuation done by operation & security team and head count was done by HR team in coordination with Liquid and Security team. Admin team was also available at the site for providing required	3	

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MOCK DRILL REPORT

	support.		
Availability and response of emergency kit / equipment / Other.	Emergency kit was immediately mobilized at the incident spot	3	
Audibility of the scenario on PA System by Persons	Security vehicle PA system is audible during evacuation of people.	3	

Good Observations:

1. Fire extinguisher was immediately used by Liquid Terminal staff for extinguishing the fire at initial stage
2. Causalities were immediately rescued by fire team with use of SCBA set.
3. MSDS was referred during the emergency handling by incident controller.
4. Spill kit was mobilised at the incident spot to control/ contain the spillage of cargo.
5. Communication / Information on emergency conveyed to all concern by POC & incident controller.
6. Use of spark proof tools along with PP tool box was observed by maintenance team.
7. PA system was used for evacuation of people by security system.
8. Response of emergency agencies was satisfactory (i.e. OHC, Fire, Security, OHS, Environment, etc.)
9. HR & Admin team reached on time and performed the duty of head count and providing required resources.

Observer – I & II: Mr. Manan Bhatt & Mr. K R Rao

1. Emergency siren was blown after 2 mins from the declaring of emergency. Person at the control room was not aware of the procedure to blow the siren.
2. Communication of incident controller with the emergency services at the site was lacking to some extent.
3. Person with proper PPE's should only be available at site (one maintenance staff was found at location without mask).
4. Punching gate/ turnstile gate were not made free for easy exit of workforce (in & out gate were opened).
5. Suggestion – There should be proper approach at main gate entrance for easy mobilization/ movement of emergency vehicle.

Overall rating

Marks from above 96 - Excellent

Marks from 90 to 95 - Very Good

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MOCK DRILL REPORT

Marks below 90 - Needs Improvement

VOTE OF THANKS:

Mr. Anand Marathe, Mr. Manan Bhatt, Mr. Rakesh Chaturvedi & Mr. K R Rao thanked all the staff involved in the drill. Mr. K R Rao also thanked OHS, Fire, OHC, Security and Maintenance team for their immediate response.

SUPPORTING STAFF:

Drill Organized By	:	Mr. Bhushan Bhatt and Mr. Rana Bambhaniya
Drill Guided By	:	Mr. K R Rao
Exercise Performance Assessor	:	Mr. Manan Bhatt and Mr. K R Rao
Site Incident Controller	:	Mr. Haresh Patel
Report prepared By	:	Mr. Manan Bhatt

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MOCK DRILL REPORT

COMPLIANCE REPORT FOR MOCK DRILL

Plant/ Facilities : Liquid Terminal
Date of Mock Drill : 25.01.2019

#	Recommendations	Action Taken/ Date	Date of Completion
1	• **Emergency siren was blown after 2 mins from the declaring of emergency. Person at the control room was not aware of the procedure to blow the siren.** • **Communication of incident controller with the emergency services at the site was lacking to some extent.** • **Person with proper PPE's should only be available at site (one maintenance staff was found at location without mask).** Training/ refresher training to be arranged covering all the personal involved in an emergency (i.e. LT, ES – LT, Security, etc.).	LT/ OHS	
2	**Punching gate/ turnstile gate were not made free for easy exit of workforce (in & out gate were opened).** As per the normal practice in an emergency all the gates should be made free to avoid any untoward incident during evacuation.	Security	
3	**Suggestion – There should be proper approach at main gate entrance for easy mobilization/ movement of emergency vehicle** Approach road need to be made clear from any obstacles so that emergency services can reach on time and also to avoid any untoward incident	LT/ ES	

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MOCK DRILL REPORT

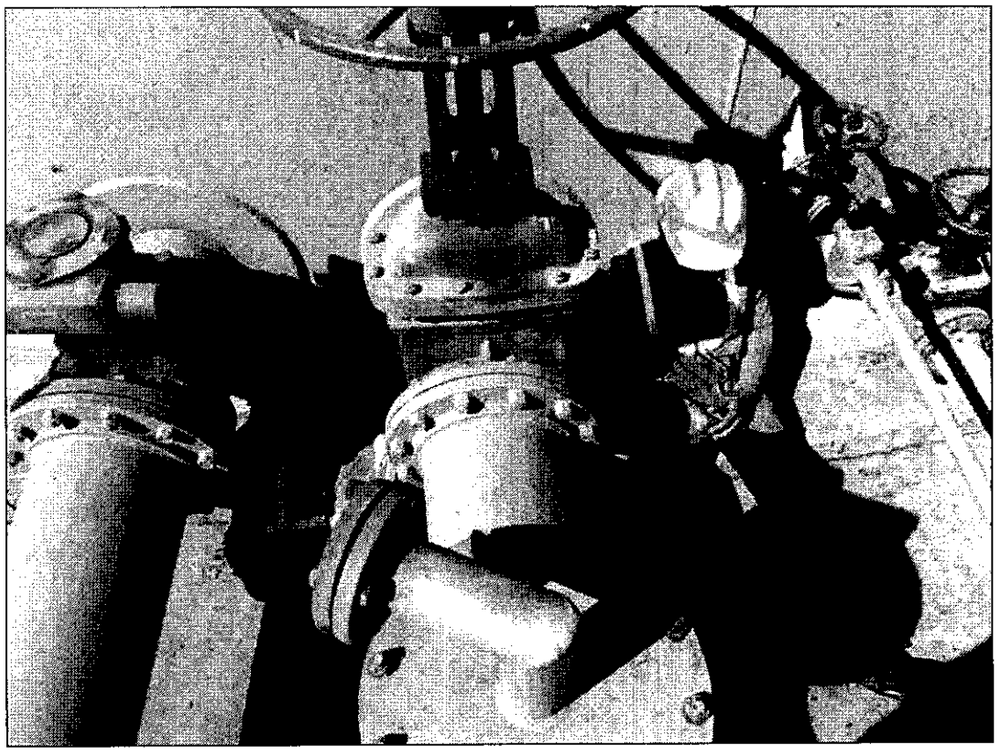
Date	:	25.01.2019
Time	:	11:45 AM
Location	:	Liquid Terminal – Enclosure-09 (Tank No. 117)
Type/Text of the Scenario	:	MTBE (Methyl Tert-Butyl Ether) leakage from the body valve of T – 117, catches fire and two person found unconscious due to inhalation

INTRODUCTION:

Loading in charge Mr. Jayesh Parmar observed leakage of MTBE and found that two people were unconscious at near body valve of T – 117 and simultaneously observed that fire has taken place in the area. He immediately informed Liquid Control In charge Mr. Vikas Dhole for ascertaining the situation.

Immediately POC, Fire and OHC were informed. POC subsequently intimated the same through message/ call to concern departments.

LOCATION (WITH PHOTOGRAPH):



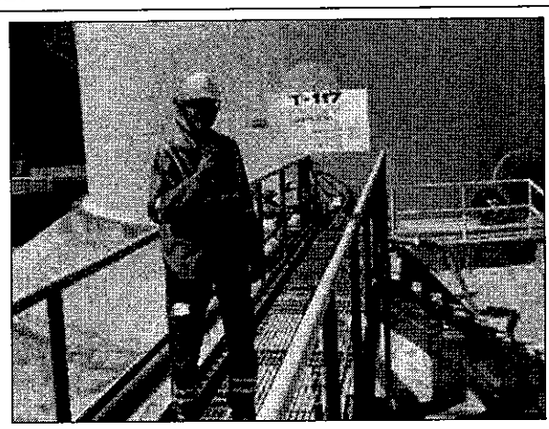
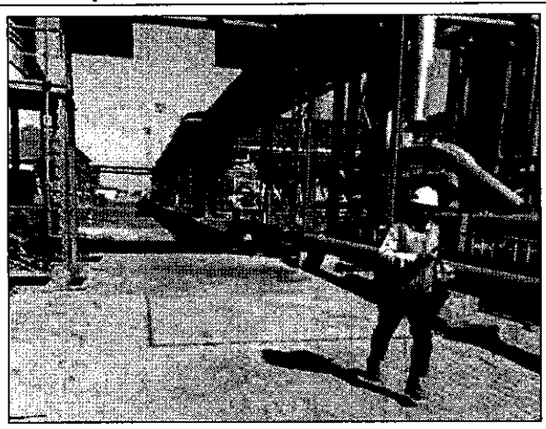
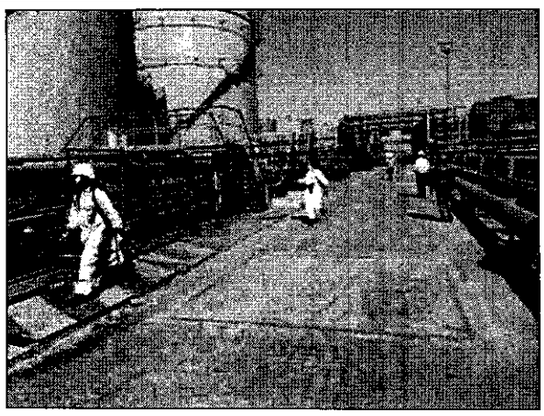
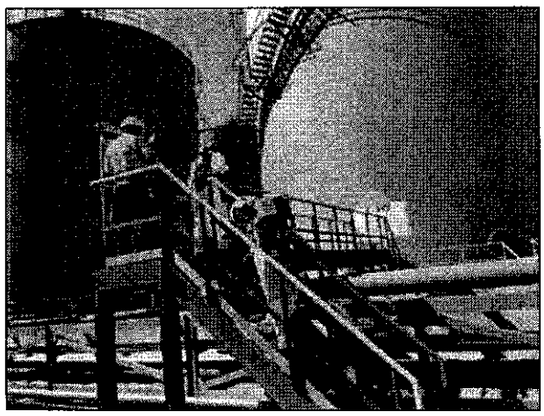
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MOCK DRILL REPORT

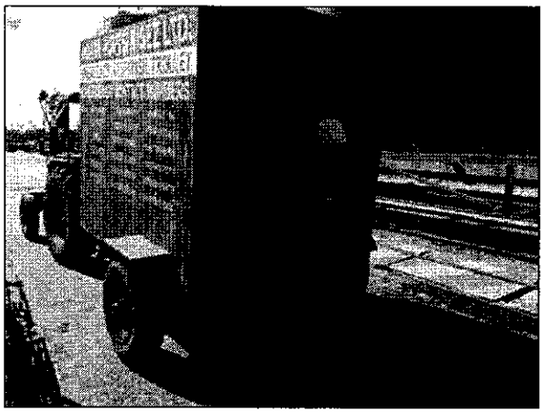
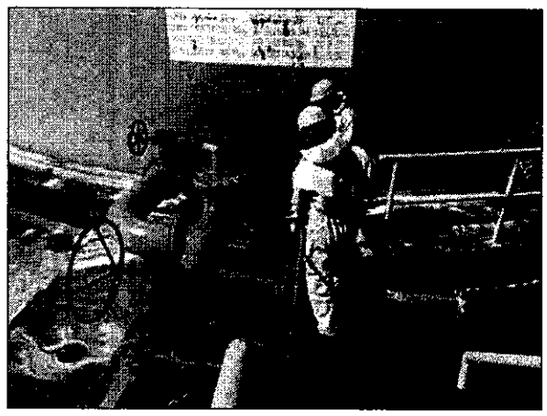
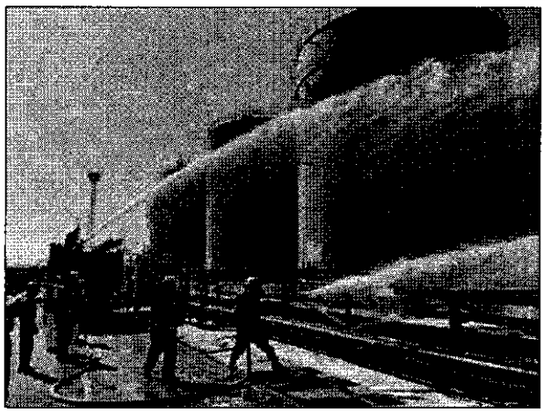
SEQUENCE OF EVENTS WITH PHOTOGRAPHS:

	
Incident Spot : Inside Liquid Terminal (Enclosure-09, Tank no. 117)	**First Responder informed to Incident Controller**
	
Incident Controller reached at site	**Emergency Declared by Incident Controller**
	
Fire team reached at site	**Fire team rescued the victim**

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MOCK DRILL REPORT

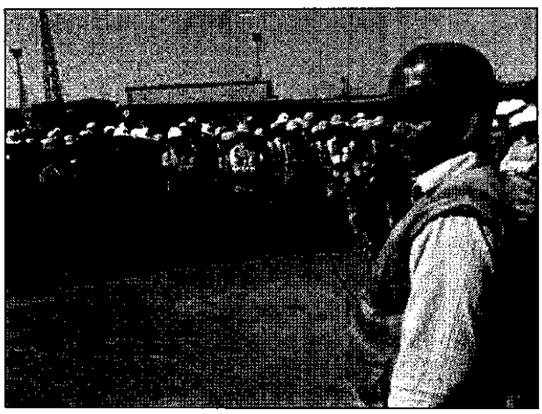
	
Ambulance reached at site	**Security team reached at site**
	
Emergency Spill kit mobilised at site	**Maintenance staff reached at site**
	
Fire Fighting by Fire Team	**People Evacuated from the Liquid Terminal**

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MOCK DRILL REPORT

	
Observer – Manan Bhatt & K R Rao	Headcounting at Assembly point (Near Driver Canteen)
	
Briefing at Assembly Point by LT - HOS (Near Driver Canteen)	Briefing at Assembly point by LT - HOD (Near Driver Canteen)
	
Briefing at Assembly point by Fire, Safety & Security	De-Briefing Meeting

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MOCK DRILL REPORT

RESPONSE TIME:

#	Description		Exact Time
1.	First responder informed to Incident Controller	:	11:45 AM
2.	Incident controller comes on site	:	11:46 AM
3.	Declaration of Emergency	:	11:46 AM
4.	Security team reaching time at incident point	:	11:51 AM
5.	Fire Tender reaching time at incident Point	:	11:53 AM
6.	Ambulance reaching time at incident Point	:	11:54 AM
7.	Departure of Ambulance with patient	:	11:57 AM
8.	Ambulance reached at OHC	:	12:01 PM
9.	First person at Assembly Point	:	--
10.	Last person at Assembly Point	:	--
11.	Maintenance/ Rescue Arrangement at site	:	11:56 AM
12.	Corporate Affairs team reaching on site	:	NA
13.	Liaoning officer reached at site	:	--
14.	Audibility of the scenario on PA system	:	--
15.	Termination of Emergency	:	12:15 PM

Note: For more than one assembly point, please mention details for point 10 & 11.

COMMUNICATION & ACTIONS:

Action By	Information To / Action By	Remarks
First Responder	Information given to incident controller about situation / scenario.	
Site Incident Controller	Assess the site and declare emergency.	
Concern Department/ Area In-charge	Inform to POC, Security, Fire, Medical, Safety etc.	
Engineering Services	LT Maintenance team reached the site and assess the leakage from the body valve with coordination of incident controller. ES – E & I team reached at site and acted as per instruction of incident controller.	
Corporate Affairs	NA	
HR/ Admin	HR Team reached at the site and ensured head count along with Security Personnel. Admin team reached at assembly point to ensure proper evacuation of workforce upon instruction of incident controller.	
Safety	Discuss to mitigate catastrophic effects with incident controller and	

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MOCK DRILL REPORT

	ask for any add or services required like PPE's, Ambulance etc.	
OHC	Ensure the type of chemical exposure with incident controller and mobilize ambulance at OHC for further treatment.	
Security Control Room	Evacuated the workforce from the terminal and carried out check with the patrolling vehicle.	
Fire Control Room Inform	Immediately rescued the unconscious persons from the incident spot and handed over to ambulance. Immediate started the fire fighting from fixed firefighting system with coordination of incident controller.	

COMMUNICATION TO MUTUAL AID GROUP
(IF REQUIRED, AS AND WHEN MUTUAL AID IS CALLED) – Not Required.

To	By Whom/ Media	Standard	Performance
IOCL		2 min. after receiving information to Emergency Control Room	
HPCL			
JINDAL SAW			
ADANI POWER			
CGPL			
HMEL			

RESPONSE TIME PERFORMANCE OF ACTION

Agency	Standard Time	Performance	Rating (Max. 9/ Block) +VE Marks	-VE Marks
Ambulance	1-2 Min	2 Min	9	
Safety	4-5 Min	4 Min	9	
Fire Services	4-5 Min	3 Min	9	

A. <u>PERFORMANCE OF OHS & F SERVICES & RESCUE SERVICES</u>

Performance	Performance	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Turn out/ response time of Fire Team	Fire team reached at site within benchmark of response time.	3	
Turn out/ response time of OHC Team	OHC team reached at site within benchmark	3	

	of response time.		
Turn out/ response time of Safety Team and in coordination with incident controller mobilisation of personnel and resources.	Response time of Safety team is within benchmark and well coordinate with incident controller for mobilisation of personnel, resources, PPE's etc.	3	
Firefighting at the site	Rescued the affected person immediately with the staff available in the terminal. Started firefighting for controlling the fire with co – ordination of incident controller.	3	
Medical attention at the site	Reported to incident Controller and immediately unconscious persons shifted to OHC for the treatment.	3	
Rescue of person	Immediately rescue of casualties by fire team by using SCBA set.	3	

B. PERFORMANCE OF MAINTENANCE DEPARTMENT

Performance	Performance	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Power shut down/ cut off	As per guided by incident controller immediate power shut off by E & I Team.	3	
Immediate arrangements at the site	All arrangement were mobilised	3	
Mobilizing of personnel and resources	Maintenance team reached at site with tool kit and appropriate PPEs.	3	
Maintenance activities being carried out at the site	As per guided by incident controller, leak controlled by maintenance team with help of tool kit.	2	1

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MOCK DRILL REPORT

	One staff was observed without proper PPEs		
Clearing debris	NA	3	
Other arrangement at required to meet emergency	Provided as required by incident controller and support team.	3	

C. PERFORMANCE OF SECURITY SERVICES

Performance	Performance Rating	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Turnout of Security	Security team reached within time and barricade the area reported to incident controller for further update.	3	
Performance of security guards	Gates were opened for easy evacuation of workforce. Turnstile was not freed/ by-passed for speedy evacuation of workforce	2	1
Security officer's command & control	Security officers restrict the entry of unauthorized persons / also ensure that vehicles do not enter the gate.	3	
Area cordoned off	Immediate barricade the area for restrict to entry at scene by security team as guided by incident controller.	3	
Prevent unwanted/ unauthorized entry into this area	Security officers restrict the entry of unauthorized persons / also ensure that vehicles do not enter the gate also co-ordinate properly with incident controller.	3	
Closer of gates	Vehicle and man movement entry gates closed by security	3	

	guard		
Providing security coverage at main gate and directing concern person to the site	Round of the terminal with announcement was taken to ascertain that all the workforces have safely moved to assembly point.	3	

D. PERFORMANCE OF OPERATION/ CONCERN DEPARTMENT

Performance	Performance Rating	Rating (Max. 3 per Block) +VE Marks	-VE Marks
Immediately pass the communication message through VHF / other available media to subordinates & emergency response team.	Communication / Information on emergency conveyed to all concern. Communication to emergency services at the site by incident controller was found lacking to some extent specially with fire services	1	2
Stopping of operation / like critical operations first & on priority basis	All operations stopped by incident controller.	3	
Emergency response of particular department at site	Response time of concern department found adequate. Fire extinguisher was immediately used at the site by LT Team and all the emergency services response time was good.	3	
Support for evacuation of people at site and head count along with HR/ Admin	Evacuation done by operation & security team and head count was done by HR team in coordination with Liquid and Security team. Admin team was also available at the site for providing required	3	

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ADANI PORTS & SPECIAL ECONOMIC ZONE LIMITED

MOCK DRILL REPORT

	support.		
Availability and response of emergency kit / equipment / Other.	Emergency kit was immediately mobilized at the incident spot	3	
Audibility of the scenario on PA System by Persons	Security vehicle PA system is audible during evacuation of people.	3	

Good Observations:

1. Fire extinguisher was immediately used by Liquid Terminal staff for extinguishing the fire at initial stage
2. Causalities were immediately rescued by fire team with use of SCBA set.
3. MSDS was referred during the emergency handling by incident controller.
4. Spill kit was mobilised at the incident spot to control/ contain the spillage of cargo.
5. Communication / Information on emergency conveyed to all concern by POC & incident controller.
6. Use of spark proof tools along with PP tool box was observed by maintenance team.
7. PA system was used for evacuation of people by security system.
8. Response of emergency agencies was satisfactory (i.e. OHC, Fire, Security, OHS, Environment, etc.)
9. HR & Admin team reached on time and performed the duty of head count and providing required resources.

Observer – I & II: Mr. Manan Bhatt & Mr. K R Rao

1. Emergency siren was blown after 2 mins from the declaring of emergency. Person at the control room was not aware of the procedure to blow the siren.
2. Communication of incident controller with the emergency services at the site was lacking to some extent.
3. Person with proper PPE's should only be available at site (one maintenance staff was found at location without mask).
4. Punching gate/ turnstile gate were not made free for easy exit of workforce (in & out gate were opened).
5. Suggestion – There should be proper approach at main gate entrance for easy mobilization/ movement of emergency vehicle.

Overall rating

Marks from above 96 - Excellent

Marks from 90 to 95 - Very Good

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MOCK DRILL REPORT

Marks below 90 - Needs Improvement

VOTE OF THANKS:

Mr. Anand Marathe, Mr. Manan Bhatt, Mr. Rakesh Chaturvedi & Mr. K R Rao thanked all the staff involved in the drill. Mr. K R Rao also thanked OHS, Fire, OHC, Security and Maintenance team for their immediate response.

SUPPORTING STAFF:

Drill Organized By	:	Mr. Bhushan Bhatt and Mr. Rana Bambhaniya
Drill Guided By	:	Mr. K R Rao
Exercise Performance Assessor	:	Mr. Manan Bhatt and Mr. K R Rao
Site Incident Controller	:	Mr. Haresh Patel
Report prepared By	:	Mr. Manan Bhatt

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MOCK DRILL REPORT

COMPLIANCE REPORT FOR MOCK DRILL

Plant/ Facilities : Liquid Terminal
Date of Mock Drill : 25.01.2019

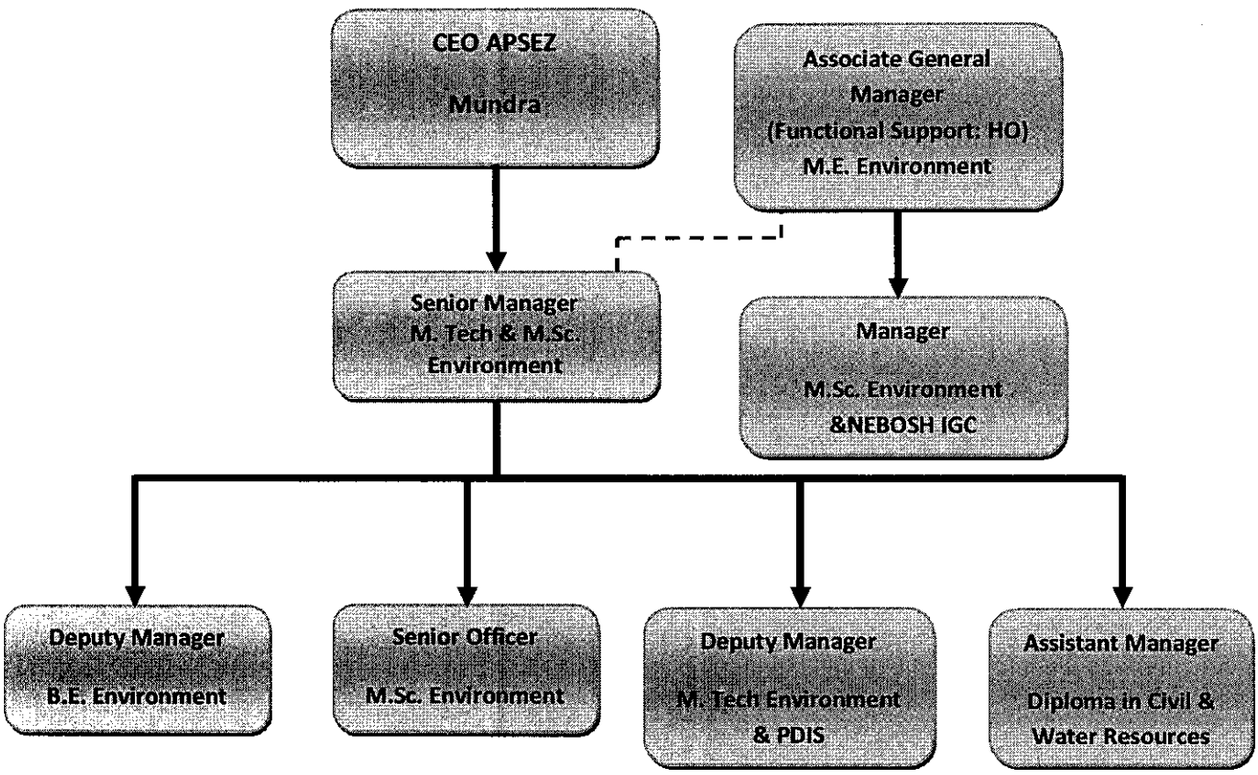
#	Recommendations	Action Taken/ Date	Date of Completion
1	• **Emergency siren was blown after 2 mins from the declaring of emergency. Person at the control room was not aware of the procedure to blow the siren.** • **Communication of incident controller with the emergency services at the site was lacking to some extent.** • **Person with proper PPE's should only be available at site (one maintenance staff was found at location without mask).** Training/ refresher training to be arranged covering all the personal involved in an emergency (i.e. LT, ES – LT, Security, etc.).	LT/ OHS	
2	**Punching gate/ turnstile gate were not made free for easy exit of workforce (in & out gate were opened).** As per the normal practice in an emergency all the gates should be made free to avoid any untoward incident during evacuation.	Security	
3	**Suggestion – There should be proper approach at main gate entrance for easy mobilization/ movement of emergency vehicle** Approach road need to be made clear from any obstacles so that emergency services can reach on time and also to avoid any untoward incident	LT/ ES	

ANNEXURE – 8

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Organogram of Environment Management Cell, APSEZ, Mundra



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ANNEXURE – 9

3077

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2016 – 17	2017 – 18	2018 – 19	2018 – 19
1.	Environmental Study / Audit and Consultancy	36.78	9.0	6.7	30.5
2.	Legal & Statutory Expenses	4.76	5.07	4.42	5.7
3.	Environmental Monitoring Services	27.95	27.02	20.36	36.0
4.	Hazardous / Non Hazardous Waste Management & Disposal	12.52	65.62	95.72	84.8
5.	Environment Days Celebration	6.71	2.85	0.28	10.0
6.	Treatment and Disposal of Bio-Medical Waste	1.27	1.13	1.21	1.56
7.	Mangrove Plantation, Monitoring & Conservation	72.38	60.0	47.0	50.0
8.	Other Horticulture Expenses	555.00	547.0	579.32	579.32
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	61.50	70.02	144.29	153.9
10.	Expenditure of Environment Dept. (Apart from above head)	131.83	102.15	109.28	117.29
	Total	**910.70**	**889.86**	**1008.58**	**1069.07**

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ANNEXURE – 10

3079 %

PCB ID: 17739

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APSEZ/EnvCell/2018-19/059

Date: 22.11.2018

Received
Gujarat Pollution Control Board
Regional Office
Kutch (East)
27/11/2018.

To,
Regional Officer
Regional Office,
Gujarat Pollution Control Board (East – Kutch),
Sector No. 8, Gandhidham,
Kutch – 370201.

Subject: Submission of compliance to observation/suggestion/instruction made by GPCB officials during inspection.

Reference: GPCB Inspection letter dated 20.11.2018, PCB ID: 17739 (**Annexure – 1**)

Dear Sir,

With reference to the above mentioned subject, APSEZL is submitting the compliance details of your observations as below:

- ✓ **Our Reply against your Observation – 1**: Approx. 200 KL (60 KL/Day) of wastewater will be generated due to washing of 01 tank as & when waste oil storage will be stored within the liquid terminal premises. Entire quantity of wastewater generated from tank washing due to storage / handling of waste oil will be sent to Effluent treatment plant for further treatment. Treated water will be utilized for horticulture purpose within the APSEZ premises.

  We have provided dedicated liquid cargo storage tank within our tank farm, however occasionally it is required to wash the tank to changeover the cargo in case of non-availability of dedicated tank. As per our present CC&A granted, maximum effluent generation quantity @ 90.31 KLD due to tank washing activity is provided. Adequate effluent treatment plant of 120 KLD capacities to treat and handle the total effluent load is in operation.

  Washing of these tanks might be few times in a year due to waste oil handling activity. So whatever quantity of wastewater generated due to this washing activity will be well within the GPCB consented limit.

- ✓ **Our Reply against your Observation – 2**: We will dispose entire quantity of waste oil to the GPCB / CPCB registered recyclers / reprocessors. Details of CPCB / GPCB registered recyclers / reprocessors are attached as **Annexure – 2**.

- ✓ **Our Reply against your Observation – 3**: Till date we have not received any waste oil from ships / vessels, however as per current CC&A , permission to receive and handle slop & its further treatment in oil water separator (25 m3/hr) is available.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India

Tel +91 2838 25 5000
Fax +91 2838 25 5110
info@adani.com
www.adani.com

✓ <u>Our Reply against your Observation – 4</u>: Legal notarized undertaking stating that handling, storage and disposal of waste oil will be done as per Hazardous Waste Rules – 2016 is attached as **Annexure – 3.**

APSEZL is submitting the compliances regularly and hope the above mentioned submission is in line with requirement.

Thanking you,
For, **Adani Ports and Special Economic Zone Ltd.**

Authorised Signatory

<u>Copy to:</u>

Unit Head (Kutch unit)
Gujarat Pollution Control Board,
Paryavaran Bhavan, Sector – 10A,
Gandhinagar – 382010.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India

Tel +91 2838 25 5000
Fax +91 2838 25 5110
info@adani.com
www.adani.com

ANNEXURE-1308

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ

પ્રાદેશિક કચેરી : કચ્છ (પૂર્વ)
દિનદયાલ પોર્ટ ટ્રસ્ટનું વહીવટ મકાન ફ્લા નં. ૨૧૫, ૨૧૬, ૨જો માળ,
સેક્ટર નં. ૮, ગાંધીધામ-૩૭૦૨૦૧, કચ્છ. ફોન : ૦૨૮૩૬-૨૩૦૮૨૮

પ્રતિ, Adani Ports & Special Economic Zone Ltd.
S.N. 169/1
Mundra, Kutch

તારીખ : 20/11/18
જીપીસીબી આઇડી : 17739

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડના અધિકારીઓ દ્વારા આપના એકમની આજરોજ જુદા જુદા પર્યાવરણીય નિયમોને આધિન સ્થળ મુલાકાત લેવામાં આવેલ.આપના એકમના સ્થળ મુલાકાત દરમ્યાન કરેલ અવલોકનો, આપે આપેલ માહિતી / દસ્તાવેજો અને પર્યાવરણીય નિયમોની જોગવાઇ આધીન, આપને નીચે મુજબ સુચનાઓ આપવામાં આવે છે જેની પૂર્તતા/સ્પષ્ટતા અંગેનો અહેવાલ (કોમ્પલાયન્સ રીપોર્ટ) આ આદેશ મળ્યાની તારીખથી કામકાજના દિવસ-૩ માં લેખીત/એક્ષજીએન/ઇલેક્ટ્રોનિક માધ્યમ મારફતે બોર્ડની વડી કચેરી ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, પર્યાવરણ ભવન, સેક્ટર ૧૦-એ, ગાંધીનગર-૩૮૨૦૧૦ ને આ કચેરીની જાણ હેઠળ અચૂક મોકલી આવવો.

(1) Waste oil ના Storage/Handling ગાદ washing or બરફીમાના તારણ storage tank નજીક વરસાદી પાણી ના ભળે તેમના ડાંદા માળા ના બરણા, દીવાલ, માળખા ની વ્યવસ્થા કરવી.

(2) ઓઈલ માટે રજીસ્ટર/લોગબુક જાળવી Receive કરાતા waste ના પ્રમાણ માપક અને તારવા કરેલ નવા સુધારા વીગતવાર ની માહિતી રજુ કરવી. (Capacity વધારો)

(3) રજીસ્ટર/લોગબુક જાળવી બોર્ડના અધિકારી દ્વારા ચકાસણી કરવા રજુ કરવી.

(4) Waste oil ના Handling, storage અને disposal Hazardous waste Rules 2016 ની જોગવાઇ મુજબ તારવા અંગેનો ને Rs 100 Notarized undertaking રજુ કરવું.

એકમના પ્રતિનિધિનું નામ અને હોદ્દો

Chirag Rajput
Dy Manager

R.R. Vinda
ASE

R. H. Jirani
SO

ANNEXURE – 2

DETAILS OF REGISTERED RECYCLER / REPROCESSOR

Sr. No.	Name & Address of the Unit	Permitted Capacity (MTA/KLA)
1	Mundra Oil Pvt. Ltd, SUR NO-141,Paiki,Mundra,SEZ, Ta- Mundra. Dist- Kutch	27000
2	Alicid organic Industries Ltd., Plot no: 208, Hanuman Henduva, opp. Gujcomasol, Nr. Khari River, Highway, Post: Palavasana, Mehsana-2	18000
3	Western India Petrochem Industry, Plot No-50, 51, GIDC Estate, Village Gozaria, Dist-Mehsana.	11100
4	Deepak Petrochem Ltd., 56/2, rameshwar road, vill. Vasenti, nr. Baska, tal. Halol, panchmahal - 389350	50400
5	Jawrawala Petroleum, Plot No:200/33, B/H Kashiram Textile Mill, Narol, Ahmedabad - 382405	9000
6	Hindustan Oils Industries, Shed No.282, A-I, Sec-III, Kandla SEZ, Gandhidham-370210, Dist-Kutch	12000
7	Concept Petrochem, S.No. 249A, Plot No: 41/A, Vasna Iyava, Vill. Sanand, Dist. Ahmdabad	12000
8	Shine Petrochem, Survey No.21, Vill: Jakshi-382150, Ta: Viramgam, Dist: Ahmedabad	12000
9	R. V. Biocoal, Survey No.205/P, National Highway – 8B, Alakh Hotel, Vill – Gomta, Ta – Gondal, Dist: Rajkot-360311	26250
10	Kutch Petrochem P. Ltd., Plot No.12-14 & 23-25, Survey No.105/1, Vill: Padana, Ta: Gandhidham, Dist: Kutch	10800

ANNEXURE-5

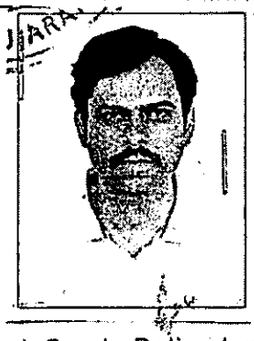
AXIS BANK LTD,
ADANI PORT, MUNDRA-370421.

GUJ/SOS/AUTHAV/101/2006

भारत 59043 SPECIAL ADHESIVE गुजरात 3083
169961 NOV 22 2018
11:55
Rs.0000100/- PB5257
INDIA STAMP DUTY GUJARAT

Purchaser's Name Chirag Rupat
Address Mundra
Name
P. C. SHAH
Area : Dist. Kutch
Reg. No. : NTR/175/R
Expiry Date
25/5/2021
License No. GJ/Auth/AV/101/2006/5211
Rupees One Hundred Only

NOTARIAL Name NOTARIAL
P. C. SHAH
Area : Dist. Kutch
Reg. No. : NTR/175/R
Expiry Date
25/5/2021
GOVT. OF GUJARAT (INDIA)
NOTARIAL NOTARIAL



LEGAL UNDERTAKING

I, Sumit Paliwal age 44 years, Sr. Manager – Environment Cell, Adani Ports and Special Economic Zone Limited at Plot No. 169/P, Navinal Island, Mundra, Ta: Mundra, Dist: Kutch do hereby undertake as under:

APSEZL has applied for CC&A-Amendment for handling, storage and disposal of Waste Oil (Slop Oil, Used Oil, Oil Tank Cleaning Water, Oily Water, etc.) from Ships / Vessels @ 0.18 MMTPA capacities.

Waste Oil will be handled, stored and disposed as per the provision of Hazardous & Other Solid Waste (Management & Transboundary) Rules 2016.

Due to proposed activity, there will be no increase in water consumption as well as wastewater generation and it will be well within the GPCB consented limit.

That is stated herein above is true to the best of my knowledge and the same I believe to be true.

Signed / Sworn
Before Me.

Date: 22.11.2018
AQBPP 1937A
Place: Mundra, Kutch

Sumit Paliwal
(Sr. Manager – Environment Cell, APSEZ, Mundra)

NOTARY
Name
P. C. SHAH
Area : Dist. Kutch
Reg. No. : NTR/175/R
Expiry Date
25/5/2021
GOVT. OF GUJARAT (INDIA)

P. C. SHAH
NOTARY (KUTCH)
JAYSUKH NIWAS,
BUNDER ROAD, MUNDRA
KUTCH (GUJARAT)

NR 1063/2018

EAC OBSERVATION:

The reply to TOR point No (4) is not proper.

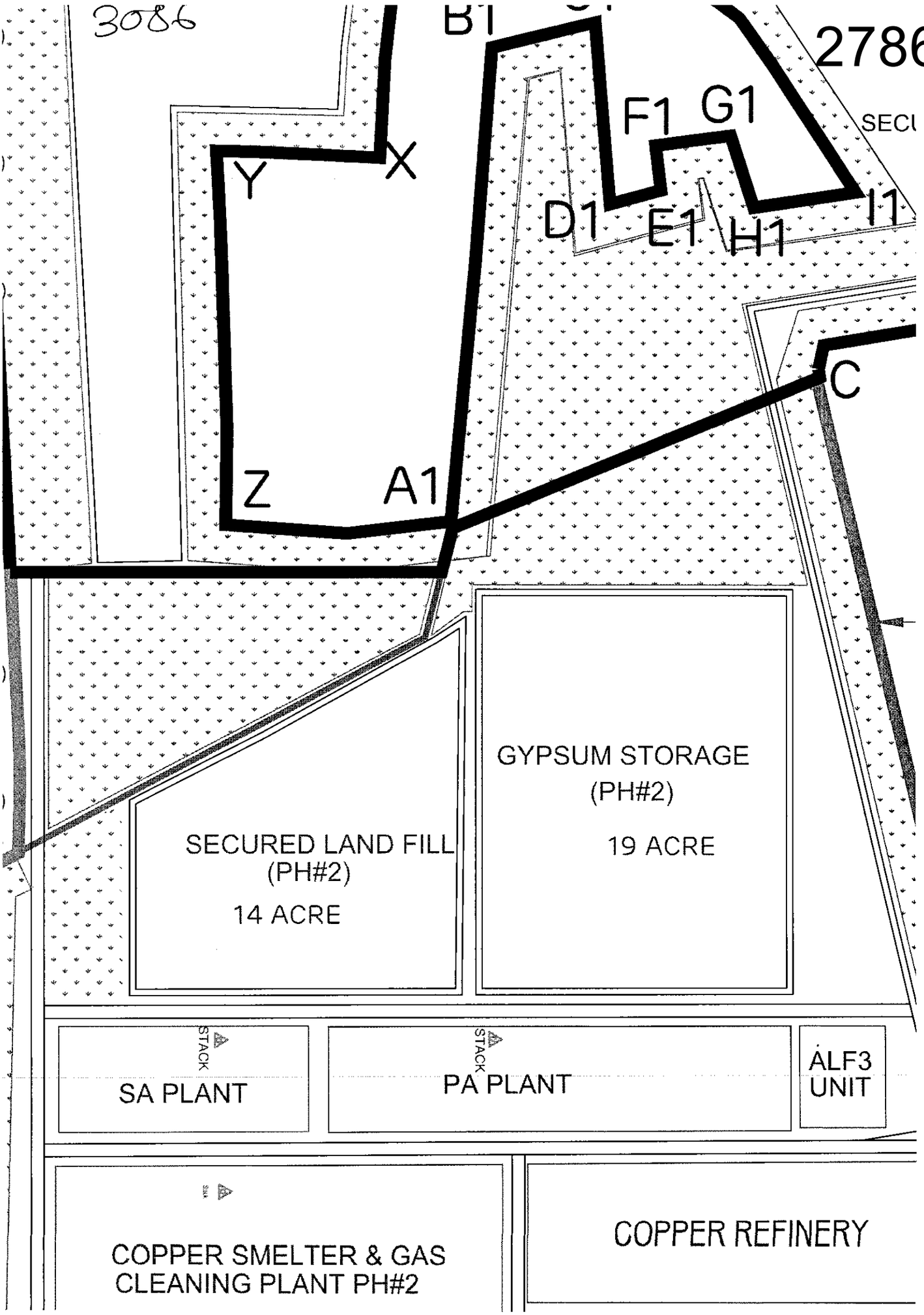
REPLY:

Description	Compliance
i) Location of the project site covering village, Taluka/Tehsil, District and State, Justification for selecting the site, whether other sites were considered.	Complied. EIA Chapter-2, Section 2.1.2, Page C2-3
ii) A Topo- sheet of the study area of radius of 10 km and site location on 1:50,000/1:25,000 scale on an A3/A2 sheet. (including all eco-sensitive areas and environmentally sensitive places)	Complied. EIA Chapter-1, Figure 1.2.
iii) Co-ordinates (Lat-long) of all four corners of the site.	Drawing along with all boundary corners is attached as **Annexure-29(a) of ADS Reply.**
iv) Google map-Earth downloaded of the project site.	Complied. EIA Chapter-1, Figure 1.3.
v) Layout maps indicating existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.	Layout of APSEZ indicating existing industries and proposed copper unit is attached as **Annexure-29(a) of ADS Reply**. Details of the proposed copper refinery unit indicating storage area, plant area, greenbelt area, utilities etc. is attached as **Annexure-29(b) of ADS Reply.**
vi) Photographs of the proposed and existing (if applicable) plant site. If existing, show photographs of plantation/greenbelt, in particular.	Complied. EIA Chapter-1, Figure 1.4(A) and 1.4 (B), pages C1-9 and C1-10.
vii) A list of major industries with name and type within study area (10 km radius) shall be incorporated. Land use details of the study area	Complied. 4620 MW TPP of Adani Power (Mundra)Limited 4000 MW TPP of Coastal Gujarat Power Limited (CGPL). Land use of the study area is provided in Chapter-3, Section-3.3 of EIA Report.
viii) Geological features and Geo-hydrological status of the study area shall be included.	Geo-hydrological study has been conducted and is attached as **Annexure- 18 of ADS Reply.**
ix) Details of Drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years.	Complied.

3085

EAC OBSERVATION NO.-29

Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. (Mega green field projects).	
x) Status of acquisition of land. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.	Total project area for the proposed Copper Refinery is 256.58 Ha. APSEZ is in possession of 154.19 Ha land and is already notified as SEZ via Gazette Notification of MINISTRY OF COMMERCE AND INDUSTRY dated 21st September 2016. The balance land of 102.39 Ha for proposed Copper Refinery Project is part of Forest Clearance (FC) proposal no- F. No. 8-04/2016-FC for diversion of 1576.81 Ha of forest land applied by M/s APSEZ. This FC proposal has been accorded stage-1 "In-principle" approval vide letter dated 16th November 2018, under Section-2 of the Forest (Conservation) Act, 1980 in favour of APSEZL for the development of Special Economic Zone (SEZ) and Industrial Park. Forest Clearance (FC) Stage-I, dated 16th November 2019.
xi) R&R details in respect of land in line with state Government policy.	No R&R involved in proposed Project.


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I1
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GYPSUM STORAGE
(PH#2)
19 ACRE
SECURED LAND FILL
(PH#2)
14 ACRE
STACK
SA PLANT
STACK
PA PLANT
ALF3
UNIT
COPPER SMELTER & GAS
CLEANING PLANT PH#2
COPPER REFINERY

3087
PROPOSED EAST PORT
AIRSTRIP
AIRPORT
SHEKHADIYA
BARAI
MUNDRA
GATE
HOSPITAL
SCHOOL
MUNDRA TOWNSHIP
MITAP
CETP
WTP
CHEMICAL CLUSTER
ADANI WILLMAR
MIRZA CORNER
ZERO POINT
NANAKAPAYA
NANA KAPAYA POCKET (DTA)
SHANTIVAN COLONY
SCHOOL
MICT COLONY
60m Road
DHRUB
ZARPARA
LABOUR COLONY
R&D YARD
LIGHT HOUSE
PORT USER BUILDING
ADANI HOUSE
LAND
BOCHA
PORT GATE
OLD PORT
IOCL
HMEL
HPCL
CFS
FTWZ
G.I.D.C.
MAIN GATE
SEZ
BARADI MA
HILL

EAC OBSERVATION:

The data retrieved from the LULC studies shall be utilized for the prediction of impacts and mitigation measures.

REPLY:

Based on the remote sensing satellite imageries data, land use/ land cover maps have been prepared for the 10 km radius study area for analyzing the land use pattern of the study area. IRS Resourcesat-2 of 5 m resolution (L4FMX) multispectral satellite data of 21st January/14th February 2016 was used for the mapping and interpretation. The land use pattern of the study area indicates that 37.41% of the study area is under agricultural land followed by water bodies of about 22.63%. Percentage of built-up area and forest land is about 5.08% and 2.02% respectively. Waste lands and wetlands in about 13.58% and 10.80% of the study area. Reclaimed land, salt pans and sandy area is about 8.48% of study area. The details of land use studies are presented in Section-3.3 of Chapter-3 in the Final EIA Report.

- **Air Quality Impact on Land use/Land cover**

Flash Smelting technology was considered for modelling studies of proposed project. The maximum predicted incremental GLC's for pollutants such as PM_{10} 1.13 µg/m^3, $PM_{2.5}$ 0.4 µg/m^3, SO_2 5.33 µg/m^3, NO_2 0.16 µg/m^3, HF 0.03 µg/m^3 and Hg <0.005 µg/m^3 in 2.2 km in NE direction were determined for FSF technology. However, in the cases, the resultant ambient air quality values are observed to be well within the NAAQS 2009 considering the worst case scenario (representing winter season).

Hence, it can be concluded that there will not have any major adverse impact on surrounding agriculture, forest land, nearest settlements and other type of lands due to the proposed copper refinery plant. Further, the proposed mitigation measures will bring down these concentrations making the activity more environment friendly. The air quality modelling isopleths are superimposed on LULC map for the prediction of impacts and mitigation measures are enclosed **Annexure-31**.

- **Water Quality Impact on Land use/Land cover**

The water system is highly integrated and is designed for Zero Liquid Discharge (ZLD). The total water requirement for the project is about 35,496 KLD (35.5 MLD). 32,267 KLD (32.27 MLD) would be sourced from desalination plant of APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). Balance will be met from recycled water. No ground water is proposed to abstract for the project usage. However, a ground water level monitoring system shall be established by installing 5 piezometers within the plant premises and monitoring water levels at a monthly interval.

Wastewater in the proposed project will be generated from plant facilities, plant operations, cooling system and landfill areas. Sewage generated from plant domestic facilities will be treated in STP and used for horticulture and plantation,

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toilets etc. Wastewater/ reject water generated from plant operations and landfill will be treated in ETPs and will be recycled for plant operations.

Kotdi creek towards south of project site and Boradi Mata creek towards southeast of project site are the major creeks in the study area. Arabian Sea, the Gulf of Kachchh is in the southern part occupying 18% of the study area. Danesri Nadi, a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. There are no other drainage courses in the project site. Danesri Nadi along the project boundary will not be disturbed and maintained with necessary bank stabilization will be done with compaction/stone pitching and raising the bund up to 2.0 m. The Danesri Nadi conservation plan will include a 50 m corridor from HFL along the stream course for green belt development and another 50 m along the green belt where any storage is coming (total of 100 m from HFL along the stream course near the storage areas) as presented in plant layout hereunder. No effluent will be discharged into this stream from the plant. Storm water from plant operations, storage areas, landfill and other pollution prone areas shall be separated and diverted to ETP for treatment and reused for plantation and other non-potable uses. The quality will be monitored periodically to ensure contaminant free storm water only reaches Danesri Nadi.

Hazardous cake, ETP waste sludge, scrubber cake, spent catalyst and spent resins (from DM, RO & Refinery) will be stabilized and stored in secured land fill of 13.35 ha as per guidelines of MoEF&CC/ CPCB/ GPCB. Further, an area of 18.62 ha and 20.63 ha are identified for the intermediate/emergency storage of copper slag and phosphogypsum. Provision would be made to reclaim the disposed copper slag and phosphogypsum from gypsum pond at a later stage for various utilization ventures. The used oil, oil sludge, nickel sludge and arsenic bearing sludge (As-Cu precipitate) will be given to authorized recycler. The detailed Geology and Hydrogeology report is enclosed as **Annexure-18**.

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EAC OBSERVATION- 31

EAC OBSERVATION:

The Air Quality modelling studies shall be re-worked out including the mercury and keeping the mixing height in view.

REPLY:

Mercury (Hg) in ambient air was monitored during the period of month of January and February 2019 at eight locations within the 10 km radius study area.

For the mercury sampling, IS: 5182-Part-23 has been followed. The collected sample has been extracted by microwave extraction (Method IO-3.1) method. The extract has been analysed by the ICP MS having least count of 5.0 ng/m^3

The Hg content in the ambient air found to be <5.0 ng/m^3 which was monitored during the period of month of January and February 2019. The dispersion modelling using AERMOD requires hourly meteorological data.

RESULTANT GLC's – WORST CASE SCENARIO

Expressed in µg/m^3

Parameter	Baseline Concentrations	Scenario-III Night Time Predicted Concentrations	Resultant GLC's	NAAQS Limit
PM_{10}	84.200	2.450	86.650	100
$PM_{2.5}$	43.900	00.850	44.750	60
SO_2	42.600	11.600	54.200	80
NO_2	32.800	00.340	33.140	80
Hg	00.005	0.006	0.0110	-

The predicted maximum GLC's during night time were observed to on higher side when compared to day time. However, the night time GLC's were found to be within the NAAQ limits.

Site specific data recorded (Sodar Study) at site is used for executing modelling of impact studies. The site specific meteorological data is processed by using AERMET processor.

AVERAGE MIXING HEIGHTS – DURING WINTER SEASON

Day Time		Night Time	
Hours	Mixing Height (m)	Hours	Mixing Height (m)
6:00	400	18:00	200
7:00	400	19:00	100
8:00	450	20:00	100
9:00	500	21:00	150
10:00	600	22:00	200
11:00	800	23:00	200
12:00	800	00:00	100
13:00	800	01:00	100
14:00	1000	02:00	200

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Day Time		Night Time	
Hours	**Mixing Height (m)**	**Hours**	**Mixing Height (m)**
15:00	800	03:00	220
16:00	600	04:00	250
17:00	400	05:00	300

Source: Site Specific Sodar Studies

Considering the mixing height following process stacks height has been revised.

Sr No	Stack Name	Earlier considered Height (m)	Revised Height (m)
	Unit-1		
1	Main Stack Secondary Gas Scrubber- I & II (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace	100	150
2	Electric Furnace and Secondary gases from Smelting – I (Bi Flue)	70	100
3	Phosphoric Acid Plant – I	90	100
	Unit-2		
4	Main Stack Secondary Gas Scrubber- I & II (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace	100	150
5	Electric Furnace and Secondary gases from Smelting – II (Bi Flue)	70	100
6	Phosphoric Acid Plant – II	90	100

PREDICTED INCREMENTAL CONCENTRATION DUE TO VARIATION IN MIXING HEIGHTS WITH FSF TECHNOLOGY

Expressed in µg/m³

Parameter	Earlier Scenario submitted in EIA	Scenario-I 24 Hrs	Scenario-II Day Time	Scenario-III Night Time
PM_{10}	1.32	1.13	0.60	2.45
$PM_{2.5}$	0.54	0.40	0.30	0.85
SO_2	10.37	5.33	5.13	11.60
NO_2	0.23	0.16	0.11	0.34
Hg	-	0.005	0.003	0.006

With increase in stack height and with reduced velocity from 22-25 m/sec to 16-18 m/sec the GLC has reduced. The results of the same is presented above.

The detailed report is provided as **Annexure- 31**

1.0 Impact on Air Quality

The air quality modeling and impacts section has been revised as per the discussions and suggestion given by EAC members during the meeting held on 10th January 2019. Sulphur dioxide (SO_2) and Particulate Matter (PM) emissions and NO_2 emissions are the main pollutants in the copper refinery plant. Further, air dispersion modeling studies were carried out for mercury. The incremental Ground Level Concentration's (GLC's) due to the proposed copper refinery have been predicted by using air dispersion modeling.

➢ ***Details of Mathematical Modelling***

For prediction of maximum Ground Level Concentrations (GLC's), the air dispersion modeling software (AERMOD version 7.1.0) was used. AERMOD is steady state advanced Gaussian plume model that simulates air quality and deposition fields up to 50 km radius. AERMOD is approved by USEPA and is widely used software. It is an advanced version of Industrial Source Complex (ISCST3) model, utilizes similar input and output structure to ISCST3 sharing many of the same features, as well as offering additional features. The model is applicable to rural and urban areas, flat and complex terrain, surface and elevated releases and multiple sources including point, area, flare, line and volume sources. Dispersion modeling using AERMOD requires hourly meteorological data. Site specific data recorded at site is used for executing modeling studies. The site specific meteorological data is processed by using AERMET processor.

➢ ***Model Set-up***

The model set-up details are presented in **Table-1** below:

TABLE-1
MODEL SET-UP

Sr. No.	Parameter	Details
1	Model Name	AERMOD (Version 7.1.0)
2	Model Type	Steady state Gaussian Plume Air Dispersion model
3	Topography	Rural, Flat
4	Averaging Time	24 hours
5	Source Type	Point Source
6	Boundary Limits	10 km X 10 km
7	Co-ordinate System	Uniform Cartesian Grid
8	Receptor Height	0
9	Anemometer	10 m
10	Surface meteorological data	Site Specific data processed by AERMET
11	Upper air Data	Site specific data using AERMET processor

- ***Model Input Data***

✓ **Atmospheric Inversion Level and Mixing Height Study**

The atmospheric inversion studies were carried out at the project site for estimating the site specific mixing heights based on variable weather conditions. Same has been used in modeling in order to have realistic concentration. The upper air data have

been generated at site was used for winter season, which represents worst case scenario. The mixing heights observed during the study period are given below in **Table-2** and the diurnal variation of ABL mixing height are shown in **Figure-1**.

TABLE-2
AVERAGE MIXING HEIGHTS – DURING WINTER SEASON

Day Time		Night Time	
Hours	**Mixing Height (m)**	**Hours**	**Mixing Height (m)**
6:00	400	18:00	200
7:00	400	19:00	100
8:00	450	20:00	100
9:00	500	21:00	150
10:00	600	22:00	200
11:00	800	23:00	200
12:00	800	00:00	100
13:00	800	01:00	100
14:00	1000	02:00	200
15:00	800	03:00	220
16:00	600	04:00	250
17:00	400	05:00	300

Source: Site Specific Sodar Studies

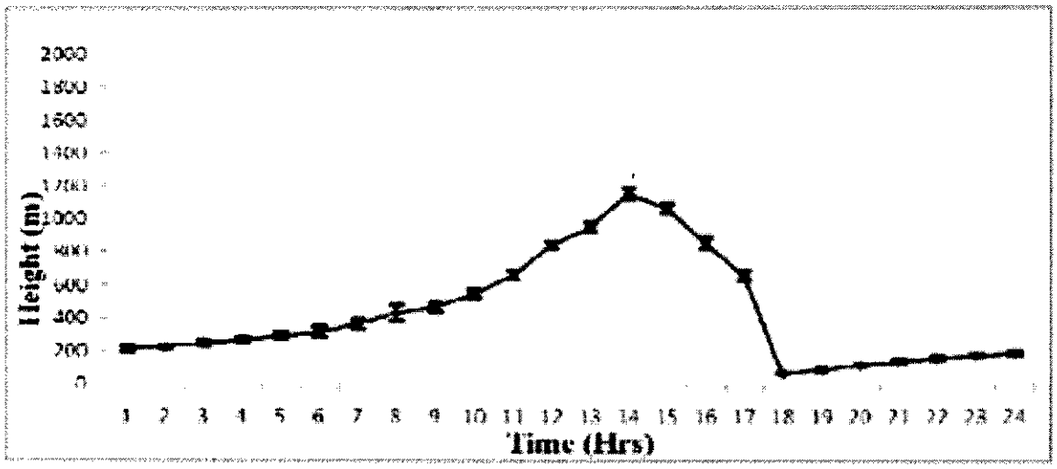


FIGURE-1
DIURNAL VARIATION OF ABL MIXING HEIGHT AT PROJECT SITE

From the studies, the maximum of inversion height is observed during noon hours (1200-1400 hours) when the ground temperature is also maximum and minimum during night time periods of maximum ground cooling (18:00 - 20:00 hours). These observations support the concept of sea breeze and land breeze conditions prevailing at the project site.

✓ **Stack Details**

The stack details have been revised based on the discussions held during the EAC meeting. The main stack secondary gas scrubber I & II and main sulphuric acid plant stack have been increased from 100 m to 150 m. Similarly, stack connected to electric furnace & secondary gases from smelting-I have been increased from 70 m to 100 m.

Similarly, stacks connected to sulphuric acid plant pre-heater-I & II, slag granulation-I and dust extraction-I (rock phosphate area) have been increased from 30 m to 45 m each. The details of stack emissions of proposed copper refinery project are given in **Table-3.**

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TABLE-3
DETAILS OF STACK EMISSIONS – FSF TECHNOLOGY

Sr. No.	Stacks	Height	Dia	Temp	Velocity	Volume	SO_2	SO_2	PM	NOx	Emission Rates (g/s)			
	Attached to	m	m	°C	m/s	Nm^3/hr	ppm	mg/Nm^3	mg/Nm^3	Ppm	SO_2	SO_2 (Check)	PM	NOx
	Unit –I													
	Flue Emission Through Stack attached to Boiler/Furnace/Heater													
1	Waste Heat Recovery Super heater - I*	70	1.5	150	16	70,000	150	394.5	50	50	7.6	7.7	1	1.8
2	Sulphuric Acid Pre Heater-I (Only for plant startup)	45	1.5	250	17	60,000	150	394.5	50	50	9.8	6.6	1.3	2.4
3	Sulphuric Acid Pre Heater-II (Only for plant startup)	45	1.5	250	17	60,000	150	394.5	50	50	9.8	6.6	1.3	2.4
4	DG Set – I (4 MVA Standby)	30					-		-	-	-	0.0	-	-
5	DG Set – II (4 MVA Standby)	30					-		-	-	-	0.0	-	-
6	Boiler – I (operational only when steam is not available from smelter)	70	1.5	150	16	70,000	150	394.5	50	50	7.6	7.7	1	1.8
7	Shaft Furnace of CCR Plant-I*	36	1.5	200	9	37000	25	65.75	50	50	0.7	0.7	0.5	1
8	Anode Casting – I	20	0.75	100	17	21,000	-		50	15	-	0.0	0.3	0.16
9	Anode Casting – II	20	0.75	100	17	21,000	-		50	15	-	0.0	0.3	0.16
10	Main Stack Secondary Gas Scrubber- I & II (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)*	150	2.8	60	17	345,900	150	394.5	50	-	27.3	37.9	3.5	-
			2.0	60	17	171,823	150	394.5		-	16.4	18.8	2.1	-
11	Electric Furnace and Secondary gases from Smelting – I (Bi Flue)*	100	2.0	150	17	135,000	150	394.5	50	-	16.4	14.8	2.1	-
			2.2	150	18	168,796	150	394.5		-	24.5	18.5	3.2	-
12	Main Stack Sulphuric Acid Plant-I & II (Bi flue)*	150	2	75	16	150,760	230	604.9	-	-	105	25.3	-	-
			2	75	16	150,760	230	604.9		-	105	25.3	-	-
13	Cathode Stripping M C – I*	30	0.3	50	6	1,500	-		50	-	-	0.0	0.02	-
14	Cathode Stripping M C – II*	30	0.3	50	6	1,500	-		50	-	-	0.0	0.02	-
15	Anode Scrap Washing MC– I*	30	0.3	40	6	1,500	-		50	-	-	0.0	0.02	-
16	Electro winning Stack – I*	45	0.3	40	19	4,500	100	263	-	-	0.3	0.3	-	-
17	Slag Granulation – I*	45	1.4	100	18	80,000	25	65.75	50	-	1.4	1.5	1.1	-
18	Steam Dryer for Copper concentrate – I*	60	1.2	120	18	54,483	25	65.75	50	-	1.8	1.0	1.4	-
19	Smelting Furnace Area (Emergency Vent-I only during process tripping)	45	1.8	300	18	86,000	150	394.5	50	-	9.4	9.4	1.2	-
20	PS Convertor Area (Emergency Vent – I (only during process tripping)	45	1.8	300	18	86,000	150	394.5	50	-	9.4	9.4	1.2	-
21	Dust Extraction – I (Rock Phosphate Handling Area)*	45	0.6	40	15	15,000	-		50	-	-	0.0	0.2	-
22	Precious Metal Recovery Plant – I*	60	1.1	60	16	50,000	100		50	15	0.4	0.0	0.07	-
	Unit-II							0				0.0		
23	Waste Heat Recovery Super heater – II*	70	1.5	150	16	70,000	150	394.5	50	50	7.6	7.7	1	1.8
24	Sulphuric Acid Pre Heater-III (Only for plant startup)	45	1.5	250	17	60,000	150	394.5	50	50	9.8	6.6	1.3	2.4
25	Sulphuric Acid Pre Heater-IV (Only for plant startup)	45	1.5	250	17	60,000	150	394.5	50	50	9.8	6.6	1.3	2.4
26	DG Set - III (4 MVA Standby)	30					-		-	-	-	0.0	-	-
27	DG Set – IV (4 MVA Standby)	30					-		-	-	-	0.0	-	-
28	Boiler – II (operational only when steam is not available from smelter)	70	1.5	150	16	70,000	150	394.5	50	50	7.6	7.7	1	1.8
29	Shaft Furnace of CCR Plant-II*	36	1.5	200	9	37,000	25	65.75	50	50	0.7	0.7	0.5	1

30	Anode Casting – III	20	0.75	100	17	21,000	-		50	15	-	0.0	0.3	0.16
31	Anode Casting – IV	20	0.75	100	17	21,000	-		50	15	-	0.0	0.3	0.16
32	Main Stack Secondary Gas Scrubber- III & IV (Bi flue) (Convertor Fugitives and Anode & scrap melting furnace)*	150	2.8	60	17	345,900	150	394.5	150	-	27.3	37.9	3.5	-
			2.0	60	17	171,823	150	394.5		-	16.4	18.8	2.1	-
33	Electric Furnace and Secondary gases from Smelting – II (Bi Flue)*	100	2.0	150	17	135,000	150	394.5	150	-	16.4	14.8	2.1	-
			2.2	150	18	168,796	150	394.5		-	24.5	18.5	3.2	-
34	Main Stack Sulphuric Acid Plant-III & IV (Bi-flue)*	150	2	75	16	150,760	230	604.9	-	-	105	25.3		
			2	75	16	150,760	230	604.9		-	105	25.3		
35	Cathode Stripping M C – III*	30	0.3	50	6	1,500	-		50	-	-	0.0	0.02	-
36	Cathode Stripping M C – IV*	30	0.3	50	6	1,500	-		50	-	-	0.0	0.02	-
37	Anode Scrap Washing MC-II*	30	0.3	40	6	1,500	-		50	-	-	0.0	0.02	-
38	Electro winning Stack – II*	45	0.3	40	19	4,500	100	263	-	-	0.3	0.3	-	-
39	Slag Granulation – II*	45	1.4	100	18	80,000	25	65.75	50	-	1.4	1.5	1.1	-
40	Steam Dryer for Copper concentrate – II*	60	1.2	120	18	54,483	25	65.75	50	-	1.8	1.0	1.4	-
41	Smelting Furnace Area (Emergency Vent-II -only during process tripping)	45	1.8	300	18	86,000	150	394.5	50	-	9.4	9.4	1.2	-
42	PS Convertor Area (Emergency Vent – II- only during process tripping)	45	1.8	300	18	86,000	150	394.5	50	-	9.4	9.4	1.2	-
43	Dust Extraction – II (Rock Phosphate Handling Area)*	45	0.6	40	15	15,000	-		50	-	-	0.0	0.2	-
44	Precious Metal Recovery Plant – II*	60	1.1	60	16	50,000	100	263	50	-	0.4	3.7	0.07	-
	Phosphoric Acid Plant*						**HF**		**PM**	-	**HF**		**PM**	-
							mg/m^3							
45	Phosphoric Acid Plant – I	100	2.1	50	18	206,000	20		50	-	0.6	1.1	1.4	-
46	Phosphoric Acid Plant – II	100	2.1	50	18	206,000	20		50	-	0.6	1.1	1.4	-

***denotes stacks not considered for modelling*

The simulations have been carried out to evaluate PM, SO_2 and NO_2 likely to be contributed by the proposed copper refinery. Further, pollutants such as hydrogen fluoride and mercury were also considered for air dispersion modelling studies. The Ground Level Concentrations (GLC's) were predicted within 10 km radius covering 16 directions.

FSF technology was considered for modelling studies. The maximum predicted GLC's for pollutants such as PM_{10}, $PM_{2.5}$, SO_2, NO_2 and Hg were determined for FSF technology and presented in **Table-4.** In order to find out the maximum GLC's on various land uses, the predicted concentrations (Isopleths) were overlaid on the topo map and presented in **Figure-1** to **Figure-4** respectively.

TABLE-4
PREDICTED SHORT-TERM MODELLING RESULTS (24 HOURLY) WITH FSF TECHNOLOGY

Pollutants	Maximum Incremental Levels (µg/m³)	Distance (km)	Direction
Particulate Matter (PM_{10})	1.13	2.2	NE
Particulate Matter ($PM_{2.5}$)	0.40	2.2	NE
Sulphur dioxide	5.33	2.2	NE
Nitrogen dioxide	0.16	2.2	NE
Hydrogen fluoride	0.03	2.2	NE
Mercury (Hg)	0.005	2.2	NE

- ***Resultant Concentrations after Implementation of Project***

The resultant concentrations after the implementation of the proposed project are given in **Table-5.**

TABLE-5
RESULTANT CUMULATIVE GROUND LEVEL CONCENTRATIONS (24 HOURLY) WITH FSF TECHNOLOGY

Pollutant	Concentrations (µg/m³)			
	Baseline	Incremental Concentration	Resultant Cumulative Concentration	NAAQS Limits
PM_{10}	84.2	1.13	85.33	100
$PM_{2.5}$	43.9	0.40	44.30	60
SO_2	42.6	5.33	47.93	80
NO_2	32.8	0.16	32.96	80

Observations:

The predicted maximum GLC's of FSL technology. However, in the cases, the resultant ambient air quality is observed to be well within the NAAQS 2009 considering the worst case scenario (representing winter season).

Hence, it can be concluded that there will not have any major adverse impact on surroundings due to the proposed copper refinery plant. Further, the proposed mitigation measures will bring down these concentrations making the activity more environment friendly.

Mixing Height and Concentration of Air Pollutants:

Sodar studies of inversion / mixing height have been undertaken by Vimta Labs Ltd. for the project site at located at project site, district Kutch, Gujarat (India). Study is undertaken for air quality modeling for the proposed copper project.

The continuous Sodar data recorded during the study period (winter season) has been utilized to evaluate hourly averaged mixing /inversion height and presented in this report.

The maximum mixing height is the height of the convective layer associated with the maximum surface temperature. The maximum mixing height exhibits both local and seasonal variations. In addition it is affected significantly by topography and large scale air movements. Maximum values of mixing heights will be observed in day time. Minimum values of mixing height will be observed in the late hours of the night or in the early morning hours and may be the result of a surface based inversion. The pollutants which released into the air from any source of pollution are being continually mixed. On hot days, they are taken up extremely high away from the ground. In contrast to that, in cool days, the mixing height is very low and pollutants remain close to the ground.

The maximum mixing height is 1000 m occurring at 14:00 hours. The convective mixing led to the decrease in concentration of the air pollutants around noon. Similarly, the minimum mixing height is 100 m occurring between 18:00-20:00 hours. Accordingly, the air pollutants are expected to exhibit variations during day and night time.

Modelling simulation were carried out considering 3 scenarios considering 24 hours mixing heights, day time and night time mixing heights. The predicted Ground Level Concentration's (GLC's) for 3 scenarios are presented in Table-6 and Table-6.

Scenario-I: Modeling considering 24 hours Mixing Height- (0.00 Hrs to 23:59 Hrs)
Scenario-II: Modeling considering Day Time Mixing Heights (6:00 AM to 18:00 PM)
Scenario-III: Modeling considering Night Time Mixing Heights (18:01 PM to 5:59 AM)

TABLE-6
PREDICTED INCREMENTAL CONCENTRATION DUE TO VARIATION IN MIXING HEIGHTS WITH FSF TECHNOLOGY

Expressed in $\mu g/m^3$

Parameter	Scenario-I 24 Hrs	Scenario-II Day Time	Scenario-III Night Time
PM_{10}	1.13	0.60	2.45
$PM_{2.5}$	0.40	0.30	0.85
SO_2	5.33	5.13	11.60
NO_2	0.16	0.11	0.34
Hg	0.005	0.003	0.006

In order to determine resultant GCL's during night time (representing worst case scenario) the reported baseline concentrations were added to the maximum predicted GLC's and the resultant GLC's were presented in the **Table-7** below:

TABLE-7
RESULTANT GLC's – WORST CASE SCENARIO
[FSF TECHNOLOGY]

Expressed in µg/m^3

Parameter	Baseline Concentrations	Scenario-III Night Time Predicted Concentrations	Resultant GLC's	NAAQS Limit
PM_{10}	84.2	2.45	86.65	100
$PM_{2.5}$	43.9	0.85	44.75	60
SO_2	42.6	11.60	54.20	80
NO_2	32.8	0.34	33.14	80

The predicted maximum GLC's during night time were observed to on higher side when compared to day time. However, the night time GLC's were found to be within the NAAQ's.

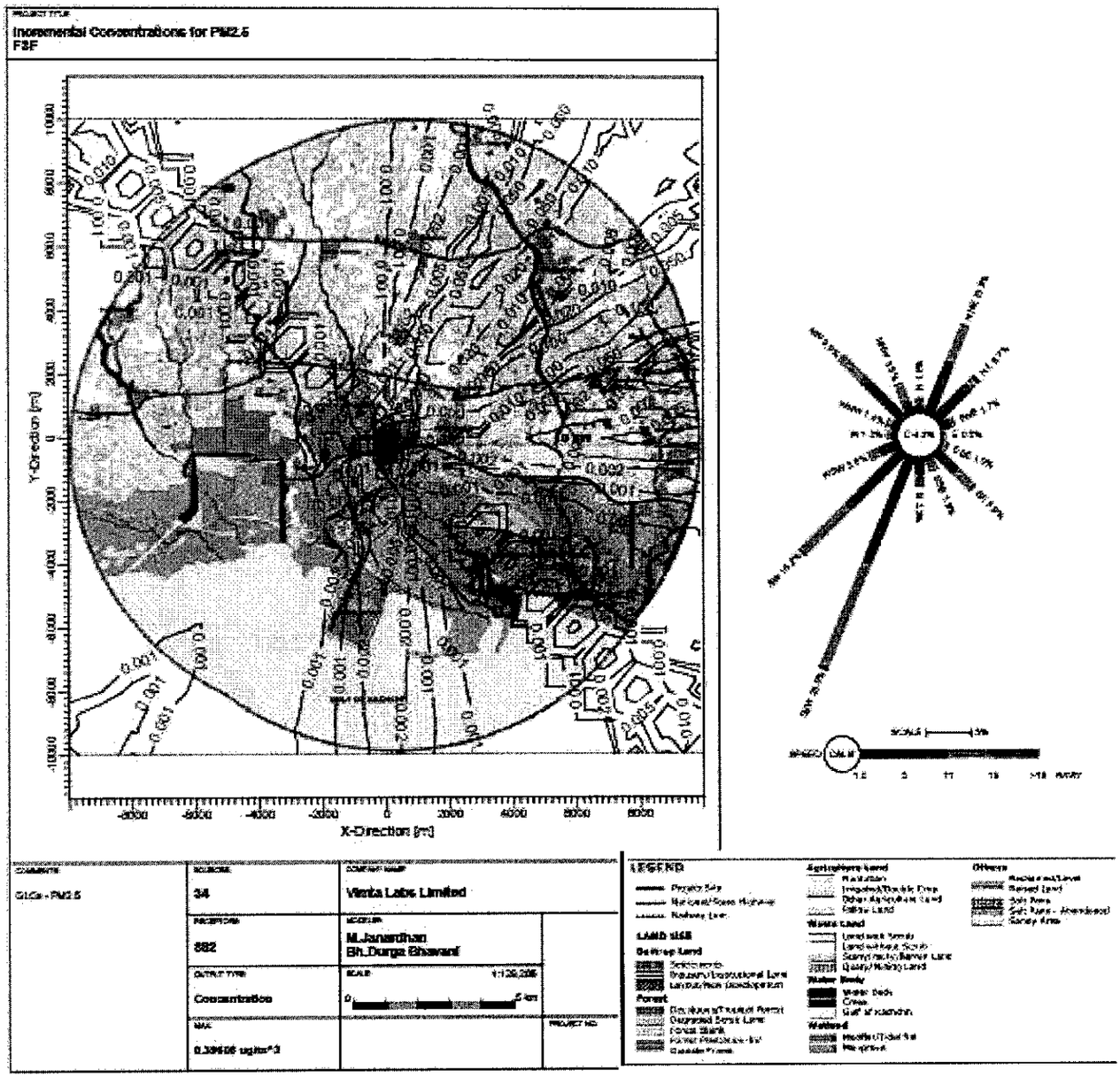


FIGURE-1
INCREMENTAL CONCENTRATIONS FOR $PM_{2.5}$ – FSF TECHNOLOGY

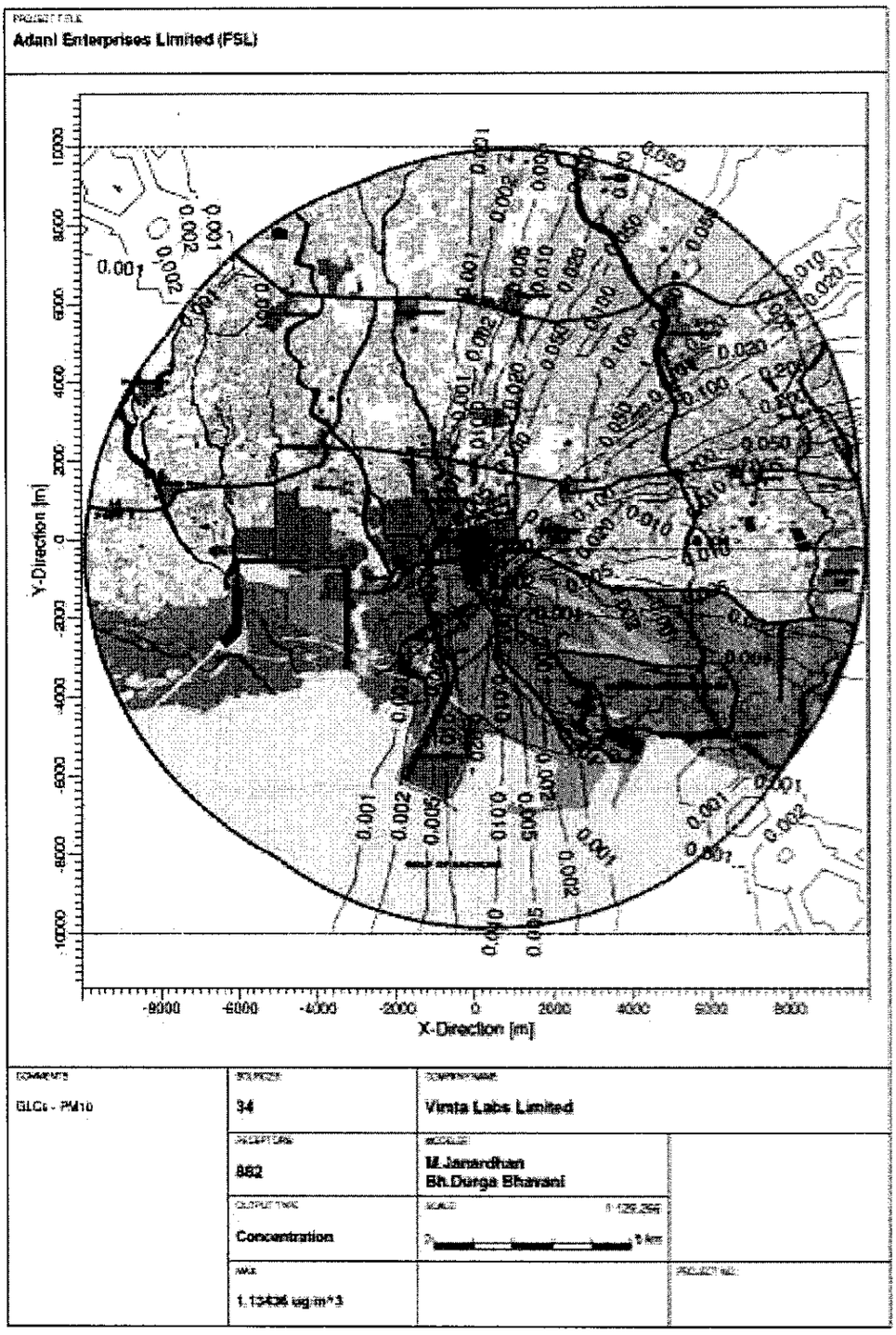


FIGURE-2
INCREMENTAL CONCENTRATIONS FOR PM_{10} (FSF TECHNOLOGY)

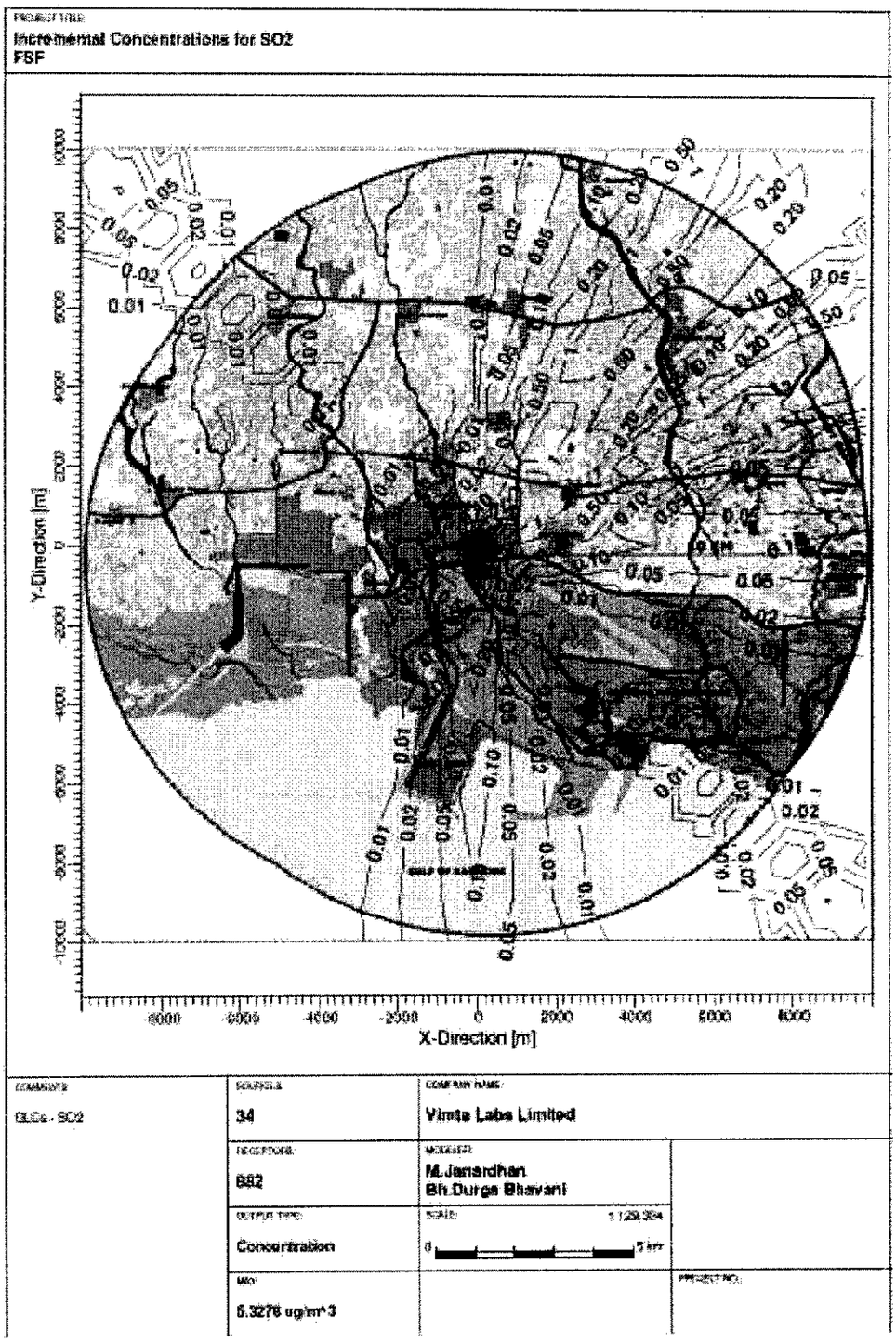


FIGURE-3
INCREMENTAL CONCENTRATIONS FOR SO_2 (FSF TECHNOLOGY)

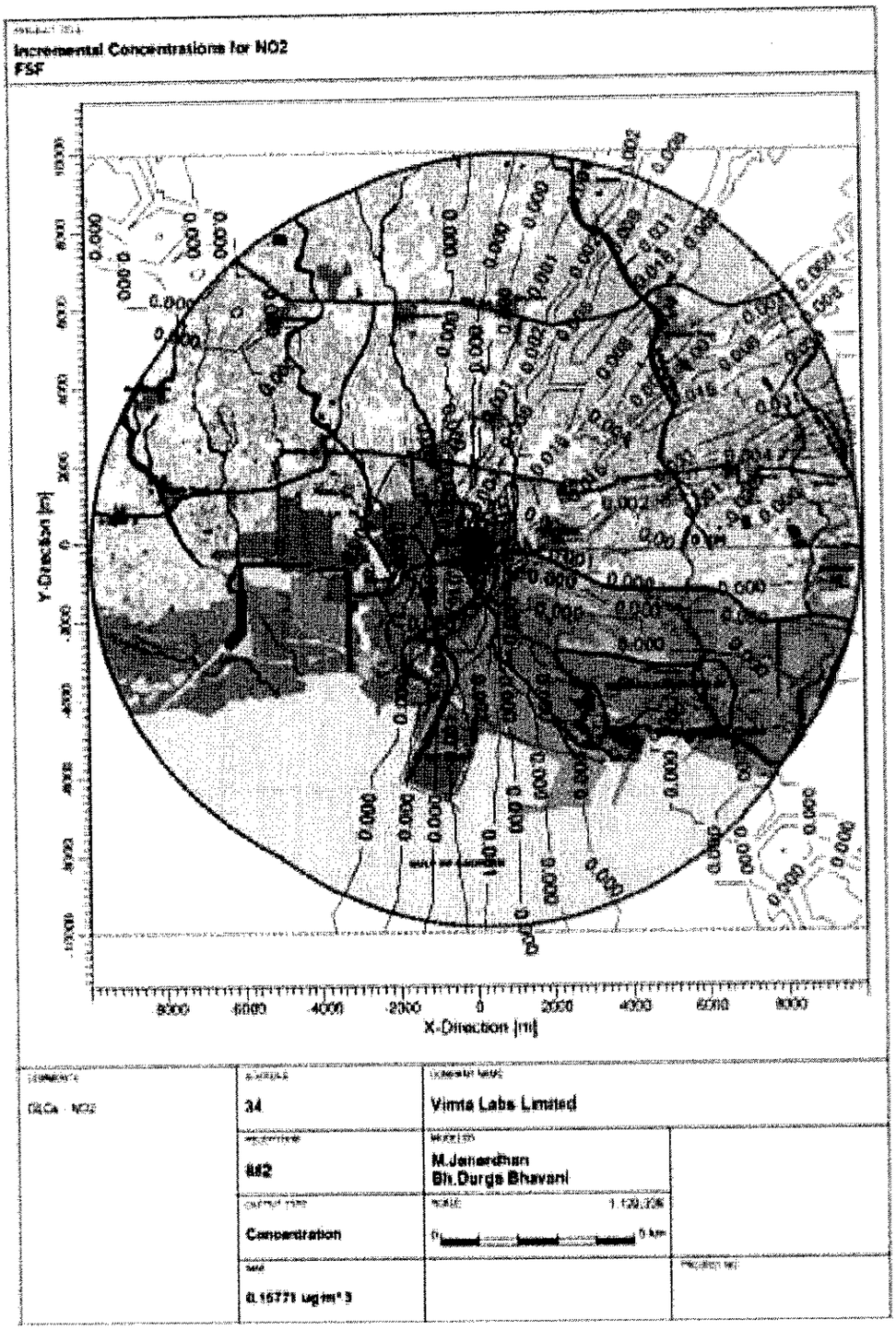


FIGURE-4
INCREMENTAL CONCENTRATIONS FOR NO_2 (FSF TECHNOLOGY)

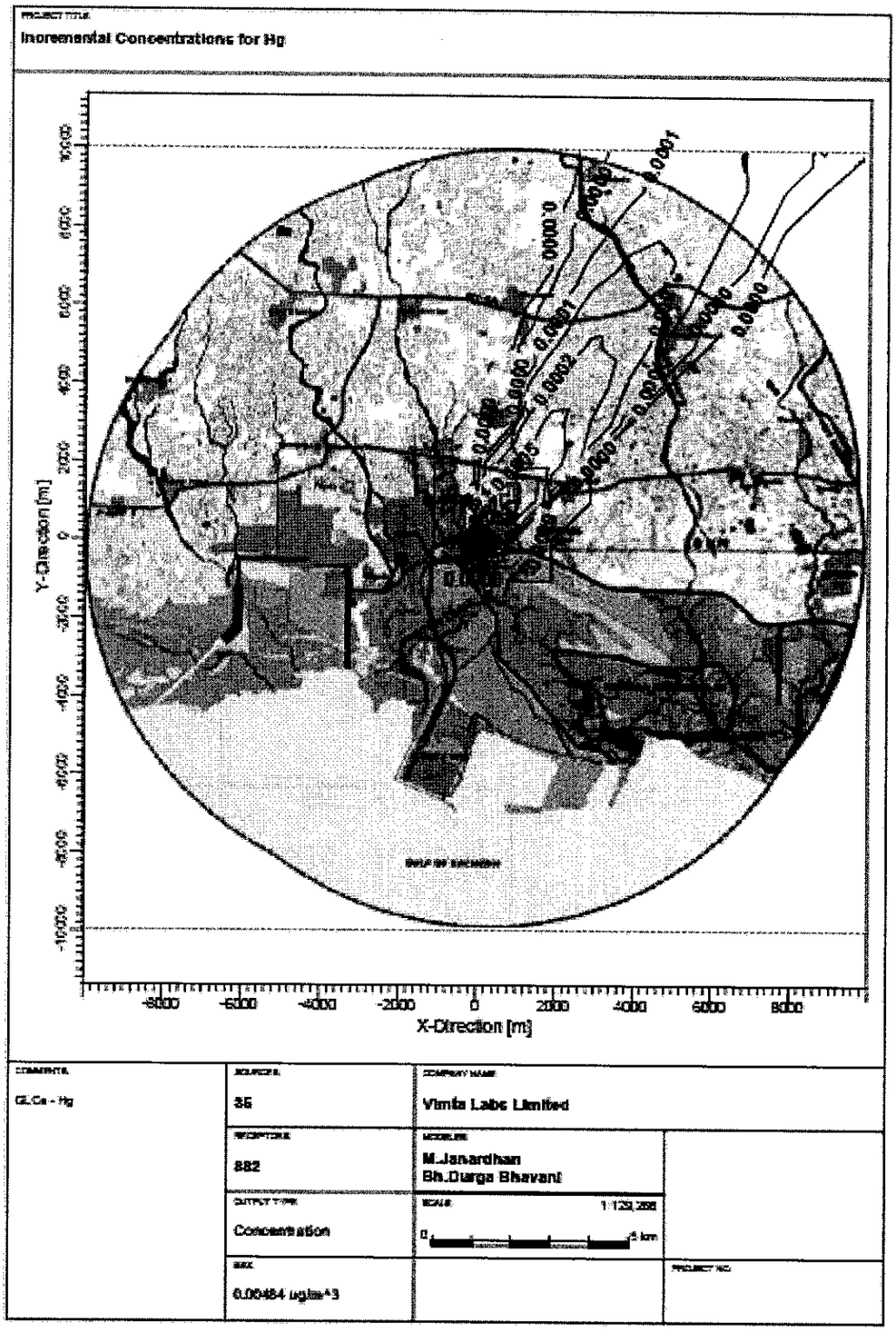


FIGURE-5
INCREMENTAL CONCENTRATIONS FOR Hg (FSF TECHNOLOGY)

3105

EAC OBSERVATION NO.- 32

EAC OBSERVATION:

"The Environmental Policy of the Organization is not meeting the requirements given in ToR Point No. 9(i), 9(ii), 9(iii), 9(iv)."

i. **Does the Company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA Report.**

REPLY:

Company has a well laid down "Environment. Health & Safety Policy" approved by the Chairman and same is available in Final EIA Report, Volume-II, Annexure-XVI. The same is displayed below.

adani

ENVIRONMENT, HEALTH & SAFETY POLICY

We at Adani, strive to make our businesses sustainable, that benefits our customers, our employees, our shareholders and society in general. We believe that in addition to integrated infrastructure business, there is a bottom line in performing our operations according to prescribed standards, specifications and regulations on governance, which are safe in working and environmental friendly for the well-being of the working community.

As a responsible corporate, we at ADANI have a firm conviction that the industrial injuries, occupational hazards as well as safety and environmental incidents are preventable. We recognize and trust people as our most important asset and have commitment to provide safe and healthy work environment impacting not only those, who are working in our industry but also community, which is living in the vicinity.

To achieve this objective, we shall

a. Develop, implement, maintain and sustain EHS Management System across the Group to set up new benchmarks for the respective sector of operations, which superimpose the regulatory and statutory requirements.

b. Verify, audit and periodically review EHS performance and set new targets to revise these benchmarks.

c. Formulate EHS objectives and targets for continual improvement and to have a periodic review for ensuring that these are in conjunction with the individual business and corporate levels.

d. Conduct all our operational activities in such a manner as to avoid harm to employees, contractors, stakeholders and community at large.

e. Inculcate safety & health as a personal value through behavioral intervention and recognize it across levels with continuous correction of unsafe behavior.

f. Provide adequate training and resources so as to bring awareness and ability to carry out work safely.

g. Emphasize responsibility and accountability to all employees and contractor workforce for safe performance on the job and encourage safe behavior off the job.

h. Evolve ways to reduce or eliminate the use or release of toxic and hazardous material and prevent pollution by conserving natural resources, recovering and recycling the raw materials for safe, healthy and clean environment.

GAUTAM S ADANI

Date: 01.01.2016

ii. Does the Environment Policy prescribe for standard operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/ conditions? If so, it may be detailed in the EIA.

REPLY:

Environment. Health & Safety Policy clearly emphasises the purpose and use of standard operating process & procedures in such manner so as to avoid harm to employees, contractors, stakeholders and community at large.

1. To address significant HSEQ risks / impacts - Procedures will be developed and documented to address significant HSEQ risks / impacts and potential deviations. The procedures and / or work instructions will include the required operating criteria. Plant and equipment having a potential to impact HSEQ performance will be maintained to meet design descriptions and specifications. Risks / impacts will be identified, documented, communicated and controlled.

2. Procedures and / or work instructions will be developed, documented, communicated and followed where their absence could cause deviations from required operating criteria or could lead to deviations from the HSEQ policy, objectives, targets or requirements. This includes the implementation of the controls identified for the pre-task risk assessment level, or Job Hazard Analysis (JHA).

3. Plant and equipment - Critical plant & equipment that have a potential to impact HSEQ performance will have a documented procedure for the maintenance, inspection, testing and modification to ensure it meets the design description and specifications.

4. Personnel - The competency of personnel will be verified and documented prior to carrying out procedures with significant HSEQ risk. Competency would be assessed as a result of training, education, experience, behaviour, attitudes and attributes required to effectively perform the role.

5. HSE Committee – HSE Committee will be formed to plan, implement and control the use of standard operating process & procedures in such manner so as to avoid harm to employees, contractors, stakeholders and community at large. Committee also will review periodically the compliance status for the environmental conditions as well as corrective and preventive action required if any.

EAC OBSERVATION NO.- 32

3107

iii. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions? Details for this system may be given.

REPLY:

The hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions has defined as below

Role, Responsibility & Reporting mechanism is detailed as follows:

Site Environmental Head:

- Developing effective Environment Management System
- To monitor the Environmental Compliance Conditions.
- To monitor the progress of the Environmental Targets set for the year
- To report all the environmental non-compliance as and when it happens to the Location Head.

Location Head:

- Effective implementation of the Environment Management System
- Monthly review of the Environmental Compliance Conditions.
- Monthly review of the progress of the Environmental Targets set for the year
- To report all the environmental non-compliance to the Business CEO within 24 hrs.
- To report any environmental emergencies to the Business CEO on immediate basis

Business CEO:

- Quarterly review of the Environment Management System
- Quarterly review of the Environmental Compliance Conditions.
- Quarterly review of the progress of the Environmental Targets set for the year
- To report all the environmental non-compliance to the Board of Directors on Quarterly Basis.
- To report any environmental emergencies to the board of Directors on immediate basis

iv. Does the company have system of reporting of Non-compliances/ violations of environmental norms to Board of Directors of the Company and/ or shareholders or stakeholders at large? This Reporting mechanism shall be detailed in EIA Report.

REPLY:

Company will have system of reporting of Non-compliances/ violations of environmental norms to Board of Directors of the Company and/ or shareholders or stakeholders at large.
AEL Board has empowered "Risk Management Committee" to manage health, safety & environment risks and achieve compliance with sustainable development responsibilities. A board resolution in this regards is attached as **Annexure 32**

The current scope of Risk Management Committee is as follows:
"The Committee is required to lay down the procedures to inform to the Board about the risk assessment and minimization procedures & the Board shall be responsible for framing, implementing & monitoring the risk management plan of the company."

Additional Scope of Risk Management Committee will be as follows:

"The Committee will also oversee management processes, standards and strategies designed to manage Health, Safety & Environment and Social risks and ensure maintaining the highest standards and compliance with applicable statutory provisions."

The risk management committee will review all the environmental compliance if any on quarterly basis along with its corrective and preventive measures. This will be the permanent agenda point for all board meetings.

Annexure-32

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CERTIFIED TRUE COPY OF THE RESOLUTION PASSED AT THE MEETING OF THE BOARD OF DIRECTORS ("BOARD") OF ADANI ENTERPRISES LIMITED ("COMPANY") HELD ON 29TH MAY, 2019.

"RESOLVED THAT in continuation to the earlier resolution passed by the Board of Directors, existing terms of reference of Risk Management Committee be modified and substituted as under:

1. To review the Company's risk governance structure, risk assessment and minimisation procedures and the guidelines, strategies and policies for risk mitigation on short term as well as long term basis.

2. To monitor and review the risk management plan of the Company.

3. To review the current and expected risk exposures of the organization, to ensure the same are identified, qualitatively and quantitatively evaluated, analysed and appropriately managed;

4. Carry out any other function as is referred by the Board from time to time or enforced by any statutory notification / amendment or modification as may be applicable.

5. To review cyber security function of the Company.

6. To oversee management processes, standards and strategies designed to manage Health, Safety & Environment and Social risks and ensure maintaining the highest standards and compliance with applicable statutory provisions."

Certified True Copy,
For Adani Enterprises Limited

J. R. Jalundhwala

Jatin Jalundhwala
Company Secretary &
Joint President (Legal)

ADANI ENTERPRISES LIMITED Ahmedabad

Adani Enterprises Ltd
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Registered Office : Adani House, Nr. Mithakhali Circle, Navrangpura, Ahmedabad 380 009, Gujarat, India

EAC OBSERVATION NO.-33

EAC OBSERVATION:

The CER shall be calculated on the slab rates as per the Office Memorandum issued on 1st May, 2018.

REPLY:

CER budget has been revised from Rs. 40 Crores to Rs. 58 Crores in line with the slab rate as per Office Memorandum (OM) of MoEF&CC dated 1st May, 2018.

For the proposed Copper refinery project, AEL has envisaged the following key areas for intervention as CER. 311

Sr. No.	Key Area Identified for intervention through CSR activities by proposed Copper Smelter Plant	Activities covered in CER Office memorandum dated 01st May 2018 of MoEF&CC	Proposed Expenditure in Project construction phase (Rs.)					Total Proposed Expenditure (Rs.)
			1st Year	2nd Year	3rd year	4th Year	5th Year	
A.	**Education Initiatives**	Education, skill development	1,50,00,000	1,64,50,000	1,79,49,000	1,45,00,430	1,53,57,960	7,92,57,390
B.	**Community Health Initiatives**	Health, Solid waste Management Facility,	2,60,00,000	3,44,20,000	3,88,69,400	1,13,50,258	1,18,64,776	12,25,04,434
C.	**Sustainable livelihood and Women Empowerment**	Skill Development, Scientific support and awareness to local farmers, Rain water harvesting, Avenue Plantation and plantations in communities area	9,32,00,000	5,41,24,000	4,51,12,680	4,61,70,568	3,73,02,507	27,59,09,755
D.	**Community Rural Infrastructure Development**	Infrastructure creation for Community Drinking Water Supply, Roads, Cross	2,50,00,000	3,92,10,000	2,25,94,700	52,75,129	55,32,388	9,76,12,217
E.	**Independent monitoring audit and Impact assessments of CSR activities**	-	-	2500000	-	3000000	-	55,00,000
Total Expenditure (Rs)			**15,92,00,000**	**14,67,04,000**	**12,45,25,780**	**8,02,96,385**	**7,00,57,632**	**58,07,83,796**

2811

3112

ANNEXURE - R5

Ministry of Environment, Forest and Climate Change
Impact Assessment Division
(Industry-I Sector)

SUMMARY RECORD OF THE TENTH (10th) MEETING OF RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE HELD DURING 22-23RD AUGUST, 2019 FOR ENVIRONMENTAL APPRAISAL OF INDUSTRY-I SECTOR PROJECTS CONSTITUTED UNDER THE PROVISIONS OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) NOTIFICATION, 2006.

The tenth meeting of the Re-Constituted Expert Appraisal Committee (EAC) for Industry-1 Sector as per the provisions of the EIA Notification, 2006 for Environmental Appraisal of Industry-1 Sector Projects was held during 22-23rd August, 2019 in the Ministry of Environment, Forest and Climate Change. The list of participants is annexed.

After welcoming the Committee Members, discussion on each of the agenda items was taken up ad-seriatim. The minutes of 9th meeting held during 30-31st July, 2019 were confirmed by the EAC and already uploaded on Parivesh portal.

22nd August, 2019

10.11 Greenfield Copper Refinery Plant (1.0 MTPA) project of **M/s. Adani Enterprises Ltd** located at Adani Ports and Special Economic Zone land in village(s) Siracha and Navinal, Taluka Mundra, District Kutch, **Gujarat** [Proposal No. IA/GJ/IND/86812/2016, MoEF&CC File No. J-11011/113/2016-IA.II(I)] – Reconsideration based on **ADS reply for EC**regarding.

10.11.1 M/s. Adani Enterprises Ltd. has made an online application vide proposal No. IA/GJ/IND/86812/2016dated 6th December, 2016 along with copies of EIA/EMP report and Form – 2 seeking environmental clearance under the provisions of the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at Sl. No. 3(a) Metallurgical Industries (Ferrous and Non-ferrous) under Category "A" EIA Notification, 2006 and the proposal is appraised at Central level.

10.11.2 The Greenfield Copper Refinery of 1 (One) Million Tons Per Annum (MTPA) project by M/s Adani Enterprises Limited, proposed at Adani Ports and Special Economic Zone land in village(s) Siracha and Navinal, Taluka Mundra, District Kutch, State Gujarat was initially received in the Ministry on 21stApril 2016 for obtaining Terms of Reference (ToR) as per EIA Notification, 2006. The project was appraised by the Expert Appraisal Committee (Industry) [EAC(I)] during its 6th meeting held on 4thMay 2016and prescribed ToRs to the project for undertaking detailed EIA study for obtaining environmental clearance. Accordingly, the Ministry of Environment, Forest & Climate Change had prescribed ToRs to the project on 21stJune 2016 vide Letter. No. J-11011/113/2016 IA.II (I)

10.11.3 Based on the ToRs prescribed to the project, the project proponent submitted an application for environmental clearance to the Ministry online on 6thDecember 2018 vide Online Application No: SW/83372/2018, Proposal Number: IA/GJ/IND/86812/2016, F. No. J-11011/113/2016 IA.II (I).

10.11.4 The project of M/s. Adani Enterprises Limited located in Villages of Siracha and Navinal, Taluka Mundra, District Kutch, State of Gujarat is for setting up of a new Copper Refinery for production of 1.0 (MTPA) of Copper Cathode. The detail of overall plant configuration as below:

Sr. No.	Plant	Units	Phase-I	Phase-II	Overall Plant Configuration
1	Copper Smelter Plant	TPA	4,50,000	4,50,000	**9,00,000**
2	Copper Refinery Plant	TPA	5,00,000	5,00,000	**10,00,000**
3	Continuous Cast Copper Rod Plant	TPA	2,50,000	2,50,000	**5,00,000**
4	Copper Scrap & E-Scrap Melting Facility	TPA	50,000	50,000	**1,00,000**
5	Sulphuric Acid Plant	TPA	15,00,000	15,00,000	**30,00,000**
6	Phosphoric Acid Plant (100% P_2O_5)	TPA	2,50,000	2,50,000	**5,00,000**

Sr. No.	Plant	Units	Phase-I	Phase-II	Overall Plant Configuration
7	Aluminum Fluoride Plant	TPA	15,000	15,000	**30,000**
8	Oxygen (Industrial) Plant	TPM	48,000	48,000	**96,000**
9	Precious Metal Recovery Plant				
a	Gold	TPA	25	25	**50**
b	Silver	TPA	250	250	**500**
c	Selenium	TPA	144	144	**288**
10	Waste Heat recovery boiler based power plant	MW	20	20	**40**

10.11.5 The proposed capacity for different products for new site area as below:

Sr. No.	Products	Units	Phase-I	Phase-II	Overall Plant Capacity
I	Main Products				
1	Copper Cathode	TPA	5,00,000	5,00,000	10,00,000
2	Sulphuric Acid (> 98%)	TPA	15,00,000	15,00,000	30,00,000
3	Continuous Cast Copper Wire Rod	TPA	2,50,000	2,50,000	5,00,000
4	Gold	TPA	25	25	50
5	Silver	TPA	250	250	500
6	Phosphoric Acid (as 100% P2O5)	TPA	2,50,000	2,50,000	5,00,000
7	Aluminum Fluoride	TPA	15,000	15,000	30,000
II	By-Products				
8	Anode Slime	TPM	250	250	500
9	Selenium	TPM	12	12	24
10	PGM Concentrate	TPM	3	3	6
11	Ferro Sand/ Iron Silicate - Copper Slag (Granulated)	TPM	92,500	92,500	1,85,000
12	Phosphogypsum	TPM	1,04,167	1,04,167	2,08,334
13	Hydro Fluro Silicic Acid (~20% as H2SiF6)	TPM	1,250	1,250	2,500
14	Copper Telluride	TPM	21	21	42
15	Tellurium	TPM	4	4	8
16	Nickel	TPM	8	8	16
17	Bismuth Bisulphate	TPM	60	60	120
18	Calomel (Mercury Chloride)	TPM	9	9	18
19	Mercury	TPM	8	8	16
20	CCR Mill Scale	TPM	25	25	50

10.11.6 The total land required for the project is 256.58 ha, out of which there is no agricultural land and grazing land. 102.39 ha forest land applied for diversion by APSEZ and 154.19 ha is non-forest land already notified as SEZ. The non-forest land

has been acquired by APSEZ and in-principle approval for diversion of forest land has been obtained by APSEZ and committed to provide this land for the project. The Dhaneswari (Dhenderi) River passes through the project area which will be suitably trained and maintained.

10.11.7 The topography of the area is flat and slightly undulating and ranges between 22°48'13.26"N to 22°50'01.88"N Latitude and 69°33'34.74"E to 69°35'08.42"E Longitude in Survey of India topo sheet No. F42J9 & 10, at an elevation of 7-10 m AMSL. The ground water table ranges between 2-10 m below the land surface during the post-monsoon season and 2-20 m below the land surface during the pre-monsoon season. The stage of groundwater development in Mundra Taluka is reported to be63.28% and designated as safeareas as per Technical Report Series, Ground Water Brochure of Kutch District by CGWB – 2013. No groundwater is proposed for either construction or operation phase of the project.

10.11.8 No national park/wildlife sanctuary/biosphere reserve/tiger reserve/elephant reserve etc. are reported to be located in the core and buffer zone within the 10 km radius of the project. The area also does not report to form corridor for Schedule-I fauna. Floral species are mainly dominated by *Prosopis juliflora* and Acacia Senegal. The faunal species were categorized as per conservation status of Wildlife Protection Act, 1972 and reveals that peacock is the only Schedule-I species in the study area and the conservation plan with Rs. 40 lakhs tentative budget is proposed in Section 3.9 of EIA Report.

10.11.9 The process of project showing the basic raw material used and the various processes involved to produce the final output, waste generated in process details are given below:

a. Copper Concentrate : Production of Copper, Sulphuric Acid, Gold, Silver and other by products such as Ferro sand (Iron Silicate/ Copper Slag), Selenium, Copper Telluride, Nickel / Nickel Sludge(Nickel Sulphate/ Nickel Carbonate), production of electricity from waste heat recovery system, etc.
b. Rock Phosphate: Production of Phosphoric Acid and by product Hydro Fluro Silicic Acid and Phospho Gypsum.
c. Aluminum Hydrate: Production of Aluminum Flouride
d. Quick Lime: For Effluent Treatment Plant

Following fuel will be used as per process Requirement:

a. LPG/ PNG
b. Furnace Oil
c. High Speed Diesel
d. Met Coke
e. Coal/ Pet Coke

During the manufacturing Process, following waste will be generated, which will be recycled in the process or will be sent to authorised recyclers:

a. Nickel Sulphate Sludge
b. Arsenic Bearing Sludge – As-Cu Precipitate

c. Used Oil
d. Oil Sludge

During the manufacturing Process, following Hazardous waste will be generated and will be stored in Secured Landfill (SLF) designed in accordance with CPCB Guidelines:

a. ETP Waste sludge and Scrubber Waste
b. Spent Catalyst
c. Spent resins from DM, RO & Refinery Plant
d. Salts from Multi Effect Evaporator

10.11.10 The proposed project to adopt pyrosmelting technology and electro refining process to produce copper cathode. The sulphur dioxide generated during the smelting of copper concentrate is converted into sulphuric acid by Double Conversion Double Absorption (DCDA) process. Part of the sulphuric acid is utilized for production of phosphoric acid within the plant.

10.11.11 Plant is designed on Zero Liquid Discharge concept design and hence no process or treated water will be discharged outside the plant. The treated water will be recycled within the process and to address treated water balance a Reverse Osmosis plant with Multi Effect Evaporator will be installed.

10.11.12 Copper Concentrate will be largely imported from various countries across the globe such as Chile, Peru, Brazil, Australia, Africa, Indonesia, etc. and Rock Phosphate is imported from countries like Jordan, Morocco, Australia, etc. Copper Concentrate & Rock Phosphate will be unloaded from the ship and transported to the closed warehouse either by pipe conveyor or through covered trucks.

10.11.13 The principal raw material for the production of copper metal is copper concentrate blend containing about 25-35% copper, 25-34% sulphur, iron 25-35% and 7-10% moisture. Approximately, 3 LTPA copper scrap and electronic scrap is also used as input to proposed copper smelting plant and copper scrap melting facility.

10.11.14 The major steps in copper extraction are as follows:

- Blending of different grades of concentrates;
- Smelting of concentrate in smelting furnace to produce an intermediate copper rich product known as" matte" containing 58 - 63% copper;
- Converting of liquid matte to blister copper (98 - 99% Cu) in Pierce-Smith converter;
- Fire refining of blister copper to produce anode copper (99.5% Cu) in anode furnace and casting of the anodes; and
- Electrolytic refining of anodes to produce copper cathodes (99.99% Cu).

10.11.15 In the process of extraction of copper metal, sulphuric acid is recovered as a byproduct from the off-gases generated from the smelting and converting furnaces. A part of sulphuric acid produced is utilized for phosphoric acid production and rest will be sold in the market based on market requirement. Phosphoric Acid (PA) Plant uses sulphuric acid produced within the plant and imported rock phosphate to produce Phosphoric Acid. Phosphoric Acid is largely used in fertilizer industries to make phosphatic fertilizers. During the process fluorine gases are recovered as hydrofluro silicic acid

(HFSA) through scrubbing system. HFSA is one of the major raw materials for production of Flouride based chemicals. Hydro fluro silicic acid generated from phosphoric acid plant will be partly sold to fluoride based industries and rest will be converted in value added aluminum fluoride. Aluminum Fluoride plant will be using HFSA produced in PA Plant and Aluminum Hydrate to produce Aluminum Fluoride. Aluminum Fluoride is an important material in production of Aluminum Metal. Aluminum fluoride produced will be sold to aluminum manufacturing companies. The precious metal in the form of anode slime is collected during electrolytic refining of copper will be processed to produce gold, silver and Platinum Group of Metals (PGM) concentrate as well as recovery of minor metals such as Tellurium, Bismuth, Nickel, etc). The copper cathode produced from copper refinery will be melted and drawn in the form of copper wire rod on continuous basis from a continuous casting and rolling machine. Copper rod will be of various sizes as per market requirement such as 8 to 32 mm.

10.11.16 The wastewater generated from copper smelter, sulphuric acid plant, copper refinery, Phosphoric Acid Plant and Aluminum Fluoride plant will be treated in state of art effluent treatment facility. Treated effluent will be consumed within the plant operations to maximum extent. A Reverse Osmosis plant with Multi effect evaporator will be installed at the outlet of treated effluent to reuse water internally and reduce water consumption. This will ensure the plant as a Zero Liquid Discharge facility.

10.11.17 The major technological units envisaged for the copper refinery project are as given below:

- Raw material handling system;
- Smelting furnace;
- Pierce smith converter;
- Ferro Sand Cleaning Furnace (FSCF);
- Copper scrap & E-scrap melting system;
- Anode furnace & anode casting wheel;
- Off gas handling;
- Sulphuric acid plant;
- Oxygen plant;
- Copper Refinery Plant;
- Precious metal recovery plant;
- Continuous cast copper wire rod plant;
- Phosphoric acid plant;
- Aluminum fluoride plant; and
- Effluent Treatment Plant (ETP),
- Utilities like Power, Water, Air and Fuel

10.11.18 The targeted production capacity of the proposed project is 1.0 million TPA. The raw material for the plantwould be procured from open market. The raw material transportation will be by pipe conveyor or covered trucks from port to plant.

10.11.19 The water requirement of the project is estimated as approx. 32800 m^3/day of freshwater requirement will be obtained from the desalination plant of Adani Port

Special Economic Zone (APSEZ). 5,418 m^3 /day treated water from ETP & STP will be utilized for plant operation.

10.11.20 The power requirement of the project is estimated as 300 MW, out of which 260 MW will be obtained from the APSEZ through MUPL and 40 MW would be generated from waste heat recovery system.

10.11.21 Baseline Environmental Studies were conducted during post-monsoon and partly winter season i.e. from 1stOctober to 31stDecember, 2016 Ambient air quality monitoring has been carried out at 8 locations during 1st October to 31st December, 2016 and the data submitted indicated: PM_{10} (35.2 to 84.2 $\mu g/m^3$), $PM_{2.5}$ (19.2 to 43.9 $\mu g/m^3$), SO_2 (14.8 to 42.6 $\mu g/m^3$) and NOx (13.1 to 32.8 $\mu g/m^3$). The results of the modeling study indicates that the maximum increase of GLC for the proposed project is 0.52 $\mu g/m^3$ with respect to the $PM_{2.5}$, 1.27 $\mu g/m^3$ with respect to the PM_{10}, 10.37 $\mu g/m^3$ with respect to the SO_2 and 0.23 $\mu g/m^3$ with respect to the NOx.

10.11.22 Ground water quality has been monitored in 8 locations in the study area and analyzed. pH: 7.3 to 7.8, Total Hardness: 125 to 392 mg/l, Chlorides: 282.6 to 978.4 mg/l, Fluoride: 0.9 to 1.5 mg/l. Heavy metals are within the limits. Surface water samples were analyzed from 4 locations. pH: 7.2 to 8.0; DO: 5.6 to 5.9 mg/l and BOD: <3 mg/l. COD from 60 to 80 mg/l.

10.11.23 Noise levels are in the range of 48.5 to56.6 dBA for daytime and 42.3 to 48.8 dBA for nighttime.

10.11.24 It has been reported that there are no people in the core zone of the project. No R&R is involved. It has been envisaged that no families to be rehabilitated,

10.11.25 It has been reported that a total of 225694 tons per annum of waste will be generated due to the project, out of which 9274tonnes per annum will be recycled through authorised recyclers and within the process. Rest will be stored in the secured landfill (SLF). It has been envisaged that an area of 85.79ha will be developed as green belt around the project site to attenuate the noise levels and trap the dust generated due to the project development activities.

10.11.26 ConsenttoEstablish/ConsenttoOperatefromthe Gujarat State Pollution Control Board /Pollution Control Committee will be obtained as per applicable requirements after obtaining the Environmental Clearance.

10.11.27 The Public hearing of the project was held on 29 April 2017atCommunity Premises Centre Samajvadi Opposite Tunda Primary School under the chairmanship of Shri D R Patel (GAS)(Additional District Magistrate and Resident Additional Collector) for production of 1.0 million TPA of setting up of Copper Refinery plant, under the chairmanship of Additional District Magistrate and Resident Additional Collector. The issues raised during public hearing were mainly about Employment, Environmental Protection and Rural infrastructure.

10.11.28 In line with Office Memorandum dated 1stMay 2018 of MoEFCC regarding Corporate Environment Responsibility, an amount of Rs. 5,800/-Lakhs has been earmarked for Corporate Environment Responsibility (CER) and allocated for relevant programmes to address water, environment, education, community health and rural infrastructure issues in the area based on public hearing issues.

10.11.29 The capital cost of the project is Rs.10,000 Crores and the capital cost for environmental protection measures is proposed as Rs. 104400 Lakhs. The annual recurring cost towards the environmental protection measures is proposed as Rs. 500 Lakhs.The detailed CSR plan has been provided in the EMP in its page No. C6-8. The employment generation from the proposed project / expansion is direct employment and about 5000 indirect employment during operation phase.

10.11.30 Greenbelt will be developed in 85.79Ha which is about 33.43% of the total acquired area. Peripheral greenbelt, consisting of at least 3 tiers around plant boundary will be developed as greenbelt and green cover as per CPCB/MoEF&CC, New Delhi guidelines. Local and native species will be planted with a density of 2500 trees per hectare. Total no. of 225000saplings will be planted and nurtured in 85.79hectares.

10.11.31 The proponent has mentioned that there is no court case or violation under EIANotification to the project or related activity.

Observations of the Committee:

10.11.32 The committee observed that in spite of detailed deliberations during EAC (Industry-1) meetingheld during 9th -11th January 2019 and subsequent information sought, same has not been adequately addressed by the project proponent.

10.11.33 The committee desired that all the information asked for should be carefully prepared and submitted by the Project Proponent. In the meantime, a sub-committee of the committee should carry out the site visit as already recommended earlier.

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LIST OF PARTICIPANTS IN 10th MEETING OF EAC (INDUSTRY-I) HELD ON 22 - 23 AUGUST, 2019

SL. No.	NAME AND ADDRESS	POSITION	ATTENDANCE SIGNATURE	
			22nd Aug, 2019	23rd Aug, 2019
1	Dr. Chhavi Nath Pandey, IFS(Retired) Email: pandeychhavinath55@gmail.com	Chairman		
Members				
2.	Dr. A. K. Dixit, Representative of Central Pulp and Paper Research Institute, Saharanpur.	Member		Absent
3.	, Representative of Indian Meteorological Department, New Delhi.	Member	Absent	Absent
4.	Dr. G. Bhaskar Raju Email: gbraju55@gmail.com	Member	Absent	Absent
5.	Dr. Jagdish Kishwan, IFS (Retd.) Email: jkishwan@gmail.com	Member	22 Aug 2019	23 Aug 2019
6.	Dr. G.V. Subramanyam Email: sv.godavarthi@gmail.com	Member	22/8/19	23/8/19
7.	Shri. Ashok Upadhyaya Email: ahupadhy@rediffmail.com	Member	22/8/19	23/8/19
8.	Shri. R.P. Sharma Email: rpsh3@hotmail.com	Member		
9.	Shri. Sanjay Deshmukh Email: docsvd@yahoo.com	Member	Absent	

SL. No.	NAME AND ADDRESS	POSITION	ATTENDANCE SIGNATURE	
			22nd Aug, 2019	23rd Aug, 2019
10.	Prof. S.K. Singh Email: sksinghdee@gmail.com **singhsk@email.com**	**Member**	Absent	Absent
11.	Dr. R. Gopichandran Email: r.gopichandran@vigyanprasar.gov.in	**Member**	Absent	Absent
12.	Shri. Jagannath Rao Avasarala Email: avasaralajagan@gmil.com	**Member**	Absent	Absent
13	Shri. J.S. Kamyotra Email: kamyotra@yahoo.co.in	**Member**	JSKamyotra 22/8/19	JSKamyotra 23/8/19
14.	Shri. Aravind Kumar Agrawal Director, MoEF&CC Email: dirind-moef@gov.in	**Member Secretary**		

****

ANNEXURE-R6

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

VOLUME-I

REPLY TO EAC OBSERVATIONS RAISED DURING MEETING HELD ON 23RD AUGUST 2019

Sponsor :

adani

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

Prepared by :

Vimta
Driven by Quality, Inspired by Science.

Vimta Labs Limited
142, IDA, Phase-II, Cherlapally
Hyderabad–500 051, Telangana State
env@vimta.com, www.vimta.com
(NABL Accredited and ISO 17025 Certified Laboratory, Recognized by MoEF&CC, New Delhi)

January 2020

PREFACE

M/s. Adani Enterprises Limited (AEL)

Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED GREENFIELD COPPER REFINERY PROJECT (1.0 MTPA) AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

VOLUME-I
REPLY TO EAC OBSERVATIONS RAISED DURING MEETING HELD 23RD AUGUST 2019

For and on behalf of VIMTA Labs Limited

Approved by : **M. Janardhan**

Signed :

Position : **Head & Vice President (Env)**

Date : 10th January, 2020

The report has been prepared inline with the prescribed TORs issued vide letter No.J-11011/113/2016-IA.II(I) dated 21st June 2016 of Ministry of Environment, Forests and Climate Change, New Delhi.

This report has been prepared by **Vimta Labs Limited** with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

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EAC OBSERVATION:

According to the EIA report, the land requirement for the project is 256.58 ha. Out of 256.58 ha, 154.19 ha is APSEZ area and 102.39 ha is a Forest land. The land use conversion plan of 154.19 ha for industrial purpose has not been obtained from the Competent Authority concerned. Further, PP has obtained stage I forest land diversion approval for 1576.81 ha in the name of M/s. Adani Ports and SEZ Limited. The factual agreement between M/s. Adani Enterprises Limited and M/s. Adani Ports and SEZ Limited (APSEZ) for the utilization of 102.39 ha in a Forest land is not clear.

REPLY:

Total project area for the proposed Copper Refinery is 256.58 ha. APSEZ is in possession of 154.19 ha land and is already notified as SEZ via Gazette Notification of Ministry of Commerce and Industry dated 21st September 2016 and the same is attached as **Annexure-1(a)**.

SURVEY NUMBER DETAILS AS PER SEZ VIA GAZETTE NOTIFICATION

Sr. No. as per Notification - 22/09/2016	Name of Village/ Area	Taluka	APSEZ Survey No./ Details	Project Survey No.	Project Area in Ha
50	Navinal	Mundra	223/part	223/P	154.18
52			224 & 225 part	224/P & 225/P	
57	Sircha		125/1	125/1	
59			295 part	295/1 Part	
61			125/2	125/2	
62			126	126	
63			129	129	
64			135	135	
65			137	137	
66			138/1	138/1	
67			140	140	
68			141	141/P	
69			142	142/P	
70			143	143	
71			144/1	144/1	
72			144/2	144/2	
73			147	147/P	
74			Unsurveyed Land	Unsurveyed Land Part	
88	Mundra Diverted Forest		Unsurveyed Land	Unsurveyed Land Part	
	APSEZ applied Forest Land Diversion		295/2 - Forest Land	295/2 - Forest Land/ Part	102.38
	Total				**256.56**

Source: Ministry of Commerce and Industry (Department of Commerce) Notification New Delhi, 21st September, 2016

The balance land of 102.39 ha for proposed Copper Refinery Project is part of Forest Clearance (FC) proposal no F.No.: 8-04/2016-FC for diversion of 1576.81 ha of forest

EAC OBSERVATION NO.-1

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land applied by M/s APSEZ. This FC proposal has been accorded stage-1 "In-principle" approval vide letter dated 16th November 2018, under Section-2 of the Forest (Conservation) Act, 1980 in favour of APSEZL for the development of Special Economic Zone (SEZ) and Industrial Park. Forest Clearance (FC) Stage-I, letter dated: 16th November 2019 is attached as **Annexure-1(b).**

The FAC committee recommended Forest land diversion for the proposed land use of 1576.81 ha which includes 125 ha land for the proposed Copper project during the meeting dated 25th January 2018. Minutes of the Meeting is attached as an **Annexure-1(c).**

There is factual agreement through a MoU **(Annexure-1(d))** dated 14th March 2019 between APSEZ and AEL which reads as "APSEZ will make available to AEL 256.58 ha of land on long term lease basis. Out of the total requirement of 256.58 ha land, currently APSEZ is in possession of 154.19 ha of land which can be readily made available for the project. The balance land of 102.39 ha is under forest diversion process and will be handed over to the project once APSEZ receives the possession of the land." The complete details of land parcels are available as part of the MoU.

In this regard, the State Govt. reported that user agency has submitted details pocket wise land use plan as per the FCA, 1980 guideline and is attached in their reply as Annexure-A, as submitted to CCF, Kutch & Nodal Officer. Detailed land use plan is in accordance with their project needs component. User agency has provided detailed land use plan and has given confirmation that diverted forest area for only those land users which are permissible under the guideline of FCA, 1980.

DETAILS OF PROPOSED LAND USE (AS PER FAC MINUTES)

Proposed Land use	Area in ha
Power Plant 1000 MW X 3	59.9
	209.2
Copper Smelter Plant – 1 MT Capacity	**125**
Coal to Polygeneration -10 MT capacity	89.52
CFS & warehousing	81.59
Engineering Cluster	5.21
Mix Industrial cluster viz engineering ware house etc and social infrastructure as per FCA, 1980 guidelines viz schools, hospitals/dispensary, community halls, cooperatives, etc.	41.45
CFS & warehousing	51.46
Commercial Airport with MRO, Storage yards, fuel tankers, terminals etc.	84.98
	112.06
Engineering Cluster with Water front for manufacturing and assembly of Crane, Boilers, Project cargo, port operation equipment, etc and Liquid storage tanks farm.	516.44
	200
Total	**1576.81**

Source: FAC minutes of meeting dated 25th January 2018

रजिस्ट्री सं० डी० एल०-33004/99

REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

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वाणिज्य एवं उद्योग मंत्रालय

(वाणिज्य विभाग)

अधिसूचना

नई दिल्ली, 21 सितम्बर, 2016

का.आ. 3029(अ).—यत:, केन्द्र सरकार ने भारत सरकार, वाणिज्य एवं उद्योग मंत्रालय (वाणिज्य विभाग) की निम्नलिखित अधिसूचनाओं के तहत गुजरात राज्य के मुंद्रा में विशेष आर्थिक जोन मै. मुंद्रा पोर्ट एण्ड स्पेशल इकोनोमिक जोन लिमिटेड के नाम में अधिसूचित/अनधिसूचित किए थे, अर्थात्:-

(1) सं. का.आ. 1365 (अ) दिनांक 27 मई, 2009;

(2) सं. का.आ. 583 (अ) दिनांक 26 मार्च, 2012;

(3) सं. का.आ. 1443 (अ) दिनांक 31 मई, 2013;

(4) सं. का.आ. 3379 (अ) दिनांक 11 दिसंबर, 2015;

और यत:, दिनांक 27 मार्च, 2012 के अनुमोदन पत्र सं. एफ.1/15/2011-एसईजेड के अनुसार उल्लिखित एसईजेड के नाम को मै. मुंद्रा पोर्ट एण्ड स्पेशल इकोनोमिक जोन लिमिटेड से बदल कर मै. अदानी पोर्ट्स एंड स्पेशल इकोनोमिक जोन लिमिटेड कर दिया था;

और यत: केन्द्र सरकार ने पूर्ववर्ती पैराग्राफ में उल्लिखित तथा इस अधिसूचना के साथ संलग्न का.आ. सं. 1365 (अ) दिनांक 27 मई, 2009; का.आ. सं. 583 (अ) दिनांक 26 मार्च, 2012; का.आ. सं. 1443 (अ) दिनांक 31 मई, 2013; का.आ. सं 3379 (अ) दिनांक 11 दिसंबर, 2015; द्वारा अधिसूचित समस्त विशेष आर्थिक जोनों को प्रशासनिक सुविधा के लिए और विकासकर्ताओं के अधिकारों, दायित्वों और वित्तीय लाभों को प्रभावित किए बिना समेकित करने का निर्णय लिया है;

अत: अब विशेष आर्थिक जोन नियम, 2006 के नियम 8 के साथ पठित विशेष आर्थिक जोन अधिनियम, 2005 (2005 का 28) (जिसे एतद्पश्चात उक्त अधिनियम कहा गया है) की धारा 4 की उप-धारा (1) के द्वितीय परन्तुक द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और प्रथम पैराग्राफ में उल्लिखित अधिसूचना सं. का.आ. 1365 (अ) दिनांक 27 मई, 2009; का.आ.सं. 583 (अ) दिनांक 26 मार्च, 2012; सं. का.आ. 1443 (अ) दिनांक 31 मई, 2013; का.आ.सं. 3379 (अ) दिनांक 11 दिसंबर, 2015 के अधिक्रमण में, ऐसे अधिक्रमण से पूर्व किए गए कार्यों या किए जाने के लिए विलोपित कार्यों को छोड कर, केन्द्र सरकार इस बात से संतुष्ट होने के बाद उक्त अधिनियम की धारा 3 की उपधारा (8) के अंतर्गत अपेक्षाएं और अन्य संबंधित अपेक्षाएं पूरी हो गई हैं, एतद्वारा प्रथम पैराग्राफ में उल्लिखित अधिसूचनाओं में वर्णित विशेष आर्थिक जोनों के समेकित करती है और निम्नलिखित क्षेत्र को विशेष आर्थिक जोन के रूप में पुन: अधिसूचित करती है जिसमें निम्नलिखित तालिका में उल्लिखित सर्वेक्षण संख्या तथा क्षेत्र शामिल हैं, अर्थात:-

तालिका

अ (बहु उत्पाद)				
क्र. सं	गाँव/क्षेत्र का नाम	तालुका	सर्वेक्षण सं./विवरण	क्षेत्र हैक्ट. में
1	धुब्र	मुद्रां	उत्तर: नवीनल क्रीक दक्षिण : जी एम बी-जी ए पी एल भूमि पूर्व: जी एम बी-जी ए पी एल भूमि पश्चिम: 175 एकड़ भूमि	121-40-43
2.	धुब्र	मुद्रां	उत्तर : जी एम बी – जी ए पी एल भूमि एवं जी ए पी एल रोड दक्षिण :जी एम बी – जी ए पी एल भूमि पूर्व: 300 एकड़ भूमि पश्चिम: 325 एकड भूमि	70-81-92
3	धुब्र	मुद्रां	उत्तर :जी एम बी – जी ए पी एल भूमि एवं जी ए पी एल रोड. दक्षिण :जी एम बी – जी ए पी एल भूमि पूर्व: जी ए पी एल रोड एवं 175 एकड़ भूमि पश्चिम: जी एम बी - जी ए पी एल भूमि	131-52-13
4	नवीनल द्वीप भूमि	मुद्रां	उत्तर : नवीनल क्रीक एवं जी एम बी-जी ए पी एल भूमि दक्षिण : कच्छ की खाडी. पूर्व : जी ए पी एल रोड. एवं 325 एकड़ एसीएल भूमि पश्चिम : क्रीक एवं वन क्षेत्र	406-29-97
			उत्तर : वन भूमि	

5	नवीनल द्वीप भूमि	मुद्रां	दक्षिण : नवीनल क्रीक पूर्व : जी ए पी एल रोड. पश्चिम: वन भूमि	80-93-62
6	मुद्रां एवं पुरानी भारत नमक एवं रसायन लि. की भूमि	मुद्रां	उत्तर: ध्रूव ग्राम की क्र.स. 169 का ट्रेवर्स लैंड और मुद्रां ग्राम की क्रं.स. 141 का ट्रेवर्स लैंड दक्षिण: बोचा क्रीक एवं पुराना मुद्रां पतन पूर्व: पुराना मुद्रां पोर्ट रोड. पश्चिम: नवीनल क्रीक एवं जी ए पी एल रोड	320-75-02
7	ध्रुव्र	मुद्रां	169	150-54-13
8	मुद्रां	मुद्रां	141 पार्ट, 141 पार्ट	71-44-64
9	बरोई	मुद्रां	207, 207 पार्ट	39-87-12
10	गोवरसामा	मुद्रां	27, 28/2, 28/3, 28/4, 28/5, 28/6, 28/7, 33/1, 33/2, 33/3, 33/4, 33/5, 34/2, 34/3, 34/4, 34/5, 34/6, 34/7, 34/8, 34/9 पार्ट, 34/9 पार्ट, 34/10, 34/11, 52/8, 52 पार्ट, 28/1, 52 पार्ट, 52 पार्ट (पुराना)	43-75-61
11	शेकादिया	मुद्रां	81/1, 81/2,120/1	04-04-68
12	लूनी	मुद्रां	162, 163 पार्ट, 165/1, 165/2, 166, 167 पार्ट, 168, 169 पार्ट, 177/2, 235 पार्ट, 237/1, 237/2, 258, 238, 239/1 पार्ट, 243 पार्ट, 244, 245/2, 245/1, 246 पार्ट, 247 पार्ट, 248 पार्ट, 254/2 पार्ट, 256/1 पार्ट, 257, 259, 262, 263, 264, 265, 266, 267/1, 267/2, 274/2, 277 पार्ट, 278/1, 278/2, 279 पार्ट, 280, 281, 282, 342 पार्ट, 342 पार्ट, 236, 468 पार्ट, 468 पार्ट, 468 पार्ट	183-68-47

13	वडाला	मुद्रां	120 पार्ट, 177/1, 177/2, 178, 179 पार्ट, 180/1, 180/2, 180/3, 181, 184, 185 पार्ट, 185 पार्ट, 186 पार्ट, 187, 188/1, 189/1, 189/2, 190/1, 190/2, 191, 192, 193, 195 पार्ट, 196/1, 196/2, 197/1, 197/2, 197/3, 197/4, 198, 199 पार्ट, 200, 243/2, 244/2, 245/1पार्ट, 245/1 पार्ट, 245/2, 251/2 पार्ट, 254, 255/1, 255/2 पार्ट, 256 पार्ट, 257, 258/1, 259,260/1, 260/2, 261/1, 261/2, 262, 263/1 पार्ट, 264/1, 264/2, 264/3, 404, 405, 406/1 पार्ट, 406/2 पार्ट, 406/3, 406/4, 423/2, 424, 425/1, 425/2,	138-02-66
			425/3 पार्ट, 431 पार्ट, 432/1 पार्ट, 432/2, 432/3, 433, 434, 435 पार्ट, 446 पार्ट, 447, 448, 449/1, 449/2, 450 पार्ट, 465 पार्ट, 467 पार्ट, 468 पार्ट, 469 पार्ट, 470 पार्ट, 478 पार्ट, 526/1, 527 पार्ट, 528/1, 528/2, 529 पार्ट, 530, 533, 534 पार्ट, 376, 466 पार्ट, 472, 202, 466 पार्ट	
14	पावादियारा	मुद्रां	10/1 पार्ट, 11, 12/3, 12/4, 12/5, 12/6, 13/1, 13/2, 13/3, 14/1 पार्ट, 15, 16 पार्ट, 30, 32/1 पार्ट, 39 पार्ट, 41, 42/1, 42/2, 43/1, 43/2, 44 पार्ट, 17 पार्ट, 29, 31/1, 31/2	26-22-33
15	भरूडिया	मुद्रां	168 पार्ट, 173/1, 173/2, 174 पार्ट, 176, 177 पार्ट, 210, 211 पार्ट, 212, 214, 217 पार्ट, 217 पार्ट, 178 पार्ट	27-01-25

16	भद्रेश्वरा	मुद्रां	54 पार्ट, 55 पार्ट, 57, 60, 153/1, 154/2, 63/1 पार्ट, 63/2 पार्ट, 82/1, 82/3, 84/1, 85/1 पार्ट, 85/2, 86/1, 89 पार्ट, 90, 96 पार्ट, 97 पार्ट, 98 पार्ट, 99, 102/1 पार्ट, 125/1, 151/2, 130/1, 131/1, 132/2, 132/3, 133, 134/2, 137/2 पार्ट, 137/3, 138, 139, 140, 152/1, 152/2, 153/2, 153/3, 153/4, 157/1, 157/3, 86/2, 88, 95, 100, 134/1(137/3), 137/1, 84/2, 130/3, 143/4, 144, 145, असर्वेक्षित भूमि of 25 एकड.	119-23-93
17	बीतावलाडिया (अतमनो वास)	अंजार	255 पार्ट, 260/1, 263, 264 पार्ट, 284/1 पार्ट, 284/2, 285 पार्ट, 289 पार्ट, 290, 291 पार्ट, 292/1, 292/2, 293/1 पार्ट, 294 पार्ट, 297/1 पार्ट, 295 पार्ट, 298/1, 298/2, 302 पार्ट, 304 पार्ट, 299 पार्ट, 300 पार्ट, 301, 306/1 पार्ट, 308 पार्ट, 309 पार्ट, 309 पार्ट, 312 पार्ट, 292/3, 345, 347, 334, 342, 346	61-24-85
18	बीतावलाडिया (उगमनोवास)	अंजार	5/1 पार्ट, 6 पार्ट, 8 पार्ट, 9 पार्ट, 9 पार्ट, 10 पार्ट, 11/1 पार्ट, 11/2 पार्ट, 11/3, 18/1 पार्ट, 18/2 पार्ट, 18/3, 19, 21, 22/2 पार्ट, 22/3, 22/4, 22/5, 23 पार्ट, 55 पार्ट, 184/1 पार्ट, 184/2 पार्ट, 186 पार्ट, 187/1 पार्ट, 220, 221 पार्ट, 222, 223 पार्ट, 224 पार्ट, 225 पार्ट, 225 पार्ट, 338, 401पार्ट, 401 पार्ट, 7, 43, 220, 405 पार्ट, 20,	61-60-25

			असर्वेक्षित भूमि of 10 एकड	
19	कुम्भरिया	अंजार	101 पार्ट, 102, 103, 104, 105 पार्ट, 112 पार्ट, 113, 114 पार्ट, 115, 116, 117, 118, 119, 120 पार्ट, 266 पार्ट, 123, 147, 148 पार्ट, 149 पार्ट, 157, 158, 159/1 पार्ट, 159/2 पार्ट, 160 पार्ट, 161 पार्ट, 162 पार्ट, 163 पार्ट, 164 पार्ट, 169 पार्ट, 171, 172, 174 पार्ट, 251 पार्ट, 252 पार्ट, 253 पार्ट, 254, 255, 256, 257, 258, 259 पार्ट, 265 पार्ट, 267 पार्ट, 270 पार्ट, 268, 269, 271, 274 पार्ट, 275 पार्ट, 276 पार्ट, 152, 111, 136	67-70-31
20	देवलिया	अंजार	4, 8/1, 9, 10, 11/1, 11/2, 45 पार्ट, 46 पार्ट, 47, 48, 49/1, 49/2, 335 पार्ट, 335 पार्ट, 338/1, 338/2, 338/3 पार्ट, 340 पार्ट, 341 पार्ट, 342/1, 342/2, 348/2 पार्ट, 384/2, 342/3, 343, 344, 346, 347, 348/1 पार्ट, 349, 350, 351, 352 पार्ट, 353 पार्ट, 354 पार्ट, 355, 356, 357, 358/1, 358/2, 358/3, 359, 360, 361, 362, 363, 364, 365, 367 पार्ट, 369/2 पार्ट, 369/3, 370 पार्ट, 384/4 पार्ट, 387 पार्ट, 395/1 पार्ट, 397 पार्ट, 398, 399, 400, 403, 404 पार्ट, 405 पार्ट, 489 पार्ट, 401, 489 पार्ट	169-42-98
21	शिनोई	अंजार	514	3-37-91
			717/1 पार्ट, 717/2 पार्ट, 718 पार्ट, 723, 724, 725 पार्ट, 728,	

22	अंजार-एसआईएम	अंजार	734 पार्ट, 735 पार्ट, 736, 737 पार्ट, 738 पार्ट, 761, 762 पार्ट, 867, 868/1 पार्ट, 868/2, 869 पार्ट, 870 पार्ट, 872 पार्ट, 873 पार्ट, 874/1 पार्ट, 875/1, 875/2, 875/3, 875/4 पार्ट, 984 पार्ट, 722/4, 727, 866, 984 पार्ट, 1026, 1058, 1005 पार्ट, 1024 पार्ट, 1025, 1026, 1027, 1010, 1005 पार्ट, 1024 पार्ट	89-14-11
23	मेघपार-कुंभर्डी	अंजार	43 पार्ट, 51/2, 52 पार्ट, 57/1 पार्ट, 63 पार्ट, 68 पार्ट, 69/1 पार्ट, 69/2 पार्ट, 70/1 पार्ट, 70/3 पार्ट, 122/2, 124/1 पार्ट, 124/2 पार्ट, 124/3 पार्ट, 124/4, 140/1 पार्ट, 140/2, 141 पार्ट, 142/4, 163 पार्ट	18-67-60
24	मुद्रां पत्तन (जी ए पी एल) पत्तन सीमा	-	निम्नलिखित वर्तमान अधिसूचनाओं के अनुसार: (i) सीमाशुल्क आयुक्त का कार्यालय, गुजरात, अहमदाबाद द्वारा जारी दिनांक 23.09.1999 की सं.17/99-सी.सी (ii) पत्तन एवं यातायात विभाग, गुजरात सरकार द्वारा जी दिनांक 11.12.2008 की सं. पी/टी/2008/69/डब्ल्यू के एस/432007/जी/ 488/जी एच/1 (iii) सीमाशुल्क आयुक्त (नि.) का कार्यालय, जामनगर द्वारा जारी दिनांक 7 मार्च, 2003 की सं. 03/2003 (iv) सीमाशुल्क आयुक्त (नि.) का कार्यालय, जामनगर द्वारा जारी दिनांक 20 मई, 2003 की सं. 03/2003	
25	मुद्रां	मुद्रां	141 पाइकी	251-43-08
26	मुद्रां	मुद्रां	141 पाइकी	74-61-45
27	धुब्र	मुद्रां	169 पार्ट	105-01-93
28	धुब्र	मुद्रां	169 पार्ट	16-18-80

29	धुब्र	मुद्रां	169/पी1/पी1/पी3	14-16-41
30	धुब्र	मुद्रां	असर्वेक्षित भूमि	28-93-61
31	जारपारा	मुद्रां	689/7	41-92-69
32	जारपारा	मुद्रां	689/29	48-42-72
33	जारपारा	मुद्रां	689/30	24-31-16
34	जारपारा	मुद्रां	689/36	63-70-79
35	जारपारा	मुद्रां	689/47	21-04-38
36	जारपारा	मुद्रां	689/48	74-46-25
37	जारपारा	मुद्रां	689/49	70-51-68
38	जारपारा	मुद्रां	689/50	41-65-27
39	जारपारा	मुद्रां	689/52	16-19-08
40	जारपारा	मुद्रां	असर्वेक्षित भूमि	269-03-89
41	जारपारा	मुद्रां	689/पी92/पी2/पी2	87-20-05
42	नवीनल	मुद्रां	55/1	1-22-42
43	नवीनल	मुद्रां	56/2	0-23-27
44	नवीनल	मुद्रां	64/1	0-98-14
45	नवीनल	मुद्रां	102/1	2-30-67
46	नवीनल	मुद्रां	102/2	1-11-29
47	नवीनल	मुद्रां	110/3	0-84-98
48	नवीनल	मुद्रां	115/3	1-02-18
49	नवीनल	मुद्रां	130	3-24-76
50	नवीनल	मुद्रां	223/पार्ट	134-29-94
51	नवीनल	मुद्रां	असर्वेक्षित भूमि	58-22-79
52	नवीनल	मुद्रां	224 & 225 पार्ट	93-48-29
53	सिरचा	मुद्रां	120	2-12-46
54	सिरचा	मुद्रां	121/1	1-16-35
55	सिरचा	मुद्रां	121/3	1-04-21
56	सिरचा	मुद्रां	121/4	1-95-26
57	सिरचा	मुद्रां	125/1	1-74-02
58	सिरचा	मुद्रां	131	2-54-95

59	सिरचा	मुद्रां	295 पार्ट	103-67-08
60	सिरचा	मुद्रां	124	1-86-16
61	सिरचा	मुद्रां	125/2	1-60-86
62	सिरचा	मुद्रां	126	2-22-58
63	सिरचा	मुद्रां	129	5-62-52
64	सिरचा	मुद्रां	135	2-60-01
65	सिरचा	मुद्रां	137	1-63-90
66	सिरचा	मुद्रां	138/1	3-65-23
67	सिरचा	मुद्रां	140	4-24-92
68	सिरचा	मुद्रां	141	2-24-60
69	सिरचा	मुद्रां	142	2-68-11
70	सिरचा	मुद्रां	143	4-14-81
71	सिरचा	मुद्रां	144/1	3-83-44
72	सिरचा	मुद्रां	144/2	1-39-62
73	सिरचा	मुद्रां	147	2-92-39
74	सिरचा	मुद्रां	असर्वेक्षित भूमि	64-72-85
75	सिरचा	मुद्रां	295/पी6/पी3	73-35-18
76	टुंडा	मुद्रां	180/पी	77-52-50
77	टुंडा	मुद्रां	असर्वेक्षित भूमि	506-94-82
78	मुद्रां	मुद्रां	141 पाइकी	607-05-00
79	मुद्रां	मुद्रां	141 पाइकी	84-17-55
80	मुद्रां	मुद्रां	जी एम बी/जी ए पी एल भूमि (ओल्ड भारत साल्ट लैंड)	382-95-00
81	टुंडा	मुद्रां	180 पाइकी	231-60-98
82	सिरचा	मुद्रां	295/1 पाइकी	62-27-12
83	बरोई	मुद्रां	238 पी	20-23-50
84	बरोई	मुद्रां	207 पी	21-70-16
85	गोवरसमा	मुद्रां	52 पी	189-25-95
86	गोवरसमा	मुद्रां	53 पी	27-01-51
	कुल योग अ			**6456.3349** हेक्टेयर
ब (एफ टी डब्लू जेड)				
87	ध्रुब्र	-	169/36	168.41

	कुल योग ब	168.41 हेक्टेयर

स (नया बहुउत्पाद)			
88	मुद्रां वन	असर्वेक्षित भूमि	1228.00.00
89	मुद्रां वन	असर्वेक्षित भूमि	227.00.00
90	मुद्रां वन	असर्वेक्षित भूमि	385.00.00
	सिरचा	असर्वेक्षित भूमि	1.59.37
	नवीनल	असर्वेक्षित भूमि	6.99.95
91	जारपारा	असर्वेक्षित भूमि	2.86.92
	जारपारा	689/पी92/पी2	5.07.11
		कुल योग स	1856.53.35
	कुल योग (अ+ब+स)		8481.2784 हेक्टेयर

[फा. सं. एफ. 1/12/2016-एसईजेड]

आलोक वर्धन चतुर्वेदी, अपर सचिव

MINISTRY OF COMMERCE AND INDUSTRY

(Department of Commerce)

NOTIFICATION

New Delhi, the 21st September, 2016

S.O. 3029(E).—WHEREAS, the Central Government had notified/de-notified the Special Economic Zone named M/s. Mundra Port and Special Economic Zone Limited at Mundra in the State of Gujarat under the following notifications of the Government of India in the Ministry of Commerce and Industry (Ministry of Commerce), namely:-

(1) S.O. number 1365 (E) dated 27th May, 2009;

(2) S.O. number 583 (E) dated 26th March, 2012;

(3) S.O. number 1443 (E) dated 31st May, 2013;

(4) S.O. number 3379 (E) dated 11th December, 2015;

AND, WHEREAS, the name of the SEZ was changed from M/s. Mundra Port and Special Economic Zone Limited (MPSEZL) to M/s. Adani Ports and Special Economic Zone Limited vide approval letter No. F.1/15/2011-SEZ dated 27th March, 2012;

AND, WHEREAS, the Central Government has decided to consolidate all the Special Economic Zones notified vide S.O. number 1365 (E) dated 27th May, 2009; S.O. number 583 (E) dated 26th March, 2012; S.O. number 1443 (E) dated 31st May, 2013; S.O. number 3379 (E) dated 11th December, 2015 referred in preceding paragraph for administrative convenience and without affecting rights obligations and fiscal benefits of the Developer(s);

NOW, THEREFORE, the Central Government, in exercise of the powers conferred by second proviso to sub-section (1) of section 4 of the Special Economic Zones Act, 2005 (28 of 2005) (hereinafter referred to as the said Act, read with rule 8 of the Special Economic Zones Rules, 2006, and in supersession of the notification number S.O. number 1365 (E) dated 27th May, 2009; S.O. number 583 (E) dated 26th March, 2012; S.O. number 1443 (E) dated 31st May, 2013; S.O. number 3379 (E) dated 11th December, 2015, referred to the first paragraph, except as respects things done or omitted to be done for such supersession, the Central Government on being satisfied that the requirements under sub-section (8) of section 3 of the said Act and other related requirements are fulfilled, hereby consolidates the Special Economic Zones mentioned in the notifications referred to the first paragraph, and re-notifies following areas comprising following survey numbers given in the table below as a Special Economic Zone, namely:

TABLE

A (Multi Product)				
Sl. No.	**Name of Village/Area**	**Taluka**	**Survey No./Details**	**Area in Hectares**
1.	Dhrub	Mundra	North: Navinal Creek South : GMB-GAPL land East: GMB-GAPL land West: 175 acre Land	121-40-43
2.	Dhrub	Mundra	North : GMB – GAPL Land and GAPL Road South :GMB – GAPL Land	70-81-92
			East: 300 Acre Land West: 325 Acre Land	
3.	Dhrub	Mundra	North :GMB – GAPL Land and GAPL Road South :GMB – GAPL Land East: GAPL Road and 175 Acre Land West: GMB - GAPL Land	131-52-13
4.	Navinal Island Land	Mundra	North : Navinal Creek and GMB-GAPL land South : Gulf of Kutch East : GAPL road and 325 acres ACL land West : Creek and Forest Area	406-29-97
5.	Navinal Island Land	Mundra	North : Forest Land South : Navinal Creek East : GAPL Road West : Forest Land	80-93-62
6.	Mundra and Old Bharat Salt and Chemical Ltd. Land	Mundra	North: Traverse Land S.No. 169 of Village – Dhrub and Traverse land S. No. 141 of Village – Mundra South: Bocha Creek & Old Mundra Port East: Old Mundra Port Road West: Navinal Creek and GAPL Road	320-75-02
7.	Dhrub	Mundra	169	150-54-13
8.	Mundra	Mundra	141 part, 141 Part	71-44-64
9.	Baroi	Mundra	207, 207 Part	39-87-12
10.	Govarsama	Mundra	27, 28/2, 28/3, 28/4, 28/5,	43-75-61

			28/6, 28/7, 33/1, 33/2, 33/3, 33/4, 33/5, 34/2, 34/3, 34/4, 34/5, 34/6, 34/7, 34/8, 34/9 Part, 34/9 Part, 34/10, 34/11, 52/8, 52 Part, 28/1, 52 Part, 52 Part (old)	
11.	Shekhadiya	Mundra	81/1, 81/2, 120/1	04-04-68
12.	Luni	Mundra	162, 163 Part, 165/1, 165/2, 166, 167 Part, 168, 169 Part, 177/2, 235 Part, 237/1, 237/2, 258, 238, 239/1 Part, 243 Part, 244, 245/2, 245/1, 246 Part, 247 Part, 248 Part, 254/2 Part, 256/1 Part, 257, 259, 262, 263, 264, 265, 266, 267/1, 267/2, 274/2, 277 Part, 278/1, 278/2, 279 Part, 280, 281, 282, 342 Part, 342 Part, 236, 468 Part, 468 Part, 468 Part	183-68-47
13.	Vadala	Mundra	120 Part, 177/1, 177/2, 178, 179 Part, 180/1, 180/2, 180/3, 181, 184, 185 Part, 185 Part, 186 Part, 187, 188/1, 189/1, 189/2, 190/1, 190/2, 191, 192, 193, 195 Part, 196/1, 196/2, 197/1, 197/2, 197/3, 197/4, 198, 199 Part, 200, 243/2, 244/2, 245/1 Part, 245/1 Part, 245/2, 251/2 Part, 254, 255/1, 255/2 Part, 256 Part, 257, 258/1, 259, 260/1, 260/2, 261/1, 261/2, 262, 263/1 Part, 264/1, 264/2, 264/3, 404, 405, 406/1 Part, 406/2 Part, 406/3, 406/4,	138-02-66
			423/2, 424, 425/1, 425/2, 425/3 Part, 431 Part, 432/1 Part, 432/2, 432/3, 433, 434, 435 Part, 446 Part, 447, 448, 449/1, 449/2, 450 Part, 465 Part, 467 Part, 468 Part, 469 Part, 470 Part, 478 Part, 526/1, 527 Part, 528/1, 528/2, 529 Part, 530, 533, 534 Part, 376, 466 Part, 472, 202, 466 Part	
14.	Pavadiyara	Mundra	10/1 Part, 11, 12/3, 12/4, 12/5, 12/6, 13/1, 13/2, 13/3, 14/1 Part, 15, 16 Part, 30, 32/1 Part, 39 Part, 41, 42/1, 42/2, 43/1, 43/2, 44 Part, 17 Part, 29, 31/1, 31/2	26-22-33
15.	Bharudia	Mundra	168 Part, 173/1, 173/2, 174 Part, 176, 177 Part, 210, 211	27-01-25

			Part, 212, 214, 217 Part, 217 Part, 178 Part	
16.	Bhadreshwar	Mundra	54 Part, 55 Part, 57, 60, 153/1, 154/2, 63/1 Part, 63/2 Part, 82/1, 82/3, 84/1, 85/1 Part, 85/2, 86/1, 89 Part, 90, 96 Part, 97 Part, 98 Part, 99, 102/1 Part, 125/1, 151/2, 130/1, 131/1, 132/2,132/3,133,134/2, 137/2 Part, 137/3, 138, 139, 140,152/1,152/2,153/2, 153/3, 153/4, 157/1, 157/3, 86/2, 88, 95, 100, 134/1(137/3), 137/1, 84/2, 130/3, 143/4, 144, 145, Unsurveyed Land of 25 acres	119-23-93
17.	Bitawaladia (Athamnowas)	Anjar	255 Part, 260/1, 263, 264 Part, 284/1 Part, 284/2, 285 Part, 289	61-24-85
			Part, 290, 291 Part, 292/1, 292/2, 293/1 Part, 294 Part, 297/1 Part, 295 Part, 298/1, 298/2, 302 Part, 304 Part, 299 Part, 300 Part, 301, 306/1 Part, 308 Part, 309 Part, 309 Part, 312 Part, 292/3, 345, 347, 334, 342, 346	
18.	Bitawaladia (Ugamanowa)	Anjar	5/1 Part, 6 Part, 8 Part, 9 Part, 9 Part, 10 Part, 11/1 Part, 11/2 Part, 11/3, 18/1 Part, 18/2 Part, 18/3, 19, 21, 22/2 Part, 22/3, 22/4, 22/5, 23 Part, 55 Part, 184/1 Part, 184/2 Part, 186 Part, 187/1 Part, 220, 221 Part, 222, 223 Part, 224 Part, 225 Part, 225 Part, 338, 401 Part, 401Part, 7, 43, 220, 405 Part, 20, Unsurveyed land of 10 acres	61-60-25
19.	Kumbharia	Anjar	101 Part, 102, 103, 104, 105 Part, 112 Part, 113, 114 Part, 115, 116, 117, 118, 119, 120 Part, 266 Part, 123, 147, 148 Part, 149 Part, 157, 158, 159/1 Part, 159/2 Part, 160 Part, 161 Part, 162 Part, 163 Part, 164 Part, 169 Part, 171, 172, 174 Part, 251 Part, 252 Part, 253 Part, 254, 255, 256, 257, 258, 259 Part, 265 Part, 267 Part, 270 Part, 268, 269, 271, 274 Part, 275 Part, 276 Part, 152, 111, 136	67-70-31
20.	Devalia	Anjar	4, 8/1, 9, 10, 11/1, 11/2, 45 Part, 46 Part, 47, 48, 49/1, 49/2, 335 Part, 335 Part, 338/1,	169-42-98

			338/2, 338/3 Part, 340 Part, 341 Part, 342/1, 342/2, 348/2 Part, 384/2, 342/3, 343, 344, 346, 347, 348/1 Part, 349, 350, 351, 352 Part, 353 Part, 354 Part, 355, 356, 357, 358/1, 358/2, 358/3, 359, 360, 361, 362, 363, 364, 365, 367 Part, 369/2 Part, 369/3, 370 Part, 384/4 Part, 387 Part, 395/1 Part, 397 Part, 398, 399, 400, 403, 404 Part, 405 Part, 489 Part, 401, 489 Part	
21.	Shynoi	Anjar	514	3-37-91
22.	Anjar SIM	Anjar	717/1 Part, 717/2 Part, 718 Part, 723, 724, 725 Part, 728, 734 Part, 735 Part, 736, 737 Part, 738 Part, 761, 762 Part, 867, 868/1 Part, 868/2, 869 Part, 870 Part, 872 Part, 873 Part, 874/1 Part, 875/1, 875/2, 875/3, 875/4 Part, 984 Part, 722/4, 727, 866, 984 Part, 1026, 1058, 1005 Part, 1024 Part, 1025, 1026, 1027, 1010, 1005 Part, 1024 Part	89-14-11
23.	Meghpar – Kumbhardi	Anjar	43 Part, 51/2, 52 Part, 57/1 Part, 63 Part, 68 Part, 69/1 Part, 69/2 Part, 70/1 Part, 70/3 Part, 122/2, 124/1 Part, 124/2 Part, 124/3 Part, 124/4, 140/1 Part, 140/2, 141 Part, 142/4, 163 Part	18-67-60
24.	Mundra Port (GAPL) Port Limits	-	As per following existing notifications: (i) No. 17/99-CC dated 23- 09-1999 issued by the Office of the Commissioner of Customs, Gujarat, Ahmedabad (v) No. PT/2008/69/WKS/432007/ G/488/ GH/1 dated 11- 12-2008 issued by Ports and Transport Department, Government of Gujarat. (vi) No. 03/2003 dated 7th March 2003 issued by the Office of the Commissioner of Customs (Prev.), Jamnagar. (vii) No. 09/2003 dated 20th May 2003 issued by the Office of the Commissioner of Customs (Prev.), Jamnagar.	--
25.	Mundra	Mundra	141 Paiki	251-43-08
26.	Mundra	Mundra	141 Paiki	74-61-45
27.	Dhrub	Mundra	169 Part	105-01-93

28.	Dhrub	Mundra	169 Part	16-18-80
29.	Dhrub	Mundra	169/P51/P1/P3	14-16-41
30.	Dhrub	Mundra	Unsurveyed Land	28-93-61
31.	Zarpara	Mundra	689/7	41-92-69
32.	Zarpara	Mundra	689/29	48-42-72
33.	Zarpara	Mundra	689/30	24-31-16
34.	Zarpara	Mundra	689/36	63-70-79
35.	Zarpara	Mundra	689/47	21-04-38
36.	Zarpara	Mundra	689/48	74-46-25
37.	Zarpara	Mundra	689/49	70-51-68
38.	Zarpara	Mundra	689/50	41-65-27
39.	Zarpara	Mundra	689/52	16-19-08
40.	Zarpara	Mundra	Unsurveyed Land	269-03-89
41.	Zarpara	Mundra	689/P92/P2/P2	87-20-05
42.	Navinal	Mundra	55/1	1-22-42
43.	Navinal	Mundra	56/2	0-23-27
44.	Navinal	Mundra	64/1	0-98-14
45.	Navinal	Mundra	102/1	2-30-67
46.	Navinal	Mundra	102/2	1-11-29
47.	Navinal	Mundra	110/3	0-84-98
48.	Navinal	Mundra	115/3	1-02-18
49.	Navinal	Mundra	130	3-24-76
50.	Navinal	Mundra	223/part	134-29-94
51.	Navinal	Mundra	Unsurveyed Land	58-22-79
52.	Navinal	Mundra	224 & 225 Part	93-48-29
53.	Siracha	Mundra	120	2-12-46
54.	Siracha	Mundra	121/1	1-16-35
55.	Siracha	Mundra	121/3	1-04-21
56.	Siracha	Mundra	121/4	1-95-26
57.	Siracha	Mundra	125/1	1-74-02
58.	Siracha	Mundra	131	2-54-95
59.	Siracha	Mundra	295 Part	103-67-08
60.	Siracha	Mundra	124	1-86-16
61.	Siracha	Mundra	125/2	1-60-86
62.	Siracha	Mundra	126	2-22-58
63.	Siracha	Mundra	129	5-62-52
64.	Siracha	Mundra	135	2-60-01
65.	Siracha	Mundra	137	1-63-90
66.	Siracha	Mundra	138/1	3-65-23
67.	Siracha	Mundra	140	4-24-92
68.	Siracha	Mundra	141	2-24-60
69.	Siracha	Mundra	142	2-68-11
70.	Siracha	Mundra	143	4-14-81
71.	Siracha	Mundra	144/1	3-83-44
72.	Siracha	Mundra	144/2	1-39-62
73.	Siracha	Mundra	147	2-92-39

74.	Siracha	Mundra	Unsurveyed Land	64-72-85
75.	Siracha	Mundra	295/P6/P3	73-35-18
76.	Tunda	Mundra	180/P	77-52-50
77.	Tunda	Mundra	Unsurveyed Land	506-94-82
78.	Mundra	Mundra	141 Paiki	607-05-00
79.	Mundra	Mundra	141 Paiki	84-17-55
80.	Mundra	Mundra	GMB/GAPL Land (Old Bharat Salt Land)	382-95-00
81.	Tunda	Mundra	180 Paiki	231-60-98
82.	Siracha	Mundra	295/1 Paiki	62-27-12
83.	Baroi	Mundra	238 P	20-23-50
84.	Baroi	Mundra	207 P	21-70-16
85.	Govarsama	Mundra	52 P	189-25-95
86.	Govarsama	Mundra	53 P	27-01-51
	Total of A			**6456.3349 Ha**
	B (FTWZ)			
87.	Dhrub	-	169/36	168.41
	Total of B			**168.41 ha**

C (New Multi Product)			
88.	Mundra Forest	Unsurveyed Land	1228.00.00
89.	Mundra Forest	Unsurveyed Land	227.00.00
90.	Mundra Forest	Unsurveyed Land	385.00.00
	Siracha	Unsurveyed Land	1.59.37
	Navinal	Unsurveyed Land	6.99.95
91.	Zarpara	Unsurveyed Land	2.86.92
	Zarpara	689/P92/P2	5.07.11
		Total of C	**1856.53.35**
	Total area of (A+B+C)		**8481.2784**

[F. No. F.1/12/2016-SEZ]

ALOK VARDHAN CHATURVEDI, Addl. Secy.

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ANNEXURE-1(b)

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F. No. 8-04/2016-FC
Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)
****

Indira Paryavaran Bhawan
Aliganj, Jorbagh Road
New Delhi – 110 003
Dated: 16th November, 2018

To,

The Principal Secretary (Forests),
Department of Forests & Environment,
Government of Gujarat,
Gandhi Nagar.

Sub: Diversion of 1576.81 ha Reserved Forest Land in favour of Adani Ports and Special Economic Zone Ltd. (APSEZL) for the development of Special Economic Zone (SEZ) and Industrial Park at Village – Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Tehsil Mundra, under Forest Division and District Kutch, Gujarat (Online Proposal No. FP/GJ/IND/17613/2004):- Reg.

Sir,

I am directed to refer to the APCCF (Land Management) and Nodal Officer, (FCA), Govt. of Gujarat letter No. FCA-1014/10-11/14/S.F-66/F dated 21.01.2016 for seeking prior approval of Central Government under Section-2 of the Forest (Conservation) Act, 1980. The proposal has been examined by the Forest Advisory Committee (FAC) constituted by the Central Government under Section-3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government of Gujarat and on the basis of the recommendations of the Forest Advisory Committee (FAC), the Central Government hereby agrees to accord *"In-principle"* approval under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 1576.81 ha Reserved Forest Land in favour of Adani Ports and Special Economic Zone Ltd. (APSEZL) for the development of Special Economic Zone (SEZ) and Industrial Park at Village – Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Tehsil Mundra, under Forest Division and District Kutch, Gujarat, subject to the following conditions:-

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) *The entire forest area being diverted, should not be cleared off the vegetation in one go after diversion. The UA may clear vegetation for the purpose of basic/essential infrastructure to be developed in the SEZ. Thereafter, as and when a specific project / industry is to come up in the SEZ, the corresponding area shall be marked on the ground and cleared off vegetation. Till then the remaining areas shall be maintained as green cover. It shall be ensured that the lease agreement is made within six months of such clearing. A detailed land use for the marked area, on which clearing of vegetation is proposed shall be submitted to the Regional Office of MoEF&CC before start of work on the area, for information. The Regional Office of MoEF&CC shall ensure that the user agency carries out the work which is in conformity with the broad land use submitted by it. It shall be ensured that minimum number of trees are cleared. The user agency shall explore the possibility of trees of 10 cm dia at breast height and above, proposed for felling/clearing are translocated to suitable location within or outside the SEZ in consultation with State Forest department;*

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(iii) Felling of tress on the forest land being diverted shall be reduced to the bare minimum and the trees should be felled under strict supervision of the State Forest Department;

(iv) *The diverted forest land shall not be proposed to be utilized for Golf Course, Beach Resort, Park or Residential purposes, or any other activity prohibited by FCA 1980, FC Rules and/or guidelines made there under*

(v) *The diverted forest land shall not be used for the construction/expansion of any private Aerodrome. The forest land may be considered, in future on merits, in case of commercial Airport is developed with the approval of DGCA.*

(vi) *The detailed existing land use with maps of all forest land 2008.41 ha (1840ha + 168.41 ha) for which the approval was granted vide letter dated 30.09.2009 and details of complete land use including forest land for the existing private Aerodrome and power plants within the SEZ may be provided for information;*

(vii) *Forest areas proposed within of Mundra survey no. 141/P, Baroi survey no. 207/P, Goversama survey no. 52/P, Luni survey no. 468/P and Bhadreswar survey no. 733/P are having sea front. 100mt shelter belt/green belt in above villages be included in the Master plan of the SEZ, excluding stretches where use of water front is inevitable;*

(viii) *All the conditions as recommended by the Chief Wildlife Warden shall be complied with the User Agency;*

(ix) *The State Government shall clarify whether any non-forest land situated in and around the SEZ but not forming part of the SEZ at present, can be acquired by/allotted to the APSEZ before Stage-II approval;*

(x) *If 683 ha land of GMB or any other non-forest land is allotted for this SEZ, then the equivalent forest land shall be reduced from the forest land diverted/being diverted for the SEZ;*

(xi) *The State Government and the UA shall make effort to include 122 ha of non-forest land in village Jarapara in the SEZ. Accordingly, it is recommended that 122 ha of forest land in Bhadreswar Block shall be maintained as green belt at the cost of UA;*

(xii) *State government will provide details of lease period, terms and conditions on which the forest land is proposed to be diverted in favour of the Use Agency;*

(xiii) *All other conditions imposed in the approval granted for diversion of 2008.41 ha (1840ha + 168.41 ha) forest land on 30.09.2009 shall be complied;*

(xiv) *Only site-specific activities, permissible under the Rules and guidelines framed under the FC Act, shall be taken up in the forest land to be diverted;*

(xv) *The recommendation of the FAC is subject to the condition that in case of conflicts, the provisions of FC Act, 1980, shall prevail over those of SEZ Act 2005;*

(xvi) *All other conditions/recommendations made by FAC on this proposal in its meeting on 25.01.2018, not in conflict with the recommendation of FAC on 20.09.2018 shall remain unchanged.*

(xvii) *The User agency shall identify suitable land for Compensatory Afforestation over double the forest area being diverted. The land shall be mutated in the name of State Forest Department before the Stage-II approval;*

(xviii) *The User Agency shall deposit in the designated account the estimated amount towards compensatory afforestation to be carrying out by the State Forest Department;*

(xix) The Compensatory Afforestation shall be done over double non-forest land (NFL) i.e *3154 ha* to the forest area proposed to be diverted, as per the recommendation of Government of Gujarat, vide its GR No. FCA-1013/11-10/SF-24/F, dt 12.06.2015. The Compensatory Afforestation shall be done within a period of three years with effect from the date of issue of Stage-II clearance and maintained thereafter in accordance with the approved plan in consultation with the State Forest Department at the cost of the User Agency. CA at rate of 1000 saplings per hectares shall be planted over *3154.00* ha.

(31,54,000 plants). If this is not possible to plant these many seedlings in the identified NFL, the balance seedlings will be planted in degraded forest land as per the prescriptions of the Working Plan at the cost of the User agency. In such case CA cost will be revised and duly approved by competent authority and will be deposited online in the Adhoc-CAMPA account of the state concerned;

(xx) The User agency shall identify and mutate in the name of State Forest Department of Government of Gujarat, 3154 ha of suitable non-forest land for CA adjacent to notified Forest for raising Compensatory Afforestation (CA) shall be notified as reserved Forest under Section-4 or Protected Forest under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act. The Nodal officer must report compliance within a period of 6 month from the date of grant of final approval and send a copy of the notification declaring the non-forest land under Section 4 or Section 29 of the Indian Forest Act, 1927, or under the relevant section of the local Forest Act as the case may be, to this Ministry for information and record;

(xxi) The State Government shall submit a certificate, that site for CA is suitable and free from all encroachments and other encumbrances, under the signature not below the rank of Nodal Officer (FCA) in the State Government;

(xxii) The land identified for the purpose of CA shall be clearly depicted on a Survey of India toposheet of 1:50,000 scale;

(xxiii) *The Compensatory Afforestation land shall be surveyed at the cost of User Agency and the User Agency shall erect pillars and barbed wire fencing or trench under the consultation of CCF, Kutch Circle;*

(xxiv) The User Agency shall deposit the cost of raising and maintaining the compensatory afforestation at the current wage rate in the account of Adhoc-CAMPA of the state concerned through online e-portal only. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years;

(xxv) The User Agency shall provide additionally 25% of the CA cost towards Soil and Moisture Conservation measures in the proposed CA area as per site requirement and the said amount shall be deposit in the account of Adhoc-CAMPA of the state concerned through online e-portal only;

(xxvi) The User Agency shall deposit, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC dated 05.02.2009. The requisite funds shall be deposited in the account of Adhoc-CAMPA of the state concerned through online e-portal only;

(xxvii) At the time of payment on the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(xxviii) The user agency should ensure that the compensatory levies (CA cost, NPV etc.) are deposited through challan generated online on web portal and deposited in appropriate bank online only. Amount deposited through other modes will not be accepted as compliance of Stage-I clearance;

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(xxix) The forest clearance will be for a period co-terminus with the lease period specified in the lease agreement. The State Government will submit the lease agreement documents specified in the lease agreement;

(xxx) The User agency shall obtain the Environment Clearance as per the provisions of the Environment (Protection) Act, 1986, if required;

(xxxi) *Complete compliance of CRZ regulations shall be ensured;*

(xxxii) Layout plan of the proposal shall not be changed without the prior approval of the Central Government;

(xxxiii) The User Agency will abide by the applicable recommendations of the State Government including State Forest/Wildlife Departments;

(xxxiv) State Government shall complete settlement of rights, in terms of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in its letter No. 11-9/1998-FC (pt.) dated 03.08.2009 read with 05.07.2013 in support thereof;

(xxxv) The user agency shall provide alternate fuels (LPG) to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(xxxvi) Boundary of the forest land proposed to be diverted shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing, distance from pillar to pillar and GPS co-ordinates;

(xxxvii) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

(xxxviii) The user agency shall submit the annual self-compliance report in respect of the above conditions to the State Government, concerned Regional Office and this Ministry by the end of March of every year regularly; and

(xxxix) The user agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations, Guidelines, relevant Hon'ble Court Order (s) and National Green Tribunal (NGT) Order(s), if any, pertaining to this project for the time being in force, as applicable to the project.

3. After receipt of the report on compliance to the conditions stipulated in the paragraph-2 above, from the State Government of Gujarat, Final/Stage-II approval for diversion of the proposed forest land under Section-2 of the Forest (Conservation) Act, 1980 will be issued by this Ministry. Diversion of the proposed forest land to the user agency shall not be effected by the State Government of Gujarat, till Final/Stage-II approval is issued by this Ministry.

Yours faithfully,

16/11/2018

(Shrawan Kumar Verma)
Dy. Inspector General of Forests (FC)

Copy to:-

1. The PCCF, Govt. of Gujarat, Gandhinagar.
2. The Addl. PCCF (Central), Regional Office (Western Zone), Bhopal.

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3. The Nodal Officer FCA, 1980, Forest Department O/o PCCF, Govt. of Gujarat, Gandhinagar.
4. User Agency.
5. Monitoring Cell, FC Division, MoEF & CC, New Delhi, for uploading.
6. Guard File.

16/11/2018

(Shrawan Kumar Verma)
Dy. Inspector General of Forests (FC)

ANNEXURE-1(c)

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d) 25% of CA cost will be deposited extra by the user agency for soil and moisture conservation (SMC) activities on the CA land.
e) Complete compliance of FRA will be done and certificate on prescribed form will be submitted along with the compliance report.

Agenda No. 3

F. No. 8-04/2016-FC

Sub: Diversion of 1576.81 ha of Reserved forest land for the development of Special Economic Zone and Industrial Park at Village - Siracha, Navinal, Dhrub, Mundra, Baroi, Gorasama, Luni, Bhadreshwar, Ta. Mundra, Dist. Kutch in favour of Adnai Group, Mundra Port and Special Economic Zone Ltd., Ahmedabad.

The above stated agenda item was considered by FAC on 25.1.18 and details available on file were also considered and the FAC observed as follows

1. The present proposal is for diversion of **1576.81 ha** of reserved forest for non-forestry purpose for the development of port based multipurpose SEZ by Adani Ports and Special Economic Zone Limited (APSEZL) in Mundra coast in Kutch district of Gujarat.

2. Adani Ports and Special Economic Zone Limited (APSEZ) is a private multi-port operator. The company was earlier known as Mundra Port & Special Economic Zone Ltd (MPSEZ) and it changed its name to "Adani Ports and Special Economic Zone Limited (APSEZL)" on January 6, 2012.

3. **Adani Ports and Special Economic Zone Limited (APSEZL):** In 1994, the Gujarat Maritime Board (GMB) approved setting up a captive jetty at the Port of Mundra. The Adani group initiated its activities in Mundra in 1994-95. In 1998, a joint sector company, the Gujarat Adani Port Ltd. (GAPL), was incorporated. In 2001, the Port of Mundra signed a concession agreement with GMB for development, operation, and maintenance of the port at Mundra.
4. According to the State Government, the Ministry of Commerce and Industry, Government of India granted in principle permission for total 10000 ha of Mudra Special Economic Zone (MSEZ) in 2001 under State Government's Exim Policy 2000. Under SEZ Act 2005 a Special Economic Zone (SEZ) at Mundra was notified in 2006. The Mundra Special Economic Zone was merged with GAPL of Adani Group. The combined company was renamed 'Mundra Port and Special Economic Zone Limited (MPSEZL)' under Adani Group.

5. **Forest Clearances granted to MPSEZL:**

   a. On 26th June 1998 the proposal for 2400 ha of Forest land for M/s Adani Chemicals was submitted by the State Government which was rejected by Forest Advisory

Committee (FAC) on the ground that the area contains 19.42 lakh mangrove trees. On 17th July 2002, FAC asked for a fresh proposal to be submitted due to high impacts of the project and its location in an ecologically fragile region. On 26th September 2002 FAC recommends 1840 ha of forest land out of the revised proposal for 1850 ha. 10 ha of interspersed mangrove forests was kept out. However, the proposal was granted in principle approval on 13th May 2004 by MoEF to M/s Adani Chemicals for diversion of **168.41 ha** of forest land in only one consolidated patch in survey area number 169/36 for salt washery and desalination plant for diversion of **1840 ha** of forestland for high purity salt works. The EC was also granted to Adani Chemicals Limited for the establishment of high purity salt works, involving an area of **2946.22 ha**, of this **1850 ha** is forestland, for which the in-principle forest clearance was granted in May 2004. The Forest Clearance (FC) and EC letters specify that 10 ha of interspersed mangrove forest, which was deleted from the proposed area shall be transferred back to the state government and maintained at the project cost.

b. On 23rd June 2004 MoEF granted approval for change of user agency from M/s Adani Chemicals Ltd to M/s Mundra SEZ Ltd. However on 5th September 2007, the MPSEZ Ltd requested the MoEF to amend the 'In principle approval' to include phasing out of payments for the diversions of the forest land and changing the name to Mundra Port and SEZ Ltd (MPSEZL); and also for change of land use in Master Plan also in favour of MPSEZ Ltd.

c. However on 27th March 2008 FAC rejected the change of land use to carry out activities related to the Master Plan of the MPSEZL which was against purposes (high purity salt works and salt washery) for which the forest land was earlier diverted. The FAC noted, *"the proposed land use completely changes the scope and purpose of the original diversion accorded....the state government may be advised to submit the proposal afresh."*

d. The application for fresh forest clearance for 1840 ha came up before the Forest Advisory Committee (FAC) of the MoEF in March 2008. Thereafter on 17th April 2008, the FAC considers and recommended the proposal following a representation by MPSEZL dated 3rd April 2008. This came under the scanner of CEC. On 16th July 2008 Central Empowered Committee reported on the FAC reconsideration decision to divert 1840 ha + 168.41 ha of forest land. The report concludes, *"the CEC is of the view that the recommendations of the FAC in the present case may not be accepted and the present request by the user agency for the diversion of forest land in a phased manner as part of the expansion of the Mundra Port and SEZ Limited may be rejected."* On 3rd October 2008 Supreme Court's order in the TN Godavarman case, *"as Regards the proposed land use, the State Government may furnish a fresh proposal to the FAC within a reasonable time."*

e. A fresh application was made by MPSEZL and was granted in-principle approval for forest land of 2008.41 ha (1840 ha + 168.41 ha) on 27.2.2009. The final approval was granted by MoEF on 30.09.2009 with specific and standard conditions.

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f. The proposed land use for **diversion of 1840 ha** of forest land as recommended by the State Government was as under:

S. No.	Description of Items	Area (Ha)
1.	Port incl. Jetties, Basine, harbour, barge Berths, Tug Berths and their Immediate back-up Areas for Cargo handling area, Crane movement area, circulation areas etc.	386.40
2.	Container Freight Stations (CFS) including closed areas, Open Container Storage areas,	257.60
3.	Godowns & Closed Storage Areas for Bulk & Liquid Cargos including Rail sidings etc.	349.60
4.	Open Stock Yards & Open Hard Stands incl. rail sidings etc. for coal, Iron Ore, Steel, Cement, FIM, Pipes etc.	423.20
5.	Transport & Utiliti Corridor including Railway Lines, Roads, Drains, water Pipelines, Oil & Gas Pipelines, Sewage Pipelines, Sea-Water Intake Channel, Outlet Channel/Pipelines, Transmission Lines, Conveyors, Telecom / Data Transmission Lines, Buildings etc.	368.00
6.	Green Belt, etc.	55.20
	Total	**1840.00**

And the proposed land use for **diversion of 168.41 ha** of forest land as recommended by the State Government was as under:

S. No.	Description of Items	Area (Ha)
1.	Container Freight Stations (CFS) including Closed areas, Open Storage areas, Circulation areas etc.	21.89
2.	Light / Medium Industries	106.10
3.	CBD / Offices, Roads, Drains, Water Pipelines, Oil & Gas Pipelines, Sewage Pipelines, electricity Lines, Telecom / Data Transmission Lines, other Buildings etc.	25.56

4.	Green Belt Development	14.85
	Total	**168.41**

6. The final approval was granted by MoEF on 30.09.2009 with specific and standard conditions..

7. **Details of notified Adani Port Special Economic Zone:** According to the project authority, the project involves development of SEZ of the 10000 ha of SEZ, the plot area, **8481.2784 ha** is notified in different point of time. On May 27, 2009, the Ministry of Commerce and Industry re-notified and consolidated the SEZ area of **6472.8684 ha**. After forest clearance, the Ministry of Commerce and Industry de-notified **1840 ha** of Mundra SEZ on 25th November 2009. The details of SEZ notification is as under:

Notification of SEZ	Area Notified as SEZ (ha)
March 4, 2006, GPCB issued a site clearance certificate to Mundra SEZ Limited for airstrip development at survey No. 52/53 of Village Goersana in Mundra.	
June 23, 2006, Ministry of Commerce and Industry notified multi product SEZ under GAPL of 2406.7592 ha in Mundra and Anjar*talukas*.	2406.759
September 6, 2006, Ministry of Commerce and Industry transferred the notified multi product SEZ under GAPL of 2406.7592 ha in Mundra and Anjar*talukas* to M/s Mundra Port and Special Economic Zone Limited.	
May 10, 2007, Ministry of Commerce and Industry notified power SEZ under Adani Power Private Limited of 293.881 ha in Tunda and Siracha villages.	293.881
July 3, 2007, Ministry of Commerce and Industry notified an additional area of 251.4308 ha was notified as part of the SEZ.	251.4308
June 23, 2006, Ministry of Commerce and Industry notified an additional area of 74.6145 ha as part of the multi product SEZ under MPSEZL.	74.6145
May 2, 2008, Ministry of Commerce and Industry notified an additional area of 1074.1755 ha under the multi product SEZ in favor of MPSEZL.	1074.1755
August 11, 2008, Ministry of Commerce and Industry notified an additional area of 2113.7962 ha under the multi product SEZ in favor of MPSEZL.	2113.7962
Total	6214.657

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May 27, 2009, Ministry of Commerce and Industry re-notified and consolidated the SEZ area of 6472.8684 ha.	**6472.8684**

8. The APSEZL again proposed in 2010 to develop another 3510.06 ha including 1840 ha already diverted and another 1670 ha of government land including 864.1299 ha of forest land. APSEZL however approached the Forest Department vide ref no APSEZL/APCCF (land)/F-01/2013-14 dated 10th June 2013 for the entire 1576.81 ha Reserved forest.

9. The State Government of Gujarat vide their letter No. FCA-1014/10-11/14/S.F-66/F dated 21.01.2016 had submitted the proposal for additional **1576.81 ha** of all remaining forest land to consolidate all land holding in the proposed APSEZ which was submitted for diversion in 2005. The proposal was considered earlier in the FAC meeting dated 20.07.2017 also. The details of forest land is as under:

Village	**Survey No.**	**Hect.**
Siracha	295/paiki	125.00
Siracha	295/paiki-2	269.10
Navinal	223/paiki	89.52
Dhurb	169/paiki	81.59
Mundra	141/paiki-2	46.66
Baroi	207/paiki	136.43
Goarsama	52/paiki	112.06
Luni	468/paiki-2	516.45
Bhadreshwar	733/paiki	200.00
		1576.81

10. The application was submitted by Mundra Special Economic Zone Limited (MSEZL) in old application form in March 2005 for Mundra Special Economic Zone (MSEZ) for following purposes:

"MSEZ is proposed to be set up with self-contained facilities like Ind. Park Complex, Distribution Center, Commercial Complexes, Housing Complexes, Utilities like Water Supply, Drainage, Roads, Lighting, Social Infrastructure like schools, colleges, hospitals, townships, open air theatre, amusement park, etc. and provision for Air-field, helipad, railway station, roads (SH& NH), etc. over a total area of about 10,000 hectares.

This 10,000 hectares land is required to be in contiguous blocks as far as possible in the area identified which includes Govt. Waste Land, Forest Land, Private Land, etc.

The development will be as per the detailed project report. The class SEZs set up at JEBEL ALI-FTZ Dubai and SHENZEN PORT – HONGKONG."

11. Justification for the diversion of forest land was given as under:

"As per the policy of the Government India, SEZs are intended to be developed as self-contained township for industrial and commercial with required infrastructure for industrial/commercial activities like water supply, sewerage, adequate power supply, effluent treatment facilities, rail, road, port and airport connectivity for easy movement of cargo and service personnel and world class township having composite social infrastructure like schools, colleges, banks, hospitals, post offices, super markets, amusement parks and gardens, recreation centers and cinema halls and hotels and restaurants and world class commercial complexes for housing the offices of international trading and industrial organizations for setting up their activities in the Special Economic Zone.

In the case of Mundra SEZ, after eliminating the existing populated areas, contiguous land available are Government was land and forest land without useful vegetation and private uncultivable land. Moreover, the land in question is located in the vicinity of Mundra Port and railway line. The forest land proposed for diversion is within the overall boundary of the Mundra SEZ project. There is significant vegetation on the proposed forest land and the particular lands cannot be avoided for making contiguous land blocks. Moreover, the sea facing forest lands offer ideal scope for development of various SEZ activities without really sacrificing any forest.

For all the above said development contiguous blocks of lands are required to facilitate proper area planning.

Moreover, SEZ project is supposed to be in vicinity of sea port for providing easy movement of bulk cargoes. For the industries located in SEZ, re-export facilities will be excellent and will have benefits of some special privileges. The SEZ industries will generate huge employment for the country and benefits of value addition accrue to the nation while the benefits of duty exemption are availed by entrepreneurs locating their industrial units in SEZ."

12. The proposal was recommended by the DFO on 24.03.2005and the Chief Conservator of Forests Kuchchh Circle recommended the proposal on 15.05.2010 to the Nodal officer FCA Gujarat with the following observation:

    1. The user agency has already diverted the reserved forest of 2008.41 ha for the same cause, so this proposed area can be developed as forests only within SEZ. Therefore, there is no need for any diversion of forest land for the same cause.

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2. If this proposal is considered for the diversion than the forest of Siracha of an area of 394.10 may be excluded because of the unique prominent *Acacia nilotica* forest in the district.
3. The area is coastal area so at least 100 mt belt toward sea may be developed as green shelter belt only.
4. For proposed compensatory afforestation land, the Murachvan area is adjoining to forest area and favourable to wildlife. But the remaining two areas Junachay and Amara are not adjoining to any forest areas. Also, they are only grazing areas for local peoples. So, as CF, undersigned does not recommend to accept these areas as compensatory lands.
5. Therefore, these proposed Junachay and Amara areas may kindly be replaced with either at Nanamodungar having dominant indigenous trees cover, Keerodungar having Caracal site and breeding site for migratory birds or land in Abdasa taluka, having GIB habitat.

13. The Nodal Officer FCA recommended the proposal on 16.08.2010 to the with following recommendations:

The user agency has submitted proposal for diversion of 1576.81 ha of forest land for the purpose of developing SEZ. However, it is recommended for 1552.81 ha area, subject to following conditions:

1. There exist rights of local people as per forest settlement reports in the area. These rights may either be continued as such or the user agency should provide alternative at their cost.
2. As Siracha RF supports good patches of Deshi Babool (*Acacia nilotica*) and small wildlife, these patches, totaling to 269.25 ha area will be conserved *in situ* as Green Belt by the user agency.
3. User agency shall provide right of way of not less than 8 mts width within Dhrub RF area for the proposed diversion of 24 ha which has been excluded from the proposal of the user agency.
4. The non-forest land to Compensatory Afforestation shall be transferred to the Department duly demarcated and surveyed by DILR and after barbed wire fencing or trench mound fencing shall be provided by the user agency as decided by CCF, Kachchh.
5. User agency will develop green shelter belt of not less than 100 mts. width all along the adjoining coastal land of the proposed area under diversion.
6. Permission of the competent authority shall be obtained by the user agency for developing the area as SEZ.
7. It user agency fails to develop the area with 5 years from the date of the formal approval, the remaining area shall be reverted back to the Forest Department without payment of any refund or compensation of any kind.

14. The State Government has recommended the proposal on 21.01.2016 subject to the following conditions:

"Diversion of **1576.81** ha of forest land of Reserved forest land for development of Special Economic Zone and Industrial Park at village-Siracha, Navinal, Dhurab, Mundra, Borai, Gorasama, Luni, Bhadreshwar, Taluka. Mundra, Distt., Kutch in favour of Adani Group Mundra Port and Special Economic Zone Ltd, Ahmedabad" this proposal is recommended subject to the following conditions:

1	The user agency shall make necessary arrangements for right of the way for the local people from the diverted land. Plan of such arrangement with the consent of local people shall be submitted before the formal approval to this proposal.
2	All the conditions as recommended by the Chief Wildlife Warden shall be complied with the User Agency. (A copy is enclosed in this proposal)
3	The User Agency shall develop and maintain a green belt at Siracha Village for *in situ* conservation of Indian Birds and Wolfs, hence 100 ha. area of Siracha village may be excluded from the diversion. Exact location of 100 ha. from the total demanded land of Siracha village can be decided at the time of formal approval.
4	If 122 ha. of Village – Zarpapa- 683 ha., of GMB or any other revenue land is allotted for this SEZ then equivalent land from land shall be reduced from the demanded forest land for this SEZ.
5	The Compensatory Afforestation land shall be surveyed at the cost of User Agency and erect pillars and barbed wire fencing or trench under the consultation of CCF, Kutch Circle.
6	The user agency shall develop the 100 mts shelter belt at adjoining sea side.
7	Approval of Developing SEZ shall be obtained by the User Agency from concerned authority.
8	The diverted shall be utilized for the purpose of the SEZ within 5(five) years from the date of the formal approval. If the user agency fails to do so, the unutilized forest land shall be recovered by the Forest Department.
9	The User Agency shall obtain Environment Clearance, CRZ Clearance before the commencement of the work.
10	The Compensatory Afforestation land shall be handed over to the State Forest Department without any liability and encroachment before the formal approval to this proposal.

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11	All the conditions of the formal approval of 2008.41 ha forest land shall be diverted shall be complied with before the formal approval of this proposal
	(a) 3770 ha non-forest land of Kutch district shall be transferred to the state Forest Department before the formal approval to this proposal for the Ghorad Sanctuary.
	(b) Compensatory Afforestation for the approval of 2008.41 ha of forest land shall be transferred to the State Forest Department before the formal approval to this proposal.
	(c) The User agency shall pay the cost of fencing in Compensatory Afforestation land to the State Forest Department before the formal approval to this proposal.
	(d) The user agency shall pay the difference amount of 5.35 Crores for the firewood estimation from 2008.41 ha forest land before the formal approval to this proposal.
	(e) Any other conditions of the formal approval of the 2008.41 ha diverted forest land before the formal approval of this proposal.
12	Diverted forest land shall not be utilized for Golf Course, Bench Resort, Park or Residential purposes or any other activity prohibited by FCA 1980 and/or guidelines there under.
13	The user agency shall comply the additional conditions of processing fee, Registration fee, Additional Compensatory Afforestation Land, Amount for Additional Compensatory Afforestation Land and additional Compensatory Afforestation Land and additional amount as per Government of Gujarat's GR No. FCA-1013/11-10/SF-24/F Dated 12.06.2015
14	The user agency shall comply the provisions of Forest Right Act, 2006 before the formal approval of this proposal.
15	Recommendations of the Nodal Officer is submitted by its letter no. JMN/29B/A/806/2015-16 dated 28.12.2015 (A copy is enclosed in this proposal)

15. The said proposal was considered earlier also by the FAC in its meeting held on 20.07.2017 and based on the facts made available on the date of FAC meeting, the following information were sought from the State Government:

(i) Detailed land use plan has not been submitted and therefore the State government shall provide detailed land use of the whole area including forest and non-forest land.

(ii) State government will analyse and examine the land use plan and submit a proposal for diversion of forest land for non- forestry purpose for only those land use which are permissible under the guideline of FCA 1980.

(iii)MOEF&CC had accorded prior approval under section 2(ii) of FC Act, in favour of M/s Mundra Port, for diversion of reserved forest area of 57.75 ha, for laying of Railway line vide letter No. 8-163/97FC, MoEF, New Delhi, dated 24.07.2004, and 1840.00 ha. & 168.41 ha. for development of port based SEZ vide No. 8-2/1999-FC(Pt), dated 27.02.2009. It has been fulfilled/complied by the user agency. The State Government shall submit complete compliance of all stipulations of past approvals under section 2(ii) of FCA, 1980.

(iv) Site inspection was carried out by the regional office for **1476.81 ha** whereas state government has now recommended the proposal for total **1576.81 ha**, which include 100 ha of *Acacia nilotica* patch , with condition that the same may be diverted by allowing user agency to pay five times of NPV of forest area. This patch is a part of 394 ha of forest of Sircha village which CF Kutch had recommended to be excluded. **Regional office may inspect the area again and give specific comments on exclusion/inclusion of 100 ha or 394 ha into the proposal.**

(v) State Government may kindly give justification for notifying the forest area as part of SEZ (special economic Zone) without seeking prior permission under the provision of Forest conservation act 1980.

(vi) It is reported that the part of non- forest area is being utilized as SEZ and now the proposal is for the balance patches of forest area which are required to be included in SEZ to make the total area as 10000 ha. From the review of the map and justification of the state it is learnt that it is statutory requirement of custom department that for processing zone of SEZ it should be located on contiguous pieces of land and that there should be over all contiguity in the various components of SEZ. State Government had further justified that there is no option than to opt for the diversion of forest land to be included in the SEZ. The State Government may be asked why this matter was not brought to the notice of FAC earlier.

(vii)State Government shall give very specific recommendation regarding suitability of Compensatory afforestation land.

(viii) State Government shall submit complete compliance of FRA.

16. Accordingly, the State Govt. and Regional office, Bhopal was requested vide the Ministry's letter dated 24.08.2017 to furnish the information as sought by FAC in its meeting held on 20.07.2017 The State Government vide their letter no. FCA-1014/10-11/14/S.F-66/F dated 01.12.2017 has submitted their compliance report as under:

S. No.	Reply of State Govt.
i. & ii	In this regard, the State Govt. reported that the user agency has submitted details pocket wise land use plan as per the FCA, 1980 guideline and is attached in their reply as Annexure-A (pg. 803/c), as submitted to CCF, Kutch & Nodal Officer. Detailed land use plan is in accordance with their project needs and project components. User agency has provided detailed land use plan and has given confirmation that diverted forest area for only

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	those land uses which are permissible under the guideline of FCA, 1980.	
	The details of proposed land use are as follows:	
	Proposed land use	Area in ha.
	Power Plant 1000 MW X 3	59.9
		209.2
	Copper Smelter Plant – 1 MT capacity	125
	Coal to Polygeneration – 10 MT capacity	89.52
	CFS & warehousing	81.59
	Engineering Cluster	5.21
	Mix Industrial cluster viz engineering ware house etc and social Infrastructure as per FCA 1980 guidelines viz schools, hospitals/ dispensary, community halls, cooperatives, etc.	41.45
	CFS & warehousing	51.46
	Commercial Airport with MRO, Storage yards, fuel tankers, terminals etc.	84.98
		112.06
	Engineering Cluster with Water front for manufacturing and assembly of Crane, Boilers, project cargo, port operation equipment, etc and Liquid storage tanks farm.	516.44
		200
	Total	1576.81
iii.	In this regard, the State Govt. reported that compliance of all conditions put forward in final Approval given by the Govt. of India.	
	In principal approval has been granted by Govt. of India vide letter No. 8-2/1999-FC (PT) dated 27.02.2009 for land admeasuring 1840 ha and 168.41 ha to Adani Ports and SEZ Ltd for development of port based Special Economic Zone. Compliance of conditions laid down in In-principle approval granted by the Govt. of India.	
	For the condition No. 8 of in principle approval no. 8-2/1999-FC (PT) dated 27.02.2009, 3752.30 ha land is transferred in the name of Forests & Environment Department out of 3700.00 ha land of which was possessed by GEDA.	
	For the Conditions No. 17, 18 & 19 of Memorandum No. FCA-1009(10-14) SF-18-K dated 17.11.2009, the user agency has given the Bank Guarantee of **Rs.77300000.00.** User agency has provided detailed compliance of all conditions put forward in Final Approval given by the Govt. of India	
iv.	In this regard, the State Govt. reported that at one point of time in 2009, **the then Conservator of Forest, Kutch has directed to exclude an area of 394 ha in Village Siracha, stating that 100 ha patch possess good vegetation and presence of wild animals.** The State Govt. accordingly recommended final proposal with deduction of 100 ha land out of this 394 h	

	in Jan. 2016.
	However, User agency requested State Govt. for the re-survey of the Siracha land stating that the Wild life report is quite old i.e. of 2009 and at present no wildlife and exotic vegetation is available in that area. The survey was carried out by CCF, Kutch office and founded that there was negligible movement of wildlife as per report and Acacia Nilotica is present only in one corner of the land parcel. Further, the area of 100 ha of Siracha is in close proximity to existing power plant and as represented by user agency this Forest land of Siracha is necessary for their expansion of Power Plant, due to integration with existing power plant. **User agency has also represented and agreed to pay 5 times NPV in line with FCA provision of addressing the situation of diversion of Wild life protected area.** User agency feels that there is no other alternative for 100 ha land and for that DCF Kutch East has recommended not to exclude 100 ha land.
	But, as per reference of Minutes of Meeting of Forest Advisory Committee held on 20.07.2017, APCCF, Regional Office, Bhopal has conducted the site inspection once again on 26.09.2017 to decide for 100 ha Siracha forest land. Previously, it was done on 06.05.2016. So now this aspect pertains to Regional Office Bhopal and its further report on latest site inspection report.
v.	**In this regard, the State Govt. reported that Ministry of Commerce and Industry, Govt of India has granted in principle permission for total 10000 ha of Special Economic Zone (SEZ) to User Agency in 2001 under State Govt's Exim Policy 2000.** In the meantime, user agency has acquired 6456 ha land in piece meal through private land, direct allotted Govt land and Govt land allotment through Gujarat Maritime Board. **As and when user agency got the possession of land, it was further notified as SEZ Area after getting approval from Ministry of Commerce and Industry, GoI.** Further, the area of 1840 ha and 168 ha forest land has been diverted to APSEZL by Forest Department in Nov-2009 has also been notified for SEZ area in April-2015 and March-2012 respectively.
	Thus, as of now total 8464 ha of area has been declared as SEZ Area.
	The area declared as SEZ area earlier is adjacent to various pockets of this 1576 ha forest land, which is proposed for diversion by User Agency. The area of 1576 ha as proposed for allotment by User Agency has not been declared as SEZ Area as it is not in their possession. As informed by user agency, they will approach Ministry of Commerce and Industry, Government of India to declare this area as SEZ area only after the area is diverted to User Agency.
	Ministry of Commerce and Industry, Govt. of India has granted in principle permission for establishing SEZ in total 10,000 ha of Special Economic

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	Zone (SEZ) to User Agency in 2001 under State Govt.'s Exim Policy 2000.
	That the forest land, is required to complete the SEZ land requirement for establishing SEZ has been mentioned in the original proposal and has been provided in various comments, offered by user agency and this office.
	Thus, as of now total 8464 ha of area, acquired in piece meal through Private land, Direct Govt. allotted land and Govt. land allotment through Gujarat Maritime Board has been declared as SEZ area.
	As informed by user agency, they will approach Ministry of Commerce and Industry, Govt. of India to declare this area as SEZ area only after the area is diverted to User Agency.
vi.	**In this regard, the State Govt. reported that the** proposal of User Agency for area under consideration is adjoining to already declare as SEZ of 8464 ha land. There is no other land except Forest Land. Hence, User agency has proposed for diversion of Forest Land.
	Ministry of Commerce and Industries, Govt. of India has granted In-principle permission for establishing SEZ in total 10000 ha of Special Economic Zone (SEZ) to User Agency in 2001 under State Government's Exim Policy, 2000.
	That the land is required to complete the SEZ land requirement for establishing SEZ has been mentioned in the original proposal and has been provided in various comments, offered by user agency and his office.
	It is statutory requirement of customs department that for processing zone of SEZ, it should be located on contiguous pieces of land and that there should be over all contiguity in the various components of SEZ. This aspect has been submitted by the State Government earlier, in its project justification and other clarifications provided.
vii.	The State Govt. stated that the detailed scheme for Compensatory Afforestation and land suitability was already prepared in Sept-2008 while processing the proposal. But, as per the opinion of then Conservator of Forests, Kutch that Non-forest Land of Junachy and Amara area offered as CA land by User Agency is not adjacent to existing forest land and therefore not suitable for afforestation.
	However, as per the latest resolution of State Government dated 15.05.2017 whenever the Non-forest land being offered as Compensatory Afforestation land is not possible to be contiguous to existing forest land and if the area of diversion is 100 ha or more area the CA land should not be less than a patch of 25 ha. Considering this guideline the CA offered land at Junachy and Amara was found suitable.
	State Government vide its GR dated 15.05.2017 has provided guidelines for suitability of private land for compensatory land. Considering this

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	guideline, the CA offered land at Junachy and Amara was found suitable.
	Suitability Certificates along with scheme of Compensatory Afforestation and land suitability for land area of 503.01 ha of Village Murachban, Taluka. Lakhpat, 283.80 ha of Village Junachy, Taluka.Lakhpat and 790 ha of Village Amara, Taluka.Nakhatrana have been provided by DCF accordingly.
	However, User Agency has given undertaking if forest department is not ready to accept proposed CA land as mentioned above, it will be changed and new CA areas will be provided before the issuance of final approval.
viii.	The State Govt. stated that an Undertaking has been given by the User Agency that all formalities as per the Guidelines of Forest Rights Rules-2006 of Government of India will be completed before final approval. So, undertaking of User Agency may be provided.

17. After the FAC meeting on 20.07.2017, theMinistry vide it's letter dated 24-08-2017 requested the Regional Office, Bhopal to **inspect the area again** and give specific recommendations on the exclusion / inclusion of 100 hectares or 394 hectares of forest area in the proposal.The Regional office inspected the project area on 26.09.2017 with the specific and the only objective of evaluating the recommendation of the State Government of Gujarat to include 100 ha of 394.10 ha of Siracha village into the project. SIR was done along with Shri U.D. Singh, APCCF (Land), GOG, Shri P.S. Randhava, CCF, Kutch and the senior officers from the User Agency. Based on the field observations during inspection, the discussions held at the time of inspection with User Agency officers as well as officers of State Forest Department, Regional office recommended the proposal for consideration of diversion of 394.10 hectares of forest area of Siracha village for the following reasons:

a) The forest land of Siracha village is adjoining the existing power plant of the User Agency. During field inspection the User Agency representatives informed that the forest land of Siracha village is required for the expansion of the existing power plant which was initially developed keeping in view the future expansion. Therefore, for the expansion of existing power plant, the User Agency has no option for alternative site and its requirement are integral for implementation, operation and expansion of future component.

b) The Siracha forest land is an isolated patch of forest measuring 394.10 (Map prepared by BISAG). *Though, it is good forest, however, since it is surrounded from all sides by habitation and various kinds of infrastructure it does not, therefore, possess high conservation value. During inspection, regional office found no major signs of wild life.* The last Inspection Report of Regional Office, Bhopal dated 06.05.2016 also under paragraph 19 mentions that during site visit, no significant wild life was seen. With the

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full development of SEZ, its conservation value would be further undermined. It the CA area is developed contiguous to an existing large forest area with good potential for conservation the loss on account of 394.10 ha of forest area would be adequately compensated.

c) Generation of power is one of the key requirements for the development of the country. The 3000 MW proposed to be generated, as informed by the User Agency, through the said expansion of adjoining power plant near Siracha, in regional office's well-considered opinion, would be far less detrimental to the overall environment as compared to another standalone thermal power plant established elsewhere to produce same amount of power. The main reason for this is that such a standalone power plant in the hinterland would be supplied huge quantity of required coal transported through railway or road whereas the proposed expanded thermal power plant would be fed coal by a conveyor system (as informed by User Agency during inspection) from Mundraport to the power plant. Secondly the expansion would use the existing sea water facility for cooling and consumptive purpose thus avoiding use of huge quantity of fresh water if the new plant were to come up elsewhere. Thirdly, the expansion would use the existing infrastructure facilities for evacuation of power.

d) The State Government has recommended payment of five times the NPV for the 100 hectares of forest area coming under diversion for non-forest use for the project.
In other words the APCCF (C), Regional Office has recommended the diversion of 394.10 ha of good forest, citing reason that it will have no future conservation value, for future expansion of TTP by APSEZL albeit at 5 times the NPV.

18. Form the documents examined by the FAC in meeting dated 25.01.2018 it is learnt that the Mundra special economic zone is proposed to set up with self-contained facilities like Industrial park complex, distribution centre, commercial complexes, Housing complexes , utilities like water supply, drainage, roads ,lighting, social infrastructure like school, colleges, hospitals , townships, open air theatre, recreation centre, cinema hall, amusement park etc and provision for air field, helipad ,railway station, roads(SH &N.H) etc over total area. The User Agency has now agreed to change the land use of forest land as informed by State Govt. vide its letter dated 01-12-2017 and the proposed changed land use of forest land is now indicated under para 16 above.

FAC deliberated on the fact that establishment of port based SEZ is necessary for the development of the country. On analysis through DSS it is observed that most of the forest area and revenue areas are under non forestry use and some patches of forest areas are available inside SEZ. In view of the clarification submitted by the State Government vide letter dated 01-12-2017 FAC recommends the grant of In Principle Approval for the diversion of **1552.81 ha** (1576.81-24 ha) of forest land subject to general standard and following specific conditions.

i The Nodal officer, FCA had recommended in 2010 that though the user agency has submitted proposal for diversion of 1576.81 ha of forest land for the purpose of developing SEZ only 1552.81 ha area may be diverted excluding 24 ha in Dhrub RF, subject to specific conditions.. It was recommended that the user agency shall provide

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right of way of not less than 8 mts width for 24 ha which has been excluded from the proposal of the user agency. The details of settlement of rights shall be provided.

ii The diverted forest land measuring 1552.81ha shall be maintained as green area within the APSEZ and the diversion for non-forestry purpose will be considered only on case to case basis by the ministry for the purpose required for SEZ.

iii Diverted forest land shall not be proposed to be utilized for Golf Course, Beach Resort. Park or Residential purposes, or any other activity prohibited by FCA 1980 and/or guidelines there under

iv From the DSS analysis it is observed that Aerodrome already exists in the zone. The diverted forest land will not be proposed for the construction of private Aerodrome as demanded by the use agency. The forest land may be considered, in future on merits, in case of commercial Airport is developed with the approval of DGCA.

v The detailed existing land use with maps of all forest land 2008.41 ha (1840ha + 168.41 ha) for which the approval was granted vide 30.09.2009 and details of complete land use including forest land for the existing private Aerodrome and power plants within the SEZ may be provided.

vi 100 meter wide green shelter belt along the sea coast except in the waterfront area shall be included in the Master Plan of APSEZ.

vii Complete compliance of CRZ regulations shall be ensured.

viii All the conditions as recommended by the Chief Wildlife Warden shall be complied with the User Agency.

ix The Compensatory Afforestation land shall be surveyed at the cost of User Agency and erect pillars and barbed wire fencing or trench under the consultation of CCF, Kutch Circle.

x Compensatory afforestation shall be raised over identified non forest land equivalent to the diverted forest land diverted and at least 1000 plants per hectare (1552.81 hectares x 1000 = 1552810 plants) shall be planted with provision for ten years on subsequent maintenance.

xi 25% of revised CA cost will be deposited extra by the user agency for soil and moisture conservation (SMC) activities on the CA land.

xii Complete compliance of Forest Right Act 2006 to be done for the 1576.81 ha of forest land by the State Government.

xiii To provide protection to the existing wildlife a patch of natural forest in Luni to Harmiramora village shall be kept as green belt without carrying out any activities in that area as recommended by the CCF Kutch Circle vide letter dated 15.5.2014 to PCCF Wildlife Gujarat. The recommendation of the Chief wildlife warden Gujarat sent vide No WLP/663/32/B/1778-79/2014 dated 30.5.2014 must be complied.

xiv The State Government will inform about the status of the land measuring 122 ha in village Jarapara and 683 ha of land belonging to GMB has been transferred to APSEZL. This area need to be deducted from the proposed forest land diversion as recommended by the State Government.

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xv State government will provide the terms and conditions on which the forest is proposed to be transferred on lease to the use agency The detail of lease period, terms, conditions and consideration, if any, may be provided.

xvi All other conditions imposed in the approval granted for diversion of 2008.41 ha (1840ha + 168.41 ha) forest land on 30.09.2009 shall be complied.

Agenda No. 4

F. No. 8-115/2000-FC

Sub: Diversion of 19.52 ha of forest land for raising the height of Barvi Dam for submergence and rehabilitation in District Thane of Maharashtra.

The above stated agenda Item was considered by FAC on 25.1.18 and observed as follows:

1. The State Govt. of Maharashtra vide their letter no. FLD-1215/CR-292-F-10 dated 15.09.2015 has submitted a proposal for diversion of 19.52 ha of forest land for raising the height of Barvi Dam for submergence and rehabilitation in District Thane of Maharashtra to Regional Office, Nagpur.
2. This is a dam being constructed since 1968 to meet the demand of water for industrial and drinking purposes. MoEF&CC vide its letter no. 8-115/2000-FC dated 19.12.2005 had accorded approval for diversion of 513.66 ha of forest land. The proposed height of the dam at the time of approval was 62.05 meter. It is reported that this projects was envisaged to be constructed in three stages. In second stage the height was raised up to 65.05 m and in third stage the height is proposed to be raised up to 72.06 m.
3. The proposal for additional area of 19.52 ha was submitted to REC Nagpur.
4. The stated proposal was considered by the REC in its meeting held on 25.01.2015. The Addl. PCCF & Nodal Officer (FCA), Government of Maharashtra and representative of the user agency were also present in the said Regional Empowered Committee (REC) meeting. After detailed examination of the proposal and interaction with the Nodal officer (FCA) and representatives of the User Agency, the REC observed as under:
   i. The Committee noted that project envisages raising the height of Barvi Dam in Thane District in the State of Maharashtra to meet the increased demand of water for industrial and drinking purposes. Project was already completed and in the 3rd stages out of which two stages area already completed and in the **3rd Stage of the project, height of dam is proposed to be increased by 7.01 meters i.e. from RL 65.05 meters to 72.06 meters to augment the storage capacity of the reservoir to meet the increased demand of water in the region.**
   ii. The Committee also noted that Government of India vide its letter no. 8-115/2000-FC dated 19.12.2005 had accorded approval for diversion of 513.66 ha of forest land. However, while submitting the initial proposal for diversion of 513.66 ha of



ગુજરાત गुजरात GUJARAT BT 167816

નંબર : ૧૧૨૩૧૫ રૂ.૧૦૦/-
તારીખ : ૧૩/૩/૨૦૧૯
નામ : અદાણી પોર્ટસ એન્ડ સ્પેશીયલ ઇકોનોમિક ઝોન લી.વતી મયુરભાઈ
સરનામું : રાયકાગામ, સિ.જી, કાંઠાએ, અમદાવાદ
શાહ શેફાલીબેન કલ્પેશકુમાર
લા.નં. એસ.બી./૩૮૦-૩૮૧/૧૯૯૮
એ/૨, ભાગ્યલક્ષ્મી એપાર્ટમેન્ટ, નવા રિધ્ધિ ફ્લેટ સામે,
મ્યુ. ગાર્ડન પાસે, વાસણા, અમદાવાદ-૭ના સહી...

S.K.Shah

MEMORANDUM OF UNDERSTANDING (MOU)

THIS MOU is entered on this 14th day of March, 2019 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART,**

and Adani Port & SEZ Ltd, a Company registered under the Company's Act 2013 and having its registered office at 1st Floor, Infrastructure House, Nr. Adani House, Navrangpura, Ahmedabad (hereinafter referred to as **"APSEZ"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL & APSEZ may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD

ADANI ENTERPRISES AHMEDABAD

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WHEREAS

AEL is setting up an integrated copper smelting & refinery complex at Mundra, Gujarat (hereinafter referred to as "**Plant**") with an annual production capacity of 10, 00,000 TPA.

Since, APSEZ is already having the land, power & water availability in the proposed area, AEL would like to utilize these resources for its Plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

APSEZ will make available to AEL 256.58 hectares of land on long term lease basis. Out of the total requirement of 256.58 hectares of land, currently APSEZ is in possession of 154.19 hectares of land which can be readily made available for the project. The balance 102.39 hectares of land is under forest diversion process and will be handed over to the project once APSEZ receives the possession of the land. The complete details of the land is placed at Annexure-I of this MOU.

APSEZ will make available to AEL 300 MW of power & 32,800 m3/day of desalinated water for the Plant operations.

The payment terms & the other commercial terms & conditions will be mutually decided by both the parties at a later convenient date.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1. The effective date shall be the date of this MOU.
2. This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

SETTLEMENT OF DISPUTES

1. In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to respective senior management of each Party, who in turn will work out an amicable settlement.

OTHER CONDITIONS:

1. Any amendment to this MoU in order to be valid shall be in writing.
2. This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED * ADANI PORTS

ADANI ENTERPRISES LTD. AHMEDABAD

Validity:

This MoU shall remain valid until execution of the Definitive Agreements to this effect.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURTANI

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature: _____

Name: Ravi Tapasi

For APSEZ

Signed and delivered by the

Signature: _____

Name: Jai Khurana

Witness:

Signature: _____

Name: Anil Nair

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Annexure-I

Land Details for the Copper Project

Sl.no	Land Details with Survey nos.	Area in Ha
1	APSEZ Land Village : Siracha, Navinal & Mundra forest, Survey nos. : 223/p, 224/p, 225/p, 295/1p, 125/1, 125/2, 126,129,135,137,138/1, 140, 141/p, 142/p, 143, 144/1, 144/2,147/p, Un surveyed p,	154.19 Ha
2	APSEZ Applied FOREST Land (Diversion under process) Village: Siracha Survey nos. : 295/2p,	102.39 Ha
	Total	**256.58 Ha**

ADANI PORTS AND SPECIAL ECONOMIC ZONE LTD.

ADANI ENTERPRISES LTD. AHMEDABAD

EAC OBSERVATION:

CRZ map inter-alia including demarcation of HTL/LTL/CRZ land classification along with super imposition of plant site through competent agencies has not been submitted.

REPLY:

The map of proposed project is superimposed on CRZ map of the area prepared in 2011 by Centre of Earth Science Studies (CESS), Thiruvanantapuram, an institute recognized by Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India. The proposed project site is outside the CRZ. This map is shown as Figure-1.5 in the Chapter-1 of EIA and also attached herewith.

Further, National Centre for Sustainable Coastal Management (NCSCM), Chennai which is a nodal agency for CRZ mapping and preparation of CZMP for Gujarat, has been engaged for the superimposition of the proposed Copper Refinery plant layout on authenticated CRZ map of district Kutch.

NCSCM has communicated that this superimposition of the proposed Copper Refinery plant layout on CRZ Map would be done after approval of CZMP map of Kutch District as the CZMP of district Kutch is under approval process by Govt of Gujarat.

EAC OBSERVATION NO.-3

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EAC OBSERVATION:

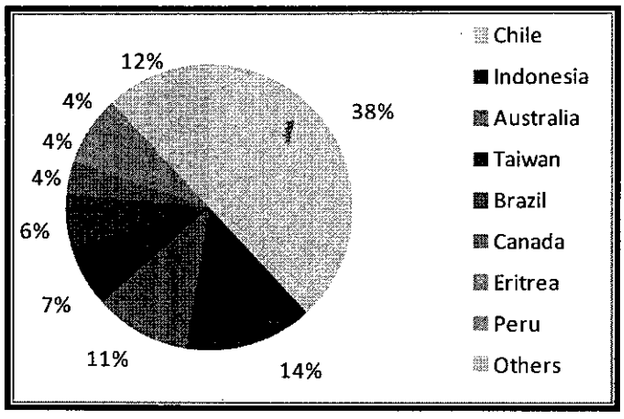
Source of copper ore concentrate, characteristics, mode of transportation from source to plant site, confirmed ore linkage document has not been submitted.

REPLY:

Copper Concentrate for the proposed project will be sourced from the following countries:

- Latin American Countries such as Chile, Peru, Brazil
- ASEAN Countries such as Indonesia, Philippines
- Australia
- Africa
- Canada
- USA

Copper Concentrate is basic raw material for the Copper Smelter. Latin American countries are the major supplier of the raw material. Copper Concentrate for the proposed project will be sourced through various mines across the globe. There is adequate reserves for the Copper are available and hence sourcing of the Copper Concentrate will not be constraint. Please find below the chart showing the receipt of the Copper Concentrate from different countries for copper smelters available in India.



World copper mine production is growing around 3% per annum and is 20 Million Tons in 2017. 42% of production is coming through Latin American countries and 17% from Asia. Europe and North America contributes 13% each. Chilli, Peru, Australia, Indonesia are some of the major countries exporting copper concentrate. China, Japan, Korea, Germany and India are the major importers of copper concentrate. A detailed Copper Concentrate Market Report prepared from International Copper Study Group (ICSG) is being presented in **annexure- 3(a).**

For long term ore (Copper Concentrate) linkage various supplier have been approached and comfort letters from various suppliers have been attached in **annexure- 3(b).**

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EAC OBSERVATION NO.-3

The typical copper concentrate analysis is shown below;

Species	Unit	Smelting Input Range
Cu	Wt%	24 - 28
Fe	Wt%	24 - 29
S	Wt%	30 - 34
SiO_2	Wt%	< 10
CaO	Wt%	< 1.0
MgO	Wt%	< 1.0
Al_2O_3	Wt%	< 2
Zn	Wt%	< 3
Pb	Wt%	< 1.5
Fe_3O_4	Wt%	< 1.5
H_2O	Wt%	< 8
As	g/t	< 2500
Se	g/t	< 300
Bi	g/t	< 200
Sb	g/t	< 150
Ni	g/t	< 350
Te	g/t	< 100
Cd	g/t	< 20
Cr	g/t	< 45
Cl	g/t	< 400
F	g/t	< 1500
Hg	g/t	< 40

Copper Concentrate will be unloaded from the vessel and transported to intermediate facility at port storage by closed conveyor system. The storage facility at the port and plant will be a closed and paved with concrete.

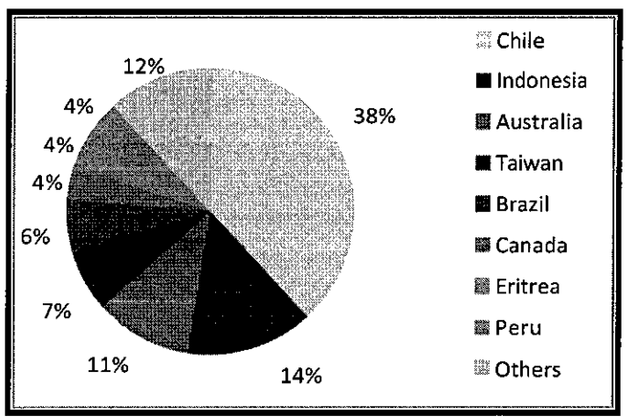
Copper Concentrate will be transported from port to plant by closed conveyor system or by closed trucks. Dust extraction/ suppression system to handle dust will be provided at the truck unloading point.

Copper concentrate storage facility will be provided and paved with concrete. All the transfer points will be fitted with dust extraction/ suppression system to handle dust. Detail drawing of the storage facility is attached in **Annexure-6.**

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Copper Concentrate Market Outlook

Copper Concentrate is basic raw material for the Copper Smelter. Latin American countries are the major supplier of the raw material. Copper Concentrate for the proposed project will be sourced through various mines across the globe. There is adequate reserves for the Copper are available and hence sourcing of the Copper Concentrate will not be constraint. Please find below the chart showing the receipt of the Copper Concentrate from different countries in India.



Below are the some of the extract information from International Copper Study Group – World Copper Fact book 2018.

1. Long term Availability of Copper
2. World Mine Production
3. Mine Production By Region
4. Top Copper Concentrate Producing Countries
5. Top 20 Mines by Capacity
6. International Trade Flow for Copper Concentrate.

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ANNEXURE-3(a)

Copper Resources and Long-Term Availability of Copper

Copper Reserves and Resources

Typically, the future availability of minerals is based on the concept of reserves and resources. Reserves are deposits that have been discovered, evaluated and assessed to be economically profitable to mine. Resources are far bigger and include reserves, discovered deposits that are potentially profitable, and undiscovered deposits that are predicted based on preliminary geological surveys (see definitions below).

According to the United States Geological Survey (USGS), copper reserves currently amount to around 790 million tonnes (Mt) and identified and undiscovered copper resources are estimated to be around 2,100 Mt and 3,500 Mt, respectively. The latter does not take into account the vast amounts of copper found in deep sea nodules and land-based and submarine massive sulphides. Current and future exploration opportunities will lead to increases in both reserves and known resources.

Definitions (http://minerals.usgs.gov/minerals/pubs/mcs/2014/mcsapp2014.pdf)

Resource: A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible.

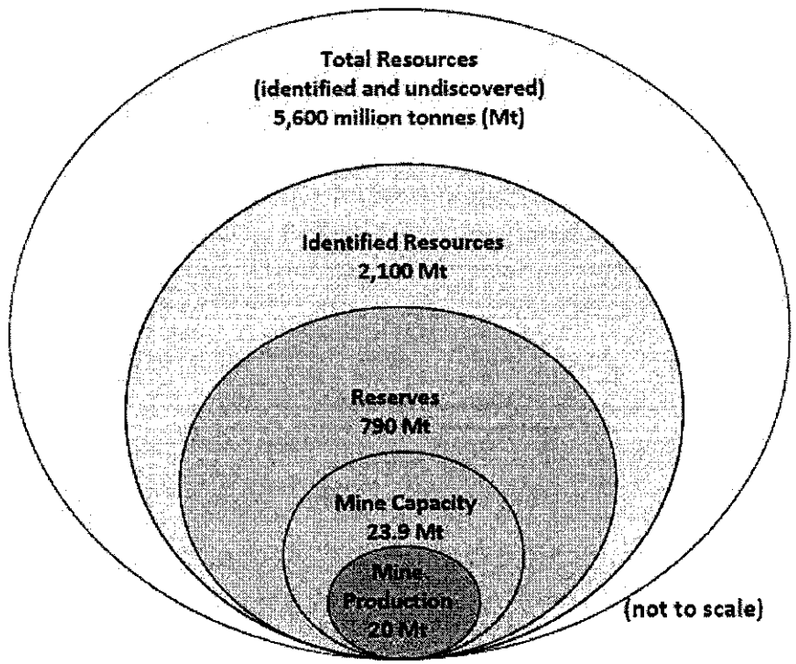
Identified Resources: Resources whose location, grade, quality, and quantity are known or estimated from specific geologic evidence. Identified resources include economic, marginally economic, and sub-economic components.

Undiscovered Resources: Resources, the existence of which are only postulated, comprising deposits that are separate from identified resources. Undiscovered resources may be postulated in deposits of such grade and physical location as to render them economic, marginally economic, or sub-economic.

Reserves: That part of the reserve base (part of an identified resource that meets specified minimum physical and chemical criteria related to current mining and production practices, including those for grade, quality, thickness, and depth) which could be economically extracted or produced at the time of determination. The term reserves need not signify that extraction facilities are in place and operative.

2017 World Copper Reserves & Mine Production [1/]

(undiscovered resources not including deep sea nodules and land-based and submarine massive sulfides - contained copper)

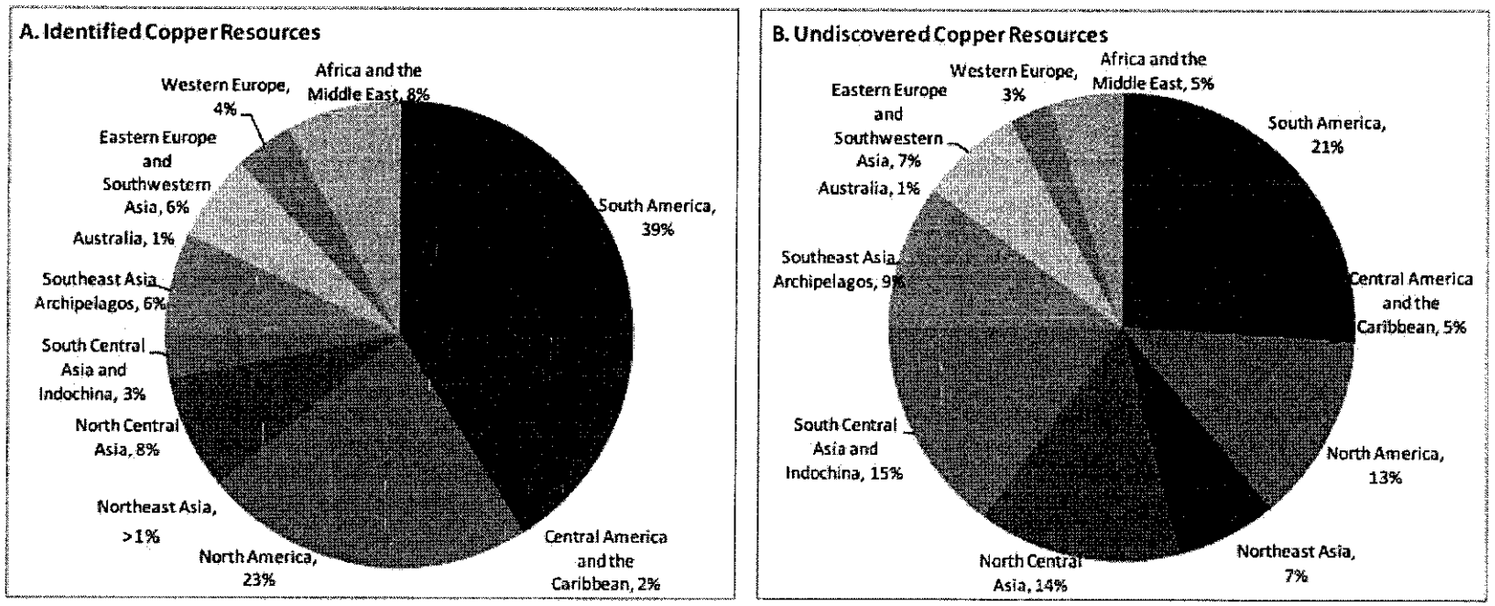


1/ Source: USGS (resources/reserves data) and ICSG (capacity/production data)

Concentrate imports per origin
The World Copper Factbook 2018

Global Distribution of Identified and Undiscovered Copper Resources in Porphyry and Sediment-hosted Stratabound Copper Deposits [1/]

In 2013 the U.S. Geological Survey (USGS) completed a geology-based, cooperative international assessment of copper resources of the world [2/]. The USGS assessed undiscovered copper in two deposit types that account for about 80% of the world's copper supply. Porphyry copper deposits account for about 60% of the world's copper. In porphyry copper deposits, copper ore minerals are disseminated in igneous intrusions. Sediment-hosted stratabound copper deposits, in which copper is concentrated in layers in sedimentary rocks, account for about 20% of the world's identified copper. The mean undiscovered totals for porphyry and sediment-hosted deposits are 3,100 and 400 Mt respectively, resulting in a global total of 3,500 Mt of copper. With identified copper resources currently estimated at 2,100 Mt, total copper resources (undiscovered + identified) are estimated at 5,600 Mt.



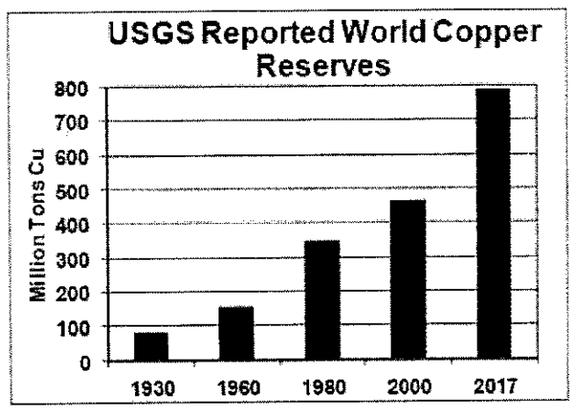
1/ Undiscovered Copper Resources - A Global Assessment, April 2014, Presentation at ICSG meeting, Lisbon, by Mrs *Jane M. Hammarstrom (USGS Global Mineral Resource Assessment Team)*
2/ Supporting studies, including documentation of the assessment methodology and descriptions of individual tracts, are available on the USGS Mineral Resources Program Web site, at *http://minerals.usgs.gov/global/*.

International Copper Study Group

Are We Going to Run Out of Copper[1]?

It is highly improbable. Since 1950, based on the then current rate of demand, there has always been, on average, 40 years of reserves, and significantly greater amounts of known resources (USGS data). In addition, recycling, innovation and mining exploration continue to contribute to the long-term availability of copper.

Despite increased demand for copper produced from ore in recent years, increases in reserves have grown, and there is more identified copper available to the world than at any other time in history.



In the period 2007-2017, 192 million tonnes of copper have been mined. In that same period however, reserves have grown by 300 million tonnes. This reflects additional exploration, technological advances and the evolving economics of mining.

Technology has a key role to play in addressing many of the challenges faced by new copper production. Known and as yet unknown innovations will ensure new mine production continues to provide vital copper supplies.

In addition copper recycling plays an important role in copper availability since today's primary copper is tomorrow's recycled material. Unlike other commodities such as energy or food, copper is not "consumed". Copper is one of the few raw materials which can be recycled repeatedly without any loss of performance, and key stakeholders such as policy-makers, scrap collectors, copper producers and recyclers must all focus on ensuring that yesterday's metal is recycled and re-used.

While this will ensure a progressive move towards a more sustainable economy, the loop cannot be completely closed for two reasons. Firstly, demand will continue to increase due to population growth, product innovation and economic development. Secondly in most applications, copper stays in use for decades.

Consequently, meeting future metals demand will continue to require a combination of primary raw materials, coming from mines, as well as recycled materials, while innovative policies and technology should continue to contribute to improvements in recycling performance and resource efficiency.

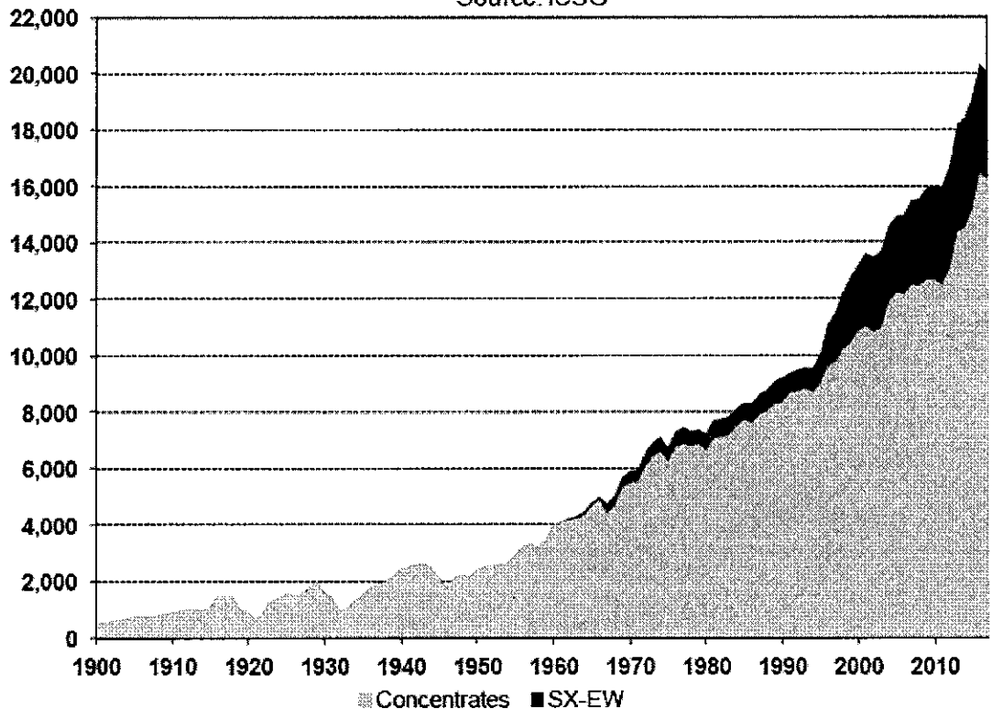
Based on the latest knowledge on geological availability and continuous industry innovation there are good reasons to believe that copper will continue to be a vital and positive contributor to society well into the future.

1/ Based on the International Copper Association briefing note on copper's long-term availability. See http://copperalliance.org/about-copper/long-term-availability/

ANNEXURE-3(a)

Copper Mine Production

World Copper Mine Production, 1900-2017
(thousand metric tonnes copper)
Source: ICSG



Since 1900, when world production was less than 500 thousand tonnes copper, world copper mine production has grown by 3.2% per annum to 20 million tonnes in 2017. SX-EW production, virtually non-existent before the 1960s, stood at 3.7 million tonnes in 2017.

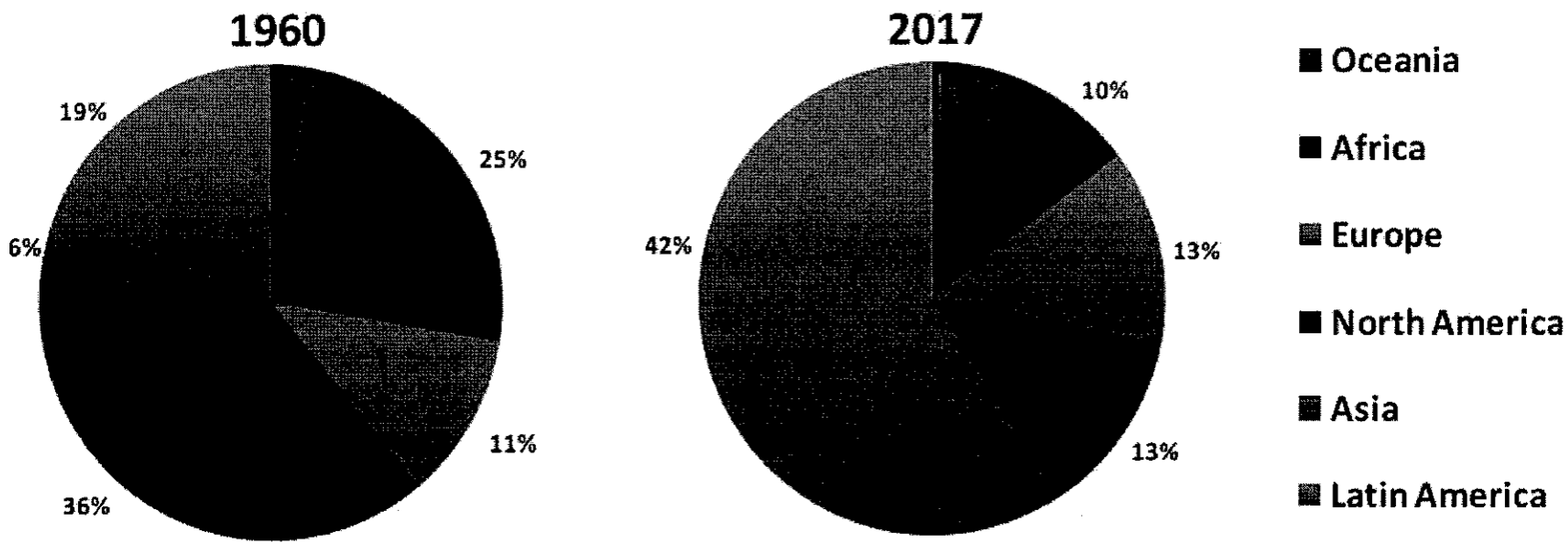
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ANNEXURE-3(a)

Copper Mine Production by Region, 1960 versus 2017

Thousand metric tonnes copper

Source: ICSG



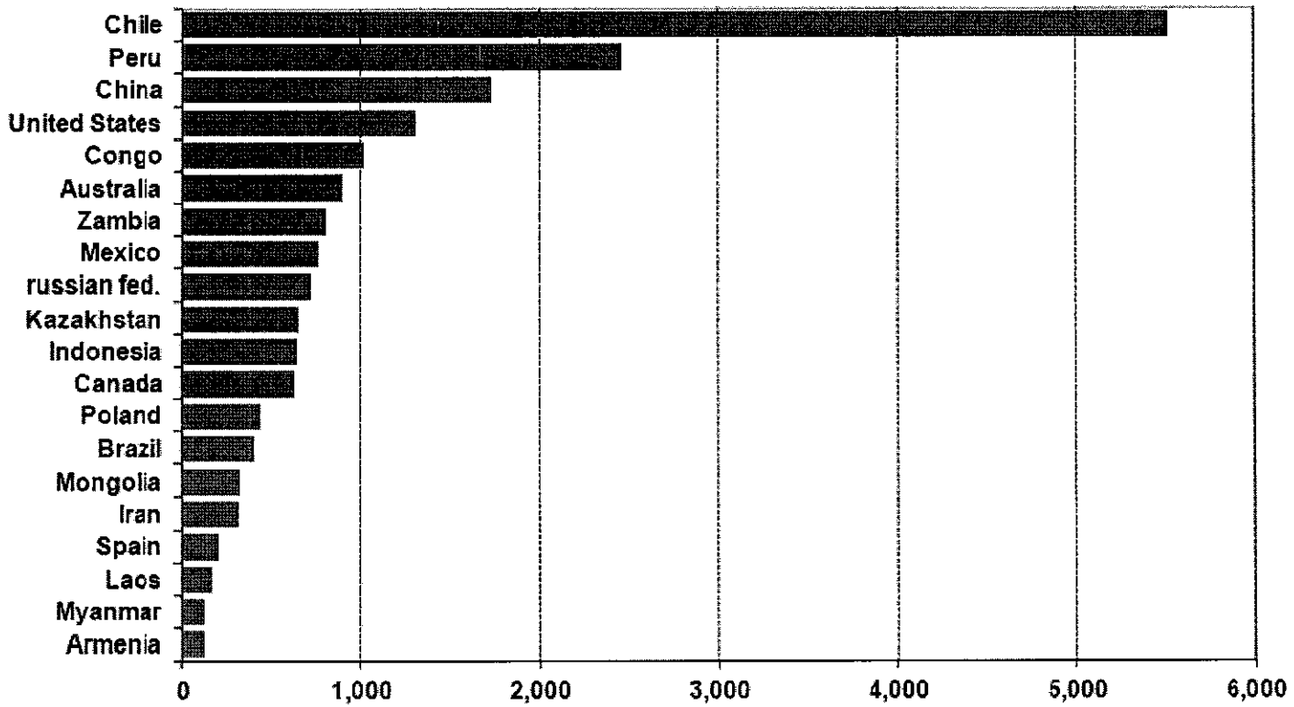
From less than 750,000 tonnes copper in 1960, copper mine production in Latin America has increased to 8.4 million tonnes in 2017, representing 42% of the global total. Asia has also exhibited significant growth. The region's share of global production has increased from just 6% to 17% over the respective period. Conversely, North America's share declined from 36% to 13%.

ANNEXURE-3(a)

The World Copper Factbook 2018

Copper Mine Production by Country: Top 20 Countries in 2017

(Thousand metric tonnes)
Source: ICSG



Chile accounted for over a quarter of world copper mine production in 2017 with mine output of 5.5 million tonnes copper. Peru, which has seen a sharp increase in output since 2015, accounted for 12% of world mine production.

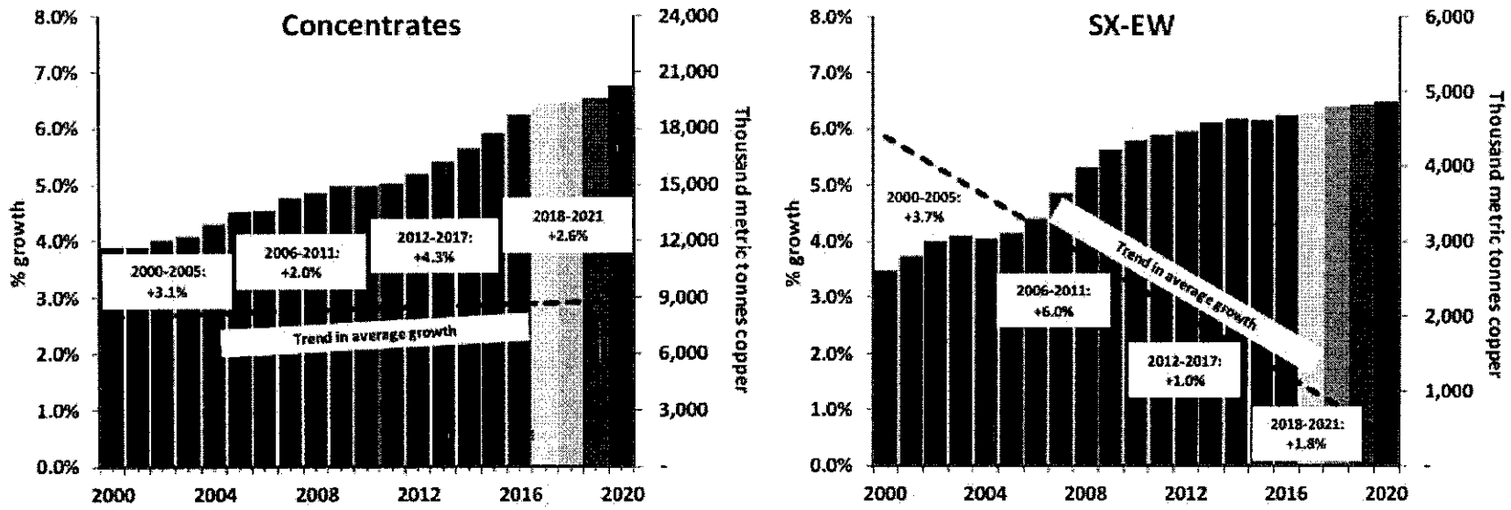
International Copper Study Group

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ANNEXURE-3(a)

Trends in Copper Mining Capacity, 2000-2021

Thousand metric tonnes (Bars) and Annual percentage change (Line)
Source: ICSG Directory of Copper Mines and Plants – H1 2018 Edition



Copper mining capacity is estimated to reach 25.9 million tonnes copper in 2021, with 20% being SX-EW production. This will be 8% higher than global capacity of 23.9 million tonnes copper recorded in 2017. Growth in copper mine capacity is expected to average 2.4% per year going forward as new capacity is added at existing and some new operations. The ratio between production and capacity is called the capacity utilization rate. The world mine capacity utilization rate was around 84% in 2017.

Note: Capacity data reflects production capabilities not necessarily production forecasts

The World Copper Factbook 2018

Top 20 Copper Mines by Capacity (basis 2018)

Thousand metric tonnes copper

Source: ICSG Directory of Copper Mines and Plants – H1 2018 Edition

Rank	Mine	Country	Owner(s)	Source	Capacity
1	Escondida	Chile	BHP Billiton (57.5%), Rio Tinto Corp. (30%), Japan Escondida (12.5%)	Concs & SX-EW	1,370
2	Grasberg	Indonesia	P.T. Freeport Indonesia Co. (PT-FI), Rio Tinto	Concentrates	700
3	Morenci	United States	Freeport-McMoRan Inc 72%, 28% affiliates of Sumitomo Corporation	Concs & SX-EW	520
4	Buenavista del Cobre (former Cananea)	Mexico	Grupo Mexico	Concs & SX-EW	510
5	Collahuasi	Chile	Anglo American (44%), Glencore plc (44%), Mitsui (8.4%), JX Holdings (3.6%)	Concs & SX-EW	504
6	Cerro Verde II (Sulphide)	Peru	Freeport-McMoRan Copper & Gold Inc. 54%, Compañia de Minas Buenaventura 19.58%, Sumitomo 21%	Concentrates	500
7	Polar Division (Norilsk/ Talnakh Mills)	Russia	Norilsk Nickel	Concentrates	450
7	Antamina	Peru	BHP Billiton (33.75%), Teck i22.5%), Glencore plc (33.75%), Mitsubishi Corp. (10%)	Concentrates	450
9	Las Bambas	Peru	MMG (62.5%), Guoxin International Investment Corporation Limited (22.5%), CITIC Metal Co., Ltd. (15%)	Concentrates	430
10	El Teniente	Chile	Codelco	Concs & SX-EW	422
11	Los Bronces	Chile	Anglo American 50.1%, Mitsubishi Corp. 20.4%, Codelco 20%, Mitsui 9.5%	Concs & SX-EW	405
12	Los Pelambres	Chile	Antofagasta Plc (60%), Nippon Mining (25%), Mitsubshi Materials (15%)	Concentrates	370
13	Kansanshi	Zambia	First Quantum Minerals Ltd (80%), ZCCM (20%)	Concs & SX-EW	340
14	Chuquicamata	Chile	Codelco	Concs & SX-EW	330
15	Kamoto	Congo	Katanga Mining Ltd (86.33% Glencore plc) 75%, Gecamines 25%	SX-EW	300
16	Radomiro Tomic	Chile	Codelco	Concs & SX-EW	290
17	Bingham Canyon	United States	Kennecott	Concentrates	280
18	Sentinel	Zambia	First Quantum Minerals Ltd	Concentrates	250
18	Toromocho	Peru	Chinalco	Concentrates	250
20	Olympic Dam	Australia	BHP Billiton	Concs & SX-EW	225

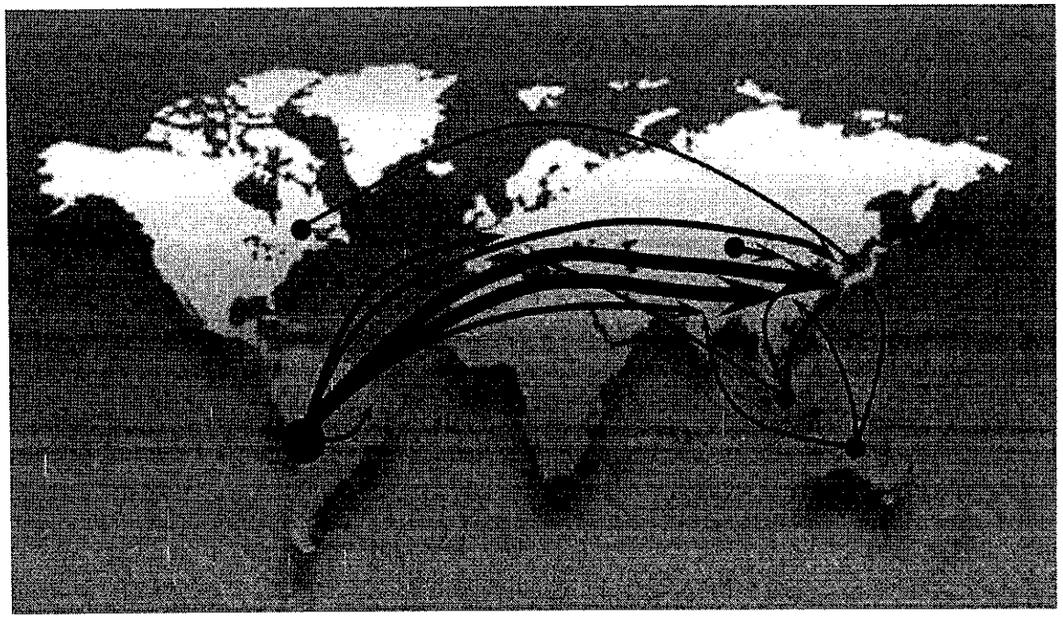
Note: Capacity data reflects production capabilities not necessarily production forecasts

International Copper Study Group

Major International Trade Flows of Copper Ores and Concentrates[1]

Major **Exporters** of Copper Ores and Concentrates, 2017

1. Chile
2. Peru
3. Australia
4. Spain
5. Mexico
6. Mongolia
7. Canada
8. Brazil
9. Indonesia
10. Kazakhstan



Major **Importers** of Copper Ores and Concentrates, 2017

1. China
2. Japan
3. Spain
4. Korean Rep.
5. India
6. Germany
7. Bulgaria
8. Philippines
9. Russian Fed.
10. Brazil

Image courtesy of the Copper Development Association.

[1]Figure is intended to illustrate trade flows but not actual trade routes. Detailed trade matrices are available in ICSG Statistical Yearbook.

ANNEXURE-3(a)

Copper Concentrate Characteristics

Species	Unit	Sourcing Range	Smelting Input Range
Cu	Wt%	18 - 54	24 - 28
Fe	Wt%	16 - 36	24 - 29
S	Wt%	22 - 36	30 - 34
SiO_2	Wt%	1 - 19	< 10
CaO	Wt%	0.2 – 3.0	< 1.0
MgO	Wt%	0.1 – 2.3	< 1.0
Al_2O_3	Wt%	0.2 – 4.2	< 2
Zn	Wt%	0.1 – 5.0	< 3
Pb	Wt%	0.1 – 3.0	< 1.5
Fe_3O_4	Wt%	0.1 – 9.0	< 1.5
H_2O	Wt%	6 - 10	< 8

Species	Unit	Sourcing Range	Smelting Input Range
As	g/t	500 - 15000	< 2500
Se	g/t	5 - 500	< 300
Bi	g/t	50 - 570	< 200
Sb	g/t	20 - 2000	< 150
Ni	g/t	10 - 2500	< 350
Te	g/t	5 - 300	< 100
Cd	g/t	2 - 270	< 20
Cr	g/t	2 - 400	< 45
Cl	g/t	20 - 1500	< 400
F	g/t	20 - 2000	< 1500
Hg	g/t	1 - 100	< 40

Concentrate Source:

Copper Concentrate will be sourced from the following countries:

- Latin American Countries such as Chile, Peru, Brazil
- ASEAN Countries such as Indonesia, Philippines
- Australia
- Africa
- Canada
- USA

ANNEXURE-3(b) 3186

RtM

Mitsubishi Corporation RtM International Pte. Ltd.
3 Temasek Avenue #32-01, Centennial Tower,
Singapore 039190
Co.Reg.No. 201230103M
ABN 22 609 587 715
www.mitsubishicorprtm.com/global

February 11.2019

Mr. Prasad A. Suryarao
Adani Enterprises Ltd,
7th Floor B Wing, Sambhaav House,
Judges Bungalow Road,
Bodakdev, Ahmedabad – 380 015;
Gujarat, India

Dear Mr. Rao / Mr. Prasanna,

Expression of Interest for Supply of Copper Concentrate

This refers to various discussions we have had over last one year.

We are happy to note that the project is now well into the final phase of getting approvals.

As you are aware, we are a part of Mitsubishi Group which has investments in copper mines like Escondida, Los Pelambres, Antamina, Quelleveco etc in Latin America. The Group also owns Triland Metals Ltd – a prominent member of London Metals Exchange.

We are currently trading approximately 600K dmt copper concentrate worldwide and with Quelleveco offtake commencing from early 2022 onwards, the book size will increase to well over 1 million dmt. We have access to some of the cleanest copper concentrate qualities available.

As assured during our meetings, Mitsubishi Corporation RtM International Pte Ltd (RtMI) shall be more than pleased to supply mutually agreed quantity of copper concentrate to the proposed Adani Copper smelter.

Looking forward to discuss in greater detail once all the approvals are in the place.

Kindly keep us posted on the progress. Thanks

Best regards,

Y.K. Sharma
Mitsubishi Corporation
RtM International Pte Ltd.

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TRANSAMINE
TRADING SA

Date : Feb 01 , 2019

M/s Adani Enterprises
Ahmedabad

Kind Attention : Mr Prasad Surya Rao

Dear Sir

This is with reference to our various discussions on the subject of Copper concentrates supplies to your proposed Copper Smelter project at Mundra.As you are aware Transamine Trading SA, trades 1.2 to 1.5 million MT of copper concentrates annually, sourcing the same across the globe from as far and wide as Chile, Peru, Mexico, US, Canada, DRC, Indonesia, Papua New Guinea, Australia etc. It has got well established relationship with all the major mines like Escondida, Grasberg, Los Pelambras, Chiquicamata, Andina, Collahuasi, Sierra Gorda, Jabel Sayid etc. It expects to maintain the volume for the coming years at the present level, which makes it one amongst the top four Copper concentrates trader in the world today.

Kindly note Transamine Trading S.A, Geneva has advised that they will be extremely keen into entering into an agreement for long term supply of Copper concentrates under frame mechanism covering multiple years, as we have discussed so far . The said agreement can be sealed and signed off, once the proposed project gets necessary Environment Clearance to establish from the relevant regulatory authorities. Therefore , please do advise us once you have received the mentioned approval – so that we can progress on the agreement.

We look forward to hearing from you soon

Thanks and Regards
Somnath Ghosh
On behalf o Transamine Trading S.A.

13 – 15 Cours de Rive, 1204 Geneva, Switzerland – Tel: +41 22 710 03 03, Fax: +41 22 710 03 19

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TRAFIGURA

TRAFIGURA INDIA PRIVATE LIMITED

11th February 2019

To,

Adani Enterprises Ltd.- Copper Business
Adani Corporate House, Shantigram,
Nr. Vaishnodevi Circle, SG Highway,
Ahmedabad – 380058, Gujarat, India

Sub: Supply of Copper Concentrate for Adani Copper Project

Kind Attention: Mr. Prasad A. Suryarao

This is with reference to the update on the progress of your Copper project at Mundra, Gujarat.

As you are aware, Trafigura is one of the largest copper concentrate suppliers in the world and have association with multiple miners and Smelters all across the world. We are delighted to reconfirm building a long term relationship with Adani for this project. We confirm our interest to be a Concentrate supplier to your Project – depending on the time frame for the project commissioning, commercial and other related terms. The said supply would be made on a regular basis from our pool of resources available. We also assure you that the quality parameters will be shared with you on a periodical basis & based on the mutual agreement, the requisite quantity shall be supplied to your project.

At last we want to reassure you that we would be definitely be interested to enter into the MoU/Definitive agreement for this project concentrate requirement offtake subject and as confirmed by you after necessary statutory approvals and other formalities which we understand are still going on including but not limiting to EC. The detailed terms & conditions will also be incorporated in the agreement based on our mutual discussion at that point of time.

Wishing you the best for your approval process, we look forward for your feedback on the progress.

Yours faithfully,

For Trafigura India Pvt. Ltd.

Amol Mehra

TRAFIGURA INDIA PRIVATE LIMITED
REGISTERED OFFICE: D-64, DEFENCE COLONY, NEW DELHI-110024, DELHI INDIA
CORPORATE OFFICE: UNIT NO. 1101, ONE BKC, PLOT NO. C - 66, G BLOCK, BANDRA KURLA COMPLEX, BANDRA (EAST), MUMBAI, MAHARASHTRA – 400 051, INDIA
WWW.TRAFIGURA.COM - EMAIL: MUMBAI@TRAFIGURA.COM
PH: +91 22 42268550 FAX: +91 22 42268599
REGISTERED NUMBER: U51909DL2009FTC234813

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MITSUI & CO.,LTD.
1-3, Marunouchi 1-chome,
Chiyoda-ku, Tokyo, 100-8631, Japan
Tel: +81-3-3285-3398

MITSUI&CO.

2890

Date. 17th, May 2019
In reply please Address to
Base Metals div.

To: Adani Enterprise Ltd – Copper Business, Ahmedabad.
Dear Mr. Prasad Suryarao,

We are delighted to receive an update on the progress of your copper project at Mundra.
It is our honor that we may have a chance to establish a long-term relationship with Adani who will be a biggest copper producer in India after the completion of the smelter construction work.

As you might be aware, we are one of the major copper concentrate supplier in the world who handle approximately 1 million DMT per year of the copper concentrates.

Our major sources of supply are; Collahuasi copper mine, Los Bronces copper mine and Caserones copper mine of which we have shares, and also, we have long-term supply contracts with the global major suppliers including Codelco and BHP, as well as off-take contracts with the middle sized copper mines in Asia Pacific region.

On top of the copper concentrates, we are capable to supply the secondary copper raw materials including copper anodes and copper blisters which may be consumed at your smelter facility.

Please be advised that we are ready to discuss our business opportunity including Memorandum of Understanding arrangement for our future raw material business once necessary licenses including the environment approval have been granted by the authorities.

We do hope your operating permission to be obtained soon, looking forward to discussing our business possibility near future and waiting any further good news from yours with this regard.
Hope this is line with our earlier discussion also.

Yours faithfully,

Tatsuhiro Torikai
General Manager
Raw Material Marketing Dept.
Base Metals Div.

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EAC OBSERVATION NO.-4

EAC OBSERVATION:

Water consumption of 10 LTPA Copper smelter is 32790 KLD whereas the water requirement for existing 4.5 LTPA copper smelter unit is only 10,000 KLD. Hence, water requirement for the proposed plant has to be reworked out.

REPLY:

The water consumption for the proposed copper plant has been reworked and reduce to 29,839 KLD based on the information submitted by various technology licensers.

Water consumption is largely due to evaporation losses in the cooling tower of Copper Smelter and Sulphuric Acid Plant, evaporation losses during the copper slag granulation. To identify the area to rework for the water consumption reduction, a benchmarking exercise was carried out.

Water Consumption is largely depends on:

1. Type of Cooling System (Air Cooling/ Water Cooling/ Sea water or River based once through system) adopted.
2. Operating conditions (Temperature of the Incoming water and Circulation Rate) prevailing.
3. Type of Copper Slag Handling System (Granulation or Ladle Cooling)
4. Air Cooling and Ladle Cooling needs large area.

Proposed project will have water consumption ~7.51 m^3/T of Copper in case of water cooling system (6.5 m^3/T of Copper in case of air cooling system) compared to Vedanta's water consumption of ~6.9 m^3/T of Copper (average of last 5 years)*.

Specific Water Consumption (m^3/T of Product)

Name of the plant	Unit	Proposed	Vedanta, India**
Copper Smelter	m^3/T of Copper	2.49	2.40
Copper Refinery	m^3/T of Copper	0.53	0.66
Sulphuric Acid	m^3/T of Copper	4.32	2.98
CCR	m^3/T of Copper	0.17	0.24
Total Copper		**7.51**	**6.28**
Phosphoric Acid	m^3/T of Phosphoric Acid	2.79	4.33

Source: Sustainability Report

****Source: National Award for Excellence in water management – 2008***

Difference between Proposed and Vedanta:

1. Sulphuric Acid Cooling Tower system: Water Cooled CT Vs Water Cooled CT+ Radiator Type air Cooler.
2. Sulphuric Acid to Copper ratio (This ratio depends on sulphur to copper ratio in copper concentrate): **3.00** vs **2.70**

Type of Cooling Towers

Due to non-availability of adequate water, referred plant uses mix of Water Cooled Cooling Tower and Radiator Type air Cooler system for Sulphuric Acid cooling which saves approximately 0.7 m3 per ton of sulphuric acid. This has reduced water consumption by ~0.7 m3/ T of Sulphuric Acid (~2.2 m3/T of Copper). Proposed project will be using water cooling system due to availability of the water from desalination plant and it also helps to reduce carbon footprint by 45% of cooling system. Detailed note is attached (**Annexure-4(a)**) for the ready reference.

Benchmarking of water consumption with some of the best Smelters in the World:

Aurubis – Germany: Aurubis Copper Plant in Hamburg – Germany; uses ~99% water required for the plant operations from the nearby River and discharges the water back in the river. Details for the last 3 years (**Annexure-4(b) & 4(C)**) are provided as below:

Description	FY 2017	FY 2016	FY 2015
Copper Production (Tons)	455,406	450,400	443,185
Water Consumption m^3/T of Cu	6	7	5

Source: Aurubis AG Environmental Statement 2016 & 2017

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ANNEXURE-4(a)

MUNDRA COPPER SMELTER – 1.0 MTPA
COMPARISON OF WET COOLING TOWER AND RADIATOR TYPE AIR COOLER

- **Preamble**

Sulphuric acid plant requires circulating water for meeting cooling requirement of various auxiliaries. Heat from various auxiliaries is gained by circulating water which is rejected to the atmosphere through cooling tower.

The heat can be rejected from the circulating cooling water either through wet cooling tower or dry cooling tower (i.e., radiator type air cooler, which is water to air cooler).

Wet cooling towers (or open circuit cooling towers) operate on the principle of evaporative cooling. The cooling water from the plant is pumped to a height of about 10 m and distributed over the cooling tower fill, cascading down the fill to the well at the bottom. In this type of cooling tower, some water is lost due to evaporation and drift which is about 2% of circulation rate. Also, in order to keep the dissolved solids in water under control, blowdown is taken from the water. To make-up for this loss (~2.5%), water needs to be continuously added into the system.

Radiator type Air Coolers (or Dry cooling towers) work on the principle of convection and conduction to dissipate heat from process fluid to the air stream created by the fans mounted on it. Dry coolers are closed loop systems which eliminate any kind of water loss and thus eliminating the continuous requirement of make-up water.

A comparative study is done with respect to the wet and dry cooling towers for the sulphuric acid plant for Mundra Copper Complex and same is presented below in this note.

1 Technical Comparison

Technical comparison of different parameters between Wet Cooling Tower and Radiator type Air Coolers are presented in the table below considering the circulating water requirement for a 1500 KTPA (100% H_2SO_4) of sulphuric acid plant for each phase.

S.No.	Description	Unit	Wet Cooling Tower	Radiator type Cooler
1	Heat Load	kW	172138	172138
2	Hot Water Inlet Temp	deg. C	42	80
3	Cold Water Outlet Temp	deg. C	32	65
4	Water Quality	-	Desalinated Water	Passivated DM
5	Total Circulating Water	m^3/hr	14804	9869
6	Temperature Range	deg. C	10	15
7	Cycles of Concentration, C		4	0
8	CT evaporation loss, E	m^3/hr	227	0
9	Total CT evaporation loss per day	m^3/day	5436	0
10	CT drift loss @ 0.01% (D) of total CW flow	m^3/hr	1	0
11	Total CT drift loss per day	m^3/day	36	0
12	CT blow down (B) B = (E / C-1) -D, where C = Cycles of Concentration,	m^3/hr	74	0
13	Total CT blow down per day	m^3/day	1776	0

MUNDRA COPPER SMELTER – 1.0 MTPA

COMPARISON OF WET COOLING TOWER AND RADIATOR TYPE AIR COOLER

S.No.	Description	Unit	Wet Cooling Tower	Radiator type Cooler
14	CT make-up total (M) M = E* (C /(C-1))	m^3/hr	302	0
15	Total CT make up water required per day for each phase (1500 KTPA SAP)	m^3/day	7248	0
16	**Total CT make up water required per day for both phase (3000 KTPA SAP)**	**m^3/day**	**14496**	**0**
17	Power Consumption to produce desal water	kW	1359	0
18	Power Consumption Fans	kW	539	4370
19	Power Consumption for CW Pumps	kW	2069	1379
20	Total Power Consumption for each phase (1500 KTPA SAP)	kW	3966	5749
21	Total Power Consumption for both phase (3000 KTPA SAP)	**kW**	**7933**	**11498**
22	Footprint each phase (1500 KTPA SAP)	m2	935	4186
23	**Footprint each phase (1500 KTPA SAP)**	**acre**	**0.231**	**1.034**
24	**Footprint both phase (3000 KTPA SAP)**	**acre**	**0.462**	**2.069**
25	**CO2 Emission each phase (1500 KTPA SAP)**	**kg**	**1123**	**1627**
26	**CO2 Emission both phase (3000 KTPA SAP)**	**kg**	**2245**	**3255**

1.1 Circulating Water Quality

For Wet cooling tower, desalinated water will be used as circulating water in the circuit.

For radiator type cooler, the circulation system is a closed one, therefore passivated DM water shall be used with provision for intermittent make-up.

1.2 Water Consumption

As per above table, make-up water requirement for wet cooling towers of both phases is approx. 14496 m3/hr to account for blowdown, evaporation and drift losses.

In radiator type air coolers, the water circulates in closed loop, hence make-up water requirement is not there (negligible, as only leakages have to be topped-up).

1.3 Power Consumption

In both the systems, fans and pumps consume power. However, in case of wet cooling tower, additional power will be consumed for generating make-up water.
As indicated in table above, total power consumed by radiator type coolers is 45% higher than wet cooling tower.

ANNEXURE-4(a)

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MUNDRA COPPER SMELTER – 1.0 MTPA
COMPARISON OF WET COOLING TOWER AND RADIATOR TYPE AIR COOLER

1.4 Footprint Area

Footprint area required for radiator type cooler will be approx. five (5) times that of wet cooling towers for same flow of circulating water.

1.5 Carbon Emissions

As per above table, there is significant difference in carbon emission (45% higher) for radiator type cooler compared to wet cooling tower.
(Note: Based on Greenhouse gas reporting: conversion factors from Department for Business, Energy and Industrial Strategy, Govt of UK. The conversion factor is 0.28307 kg CO2 for each kWh produced.)

1.6 Material of Construction

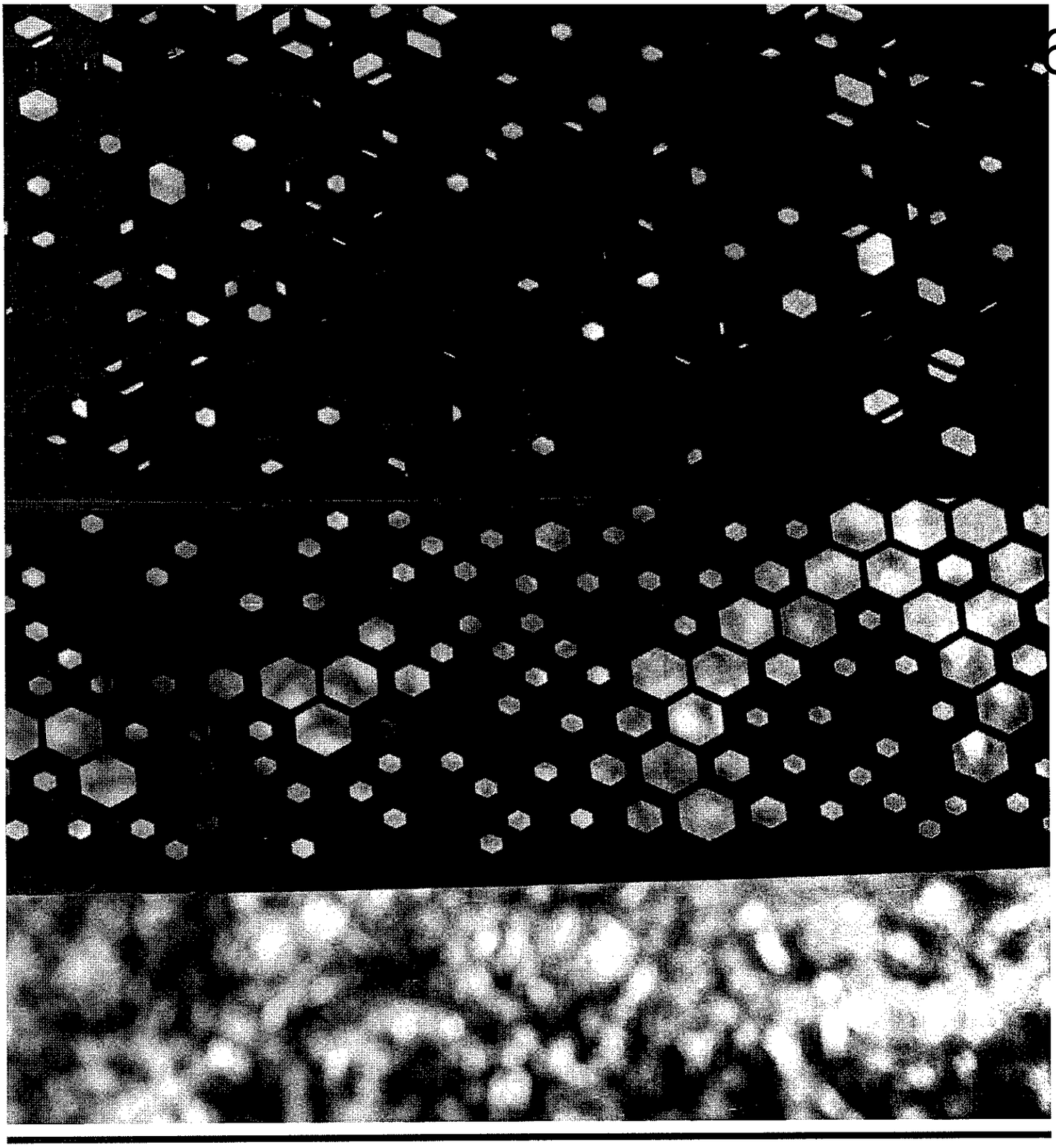
FRP can be used for cooling tower casing and PP/ PVC materials can be used in wet cooling tower for fills & drift eliminators.

Radiator type cooler casing/ structure shall be carbon steel with epoxy painting and finned tubes shall be of Stainless steel.

2 Conclusion

Wet cooling tower is recommended due to the following as detailed above:
1) Lower power consumption 45%
2) Lower carbon footprint by 45%
3) Lower land requirement by 77%
4) No need of DM water
5) Reliable performance as no issues of fouling being an open system

***



Environmental Protection in the Aurubis Group

and consolidated Aurubis AG Environmental Statement 2017 Hamburg and Lünen Sites

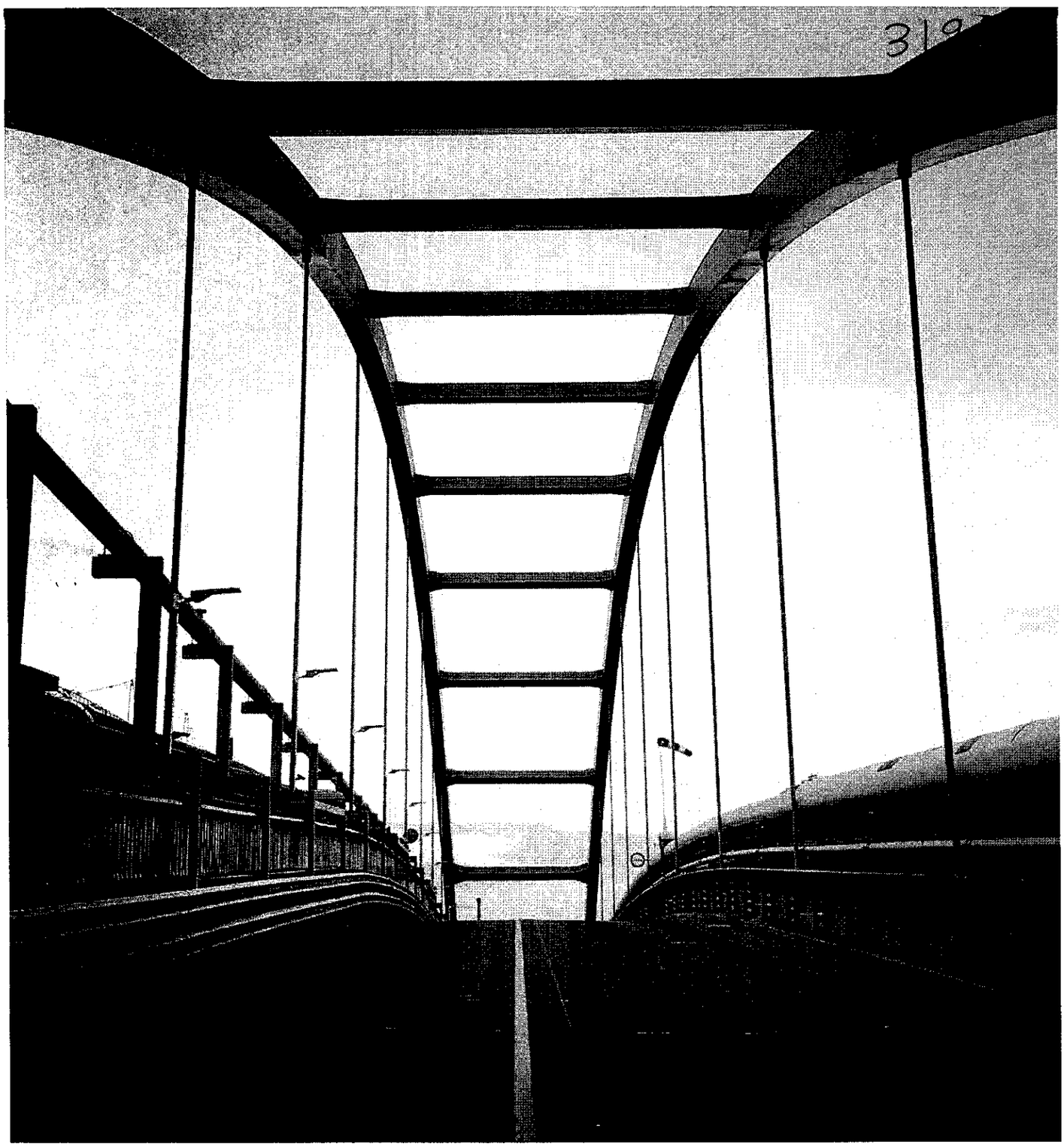
Aurubis
Metals for Progress

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Key figures for Aurubis AG, Hamburg site,
in the 2016 calendar year

Input	2016	2015
Raw materials		
Copper concentrate (dry)	1,042,703 t	1,218,492 t
Copper scrap/refining material	47,928 t	46,218 t
Other Cu-bearing raw materials	137,773 t	126,759 t
PM-bearing raw materials incl. scrap	22,398 t	22,885 t
Lead scrap and waste	24,439 t	23,490 t
Other metal-bearing waste for recycling	579 t	385 t
Total TC/RC-earning raw materials	**1,275,821 t**	**1,438,229 t**
Auxiliaries		
Sand and additives incl. cyclone sand	135,531 t	138,473 t
Iron as an additive	15,276 t	16,856 t
Total input materials	**1,426,628 t**	**1,593,557 t**
Input material/t copper	**3.2 t/t Cu**	**3.6 t/t Cu**
Energy		
Electricity consumption	511,764 MWh	539,442 MWh
Additional electricity consumed to produce oxygen	118,362 MWh	118,794 MWh
Natural gas	481,446 MWh	468,933 MWh
Coke	52,254 MWh	56,077 MWh
Other energy sources	17,034 MWh	19,053 MWh
Total energy consumption	**1,180,860 MWh**	**1,202,300 MWh**
Energy consumption/t copper	**2.6 MWh/t Cu**	**2.7 MWh/t Cu**
Water withdrawal/uptake		
River water	63,676,000 m^3	67,406,000 m^3
Potable water	339,000 m^3	343,000 m^3
Precipitation	397,000 m^3	428,000 m^3
Total water uptake	**64,412,000 m^3**	**68,177,000 m^3**
Water discharge/t copper	**143 m^3/t Cu**	**154 m^3/t Cu**
Area used at the Hamburg site		
Total plant area	871,000 m^2	871,000 m^2
Buildings and paved area	766,000 m^2 (equivalent to 88 %)	766,000 m^2 (equivalent to 88 %)

Output	2016	2015
Products		
Copper	450,400 t	443,185 t
Sulfuric acid products as H_2SO_4 (from exhaust gas cleaning)	946,224 t	1,005,178 t
Iron silicate stone (incl. granules)	743,204 t	777,165 t
Silver and gold, selenium	1,804 t	1,430 t
Metal compounds (Ni, As)	2,317 t	2,635 t
Lead	13,123 t	13,876 t
Total products	**2,157,071 t**	**2,243,469 t**
Waste		
Recycling	5,992 t	8,773 t
Disposal	4,617 t	4,630 t
Total recycling & disposal	**10,609 t**	**13,403 t**
of which hazardous waste	7,812 t	10,493 t
Waste/t copper production	**24 kg/t Cu**	**30 kg/t Cu**
Waste/t input material	**7 kg/t**	**8 kg/t Cu**
Construction waste (informative)	41,202 t	32,016 t
Total waste	**51,811 t**	**45,419 t**
Conversion into products	**99.3 %**	**99.2 %**
Emissions		
Dust	43 t	42 t
Dust/t copper	96 g/t Cu	96 g/t Cu
SO_2	2,004 t	1,868 t
NO_x/t copper	482 g/t Cu	478 g/t Cu
Direct CO_2 emissions (diesel for vehicles)	166,472 t	171,410 t
of which CO_2 from fuels	118,954 t	117,230 t
CO_2 from fuels/t copper	0.26 t/t Cu	0.26 t/t Cu
Direct CO_2 emissions (diesel for vehicles)	3,498 t	3,807 t
Indirect CO_2 emissions		
from electricity consumed (ETS)	288,154 t	314,520 t
from the additional electrical consumption for oxygen production (ETS)	71,017 t	71,276 t
Metal discharge in water	647 kg	606 kg
Metal discharge in water/t copper	1.4 g/t Cu	1.4 g/t Cu
Water discharge		
Direct discharge	61,305,259 m³	66,048,533 m³
Indirect discharge	44,220 m³	54,147 m³
Total water discharge	**61,349,479 m³**	**66,102,680 m³**
Water discharge/t copper	**136 m³/t Cu**	**149 m³/t Cu**



Environmental Protection in the Aurubis Group

and Updated Aurubis AG Environmental Statement 2018
Hamburg and Lünen Sites

Aurubis
Metals for Progress

Key figures for Aurubis AG, Hamburg site,
in the 2017 calendar year

Input	2017	2016
Raw materials		
Copper concentrate	1,287,268 t	1,042,703 t
Copper scrap/refining material	49,125 t	47,928 t
Other Cu-bearing raw materials	112,897 t	137,773 t
PM-bearing raw materials incl. scrap	27,347 t	22,398 t
Lead scrap and waste	26,438 t	24,439 t
Waste for recycling	823 t	579 t
Total TC/RC-earning raw materials	**1,503,897 t**	**1,275,821 t**
Auxiliaries		
Sand and additives incl. cyclone sand	182,957 t	135,531 t
Iron as an additive	13,586 t	15,276 t
Total input materials	**1,700,440 t**	**1,426,628 t**
Input material/t copper	**3.7 t/t Cu**	**3.2 t/t Cu**
Energy		
Electricity consumption	549,957 MWh	522,908 MWh
Additional electricity consumed to produce oxygen	119,594 MWh	118,362 MWh
Natural gas	439,834 MWh	481,446 MWh
Coke	49,513 MWh	52,254 MWh
Other energy sources	17,205 MWh	17,034 MWh
Total energy consumption	**1,176,104 MWh**	**1,192,004 MWh**
Energy consumption/t copper	**2.58 MWh/t Cu**	**2.65 MWh/t Cu**
Water withdrawal/uptake		
River water	67,277,000 m³	63,676,000 m³
Potable water	332,000 m³	339,000 m³
Precipitation	514,000 m³	397,000 m³
Total water uptake	**68,123,000 m³**	**64,412,000 m³**
Water consumption/t copper	**150 m³/t Cu**	**143 m³/t Cu**
Area used at the Hamburg site		
Total plant area	871,000 m²	871,000 m²
Buildings and paved area	766,000 m² (equivalent to 88 %)	766,000 m² (equivalent to 88 %)

3200

Output	2017	2016
Products		
Copper	455,406 t	450,400 t
Sulfuric acid products as H_2SO_4 (from exhaust gas cleaning)	1,074,468 t	946,224 t
Iron silicate stone (incl. granules)	786,787 t	743,204 t
Silver and gold, selenium	1,866 t	1,804 t
Metal compounds (Ni, As)	3,087 t	2,317 t
Lead	11,349 t	13,123 t
Total products	**2,332,962 t**	**2,157,071 t**
Waste		
Recycling	10,294 t	5,992 t
Disposal	4,960 t	4,617 t
Total recycling & disposal	**15,254 t**	**10,609 t**
of which hazardous waste	11,652 t	7,812 t
Waste/t copper output	**33 kg/t Cu**	**24 kg/t Cu**
Waste/t input material	**9 kg/t**	**7 kg/t**
Construction waste (informative)	24,027 t	41,202 t
Total waste	**39,281 t**	**51,811 t**
Conversion into products	**99.1%**	**99.3%**
Emissions		
Dust	43 t	43 t
Dust/t copper	95 g/t Cu	96 g/t Cu
SO_2	2,046 t	2,004 t
NO_x/t copper	564 g/t Cu	482 g/t Cu
Direct CO_2 emissions (ETS, excluding diesel)	166,732 t	166,472 t
of which CO_2 from fuels	109,721 t	118,954 t
CO_2 from fuels/t copper	0.24 t/t Cu	0.26 t/t Cu
Direct CO_2 emissions (diesel for vehicles)	3,865 t	3,498 t
Indirect CO_2 emissions		
from electricity consumption (ETS)	288,816 t	272,770 t
from additional electricity consumption for oxygen production	63,744 t	63,087 t
Metal discharge in water	684 kg	647 kg
Metal discharge in water/t copper	1.5 g/t Cu	1.4 g/t Cu
Water discharge		
Direct discharge	65,364,198 m³	61,305,259 m³
Indirect discharge	50,288 m³	44,220 m³
Indirect discharge	**65,414,486 m³**	**61,349,479 m³**
Water discharge/t copper	**144 m³/t Cu**	**136 m³/t Cu**

EAC OBSERVATION:

According to the EIA records, Dhaneshwari River is passing through the project site and the mangrove reserve forest is existing within the project site. Quantification of these mangroves and conservation measures for mangroves and the river stream has not been submitted.

REPLY:

As mentioned in EIA report, Dhaneshwari River is passing through the project site. However, no mangrove reserve forest is existing within the project site. The mangroves are present at Kotdi creek which is about 200 m from the project site in the southern side. Flow of the water from the river will not be disturbed. There will be bridges across the two land parcels for accessing. No activity will be carried out in Dhaneshwari river bed. A 50 m wide greenbelt has been proposed along the side of Dhaneshwari River within the project site. In addition, further provision of 50 m (total 100 m along the river side) has been proposed wherever solid waste storages are proposed.

Wildlife Conservation Plan & Mangrove Conservation Plan study including quantification of the Mangroves (Area under mangroves is 1,251.74 ha in the study area) for the proposed greenfield copper refinery project has been prepared. Mangroves in the study area has been quantified based on the geo-reference mapping of mangroves done for entire SEZ area by National Centre for Sustainable Coastal Management (NCSCM), Chennai.

Wildlife Conservation Plan & Mangrove Conservation Plan has been submitted to Divisional Forest Officer (Kutch- East) and it is forwarded by DFO to CCF. CCF has further forwarded the Conservation Plan to Chief Wildlife Warden (CWLW) of the state, for approval process

A study carried out by National Centre for Sustainable Coastal Management (NCSCM), Chennai in year 2018, the total mangrove cover in Kotdi-I and Kotdi-II creeks was about 410 ha, out of which dense mangroves occurred to the extent of only 50 ha (12%), followed by sparse mangroves, distributed in 189 ha. The scattered mangrove covered an area of 171 ha. A study by Thivakaran and Sawale (2016) reported 47 species of macrofauna in the Mundra mangrove eco-system. Total 12 species of gastropods, 14 species of crustaceans, 9 species of bivalves, 8 species of polychaetes and 4 species belonged to the category "others". Increasing spread of mangrove area and high species richness of macrofauna suggests healthy and dynamic condition of mangrove ecosystem in this area. Study suggests that mangrove plantation shall be carried out by Kutch East Forest Division as the area is under their jurisdiction and the staff has vast experience in mangrove plantation and management. A financial outlay of Rs. 250 Lakhs has been proposed by AEL for mangrove plantation and monitoring. The mangrove conservation report is enclosed as **Annexure-5**.

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EAC OBSERVATION NO.-5



SAMPLING LOCATIONS FOR FLORA AND FAUNA STUDY IN THE BUFFER AREA



SAMPLING LOCATIONS FOR FLORA AND FAUNA STUDY IN THE CORE AREA

Conservation Measures for Mangroves:

a) A tall wall around the project boundary will be constructed so that dusting is controlled during construction and operation phases.
b) Thick green belt around the project boundary will be created so that fugitive particulate matters are arrested.
c) Dust pollution control measures will be implemented at various generating point sources in the plant areas.
d) Water pollution control measures will be in place including treating industrial effluents containing heavy metals.
e) The plant will operate on Zero Liquid Discharge (ZLD) principle.

Further,

a) Mangrove plantation is planned on the bank of Kotdi-I, Kotdi-II and Baradimata creek systems.
b) Total 50 ha of plantation every year will be taken-up for 10 years period for which budget and action plan has been proposed in wildlife and mangrove conservation plan developed in consultation with DFO Kutch East.
c) The financial allocation for Mangroves protection measures is about Rs. 250 lakhs.

adani

3204

To,

Deputy Conservator of Forest
Kutch East Forest Division,
Bhuj, Gujarat

Sub: Submission of Wildlife and Mangrove Conservation Plan Approval please.

Ref:

1) Letter no- No. A/ JMN/ T.9/ 91/ 2018-19 of you good office dated 04.05.2019.
2) Chief Conservator of Forest, Kutch Forest Division, Bhuj- Kutch vide letter no- A/ JMN/ T.12/ 501 dated 11.04.2019

Kind Attn: Sh. P A Vihol

Dear Sir,

With reference to the above referred letter, we are submitting the revised report after incorporating the following as desired by you:

In Principle Approval (Stage-IV) granted by MoEFCC to M/s APSEZ is incorporated in Annexure No-1 of Wildlife and Mangrove Conservation Plan attached herewith in 4 copies.

Map indicating distance of proposed area from the Sanctuary, Eco-Sensitive Zones as well as Kutch Biosphere Reserve and nearby wetlands is incorporated in Annexure No-3 of Wildlife and Mangrove Conservation Plan attached herewith in 4 copies.

The Stage-1 Forest Clearance has been obtained by the M/s APSEZ for 1576.81 Ha Forest Land in various patches. M/s APSEZ is under obligation to comply with all conditions of this Forest Clearance to secure Stage-2 clearance.

Copper project is proposed by separate company "M/s AEL" for which land shall be provided by M/s APSEZ as a clear land after all clearance. M/s AEL has obtained the TOR from MoEFCC for EIA of Copper Project and this Wildlife and Mangrove Conservation Plan is being prepared Condition No 5 (v) of the TOR received by M/s AEL. This conservation plan scope is to identify Schedule-I Fauna if any exist in the study area (10Km radius) and identify if may get impacted by the proposed copper project and prepare conservation plan for the same.

રવાનગી કારકુન
નાયબ વન સંરક્ષકશ્રીની કચેરી
પૂર્વ વન વિભાગ, હોસ્પિટલ રોડ,
ભુજ - કચ્છ. ૩૭૦૦૦૧.

Adani Enterprises Ltd
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Proposed Copper project boundary does not fall inside any protected area or any ESZ of any protected area and no forest diversion is applied by M/s AEL for the proposed copper project. There is guideline for wildlife conservation plan budget on the basis of percentage of total project cost only in case a project involves diversion of forest land in protected area which is not the case for Copper project of M/s AEL.

Hence, the conservation cost for wildlife and the mangroves for proposed Copper project has been arrived on the basis of scientific study and estimate for Schedule—I species in the study area (10 Km radius of copper project). Total Rs 443.5 Lakhs has been proposed as budget for conservation activities. Total project cost shall be Rs 10,000 Cr.

Hope you will find this report and map suffice the requirement and satisfactory. For your kind perusal and forwarding to Chief Wildlife Warden (CWLW) for approval please.

Thanking you,
For, Adani Enterprises Limited,

(Santosh Kumar Singh)
Authorized Signatory,

Enclosures: As above

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3206

Wildlife Conservation Plan & Mangrove Conservation Plan for Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone in Siracha and Navinal Villages of Taluka Mundra, District Kutch, Gujarat



adani

SUBMITTED BY

M/S. ADANI ENTERPRISE LIMITED

September-2019

Wildlife Conservation Plan & Mangrove Conservation Plan for Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone in Siracha and Navinal Villages of Taluka Mundra, District Kutch, Gujarat

Submitted by

M/s. Adani Enterprise Limited

Study by
Dr. Bharat Jethva
NABET Accredited FAE
Cat-I, Ecology & Biodiversity
Bhagwati Enviro Care Pvt. Ltd.

September-2019

3208

CERTIFICATE

This report "Wildlife Conservation Plan and Mangrove Conservation Plan for Proposed Greenfield Copper Refinery Project (1.0 MTPA) at Adani Port Special Economic Zone in Siracha and Navinal Villages of Taluka Mundra, District Kutch, Gujarat" has been prepared by us based on extensive field visits and data collected, review of published literature, information and maps furnished by M/s Adani Enterprise Limited, and data available in public domain. The study was restricted to project area and its 10 km periphery from the project area.

Dr. Bharat Jethva
NABET Accredited FAE
Cat-I, Ecology & Biodiversity
Bhagwati Enviro Care Pvt. Ltd.
Ahmedabad

23rd August 2019
Ahmedabad

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1. INTRODUCTION

1.1. Background

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha (634 acres) of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology, which will be located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, Taluka Mundra, district Kutch, Gujarat.

As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. The application No: IA/GJ/IND/53004/2016 for prior EC (Form-1 and Pre Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April 2016 and same was reviewed by the Expert Appraisal Committee (Industry-I) the meeting held on 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. TOR has been issued by MoEF&CC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016 (Annexure-I). EIA for the project has been conducted by the NABET accredited consultant and submitted to MoEF&CC for Environmental Clearance in 2018.

As a part of approved ToR No. 5(v) 'Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule I fauna, if any exists in the study area is to be prepared'. Present study is carried out towards preparation of above mentioned plan based on primary data and field surveys. Besides, as on voluntary basis, the Mangrove Conservation Plan has also been

incorporated in this report. Therefore, the present study is carried out to fulfil requirement of the Term of Reference (ToR).The present study is a detailed account of flora, fauna, mangrove and wildlife habitats present in 10 km radius of the proposed project area based on literature survey and primary data collection. Additionally 10-15 km radius area was also studied to check if there is any environmental sensitivity present based on the secondary information and published literature.

1.2. Legal Framework

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha (634 acres) of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology, which will be located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, Taluka Mundra, district Kutch, Gujarat.

The proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. The application No: IA/GJ/IND/53004/2016 for prior EC (Form-1 and Pre Feasibility Report) for the proposed project has been submitted to MoEF&CC on 21st April 2016 and same was reviewed by the Expert Appraisal Committee (Industry-I) the meeting held on 4th May 2016 in New Delhi to prescribe Terms of Reference (TORs) for the preparation of EIA/EMP report. TOR has been issued by MoEF&CC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016. The present study is to fulfil the requirements of studies mentioned under ToR No. 5(v) issued to AEL.

1.3. Scope of Work

Scope of work for this study is in line with the ToR No. 5(v) issued to AEL which include preparation of Wildlife Conservation Plan and Mangrove conservation plan as part of this report. The preparation of the wildlife and mangrove consecration plan required the study of habitat types and quality, species, diversity, rarity, fragmentation, ecological linkage, age, abundance, etc. in case of schedule fauna, conservation measures should be proposed, And a detailed study to assess the wildlife habitats, their migration route, etc. and measures to mitigate impacts of the proposed activities.

The present study has carried out identification of ecologically sensitive receptors (species, habitats& eco-systems) based on field investigations and literature survey along with their mitigation with conservation action plan. The study was carried out in core area (project site) and in buffer area i.e. 10.0 km periphery from the project site. The study was carried out systematically and scientifically using primary and secondary data in order to bring out factual information on the ecological conditions of the project site and its surroundings.

The study involved assessment of general habitat type, vegetation pattern, preparation of inventory flora and fauna of terrestrial ecosystem in 10 km radius from the boundary of proposed project site. Biological assessment of the site was done to identify whether there are any Rare, Endemic or Threatened (RET) species of flora or fauna in the core area as well its buffer zone and to identify whether there are any ecologically sensitive area within buffer zone that is likely to be impacted. The study also designed to suggest suitable mitigation measures if necessary for conservation of important species and their habitats etc.

1.4. Objectives of the Study

The major aim of the present study is to avoid any impact of proposed project activity on important natural habitats or species in the study area. Therefore, the study is carried out with following objectives.

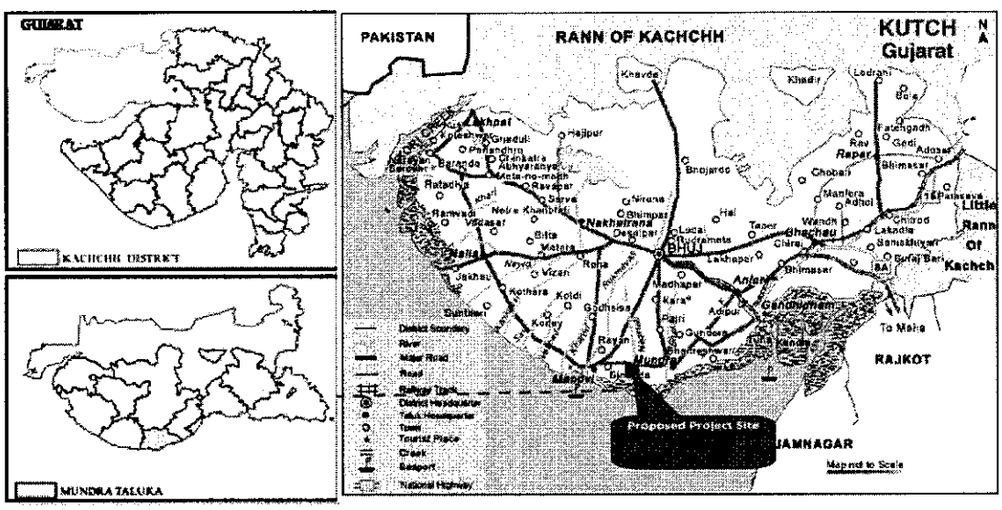
- To evaluate the ecological status of the study area with respect to important flora, fauna and ecologically sensitive habitats etc.
- Assessment of any impacts of the project activities on ecologically sensitive habitats and species.
- Recommend mitigation measures in the form of wildlife conservation plan with an in-built monitoring mechanism and schedule of implementation along with financial budget.

2. STUDY AREA

2.1. Project Location

The proposed project site is located in villages Siracha and Navinal at APSEZ Taluka Mundra, district Kutch in the state of Gujarat (Map-2.1).

Map- 2.1: Proposed project location in Siracha village of Kutch district in Gujarat.



2.2. Study Area:

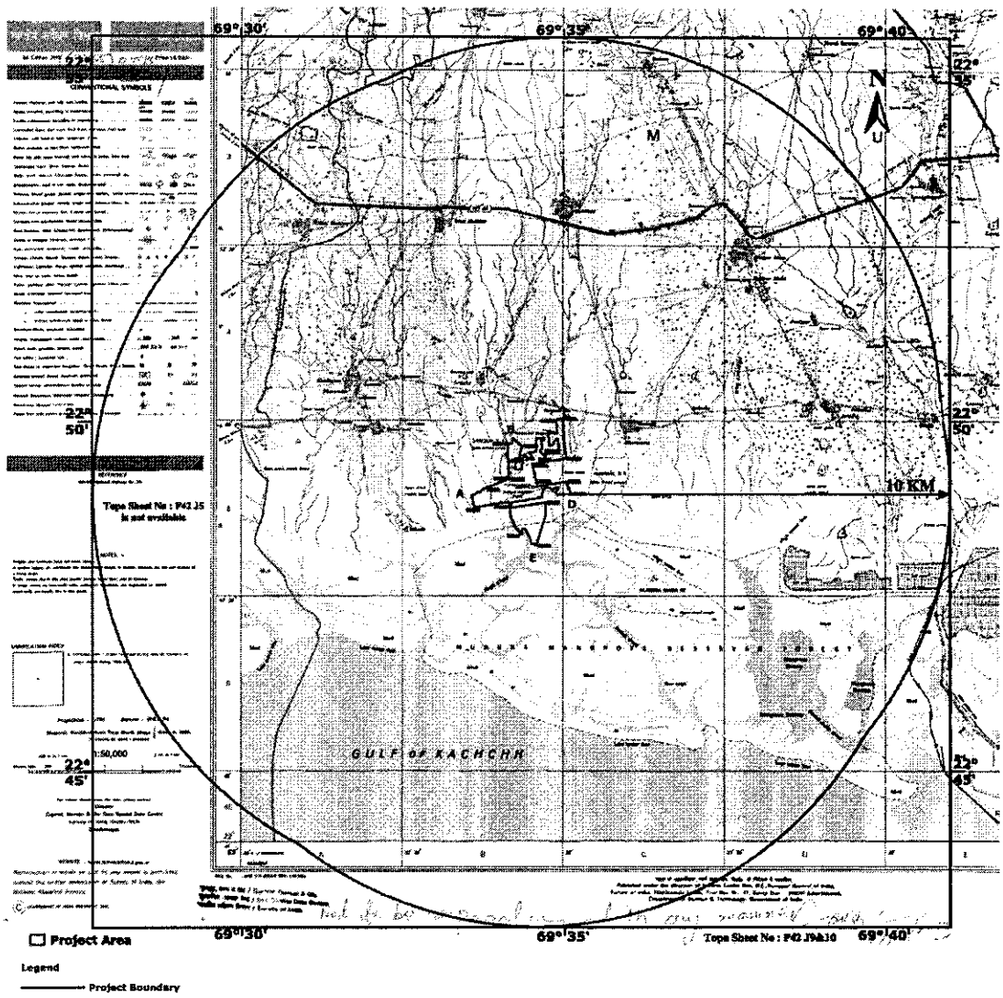
For the convenience of the study and the user agencies, the study area was divided in two major parts i.e. 1) Core area/project area and 2) Buffer area i.e. 10.0 km periphery of the project boundary (Map-2.3).

2.2.1. Core Area:

Core area is proposed project area of Greenfield Copper Refinery plant at Mundra (Map-2.2) The total area earmarked for the proposed project is 256.58 ha (634 acres), in which 154.19 ha (381 acres) of land belongs to APSEZ area and 102.39 ha (253 acres) of land belongs to forest area for promoting industrial development. The Gulf of Kutch sea coast is located at 3.9 km south from the proposed project site. The area is located 5.0 km south of National Highway NH- 8A and 0.3 km from State Highway SH-6. No

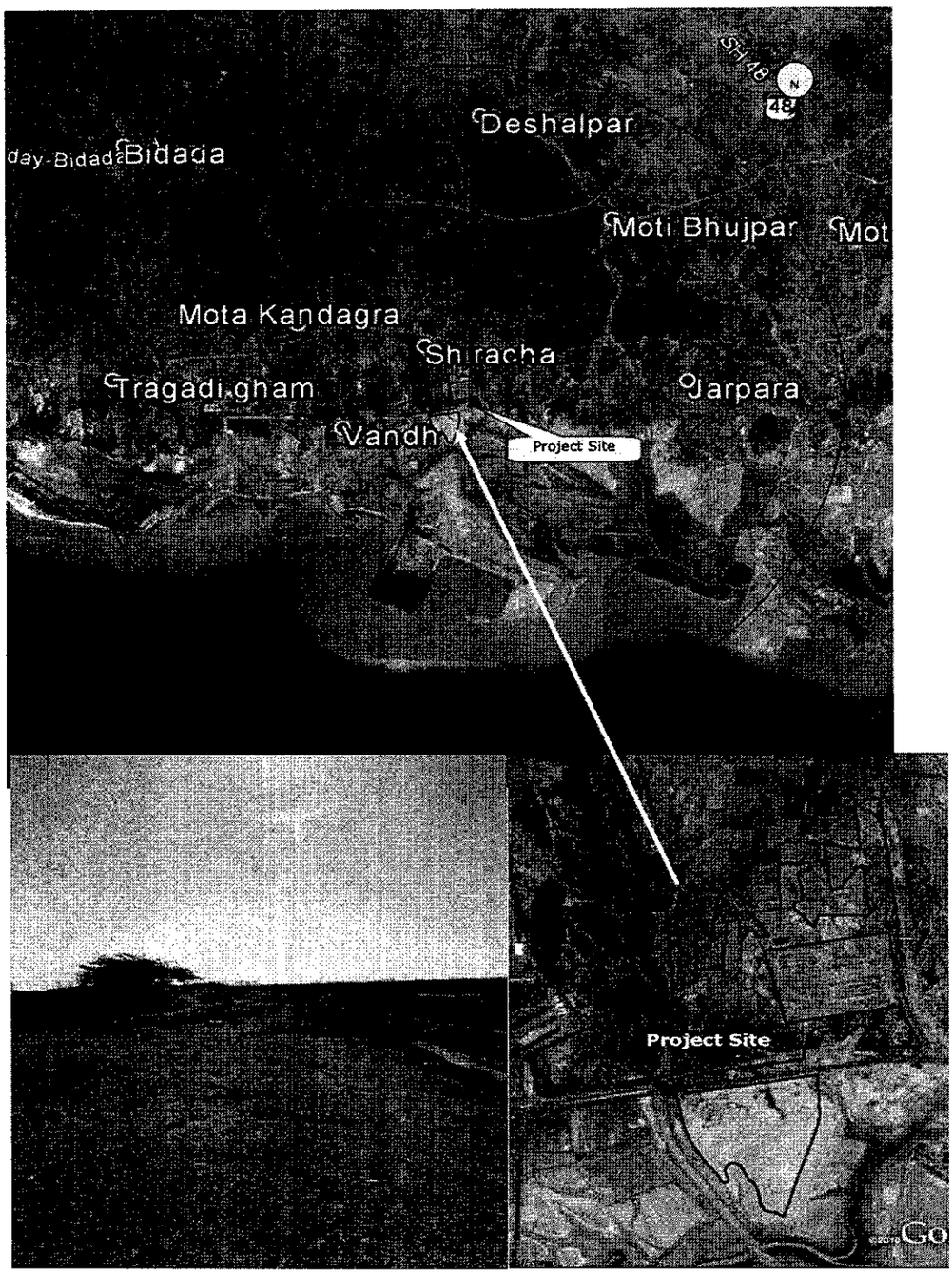
major vegetation or any human settlements present in the core area, therefore, there is no need for rehabilitation of any human settlements from the project site. Most importantly the project site does not fall in 10.0 km periphery of any National Park or Sanctuary or their eco-sensitive zones. Site is located outside the Coastal Regulatory Zone areas of Gulf of Kutch sea coast therefore, does not attract CRZ clearance.

Map-2.2: Proposed project location on Toposheet.



Corner Point	Latitude	Longitude
A	22°48'55.40"N	69°33'34.74"E
B	22°49'44.92"N	69°34'13.74"E
C	22°50'01.88"N	69°34'59.78"E
D	22°48'57.23"N	69°35'08.42"E
E	22°48'13.26"N	69°34'35.43"E

Map-2.3: Project location (core area) with 10.0 km buffer (study area) in Gujarat



2.2.2. Buffer Area

The buffer area mainly consists of revenue areas 18 villages that fall in 10.0 km periphery of the project site (Map-2.2). The list of villages is given in Table-2.1.

Table-2.1: List of villages falling in 10 km buffer area.

No	Village	No	Village	No	Village
1	Tunda	7	Mota Bhadiya	13	Khakhar Moti
2	Shiracha	8	Kandagara Mota	14	Deshalpar
3	Navinal	9	Bhujpar Nani	15	Sukhapar
4	Jarpara	10	Bhujpar Moti	16	Nani Khakhar
5	Bidada	11	Depa	17	Gelda
6	Tragadi	12	Nana Bhadiya	18	Dhrab

Majority of the land of the buffer area is occupied by the agriculture fields, forest area, industries (Saltpans, Ports, and Power plants), open scrub vegetation, mangrove, mudflats, pond/ reservoir, roads & railway network & built up areas etc. Most importantly there are no Wildlife Sanctuaries or National Parks located in the 10.0 Km periphery of the proposed project area. The proposed project land is located outside the Coastal Regulatory Zone of Gulf of Kutch coast.

3. METHODOLOGY

3.1. Basic frame work of data collection

The prediction of impacts of industries on flora and fauna depends on understanding of the proposed activities, its magnitude/extent, scale and ecological conditions in the surrounding area. Collection of comprehensive baseline information on flora and fauna is therefore a prerequisite for assessment of impacts of development activities. It would also help in advance planning and mitigate the impacts and ultimately managing the natural habitats and resources. The approach to achieve the stated objectives within defined scope of work, include field surveys, interviews, and reviews of literature. Following was the basic fame work of the data collection and analysis for the present study.

3.2. Field Surveys

Several field visits were carried out between month of February-March 2019 and September 2019 to understand and assess the impacts of proposed project activities on flora and fauna and natural habitats. We evaluated the distribution and abundance of flora and fauna and mangroves in project area and in buffer area separately.

3.3. Identification of Important Ecological Habitats

The important ecological habitats and features were identified based on our field visits and also mapping of landuse types in the study area. We identified ecologically important habitats through primary survey, literature survey and consulting local naturalists etc. These important ecological habitats and features were then identified on landuse map that is prepared for the study area. Land use map of 10 km radius of the proposed project site is prepared by Vimta Labs Limited is used for the present study. Prominent landuse features such as, roads, rivers/waterbody/drainages, agriculture, sea, sandy beach, mangrove, mudflats, industrial and built up areas, forest area, scrubland etc. were digitized using open source software such as QGIS and their areas were calculated. There may be acceptable

margin of errors in the final map however, locations and important features are identified and shown on map.

3.4. Study of Flora

In order to study the flora we laid 10X10 m^2 size 37 quadrates in buffer and 10 quadrates in core area (Map-3.1 & 3.2). Quadrates were laid separately for detailed analysis of vegetation in the core area (project site area) and buffer areas (10 km periphery). In order to study herbs and grass species, we laid a 1X1m^2 quadrate within the above mentioned quadrates. Details of Geographic Coordinates of each of the quadrates laid are given in Map-3.1 and Annexure-II. Information on geographic coordinate, occurrence of plants, their species names, numbers and floral phenotypes, life forms etc. were collected from each quadrate we laid. Direct visual enumeration of plant species was carried out to generate data on flora. The collected data was then systematically and scientifically analyzed to produce information on following biodiversity parameters of flora. The encountered vegetation of the study area was analyzed to calculate density, frequency & abundance (Curtis and McIntosh, 1950). Total abundance, density and frequency in respect to individual species were calculated in order to understand the vegetation structure and relative importance of the sampled areas. We used Shannon Weaver Index (Shannon & Weiner, 1949) for Species diversity and Simpson dominance index (Simpson, 1949) for species dominance. Species enumeration (inventory), richness, total abundance, density, and evenness provide systematic baseline information of the vegetation community.

3.5. Study of Fauna

We mainly studied the fauna of higher trophic levels which acts as indicator of the type and health of the environment.

Reptiles: Majority of the reptile species are fossorial in habit therefore the assessment of reptiles and their diversity etc. holds special significance for any development projects. It is difficult to conduct quantitative study on reptiles within a short period of time. Therefore, we relied on qualitative observations only. We carried out study based on interview survey,

secondary literature as well as direct observation on road killed reptiles. We randomly looked for various reptiles and their presence i.e. lizards, snakes etc. in the study areas. Therefore, only a check list of reptiles observed during the study period was prepared.

Birds: Birds, occupying higher trophic levels in the ecosystems, respond quickly to the changes in the habitats and therefore serve as one of the best indicators for evaluating the status of the area. Therefore, we created baseline data on birds by systematically and collected data on their occurrence i.e. presence absence in the buffer and core areas in the study area.

Map-3.1: Sampling locations for flora and fauna study in the core area.



Map-3.2: Sampling locations for flora and fauna study in the buffer area.



For creating baseline data on birds we randomly walked in the study area during early morning i.e. 6:00 AM to 9AM and at evening 5:00PM to 7:00 PM. These time periods of the day are when maximum bird movements are expected. We walked randomly in the study area carried out sightings of birds ad libitum and recorded species based on their identification. Special reference books for bird species identification were used. Apart from walking randomly, we also relied on specific habitat search for different species i.e. dense bushes, wetland, ponds, big trees, agriculture areas etc. In order to accomplish the inventorization of the bird species found in the study area. All the bird species are classified based on their conservation status, their schedule under Wildlife Protection Act 1972, their migratory status, habitats and their feeding guilds. This was further used for finding out important bird

species in the study area i.e. rare, endangered or species of high conservation significance.

Mammals: Like birds, mammals are also occupying higher trophic levels in many ecosystems and respond quickly to the changes in their habitats therefore, serves as best indicators of the ecosystem health. We therefore, chose to create qualitative baseline information on presence and absence of mammals in the study area. Since the presence of mammalian species is low affecting probability of their sightings, in the study area, it was difficult to estimate their population using line transect method. More importantly, it was difficult to accommodate the sightings of nocturnal and diurnal animals in the study. Therefore, we prepared a qualitative check list of mammals based on their presences and absence using indirect evidences and signs such as footprints, dens, droppings, diggings, scrap marks, etc. in the project area.

Apart from these, search efforts were also made for various signs of important wildlife species in the study area which includes looking for wildlife signs such as dens, diggings, scrap marks, droppings etc. The sites where likelihood of animals is higher such as shady trees, waterholes, dense and undisturbed bushes etc. were surveyed intensively during the survey in the study area. This survey has helped us in identifying various species of mammals in the study area. For mammal inventory, both direct sightings and indirect evidences (like dung, scats, pellets, foot prints, nests, dens etc.) were accounted.

3.6. Important Wildlife Habitats and Protected Areas

We assessed the presence and distances of important wildlife habitats and hotspots such as protected areas, mangroves, breeding and nesting habitats, coastal habitats, important wetlands, and grassland area from core area. These important areas such as Protected areas (National Park, Wildlife Sanctuaries, Conservation Reserves etc.), Wetlands of national importance, Ramsar sites, Important Bird Areas (IBAs), classified by the Bombay Natural History Society etc.

3.7. Rare, Threatened & Endemic Wildlife Species and Their Corridors

We also assessed the presence of rare, endangered, endemic and threatened wildlife creed species in the project area/core area and buffer area. Special search efforts were made during the field visits to identify any such sensitive species or their corridors etc. in the project area and buffer area. Apart from field visits we relied on interview surveys of local people, consultation with local biologists and naturalists etc.

3.8. Literature Review

Considering the time limitation to undertake statistically rigorous data gathering system, study also relied on existing knowledge about the ecology and biodiversity of the region. Importantly, there are quite a few studies undertaken in the past dealing with the impacts of copper refinery plants on flora and fauna and other concerns of biodiversity conservation. Literature on copper refinery projects and associated environmental issues were downloaded and collated through internet. Various relevant literatures were surveyed during the study for collection of baseline information. Maps, reports and documents collected from the project proponent were also reviewed and used in the present study. Books on flora, fauna and wildlife were also studied in order to understand the biology of several species. Other wildlife and mangrove conservation plans submitted for the surrounding area are also referred.

3.9. Consultations

During the study, series of consultations were made with both technical and non technical stakeholders to get precise information on the project area/core area and buffer zone habitats. In order to know more about the seasonal presence of several faunal species and their movement, study team informally consulted and discussed with local naturalists and local people, from the villages, herders and farmers who inhabit close to the proposed project area.

3.10. Supplementary Information

Other than the above, for the purpose of this study, relevant information was also collected from following sources:

Research papers on flora and fauna and mangroves

Google imageries/Google Maps

Project related Maps provided by Adani Enterprise Limited

Communications with subject experts

3.11. Analysis to Evaluate the Potential Impacts

The information collected on status of flora and fauna and, their spatio-temporal distributions, hotspots, and potential impacts of proposed project development were logically analyzed and conclusions were extracted for preparation of conservation plan for the project proponent to implement.

3.12. Preparation of Wildlife Conservation Action Plan:

After identification of key impacts of the project, on flora, fauna or any key habitats of any important species or their corridors, a comprehensive wildlife conservation action plan was prepared with monitoring mechanism and financial projections.

3.13. Limitations of the Study

The study undertaken is structured around the project information as provided by the project proponent, any change in the proposed activities may result in variation of outcome. The study is based on field visits, literature survey, consultation with local people etc. Professional judgment and subjective interpretation of facts has been applied for this study. All information's and inferences presented herein are based on the specifics currently available within the limits of the scope of work, information provided by the client or its representative, existing secondary data and schedule.

4. Ecological Assessment

The observations and assessment of overall ecological scenario presented in this chapter include details of flora, fauna, natural habitats, protected areas, wildlife species and their migration corridors etc. Such baseline information provides better understanding of the situation and overall ecological importance of the area. This baseline information viewed against proposed project activities help in predicting their impacts on the wildlife and their habitats in the region. Data collected and information gathered from secondary literature on flora, fauna, protected area, natural habitats, wildlife species etc., were analyzed and results are presented as follow.

4.1. Biogeographic Zone

The region falls in Indo-Malay Realam (IM 1303) and Deserts and Xeric Shrublands Biome as defined by WWF. The North-western Thorn Scrub Forests [IM1303] ecoregion represents a large expanse of degraded dry forest surrounding the Thar Desert. Neither exceptionally species-rich nor high in endemism, the ecoregion nevertheless harbours viable populations of antelopes.

As per classification of Indian Biogeographic zones by Rodgers et al. (2000), Kutch district falls under Biogeographic Zone 3 - the Indian Desert and the Biogeographic Province Kutch Desert- 3B.

4.2. Protected Areas

As per our information and survey there is no Sanctuary, National Park, or notified wildlife corridors within the core area and buffer area (10 km) of the project site. Marine National Park is located at 33.0 km distance in south-west direction, Marine Sanctuary is located in same direction at 35.0 km distance, where as Narayan Sarovar Sanctuary is located at 103.0 km in North-West direction, Kutch Desert Wildlife Sanctuary is situated in the Great Rann of Kutch at 70.0 km North East direction. The Wild Ass Sanctuary is located in the Little Rann of Kutch at distance of 77.0 km, Kutch Bustard

Sanctuary at 92.0 km in North direction and Chari-Dhand Wetland Conservation Reserve is located at 82.0 Km north. Majority of the protected areas and their eco-sensitive zones are located beyond 30 km distance from the project site (Table-4.1, Map-4.1, Annexure-III).

Table-4.1: Protected area and their distances from proposed project site.

No	Protected Areas	Distance	Direction
1	Marine National Park	33 Km	South-West
2	Marine Sanctuary	35 Km	South-West
3	Narayan Sarovar Sanctuary	103 Km	North-West
4	Kutch Bustard Sanctuary	92 Km	North-West
5	Wild Ass Sanctuary	77 Km	East
6	Kutch Desert Sanctuary	70 Km	North-East
7	Chhari Dhandh Conservation Reserve	82 Km	North
8	Banni Grassland Important Bird Area	69 Km	North

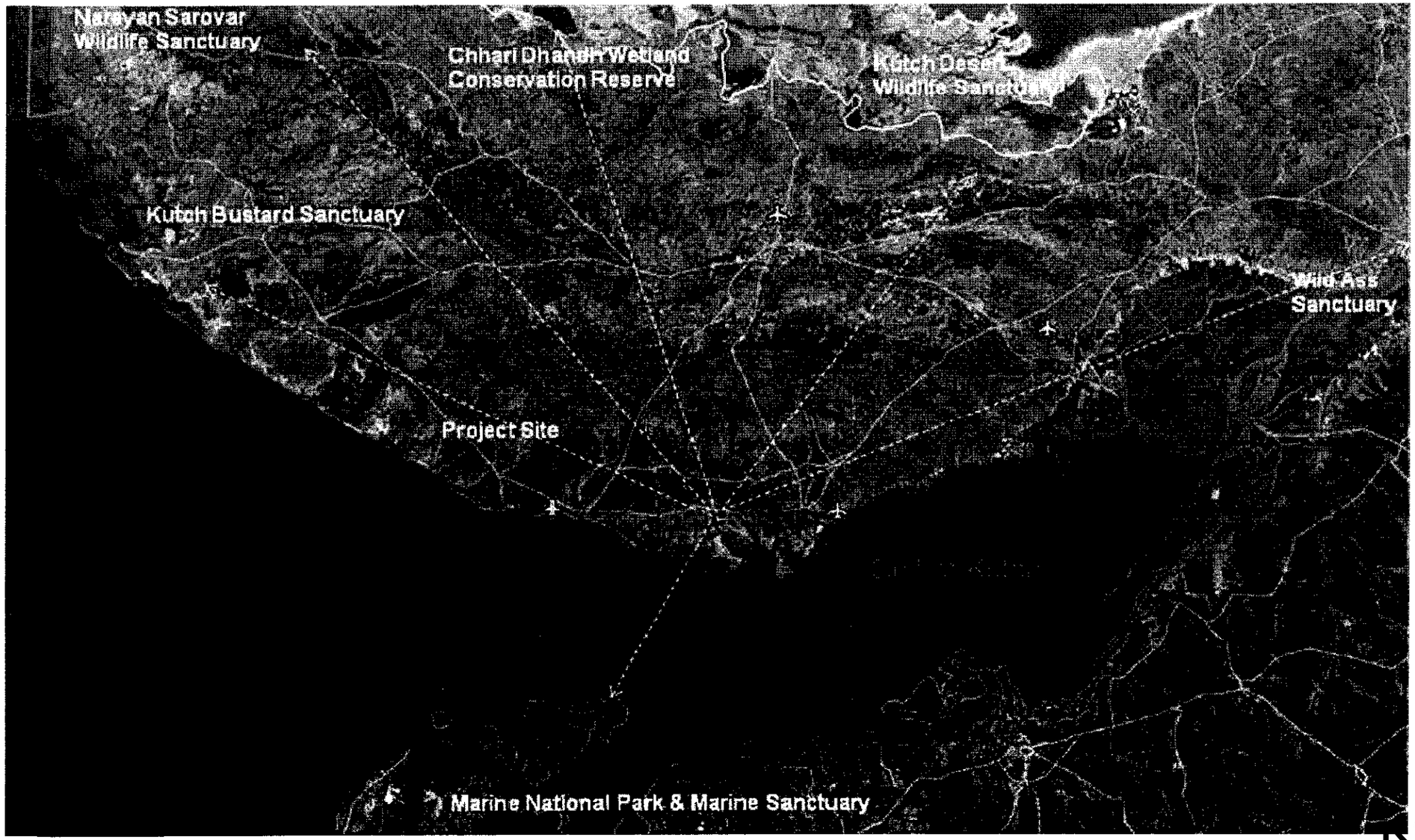
4.3. Landuse Types in the Study Area

We mapped various landuse types of the study area using field surveys and various references available online. The major landuse features are agriculture, sea, mudflats, open scrubland, sparse wasteland, mangroves etc (Table-4.2 & Figure-4.1, Plate-4.1).

Table-4.2: Area & percentages of various landuse types in the study area.

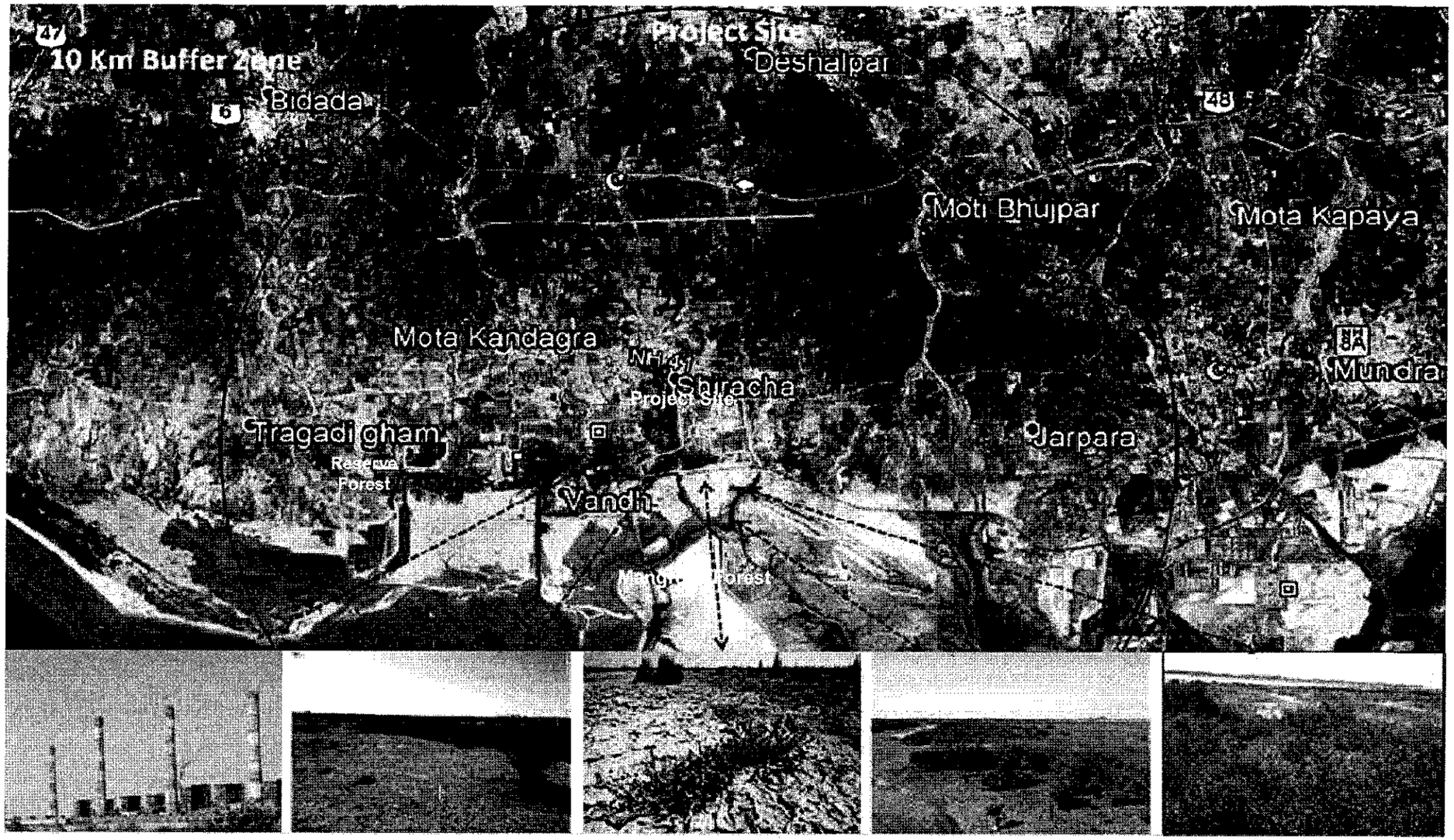
No	Landuse Type	Area (ha.)	% of Area
1	Built up Area	2103.27	5.08
2	Forests	837.62	2.02
3	Agriculture	15484.69	37.41
4	Wasteland	5620.36	13.58
5	Waterbody	9366.3	22.63
6	Wetlands	4469.36	10.80
7	Others	3512.17	8.48
	Total	41.393.77	100.0

Map-4.1: Project site location vs. protected areas in Kutch district.



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Plate-4.1: Project site location and habitat types in the 10 km buffer study area.



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Map-4.2: Landuse pattern in the study area.

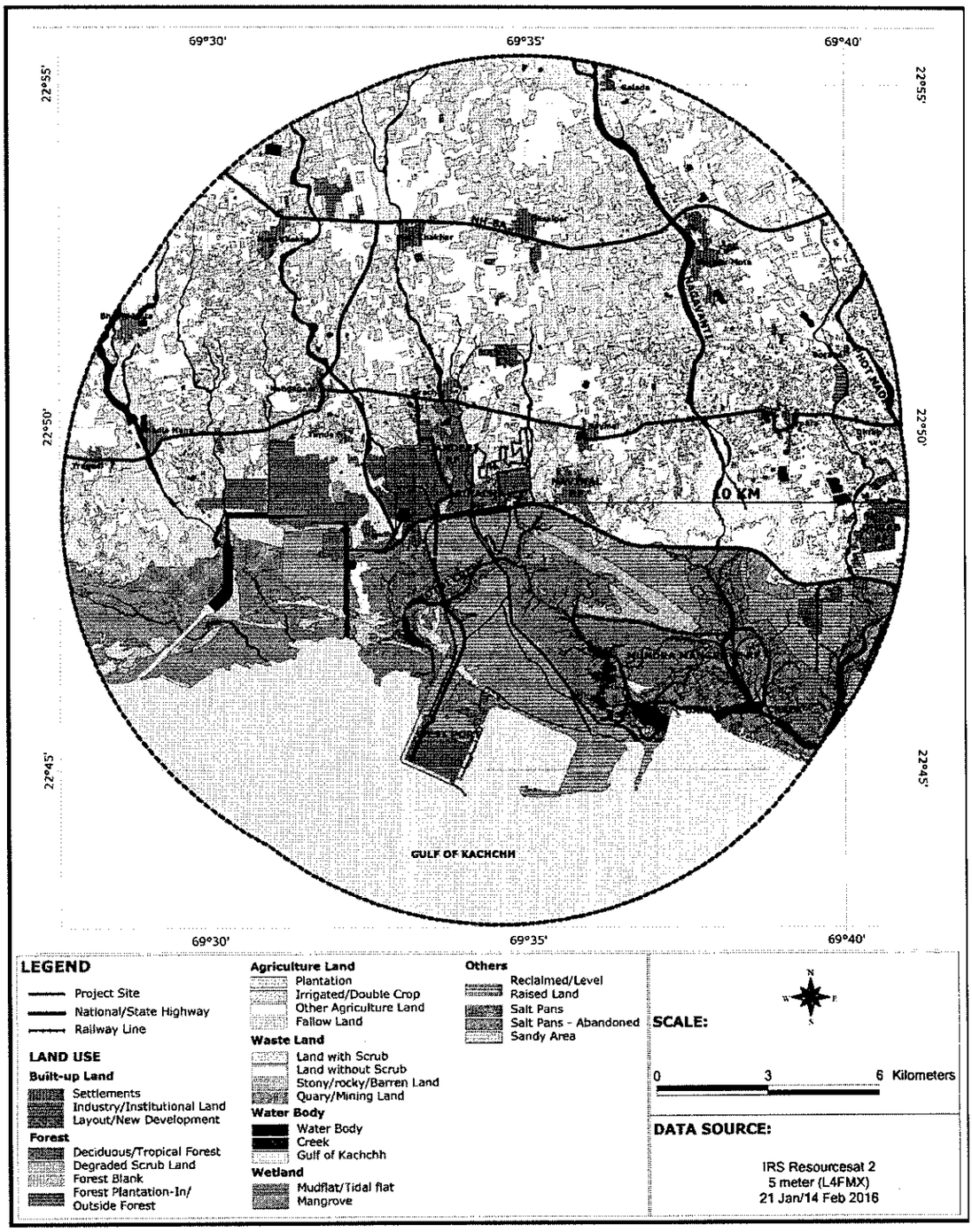
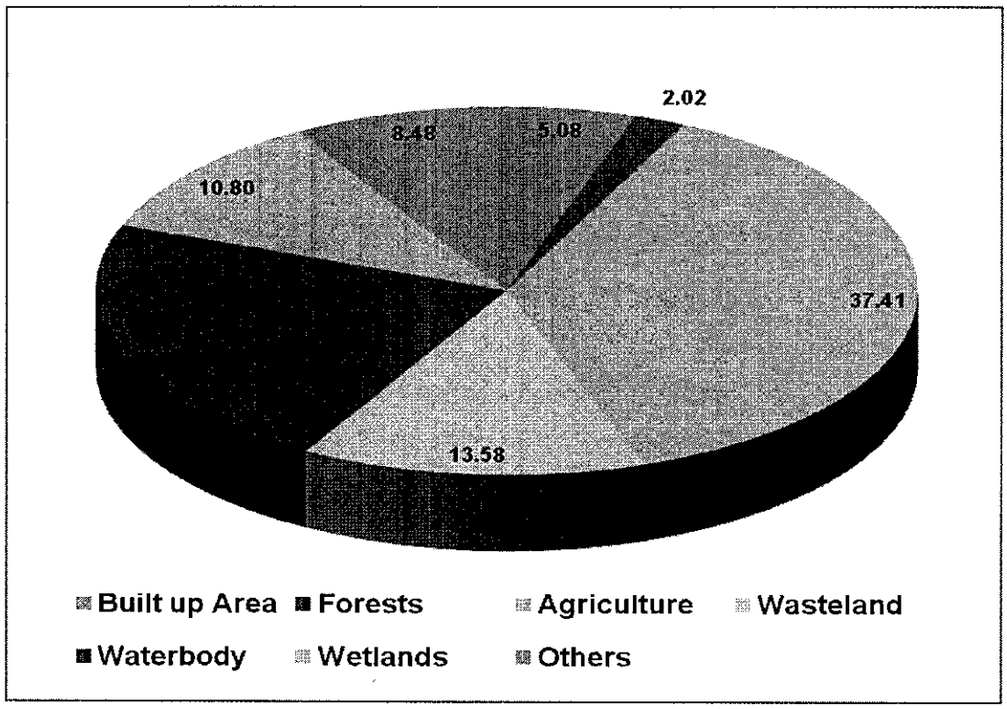


Figure-4.1: Percentage of various landuse classless in the study area.



4.4. Important Ecological Habitats

Based on our field visits and literature survey we identified two important and ecologically sensitive habitats that are located within 10km buffer zone. These habitats are listed below

i. *Forest Area*
ii. *Mangrove ecosystem*
iii. *Waterbodies*
iv. *Important birdwatching site*

4.4.1. Forest Area & Forest Type

As per information received from project proponent, the Land requirement for the project is 256.58 ha. (634 acres), in which 154.19 ha is APSEZ area and 102.39 ha. (253 acres) of land belongs to forest area for promoting industrial development. Therefore, core project area does include forest area. Forest Clearance for this land is under process and stage-I clearance is already received for the same. MoEF&CC (forest conservation division) has granted

Stage-I approval for diversion of 1576.81 ha. of reserved forest land in favour of Adani Ports & Special Economic Zone Limited (APSEZL) vide letter F.No.8-04/2016-FC dated 16th November 2018 (Annexure-IV). Part of the diverted forest land area (253 acres) will be utilized for the proposed copper refinery project after all approvals.

As per the forest classification of Champion and Seth (1968), forest of Kutch district classified under the "Northern Tropical Thorn Forest". The forest area in the proposed project area consists of mostly Prosopis juliflora with scattered trees of *Anogeissus pendula, Acacia leucophloea, Zizyphus mauritiana, Prosopis cineraria, Salvadora persica* and *Salvadora oliodes etc.*

Apart from forest areas involved in the core area, there are forests areas present in the buffer zone which are under the jurisdiction of Kutch West Forest Division of Gujarat Forest Department (Table-4.3). These forest areas are well marked with a boundary wall indicating its possession by the forest department. These forest areas are of two vegetation types 1) Open scrub forest and 2) Mangroves. Total 6419.25 ha. of Reserved Forests area is present in the study area (Table-4.3). Most part of the reserve forest areas (83.0%) is in the form of mangrove forest falling in the creek systems on the coast. Remaining 17.0% falls in the open thorny scrubland forests.

The inland open scrub forests are dominated with dense patches of *Prosopis juliflora* along with scattered plants of *Acacia nilotica, Prosopis cineraria, Zizyphus numularia, Salvadora persica, Salvadora oliodes, Capparis decidua, Calotropis procera, Balanites aegyptica, Butea monosperma, Acacia leucophloea, Casia auriculata etc.* The vegetation type of these forest areas are representative of desert eco-system. The details of the forest areas are given in Table-4.3.

The other kind of forest reserve are situated in costal area for example on high tidal mudflats which are harbouring inadequate patches of mangroves and coastal vegetation details of the region is given in the section on mangroves.

Table-4.3: Details of Forest area and forest types in study area.

No	Village	Survey No	Area	Type
1	Deepa	220/p	17.36	RF Section-20
2	Borana	20/p	26.62	RF Section-20
3	Dhrab	169/p	23.43	RF Section-20
4	Dhrab	169/p	81.59	RF Section-20
5	Jarpara	169/p	26.61	RF Section-20
6	Mundra Mangrove Range	2	5333.73	RF Section-20
7	Mundra Rakhal Dhuvo	2	334.34	Reserve Forest
8	Navinal	223/p	21.85	RF Section-4
9	Navinal	223/p	89.52	RF Section-20
10	Siracha	295/p	125.00	RF Section-20
11	Siracha	295/p	209.20	RF Section-20
12	Siracha	517/p	130.00	RF Section-4

4.4.2. Mangroves Ecosystem

Kutch mangroves distributed in the arid to semi-arid coastal belts are traditionally considered as the low dense mangroves which are mostly degraded. Structural attributes of Kutch mangrove are not comparable with other luxuriant mangrove formations on other coasts of India (Sawale and Thivakaran, 2013). The semi-arid coastal belt of Kutch is known for its harsh environmental conditions like hyper-salinity (36-47 ppt), wider ambient temperature fluctuations (11.2 to 48.7oC), high evopo-transpiration (R/ETP-0.03–0.20) and frequent natural disasters like cyclones and earthquakes (Sawale and Thivakaran, 2013). Added, the recent spurt in inland watershed development schemes deprive the meagre seasonal run-off to neretic waters, rendering it singly conspecific formations of *Avicennia, marina*; a hardy species capable of tolerating high physiological stresses (Sawale and Thivakaran, 2013). Though eight true mangrove species were reported earlier from the Gulf of Kutch, *A. marina* was the only species recorded on the coast of Mundra with sporadic occurrence of *Rhizophora mucronata* and *Ceriops tagal* (Sawale and Thivakaran, 2013). Majority of the mangrove areas are represented by only one species i.e. *Avicennia marina*. Few other species such as *Rhizophora mucronata* and *Ceriops tagal* are planted by forest department as part of their mangrove conservation schemes. National Centre for Sustainable Coastal Management, Chennai, carried out a status

survey ('Comprehensive and Integrated plan for preservation and conservation of mangroves and associated creeks in and around the Adani Ports and Special Economic Zone Ltd., Mundra, Gujarat') of the mangroves along the creeks and adjoining land/island as of 2016-17. The total mangrove cover of the area was estimated to be 2340 ha. There has been an increase of mangrove cover by 246 ha (~10%) compared to the mangrove area of 2011 (using aerial photo of 2011, NCSCM has estimated it to be 2094 ha). In 2016-17, out of 2340 ha, the dense mangroves were 629 ha contributing to 27% of total mangrove cover.

Most of the mangrove areas (83.0%) are located in the notified reserve Mangrove Forest areas of Navinal, Shiracha and Jarpara village coasts (Survey no-2 Mangrove Forests). The coastal area of Tunda, Navinal, Shiracha, Jarpara and Tragdi villages have patches of scattered, sparse and dense mangroves. Most of the mangroves are located on high-tidal mudflats and on the banks of creeks. Major creeks present in 10 km buffer zone study area are Kotdi-I, Kotdi-II, Baradimata-I and Baradimata-II. A sizable patch of dense mangrove is also located at 170 meters (on bank of kotdi- II creek) from Southern most boundary of the proposed project site (Map-4.1, & Map-4.2, Plate-4.1). Dense mangrove formations are common on banks of creeks from 0 to 75 meters where tidal water reaches everyday. Rest of the mangroves are in the form of sparse stunted which are grown on the tertiary branches of tidal creeks.

Kotdi and Baradimata are shallow creeks compared to Bocha, Navinal and Khari creeks. Kotdi I exhibited least depth, and significant areas of the creek are exposed during low tide. In case of Kotdi II creek, though part of mouth is exposed during low tide, considerable sections of the inner parts of the creek have water at MLWS levels. The mouth regions of both main branches of Baradimata creek were covered with water during high tide. Due to the presence of water covered areas during high tide, Kotdi I & Kotdi II and branches of Baradimata-I and Baradimata-II have conditions conducive for growth of mangroves.

4.4.3. Waterbodies

Our observation and literature review suggests that there are no major inland wetlands present within the study area i.e. 10.0 km buffer zone of the project site. Drainage pattern of the study area and project site are drained by several rivers and small tributaries, which are of dendritic pattern which remains dry in almost all the season. The Dhaneswari River (Danesri Nadi) a seasonal river (rain fed) flows in the western part of the project site. The water bodies flows through study area are Kotdi creek (0.5 km, S), Khari Nadi (1.9 km, W), Gulf of Kutch (3.9 km, S), Nagavanti Nadi (4.7 km, E) and Phot Nadi (8.7 km, ENE) from the project site. Natural drainage passing through the site will be suitably trained and maintained. These drainages have small check dams built on them which are known to accumulate overflowing runoff water for a short period. Apart from being important hydrological features in the semi-arid area, these check dams provide important habitat for many bird species and water source for wildlife in the region. One such drain is Khari River which flows from North-to South in western side of proposed project site. There is no check dam on this river in the vicinity of project site. However, all such drainages are seasonal in nature and flows only during rainy days. These drainages flows water from main land to Gulf of Kutch. Most of the stagnant water sources i.e. check-dams are located at substantial distances i.e. more than 2.5 km distance from the proposed project site. There will not be any diversion of rivers. Further, conveyer for copper concentrate and rock phosphate and acid pipeline will cross over the existing water intake channel available for power plant. Suitable culverts will be built as required.

4.4.4. Important Birdwatching Site

Majority of the waterbird species reported in the present study are found at Modhva mudflats located beyond 11.0 km south-west outside the study area. It is located adjacent to Sea water outfall of CGPL. Modhva area is a mix of sandy beach, saltpans, coastal mudflats with scattered mangroves and thorny bushes on the coast which provides a suitable mix of wetland habitat

to attract large populations of migratory and resident birds. Most importantly this area provides much needed staging and stop over sites for the migratory birds flying on Central Asian Migratory bird Flyway.

The Modhva coastal area is known amongst the birdwatcher as it is one of the important and prominent birdwatching and bird photography sites of Kutch. The national and international birdwatching tour agencies bring their keen birdwatching and bird photography clients to this birdwatching site of Kutch. The site is known for shore birds such as Crab plover, Oystercatcher and waterbirds such as flamingos etc. The site is therefore one of the important eco-tourism sites of Kutch. Therefore in view of its ecological and economical value, Modhva coastal area is considered as important site for conservation. Since it lies outside the study area i.e. 10.0km, there are negligible chances of impacts on this area by the proposed project.

4.5. Floral Diversity and Vegetation Type in Core & Buffer Area

We evaluated biodiversity and abundance parameters of vegetation/plant species in the core area and in the buffer area of the project site.

4.5.1. Vegetation Type & Community in Core Area & Buffer Area:

Core area: The proposed project site falls in the arid-semi arid climatic condition. Our field survey and literature review suggest that the vegetation types and community in the project area is that of semi arid-arid regions. It is represented by sparse thorny scrub vegetation in two industrial areas i.e. thermal power plants. The major part of the project area is devoid of large trees and mainly consists of dense and sparse shrubs i.e. *Prosopis juliflora, Prosopis cineraria, Acacia nilotica, Casia auriculata* and *Zizyphus numularia, caparis deciduas etc.* the major grasses include several species of *Cyperus* and herbs *Indigofera*. Details of vegetation survey results are discussed in forth coming sections.

Buffer area: The buffer area (10.0 km periphery) comprises mainly of agriculture fields, wastelands, forest plantation patches by forest department,

scattered bushes of *Prosopis juliflora, Prosopis cineraria, Acacia nilotica, Salvadora persica, Salvadora oliodes, Azadirachta indica. Prosopis juliflora* and *Zizyphus numularia* among the wild plants and cotton, coconut, dates, pomegranate, among the cultivated crops are the most dominant plants in the buffer area.

Except for highly scattered and small plants of *Commiphora wightii*, there were no rare, endangered or conservation concern species present in the close vicinity of the project area in the buffer zone. Major part of the buffer area is agriculture fields particularly on the Eastern side of the project area. Since ground water is saline up to 15 km from the coast and highly saline up to 4 km from the coast. Thus, dry land farming is practiced near the coast and irrigated farming is practiced in the farms that are 5-6 km away from the coast. Cotton, Jowar, Bajra are the main crops grown here. Some villages, especially in the central corridor are endowed with good surface water facilities, and irrigated agriculture is possible in these villages. Being semi-arid, arid zone, this region support low plant growth and therefore, not many large trees with sizable canopies are present in the buffer zone. However, at every village local people have managed to grow trees for shade, aesthetic and religious values.

Though, we could not report presence of some of the important species plant species (probably due to lack of rain species did not occur), according to literature survey, Navinal area at Mundra has representation of native vegetation of Kutch. Some of the important threatened plant species reported from the region include *Dipcadi erythraeum, Helichrysum cutchicum, Ephedra foliata, Heliotropium rariflorum, Tribulus rajasthanensis, Pavonia ceratocarpa, Convolvulus stocksii, Commiphora wightii.* Out of this *Helichrysum cutchicum, Ephedra foliata and Tribulus rajasthanensis* are endemic species. Gujarat State Biodiversity Board earlier proposed to declare the area as biodiversity heritage site. However the proposed development of the "Biodiversity Park at Navinal village, Mundra Taluka" has been shelved by Gujarat State Biodiversity Board, though initially proposed.

Hence, it is given to understand that the earlier proposed biodiversity park will not be further developed in the study area.

4.5.2. Floral Abundance, Frequency and Density

Based on our vegetation sampling data we derived various measures of abundance of plants species in the core and buffer area of the project site (Table-4.4). These parameters help understand the vegetation community structure in the project area/core area and buffer area/ surrounding area. We found total 12 species of Grass, 12 herbs, 4 shrubs and 2 tree species in the project core area. Where as we reported total 22 species of grasses, 26 species of herbs, 8 species of shrubs and 7 species of trees during our sampling efforts in the buffer areas. There could be more species of plants in the study area. However, our sampling and analysis of the vegetation data suggests that the abundance and density of plant species are lower in the core and buffer area (Table-4.4). This suggests that the area falls in Arid-semi arid condition. As per classification of biome, biogeographic zone, biogeographic province, this area falls in Indian Desert/Kutch Desert/Northern Thorny Scrub Forest. These classifications of the study area suggest lower abundance, density and diversity of plants in the region is reflected in our floral study of the project area.

4.5.3. Dominant Plant Species

Important Value Index is a parameter for calculating the dominance and diversity indices for vegetation as it is combination of frequency, density and dominance. Based on our survey results we found that *Prosopis juliflora* & *Zizyphus numularia, Salvadora,* in shrubs and *Cymbopogon martini, Aristida, Dichanthium annulatum,* in grasses and *Casia auriculata etc. in herbs* are the most dominant species in the region (Table4-4). This is derived through, the Important Value Index (IVI) that we calculated for various plant species through quadrate sampling (Table4-4). IVI for *Prosopis juliflora* was 58.7 in buffer and 103.0 in core area. Whereas, *Aeluropus lagopoides (9.5/47.2), Cymbopogon martinii (116.7/*35.6*)* were in the buffer and core areas respectively.

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Table-4.4: Floral Diversity and their relative frequency, abundance density, important value index for core and buffer area.

No	Type/ Class	Species	Abundance		Relative Frequency		Relative Dominance		Relative Density		IVI	
			Buffer	Core	Buffer	Core	Buffer	Core	Buffer	Core	Buffer	Core
1	Grass	*Aeluropus lagopoides*	1.86	1.6	7.45	16.7	7.40	8.3	10.24	22.2	25.09	47.2
2	Grass	*Apluda mutica*	1.60	1	5.32	3.3	3.70	8.3	6.30	2.8	15.32	14.4
3	Grass	*Aristida adscensionis*	1.33		3.19		3.70		3.15		10.04	
4	Grass	*Aristida funiculata*	1.50	1.3	6.38	13.3	3.70	8.3	7.09	13.9	17.17	35.6
5	Grass	*Aristida histricula*	1.00		5.32		3.70		3.94		12.96	
6	Grass	*Cenchrus ciliaris*	1.00	1	4.26	6.7	3.70	8.3	3.15	5.6	11.11	20.6
7	Grass	*Chloris barbata*	1.20		5.32		3.70		4.73		13.75	
8	Grass	*Chloris quinquesetica*	1.00		4.26		3.70		3.15		11.11	
9	Grass	*Chrysopogon fulvus*	1.50		4.26		3.70		4.73		12.68	
10	Grass	*Cymbopogon martinii*	2.00	1.3	6.38	13.3	3.70	8.3	9.45	13.9	19.54	35.6
11	Grass	*Cynodon dactylon*	1.00		4.26		3.70		3.15		11.11	
12	Grass	*Cyperus difformis*	1.00	1	4.26	3.3	3.70	8.3	3.15	2.8	11.11	14.4
13	Grass	*Cyperus flavidus*	1.00	1	6.38	6.7	3.70	8.3	4.73	5.6	14.81	20.6
14	Grass	*Dactyloctenium aegypticum*	1.00		4.26		3.70		3.15		11.11	
15	Grass	*Dactyloctenium sindicum*	1.50		2.13		3.70		2.36		8.19	
16	Grass	*Desmostachya bipinnata*	1.00	1	1.06	10	3.70	8.3	0.79	8.3	5.55	26.7
17	Grass	*Dichanthium annulatum*	1.40	1	5.32	3.3	3.70	8.3	5.51	2.8	14.53	14.4
18	Grass	*Eragrostis cilianensis*	1.50	1	2.13	10	3.70	8.3	2.36	8.3	8.19	26.7
19	Grass	*Heteropogon contortus*	1.25	1	4.26	3.3	3.70	8.3	3.94	2.8	11.90	14.4
20	Grass	*Ischaemum indicum*	1.50		2.13		3.70		2.36		8.19	
21	Grass	*Sporolobus maderaspatenus*	1.20		5.32		3.70		4.73		13.75	
22	Grass	*Urochondra setulosa*	1.67	1.3	6.38	10	18.51	8.3	7.88	11.1	32.77	29.4
23	Herb	*Achyranthus aspera*	1.17	1	3.59	2.4	4.69	0.1	2.64	1.3	10.92	3.8
24	Herb	*Aerva javanica*	1.13	1	4.79	4.8	7.04	0.1	3.40	2.6	15.22	7.5
25	Herb	*Ageratum conezoides*	1.00		1.20		4.69		0.75		6.64	

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26	Herb	*Aloe barbandensis*	1.00		0.60		4.69		0.38		5.67	
27	Herb	*Argemone mexicana*	1.00		2.40		0.05		1.51		3.95	
28	Herb	*Casia auriculata*	1.00	1	2.99	9.5	0.05	0.1	1.89	5.3	4.93	14.9
29	Herb	*Censia coromandelica*	1.33		1.80		0.05		1.51		3.35	
30	Herb	*Citrulus colocynthis*	1.00		0.60		0.05		0.38		1.02	
31	Herb	*Coculus hirsutus*	1.00		1.80		0.05		1.13		2.98	
32	Herb	*Cressa cretica*	6.00	1	1.20	4.8	8.44	0.1	4.53	2.6	14.17	7.5
33	Herb	*Crotolaria lutescens*	1.00		1.20		4.69		0.75		6.64	
34	Herb	*Fagonia indica*	1.00	1	0.60	4.8	7.04	0.1	0.38	2.6	8.01	7.5
35	Herb	*Indigofera cordifolia*	1.00	1	1.20	2.4	5.86	0.1	0.75	1.3	7.82	3.8
36	Herb	*Indoneesiella echioides*	1.00		4.79		5.02		3.02		12.83	
37	Herb	*Justicia procumbens*	1.00		2.40		0.05		1.51		3.95	
38	Herb	*Lepidagathis trimerus*	1.00		1.80		0.05		1.13		2.98	
39	Herb	*Leptochloa fusca*	1.00		1.80		0.05		1.13		2.98	
40	Herb	*Metanus emarginatus*	1.00	1	2.99	4.8	0.05	0.1	1.89	2.6	4.93	7.5
41	Herb	*peristrophe bicalyculata*	1.00	1	1.20	2.4	0.09	0.1	0.75	1.3	2.05	3.8
42	Herb	*Plantago ovata*	2.25		2.40		0.05		3.40		5.84	
43	Herb	*Salicarnia brachiata*	1.50	1	1.20	4.8	0.05	0.1	1.13	2.6	2.38	7.5
44	Herb	*Scirpus tuberosus*	2.00	1	1.80	4.8	0.05	0.1	2.26	2.6	4.11	7.5
45	Herb	*Solanum xanthocarpum*	1.00	1	2.99	4.8	0.05	0.1	1.89	2.6	4.93	7.5
46	Herb	*Suaeda meritima*	1.00	2	1.20	7.1	0.05	0.1	0.75	7.9	2.00	15.1
47	Herb	*Tephrosia purpurea*	1.00		1.20		0.05		0.75		2.00	
48	Herb	*Tribulus terrestris*	1.00		1.20		0.05		0.75		2.00	
49	Shrub	*Balanites aegyptica*	1.00		1.80		0.05		1.13		2.98	
50	Shrub	*Calotropis procera*	1.25	1	2.40	2.4	0.05	9.4	1.89	1.3	4.33	13.1
51	Shrub	*Capparis decidua*	1.00	1	1.20	4.8	0.05	9.4	0.75	2.6	2.00	16.8
52	Shrub	*Commiphora wightii,*	1.00		1.20		0.05		0.75		2.00	
53	Shrub	*Prosopis juliflora*	1.00	5.3	2.99	16.7	4.69	37.7	1.89	48.7	9.57	103
54	Shrub	*Salvadora oliodes*	3.70		13.77		13.60		32.08		59.45	

55	Shrub	*Salvadora persica*	1.67		3.59		0.09		3.77		7.46	
56	Shrub	*Zizyphus numularia*	1.00	1	2.40	7.1	11.73	4.7	1.51	3.9	15.63	15.8
57	Tree	*Acacia leucophloea*	1.00	1	2.40	4.8	11.73	18.8	1.51	2.6	15.63	26.2
58	Tree	*Acacia nilotica*	1.00	1.3	1.20	7.1	0.05	18.8	0.75	5.3	2.00	31.2
59	Tree	*Acacia senegal*	1.00		2.99		0.05		1.89		4.93	
60	Tree	*Acacia tortilis*	2.00		2.99		0.09		3.77		6.86	
61	Tree	*Avicennia marina*	1.00		1.80		0.05		1.13		2.98	
62	Tree	*Butea monosperma*	1.00		1.20		0.05		0.75		2.00	
63	Tree	*Prosopis cineraria*	1.33		7.19		4.69		6.04		17.91	

4.5.4. Invasive or Exotic Species

Prosopis juliflora is an evergreen tree native to South America, Central America and the Caribbean. In the United States, it is well known as mesquite. It is fast growing, nitrogen-fixing and tolerant to arid conditions and saline soils. *Prosopis julifl*ora is an exotic and invasive widespread, multi-branched shrub/tree species in the India. It has been invading grasslands, native scrubland and forests of Gujarat and India.

Our study showed that the *Prosopis juliflora* is one of the most dominant and wide spread in the core and buffer areas of the project site. Our biodiversity, abundance, density measures suggests *Prosopis juliflora* is fast growing in the area.

4.5.5. Floral Biodiversity in the Study Area

In order to understand the status of vegetation communities in terms of stability, diversity indices such as species dominance, species diversity, similarity index and abundance are derived.

Table-4.5: Biodiversity indices (Averages) for core and buffer areas.

Indices	Buffer Area		Core Area	
	Grass	Other vegetation	Grass	Other vegetation
Species Richness	22	41	12	18
Dominance_D	0.05	0.12	0.12	0.26
Simpson_1-D	0.94	0.88	0.88	0.74
Shannon_H	2.96	2.97	2.26	2.08
Evenness_e^H/S	0.88	0.47	0.80	0.44

Shannon-Wiener Diversity Index: The biodiversity values for core and buffer areas were derived from the quadrate samples laid in the field. The value of the Shannon-Wiener Index (H') usually lies between 1.5 and 3.5 for ecological data and rarely exceeds 4.0. Lower value of Shannon-Wiener Index (H') suggests degraded or arid conditions with low biodiversity values. Our results suggest the H' value to be normal for the dry arid conditions

(Table-4.5). There was difference between the core and buffer area in terms of diversity indices. This was because core area mostly consists of Prosopis juliflora dominated bushes and saline land with open wasteland where as in buffer area there is variety of habitats and agriculture lands.

Species Richness (S): It is a count of the number of species found when the observers sample the community. It is represented by "S". Our data analysis for the core and buffer zone suggests that average species richness per sample is lower in core area compared to that of buffer area (Table-4.5). This is because of the difference in the land use types in core and buffer areas.

Simpson's Diversity Index (D): The Simpson index is one of the most meaningful and robust diversity measures available. In essence it captures the variance of the species abundance distribution. It is a diversity index proposed by Simpson (1949), to describe the probability that a second individual drawn from a population should be of the same species as the first. The value of D varies between 0 and 1. Our data analysis suggests that relatively core area is less diverse than the buffer area as the D value is higher in core area than in the buffer area (Table-4.5).

Evenness: It is a measure of species diversity, which quantifies how equal the community is numerically. The less variation in communities between the species show higher evenness. The value varies between 0 and 1. Our data analysis for core and buffer zone showed higher values of this index suggesting that the communities of vegetation does not vary much within the core and outside in the buffer areas (Table 4-5).

4.5.6. Endangered/Threatened/Protected Species

Our field survey in the project area suggest that there are no endangered, endemic, rare plant species present within the project boundary i.e. core area. However, we found an important species i.e. *Commiphora wightii*, in the buffer area with low abundance and frequency of occurrence (Table-4.4). This plant has high medicinal value and is facing the threats of extinction by

overexploitation for commercial purpose (GUIDE, 2009, Joshi et al. 2005) from Kutch.

4.6. Faunal Diversity and Species Inventory

The present study has made assessment of 3 major higher vertebrate classes such as Reptiles, Birds and Mammals. The assessment of fauna representing higher trophic levels in the ecosystem was carried out since their diversity acts as indicators of the health of the ecosystem in which they live. The details of the results/observations are given as following.

4.6.1. Reptiles Species Recorded During the Survey

Majority of the reptile species are fossorial in habit, therefore the assessment of reptiles and their diversity etc. holds special significance for any development project. In the present study we identified a total of 6 species of reptiles within the core area and 12 species in the buffer area (Table-4.6).

Table-4.6: Checklist of reptiles reported form the core and buffer area.

S. No.	Name of Species		Conservation Status as per IWPA-1972 (Schedule I to VI)	Conserv -ation Status as per IUCN	Observed/ Reported	
	Common Name	Scientific Name			Core Area	Buffer Area
1	Cheakered Keelback	*Natrix piscator*	Schedule-IV	LC		1
2	Common Skink	*Mubuya carinata*	Schedule-IV	LC	1	1
3	Fan Throated Lizard	*Sitana ponticeriana*	Schedule-IV	LC	1	1
4	Flap shell Turtle	*Lissemus punctatea*	Schedule-I	LC		1
5	Garden Lizard	*Calotes versicolor*	Schedule-IV	LC	1	1
6	Indian Fringe Toed Lizard	*Acanthodactylus cantoris*	Schedule-IV	LC	1	1
7	Indian monitor lizard	*Varanus bengalensis*	Schedule-I	LC		1
8	John Sand Boa	*Eryx johni*	Schedule-IV	LC	1	1
9	Rat Snake	*Ptyas mucosus*	Schedule-IV	NT		1
10	Saw scaled Viper	*Echis carinatus*	Schedule-IV	NT		1
11	Short tailed Agama	*Agama minor*	Schedule-IV	LC	1	1
12	Spiny-tailed Lizard	*Uromastix hardwickii*	Schedule-II	LC		1
VU=Vulnerable, EN=Endangered, NT=Near Threatened, LC=Least Concerned						

Of the reported reptiles species in the buffer area, 2 species (Flap shelled turtle and Indian Monitor Lizard) belong to Schedule-I of the Wildlife Protection Act 1972. No threatened species of reptiles as classified by the IUCN are reported from core or buffer area during our survey. The Indian Flap shell turtle was reported from waterbodies in buffer area which is common throughout country is also listed as least concerned by IUCN. However, one species belong to Schedule-II (Spiny tailed Lizard) where as reset of the species belong to Schedule-IV. Majority of the reptile species (except Rat snake and Saw scaled viper) reported from the buffer area fall in 'Least Concerned' category of IUCN. No endangered, rare, threatened or endemic species of reptiles was reported from the project core area.

4.6.2. Birds Species Recorded During the Survey

During the study we observed a total of 95 bird species in the study area. Majority of the species (74) are resident specie, where as only 21 species were found to be migratory (Table-4.7). Of these 95 recorded bird species, 89 belong to 'Least Concerned' category rated by IUCN where as total 6 species are i.e. Painted Stork, Oriental White Ibis, Eurasian Curlew, Lesser Flamingo, Oriental Darter and Black tailed Godwit belong to Near Threatened Species (Table-4.7).

Majority of the birds reported from the core and buffer area belong to the Schedule-IV of Wildlife Protection Act 1972 (Table-4.7). Whereas, total 5 species (Black shoulder kite, Eurasian Spoonbill, Indian Peafowl, Marsh Harrier, Shikra) belong to Schedule-I of IWPA 1972. Whereas House crow belong to Schedule-V.

The birds were recorded mainly from non-forested, degraded areas and in the surrounding agriculture landscape interspersed with scattered trees and drainages. The bird species groups observed in the study area were represented by species of open scrubland such as Passerines, Shrikes, Francolin, etc. and waterbodies birds such as Waders/shorebirds, Waterbirds, Egrets, Herons sandpipers, plovers etc. Majority of the birds

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Table-4.7: Inventory of birds reported from the study area with their conservation status.

S. No.	Name of Species		IWPA-1972 Status	IUCN Status	Observation		Migratory
	Common Name	Scientific Name			Core	Buffer	
1	Asian Koel	*Eudynamys scolopacea*	Schedule-IV	LC		1	R
2	Baya Weaver	*Ploceus philippinus*	Schedule-IV	LC		1	R
3	Black drongo	*Dicrurus macrocercus*	Schedule-IV	LC	1	1	R
4	Black Francolin	*Francolinus francolinus*	Schedule-IV	LC	1	1	R
5	Black headed Gull	*Larus ridibundas*	Schedule-IV	LC		1	M
6	**Black shoulder kite**	***Elanus caeruleus***	**Schedule-I**	**LC**		**1**	**R**
7	Black winged stilt	*Himantopus himantopus*	Schedule-IV	LC		1	R
8	Black-tailed Godwit	*Limosa limosa*	Schedule-IV	**NT**		1	M
9	Blue rock pigeon	*Columba livia*	Schedule-IV	LC	1	1	R
10	Brown headed Gull	*Larus brunnicephalus*	Schedule-IV	LC		1	M
11	Cattle egret	*Bulbulcus ibis*	Schedule-IV	LC	1	1	R
12	Chestnut-bellied Sandgrouse	*Pterocles exustus*	Schedule-IV	LC		1	R
13	Comb Duck	*Sarkidiornis melanotos*	Schedule-IV	LC		1	R
14	Common babbler	*Turdoides caudatus*	Schedule-IV	LC	1	1	R
15	Common Coot	*Fulica atra*	Schedule-IV	LC		1	R
16	Common Crane	*Grus grus*	Schedule-IV	LC		1	R
17	Common Crested Lark	*Galerida cristata*	Schedule-IV	LC	1	1	R
18	Common Greenshank	*Tringa nebularia*	Schedule-IV	LC		1	R
19	Common Hoopoe	*Upupa epops*	Schedule-IV	LC	1	1	R
20	Common Iora	*Aegithina tiphia*	Schedule-IV	LC		1	R
21	Common Kingfisher	*Alcedo atthis*	Schedule-IV	LC		1	R
22	Common myna	*Acridotheres tristis*	Schedule-IV	LC	1	1	R
23	Common Redshank	*Tringa totanus*	Schedule-IV	LC	1	1	R
24	Common Sandpiper	*Actitis hypoleucos*	Schedule-IV	LC	1	1	R
25	Common tailor bird	*Orthotomus sutorius*	Schedule-IV	LC		1	R
26	Common Woodshrike	*Tephrodornis pondicerianus*	Schedule-IV	LC	1	1	R
27	Coppersmith Barbet	*Megalaima haemacephala*	Schedule-IV	LC		1	R
28	Crab Plover	*Dromas ardeola*	Schedule-IV	LC		1	M
29	Desert Wheatear	*Oenanthe deserti)*	Schedule-IV	LC	1	1	M
30	Dunlin	*Calidris alpine*	Schedule-IV	LC		1	M

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31	Eurasian collared dove	*Streptopelia decaocto*	Schedule-IV	LC	1	1	R
32	Eurasian Curlew	*Numenius arquata*	Schedule-IV	**NT**		1	M
33	Eurasian Oystercatcher	*Haematopus ostralegus*	Schedule-IV	LC		1	M
34	**Eurasian Spoonbill**	***Platalea leucorodia***	**Schedule-I**	**LC**		1	R
35	European Roller	*Coracias garrulus*	Schedule-IV	LC		1	M
36	Franklin's Prinia	*Prinia hodgsonii*	Schedule-IV	LC	1	1	R
37	Graceful Prinia	*Prinia gracillis*	Schedule-IV	LC		1	R
38	Great Cormorant	*Phalacrocorax carbo*	Schedule-IV	LC		1	R
39	Great White Pelican	*Pelecanus onocrotalus*	Schedule-IV	LC		1	M
40	Greater couckal	*Centropus sinensis*	Schedule-IV	LC	1	1	R
41	Greater Flamingo	*Phoenicopterus roseus*	Schedule-IV	LC		1	R
42	Greater Painted-Snipe	*Rostratula benghalensis*	Schedule-IV	LC		1	R
43	Green bee eater	*Merops orientalis*	Schedule-IV	LC	1	1	R
44	Green Sandpiper	*Tringa ochropus*	Schedule-IV	LC		1	R
45	Grey francolin	*Francolinus pondicerianus*	Schedule-IV	LC	1	1	M
46	Grey heron	*Ardea cinerea*	Schedule-IV	LC		1	M
47	House crow	*Corvus splendens*	Schedule-V	LC		1	R
48	House sparrow	*Passer domesticus*	Schedule-IV	LC		1	R
49	**Indian Peafowl**	***Pavo cristatus***	**Schedule-I**	**LC**		1	R
50	Indian pond heron	*Ardeola grayii*	Schedule-IV	LC		1	R
51	Indian robin	*Saxicoloides fulicata*	Schedule-IV	LC	1	1	R
52	Indian Roller	*Coracias benghalensis*	Schedule-IV	LC	1	1	R
53	Indian silverbill	*Lonchura malabarica*	Schedule-IV	LC	1	1	R
54	Jungle babbler	*Turdoides striatus*	Schedule-IV	LC	1	1	R
55	Jungle Crow	*Corvus macrorhynchos*	Schedule-IV	LC	1	1	R
56	Kentish Plover	*Charadrius alexandrinus*	Schedule-IV	LC		1	M
57	Large Egret	*Casmerodius albus*	Schedule-IV	LC		1	R
58	Laughing dove	*Streptopelia senegalensis*	Schedule-IV	LC	1	1	R
59	Lesser Flamingo	*Phoenicopterus minor*	Schedule-IV	NT		1	R
60	Little cormorant	*Phalacrocorax niger*	Schedule-IV	LC		1	R
61	Little egret	*Egretta garzetta*	Schedule-IV	LC		1	R
62	Little grebe	*Tachybaptus ruficollis*	Schedule-IV	LC		1	R
63	Little Ringed Plover	*Charadrius dubius*	Schedule-IV	LC		1	M

64	Long tailed shrike	*Lanius schach*	Schedule-IV	LC	1	1	R
65	**Marsh Harrier**	***Circus aeruginosus***	**Schedule-I**	**LC**		1	M
66	Marsh Sandpiper	*Tringa stagnatilis*	Schedule-IV	LC		1	M
67	Median Egret	*Mesophoyx intermedia*	Schedule-IV	LC		1	R
68	**Oriental Darter**	***Anhinga melanogaster***	**Schedule-IV**	**NT**		1	R
69	Oriental magpie robin	*Copsychus saularis*	Schedule-IV	LC	1	1	R
70	Oriental White Ibis	*Threskiornis melanocephalus*	Schedule-IV	**NT**		1	R
71	Oriental White-eye	*Zoosterops palpebrosus*	Schedule-IV	LC		1	R
72	Painted Stork	*Mycteria leucocephala*	Schedule-IV	**NT**		1	R
73	Pied Avocet	*Recurvirostra avosetta*	Schedule-IV	LC		1	M
74	Pied Kingfisher	*Ceryle rudis*	Schedule-IV	LC		1	R
75	Purple Moorhen	*Porphyrio porphyrio*	Schedule-IV	LC		1	R
76	Purple sunbird	*Nectarinia asiatica*	Schedule-IV	LC	1	1	R
77	Red vented bulbul	*Pycnonotus cafer*	Schedule-IV	LC	1	1	R
78	Red wattled lapwing	*Vanellus indicus*	Schedule-IV	LC	1	1	R
79	River Tern	*Sterna aurantia*	Schedule-IV	LC		1	R
80	Rose ringed parakeet	*Psittacula krameri*	Schedule-IV	LC	1	1	R
81	Ruff	*Philomachus pugnax*	Schedule-IV	LC		1	M
82	Rufus tailed lark	*Ammomanes phoenicurus*	Schedule-IV	LC	1	1	R
83	**Shikra**	***Accipiter badius***	**Schedule-I**	**LC**		1	R
84	Singing Bush-Lark	*Mirafra cantillans*	Schedule-IV	LC	1	1	R
85	Southern Grey Shrike	*Lanius meridionalis*	Schedule-IV	LC	1	1	R
86	Stone-Curlew	*Burhinus oedicenemus*	Schedule-IV	LC	1	1	R
87	Sykes's Crested Lark	*Galerida deva*	Schedule-IV	LC	1	1	R
88	Variable Wheatear	*Oenanthe picata*	Schedule-IV	LC	1	1	M
89	Western Reef Egret	*Egretta gularis*	Schedule-IV	LC		1	R
90	White throated kingfisher	*Halcyon smyrnensis*	Schedule-IV	LC		1	M
91	White Wagtail	*Motacilla alba*	Schedule-IV	LC	1	1	R
92	White-eared Bulbul	*Pycnonotus leucotis*	Schedule-IV	LC	1	1	R
93	Wire-tailed Swallow	*Hirundo smithii*	Schedule-IV	LC		1	R
94	Wood Sandpiper	*Tringa glareola*	Schedule-IV	LC	1	1	M
95	Yellow wattled lapwing	*Vanellus malarbaricus*	Schedule-IV	LC		1	R

NT=Near Threatened, LC=Least Concerned; R=Resident, M=Migratory

observed in the study area represent birds of wetlands, coastal mudflats, wetland and semi arid non-forested landscapes etc. Moreover, many of the bird species reported in the present study are common even in human dominated landscapes such as urban cities, lakes and ponds etc. Majority of the waterbird species reported here are found from adjoining reserve forest areas, mangrove creeks, and mudflats located south-west side in the study area. Intertidal mudflats, saltpan and the coastal creeks provide suitable mix of wetland habitat which attracts large populations of migratory and resident birds. Most importantly this area provides much needed staging and stop over sites for the migratory birds flying on Central Asian Migratory bird Flyway. The Modhva coastal area is well known amongst the birdwatcher as it is one of the most important and prominent birdwatching and bird photography sites of Kutch. However, this site is located beyond 11.0 km therefore, lies outside the study area. Majority of the resident species reported in the study area are known to breed in this region as well as in entire Gujarat. No rare, endangered, endemic bird species were found to breed in the core project area.

4.6.3. Mammal Species Recorded During the Survey

We observed a total of 13 mammal species in the buffer area and 6 in the core area of the project site (Table- 4.8). The common mammalian species that were directly observed in the core area include Indian Jackal, Wild Pig, Common Mongoose, Indian Hare, Indian desert gerbil and Five Striped Squirrel etc.

No Threatened or Schedule-I species reported from the core area of the project site (Table-4.8). Indian Jackal, Jungle cat, Indian Fox, Common Mongoose belong to Schedule-II of IWPA 1972. Whereas Nilgai, Wildpig belong to Schedule-III. Rest of the species belong to Schedule-IV of WPA. Majority of the common mammalian species recorded during the survey in the core and buffer area are present throughout semiarid, non-forested and non-protected landscapes especially in Kutch region.

4.6.4. Dominant Faunal Species in the Core & Buffer Area

Based on our observations, interview survey of local people, forest officials and NGOs working in nature conservation activities in Kutch region, we found that Nilgai, Wild Pig are most common and dominant mammal species present in the landscape. Whereas there were several birds species belong to Passerine were most common and dominant group of birds present in the core and buffer area of the project site. Among reptiles, Spiny tailed Lizard, common garden lizard, Indian Monitor Lizard etc. were most common species present in the buffer areas of the project site.

Table-4.8: Inventory and conservation status of mammals reported from study area.

S. No.	Name of Species		Conservation Status as per IWPA-1972	Conservation Status as per IUCN	Observation	
	Common Name	Scientific Name			Core	Buffer
1	Indian Jackal	*Canis aureus*	Schedule-II	LC	1	1
2	Jungle cat	*Felis chaus*	Schedule-II	LC		1
3	Indian Fox	*Vulpes bengalensis*	Schedule-II	LC		1
4	Nilgai	*Boselaphus tragocamelus*	Schedule-III	LC		1
5	**Chinkara**	***Gazella bennettii***	**Schedule-I**	**LC**		**1**
6	Indian Hare	*Lepus nigricollis*	Schedule-IV	LC	1	1
7	Wild Pig	*Sus scrofa*	Schedule-III	LC	**1**	1
8	Common mongoose	*Herpestes edwardsi*	Schedule-II	LC	1	1
9	Indian porcupine	*Hystrix indica*	Schedule-IV	LC		1
10	Palm squirrel	*Funambulus pennanti*	Schedule-IV	LC	1	1
11	Fruit Bat	*Cyanopterus sphynx*	Schedule-V	LC		1
12	Long-eared hedgehog	*Hemiechinus auritus*	Schedule-IV	LC	1	1
13	Indian desert gerbil	*Meriones hurrianae*	Schedule-IV	LC		1

4.6.5. Wildlife Corridors

Our observations suggested that there is no rare, endangered, conservation concern species of fauna present within the proposed project core area. The proposed project area for Copper Refinery Plant is not a part of any special habitat (breeding) for any of the Threatened or Schedule-I important fauna and does not provide any contiguity of habitats between two important habitats or any other protected areas. Moreover, the proposed project area is located in close to already industrialized zone therefore; it does not make part of any wildlife habitats. Apart from this, there are no protected areas located within 30.0 km radius of the proposed project site therefore; the proposed area does not seem to make part of any wildlife corridors.

4.6.6. Identification of Species of High Conservation Significance

Based on our extensive field visits, literature survey, and consultation with experts & local people, we found following 8 species that are of high conservation significance (Table-4.9).

Table-4.9: Species of high conservation significance (Threatened or Schedule-I) present in the study area.

S. No.	Name of Species		IWPA-Status	IUCN Status
	Scientific Name	Common Name		
Reptiles	Flap shell Turtle	*Lissemus punctatea*	Schedule-I	LC
	Indian monitor lizard	*Varanus bengalensis*	Schedule-I	LC
Bird	Black shoulder kite	*Elanus caeruleus*	Schedule-I	LC
	Eurasian Spoonbill	*Platalea leucorodia*	Schedule-I	LC
	Indian Peafowl	*Pavo cristatus*	Schedule-I	LC
	Marsh Harrier	*Circus aeruginosus*	Schedule-I	LC
	Shikra	*Accipiter badius*	Schedule-I	LC
Mammal	Chinkara	*Gazella bennettii*	Schedule-I	LC

We found total 8 faunal species belong to Schedule-I of Wildlife Protection Act 1972. These species include 2 species of reptiles, 5 species of birds and one mammal. These species are present in the buffer zone of 10 km radius i.e. study area.

5. Potential Impacts & Mitigations

Impacts of proposed Copper Refinery Plant on flora and fauna of surrounding area were identified mainly by using baseline ecological information presented in previous Chapter-4. The baseline information was collected through direct field visits and substantiated through secondary information including EIA, consultation with local people etc. We also utilized assessment provided in the EIA particularly Air modelling information. Finally, the baseline ecological information was juxtaposed with the project activities and impacts arising due to its construction and operation phases. The specific impacts were visualized in terms of issues related with the ecology of important species issues related with their habitats.

Following the above mentioned approach, impacts on various components of biodiversity were assessed. The component wise identification of potential impacts is deliberated below.

5.1. Anticipated Ecological Impacts of Proposed Project Activity

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity in 256.58 ha. of area, which includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology, which will be located at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, Taluka Mundra, district Kutch, Gujarat.

The above mentioned project in absence of mitigation measures could have numerous ecological impacts during the construction and operation phases. The impacts during construction phase could be short term, temporary in nature and will be confined to the close boundary of the project site. Following are the general ecological impacts anticipated from the construction and operation phases of the copper refinery plant.

- Irreversible change in landuse/habitat worth the project area. Vegetation would be removed from the project site. Total 154.19 ha of APSEZ land and 102.39 ha. forest land would be converted to industrial use.

- Copper is a metal that occurs naturally in the environment, and also in plants and animals. Low levels of copper are essential for maintaining good health. Elevated levels of copper are toxic in aquatic environments and may adversely affect fish, invertebrates, plants, and amphibians.

- Chronic fugitive emissions and the material flow through water and air could potentially degrade aquatic and terrestrial eco-systems. Copper refinery is likely to release toxic fumes, pollutants such as compounds of sulphur, fumes of metals like Cd, Zn etc., & impurities like Ni, Fe, As, Sb in surrounding environment and cause irreversible damage to ecology if strict environment control measures are not implemented.

- The major impact on terrestrial ecology could be due to emission of dust which will settle on surrounding area soil and vegetation and it would gradually decrease biomass productivity of the eco-systems.

- During the construction work, the excavation of the soil take place and construction wastes such as oil, grease and debris may pollute the soil and decrease its productivity.

- The impact on the terrestrial ecology could be due to the emission of pollutants such as SO_2 and Particulate Matters (PMs) due to dusting. When sulfur dioxide combines with water and air, it forms sulfuric acid, which is the main component of acid rain. Acid rain can cause deforestation and could potentially acidify waterways to the detriment of aquatic life.

- Project site runoff drains into Kotdi creek system of Gulf of Kutch through minor drainages. Chronic spillage and flow of pollutants and

dust sediments from the project site through runoff could have severe impacts on flora and fauna of Kotdi creek system which include mangroves, birds, fishes, crabs etc.

5.2. Impacts on Terrestrial Flora

Baseline status of terrestrial vegetation clearly suggests that the project sites falls in semi-arid and coastal biogeographic zone with low floral density and diversity.

Removal of vegetation: The proposed copper refinery plant construction activities may involve removal of vegetation from the project site. Out of total 256.58 ha. 33% i.e. 85.79 ha. area would be used for green belt/green cover. Whereas 170.79 ha. area would be cleared off vegetation. Therefore, standing vegetation from total 170.79 ha. area would be removed permanently. The vegetation in the proposed project site consists of mostly *Prosopis juliflora* which is an invasive species. Therefore, the unavoidable removal of vegetation during construction activity from the core area could not be considered significant. However, it is recommended that minimum vegetation shall be removed from the project site and the important plant and tree species on the periphery of the project site be left as part of green belt development. Apart from this, project proponent would be providing compensatory land to forest department which would compensate the loss of forest land.

Pollution affecting soil, water & plants growth: Suspended particulate matter produced during construction and operational phase of the copper refinery plant would be deposited in the surrounding forest areas and water bodies including river will change habitat quality of aquatic and terrestrial ecosystem. Their direct deposition on vegetation causes loss of chlorophyll content in leaves, arrest of photosynthesis process, leaf injuries resulting in restricted growth and regeneration of plants. There are patches of forest plantations and mangroves located in the buffer area of the proposed project site.

According to air modelling carried out by EIA agency, it is predicted that the pollutants would travel up to 2.2 km North-East direction. The project area is partly located in the forest area. Also there are reserve forest areas located adjacent to the proposed project site, hence chances of pollutants and dust causing degradation of the forests and vegetation in surrounding area is higher if strict pollution control measures are not implemented. Development of thick green belt would also restrict pollutants spreading outside the premises. It is also recommended that a tall compound wall shall be built on the periphery of the project area premises this would restrict spread of pollutants.

Degradation of vegetation due to acid rain: It is also well known through number of studies that SO_2 emission from copper refinery plant has been a major cause of acid precipitation, commonly known as "acid rain," which can damage vegetation. These pollutants originate from copper plants and nearby thermal power plants would interact with reactants present in the atmosphere and result into acid deposition. Due to the interaction of these acids with other constituents of the atmosphere, protons are released causing increase in the soil acidity, lowering of soil pH mobilizes and leaches away nutrient cations and increases availability of toxic heavy metals. Such changes in the soil chemical characteristics reduce the soil fertility, which ultimately causes the negative impact on growth and productivity of forest trees and crop plants. Strict pollution control using state of the art technology measures would restrict emission of gaseous emissions.

Impacts on important flora: Though, we did not report presence of some of the important plant species (probably due to lack of rain species did not occur), according to literature survey, Navinal area at Mundra has representation of native vegetation of Kutch. Some of the important threatened plant species reported from the region include *Dipcadi erythraeum, Helichrysum cutchicum, Ephedra foliata, Heliotropium rariflorum, Tribulus rajasthanensis, Pavonia ceratocarpa, Convolvulus stocksii, Commiphora wightii.* Out of this *Helichrysum cutchicum, Ephedra*

foliata and Tribulus rajasthanensis are endemic species. Our present survey also reported presence of a 'Critically Endangered' species listed by IUCN i.e. *Commiphora wightii* in the surrounding forests and wasteland areas. If no strict pollution control measures are taken, these species and their habitats could be affected. *Commiphora wightii* is medicinally and economically important plant which has very slow growth rate in semi-arid zones. However, their population is quite small and isolated in the buffer area. Also they are found in quite stunted stage. It is recommended that project proponent shall financially support forest department's activities to conserve these endemic and important species found in this region by way of carrying out plantation activities specifically to conserve these species.

Impacts on Mangroves: The baseline information suggests that the coastal area of Tunda, Navinal, Shiracha, Jarpara and Tragdi villages have patches of scattered, sparse and dense mangroves. Most of the mangrove areas are located in the notified reserve Mangrove Forest areas of Navinal, Shiracha and Jarpara village coasts. Closest mangrove distribution is located at 170 meters South form the project areas on the bank of Kotdi creek (Map-4.2). However, a sizable patch of dense mangrove is also located on the coast of Tragdi village.

The closest mangrove distribution is located at 170 meters (on bank of Kotdi –II creek) from South of the proposed project site (Map-4.1, & Map-4.2). Therefore, the chances of damage to mangroves by fugitive emission are high which are located immediate south of the project site. Though the predominant wind direction is from south-west in the region, there are still chances of mangrove being impacted due to its close distance from the project site. It is therefore, recommended that strict pollution control measures shall be implemented so that the mangrove south of the project area are least affected.

Apart from the above mentioned impact, a drainage known as Dhaneshri Nadi flows through the western part of the project site and it drains into Kotdi Creek system. Kotdi creek system has sparse and dense mangrove growth

on both sides. Therefore, if the Dhaneshri river/drainage is not trained suitably, it may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity to mangrove and its habitats. Therefore, it is recommended that Dhaneshri River should be trained in such a way so that it does not carry runoff from the project area.

Since mangroves are important plants and constitutes important eco-system in the study area, it is recommended that project proponent shall chalk out a detailed mangrove conservation plan. Aim & Objective of mangrove conservation plan shall be to strictly avoid any damage by the project activities, preserve and add more mangrove areas. The mangrove conservation plan shall include following aspects.

- Identification potential mangrove plantation area in the study area for taking up mangrove plantations.
- Systematic monitoring of mangrove stock at every 5 years for 20 years. Monitoring shall include monitoring of species diversity, tree density, tree height, tree girth (GBH), regeneration classes, recruitment classes etc. in the study area.
- Creating awareness about mangrove and their conservation among local villagers in the study area.
- Review of the actions taken at every 5 years and extend the plan accordingly if necessary.

5.3. Impacts on Fauna

Though, the impacts of proposed plant and related construction activities may be on several faunal taxa, but for the present study we focused mainly on vertebrate classes i.e. reptiles, birds and mammals for identification of impacts and future monitoring purpose. Therefore, in the present study we identified impacts on the reptiles, birds and mammals particularly important, threatened, endemic and flagship species of the landscape.

5.3.1. Impacts on Reptiles

The baseline study has reported total 12 species of reptiles reported from the study area and 6 species from core area. No rare, endangered or Schedule-I species are reported from the core area i.e project site. However, Flap shell Turtle, and Indian Monitor Lizard are reported from the buffer area which belongs to Schedule-I of Wildlife Protection Act 1972. These species are listed as Least concerned as per IUCN Red list categories. However, a species i.e. *Uromastix hardwickii* belong to Schedule-II which is reported from buffer area. This is a resident and most vulnerable species as it is localized and sedentary unlike other reptiles such as snakes and lizards. This species is often hunted or poached for their oil and meat. Therefore, it is recommended that during construction phase no construction workers shall be involved in poaching of such species. Since no rare or high conservation significance species of reptiles is present in the core and immediate buffer area of the proposed project site, the impact on the reptiles could be low.

5.3.2. Impacts on Birds

We observed total 95 species of birds in the study area. We identified total 5 species of high conservation significance which are species protected as Schedule-I species under Wildlife Protection Act 1972. Most important bird habitat is identified near Modhva coast, is located beyond 11.0 km distance i.e. outside the study area. Intertidal mudflat, sandy beach, mangrove, coastal thorn forest etc. Provide favourable and suitable habitats to large number of resident and migratory birds. Since this area is located beyound 10.0 km south west from the project site, the impact of project activities is expected to be negligible due to opposite wind direction most time of the year. However, project proponent shall take utmost care in controlling dust, fugitive emissions and pollutants flowing to this area thorugh water or air. Therefore, it is recommended that the pollutoin control measures shall be strictly implemented by project proponent during construction and operation phase.

It is often noticed, that construction workers engage in poaching of wild animals particularly birds which are easy to trap using various methods. It is therefore, recommended that construction workers shall be strictly instructed so that they don't engage in such acts. It is also recommended that project proponent shall monitor the status of this ecologically and economically important birdwatching habitat as part of their periodic comprehensive biodiversity monitoring programme.

5.3.3. Impacts on Mammals

We observed a total of 13 mammal species in the buffer area and 6 in the core area of the project site. No Threatened or Schedule-I species reported from the core area of the project site. Majority of the common mammalian species recorded during the survey in the core and buffer area are present throughout semiarid, non-forested and non-protected landscapes especially in Kutch region.

There are only few most common mammals species present in the core area reported during the study. These species would be displaced during construction phase and operation phase. There is only one schedule-I species, present in the buffer area. Overall habitat degradation due to change in landuse pattern, pollution (dusting, air, and noise), increase human presence, increased illumination, increased traffic etc. in and around proposed project area would displace majority of the mammal species from the project core and surrounding buffer areas. Therefore, project proponent shall control emission and dust pollution which would not affect the forest areas and vegetation in the surrounding area which provides resting and feeding habitats to mammalian species in the study area.

6. Wildlife Conservation Plan

Based on our field observations and literature survey we found several species important plant and animal species as well as Schedule-I wildlife species in the study area (Table-6.1). We reported a plant species and 12 animal species. The faunal wildlife species include 2 species of Reptiles, 9 species of birds and one species of mammal.

Table-6.1: Species of higher conservation significance present in the study area.

Sr. No.	Name of Species		IWPA-1972 Status	IUCN Status
	Common Name	Scientific Name		
Plants	Gugal	*Commiphora wightii*		CR
	Mangroves	*Avicennia marina*	Important	LC
Reptiles	Flap shell Turtle	*Lissemus punctatea*	Schedule-I	LC
	Indian monitor lizard	*Varanus bengalensis*	Schedule-I	LC
Bird	Black shoulder kite	*Elanus caeruleus*	Schedule-I	LC
	Eurasian Spoonbill	*Platalea leucorodia*	Schedule-I	LC
	Indian Peafowl	*Pavo cristatus*	Schedule-I	LC
	Marsh Harrier	*Circus aeruginosus*	Schedule-I	LC
	Shikra	*Accipiter badius*	Schedule-I	LC
Mammal	Chinkara	*Gazella bennettii*	Schedule-I	LC

Species wise status, impacts and the mitigation measures are suggested in as follow.

6.1. CRITICALLY ENDANGERED PLANT SPECIES:

Gugal: (*Commiphora wightii*)

Status: Our field survey in the proposed project area revealed that there is a critically endangered plant species present in the buffer areas. However, this plant was found with low density in the buffer area. This plant has high medicinal values and is facing the threats of extinction by over exploitation for commercial purpose (Silori et al., 2004; Joshi, 2002; GUIDE 2009) from Kutch. However, recently Gujarat Forest Department has accomplished a large scale project on plantation of *Commiphora wightii* in Gujarat. Through

this project thousands of plants were raised and planted in entire Kutch region. This project has improved the number and density of the species in the region.



Impacts: The construction of copper refinery plant and allied industrial development operations would involve large scale removal or vegetation, excavation, material handling, could result in habitat degradation due to air borne dusting from copper plant, effluent discharge, pollution load, movement of vehicle etc. can potentially affect the density and distribution of this species in the buffer area.

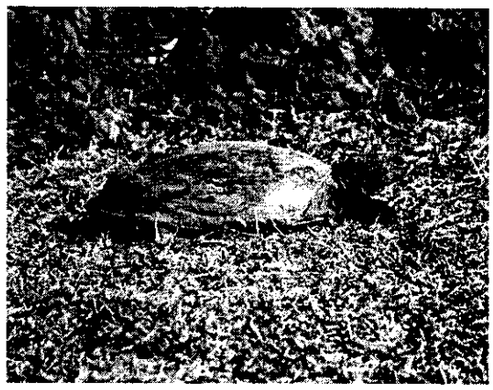
Recommendations: AEL shall put in place all kinds of pollution control measures so that the surrounding vegetation is not degraded and this species along other plants survive normally in the study area. AEL shall carryout comprehensive biodiversity monitoring at regular intervals in order to check impact of their project activities on surrounding area and special emphasis shall be given to this species. It is also recommended that company should take up plantation of *Commiphora wightii* by involving local forest department, which has vast experience of carrying out plantation of this specialized plant species. Since removal of vegetation would be done in the first year of commencement of the project, it is advised that the plantation shall be carried out in the first year itself. Since the plant is slow growing, it is recommended that a total of 10.0 ha. of *Commiphora wightii* plantation shall be done in the first year itself. Rest of the time Kutch East Forest Division would carry out maintenance of the plants. This plantation shall be carried out in the reserved forests, unclassed forests or roadside areas as found suitable by the Kutch East Forest Division.

6.2. SCHEDULE-I FAUNA

Among the fauna, we reported total 8 animal species. As mentioned above, the faunal wildlife species include 2 species of Reptiles, 5 species of birds and 1 species of mammal.

6.2.1. REPTILE/ INDIAN FLAP SHELL TURTLE/ MONITOR LIZARD

Status: During our study this species of reptile was recorded from the small village ponds in the study area. The species is resident and breeding in the buffer areas. The Indian Flap shell Turtle (*Lissemys punctata*) is a freshwater species of turtles are widespread and common in the South Asian provinces. They are listed as Schedule-I species under Wildlife Protection Act 1972 and as Least Concerned as per IUCN threat categories. Monitor Lizard is also one of the reptile's species which is found in the study area.



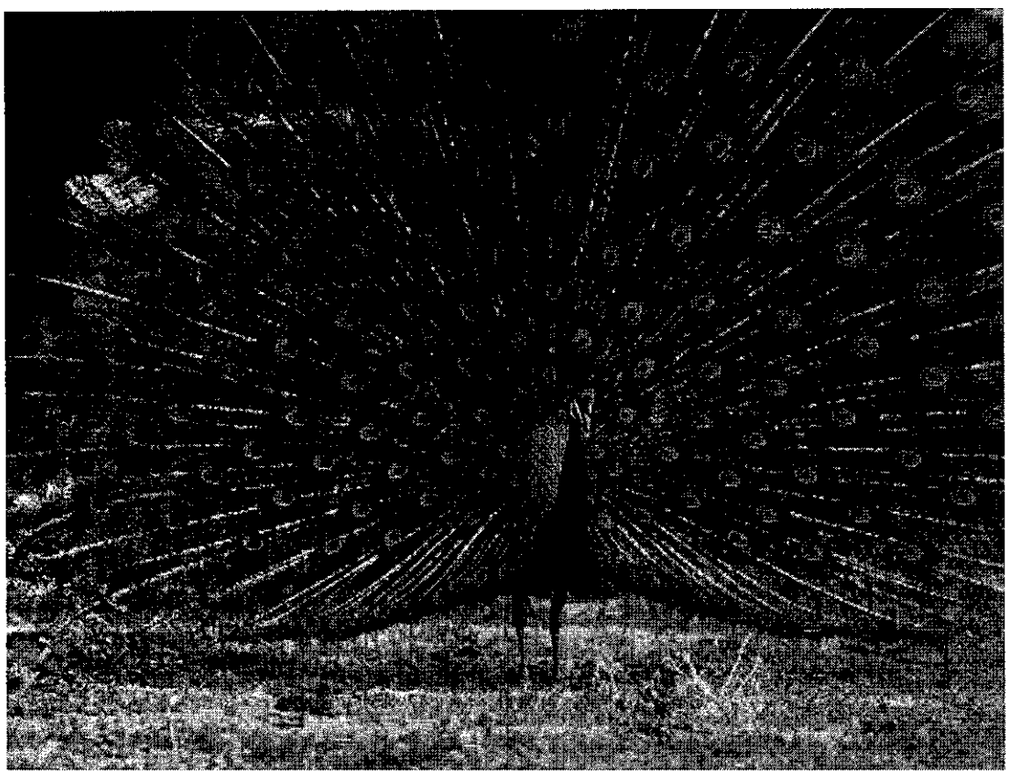
Impacts: Since this species is an aquatic and cold blooded, it may be subjected to impacts related to water pollution and hydrological impacts arising due to project activities. These may include degradation of water sources, soil characteristics, choking of drainages etc. This species is otherwise not hunted or eaten by the people. Therefore, changes of degradation of overall aquatic habitat qualities in the buffer area are likely to affect these species and their distribution.

Recommendations: AEL shall put all kind of pollution control measures in place so that surrounding area ecological conditions are not degraded. During construction it shall be seen that no drainage, ponds etc. are damaged or altered. AEL shall carryout comprehensive biodiversity monitoring at regular intervals in order to check impact of their project activities on surrounding area and special emphasis shall be given to

monitoring of surface (drainage, check dams, ponds) water and wetlands in the buffer area.

6.2.2. BIRDS/ INDIAN PEAFOWL

Status: The Indian Peafowl (*Pavo cristatus*) is a resident breeder in the Indian subcontinent. The bird was justifiably declared as the national bird of India in year 1963 due to its 'flagship' value founded on its glorious position in mythology and its widespread distribution in the country.



The species is found in dry semi-desert grasslands, scrub and deciduous forests. It forages and nests on the ground but roosts on top of trees. It eats seeds, insects, fruits, small mammals and reptiles. The Indian Peafowl is a ground nesting bird and it lays a clutch of 4-8 eggs which take 28 days to hatch. The eggs are light brown and are laid every other day usually in the afternoon. The male does not assist with the rearing, and is illegal. Poaching of peacocks for their feathers and poisoning by feeding on pesticide treated seeds are known threats to wild birds.The collection of tail feathers is only allowed if shed by the bird. The Indian peafowl is under various threats that

include the demand for feathers and wild meat, conflict with farmers during cropping season, increased use of chemical fertilizers and pesticides and habitat degradation.

Impacts: Our field study reported presence of Indian Peafowl in the buffer areas of project site. The species was observed in the buffer area of 10 km radius particularly near human habitations, villages and agriculture fields. Since our study reported presence of Indian Peafowl in the buffer area, its possibility of nesting in buffer area could not be ruled out. Since Indian Peafowl is a ground nester, several project activitie can have adverse impacts on their nesting grounds such as pollution, degredation of soil and vegetation from surrounding ara and in the forest areas. Direct disturbance by presence of people, vehicle, their noise, vibrations, lights etc. can potentially disturb most of the bird species.

Recommendations: following actions for the conservation and protection are suggested in wildlife conservation action plan to reduce impacts of project related activities on the species. Based on our field observation on the distribution, behavioral ecology, conservation need, and envisaged impacts of proposed copper refinery project, we identified several species specific actions that would help reduce the impacts of project on Indian Peafowl as under.

i. A rapid survey for the breeding population of Indian Peafowl during their nesting season shall be carried out in pre-monsoon season by wildlife experts so as to ensure that no nesting of the species is present in and around project or corea area.

ii. Since Indian Peafowl is a ground nesting bird, construction activities could disturb their nesting activities. Therefore if nesting of peafowl is found, in core area, construction activities should not be carried out in that particular block. Construction activities should resume only after egg hatching is completed and the fledglings leave the nest.

iii. Avoid vehicle movement in the area where nesting is found. The movement of vehicles or humans shoul be prohibited in vicinity of the nesting area.

iv. Electric lines within the project area and outside the project area shall be designed to minimize the potential for electrocution of indian peafowl and other such large birds.

v. Lightings within the project area could potentially deter the species presence. Therefore, AEL shall ensure that minimum illumination comes out from the project area. This can be done by adjusting the angles of the light sources and using low intensity focused bulbs inside the project area.

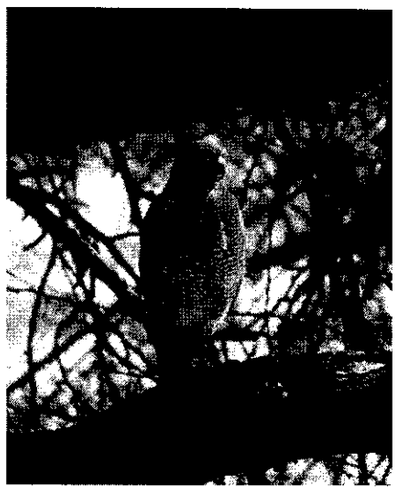
vi. Tree Plantation shall be carried out by AEL in the surrounding villages and schools etc. in the buffer area. This would help the species and provide them much needed roosting place.

vii. Staff involved in construction and operation activities shall be trained and made aware of Indian Peafowl's status as National Bird of India, and Schedule-I species protected under Indian Wildlife Protection Act 1972. This is important because if there any casualties of the species are found then they should report to the project authorities and the local forest department to carryout further necessary actions.

6.2.3. BIRDS/ SCHEDULE-I RAPTORS

Status: Total 3 bird species i.e. terrestrial Raptors belonging to Schedule-I of Wildlife Protection Act 1972 are reported from the study area. These species are Black shoulder kite, Marsh Harrier, Shikra. Of these 3 species of Raptors, none are reported from the core area and all 3 are reported from buffer area. The species of Harriers are migratory bird species whereas, rest of the species are resident species. Most of the raptor species are recently added to Schedule-I list through amendment made in year 2013.

Impacts: These 3 species of terrestrial raptors are predators and occupies tertiary consumers positions in the food chain and ecological pyramids. Therefore, any change in primary productivity would affect their distribution, density and population in the region. Therefore, project activities resulting in air, water and noise pollution, degradation of vegetation would potentially affect the habitat of these bird species and their population in the study area. Moreover, direct disturbance by presence of people, vehicle, their noise, vibrations, lights etc. can potentially displace most of the raptors species from the project area and its immediate surroundings.

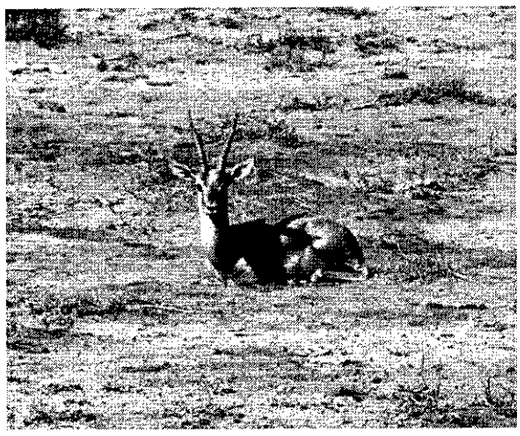


Recommendations: It is recommended that AEL shall take utmost care in controlling dust, fugitive emissions using state of the art technologies and put in place all types of pollution control measures during construction and operation phases which would ensure minimum degradation of surrounding vegetation, forest area vegetation and waterbodies. Minimize vehicle movements around the project areas. Adjust lightings within core area and ensure minimum illuminations spreads outside the project area. Keep all the machineries maintained so that minimum noise and vibrations are generated in the surrounding area. Since most of the raw materials and products are to be carried through conveyer belts the impact related to vehicle movements would be low.

6.2.4. CHINKARA (*Gazella bennettii*)

Status: The important herbivore present in the buffer area is Chinkara which is protected as Schedule-I species in Wildlife Protection Act 1972. During our survey, we reported presence of Chinkara through direct sightings in the buffer area in the study area. Indian gazelle is a shy animal and avoids human habitation. It stands at 65 centimetres and weighs about 23 kilograms. It can go without water for long periods and can get sufficient

fluids from plants and dew. Although most individuals are seen alone, they can sometimes be spotted in groups of up to four animals. It lives in grasslands and desert areas in India. Its population is on the decline due to it being hunted for game. Narayan Sarovar Wildlife Sanctuary and its surrounding areas are known for Chinkara population. The sanctuary is also known as Narayan Sarovar Chinkara Sanctuary. The species is common in landscape of Kutch and North Gujarat. The species is listed as Schedule-I in Wildlife Protection Act 1972 and as Least Concerned by IUCN. The species needs safe, undisturbed arid semi arid plains with open arid sparse vegetation.



Impacts: This mammal species is likely to be using surrounding area for their feeding and breeding. They are also likely to be using waterbodies in the buffer area for their requirement of water. The impacts of copper refinery and allied development activities on herbivore are likely to be direct as they are primary consumers in the eco-system. Degradation of soil, vegetation and habitat due to chronic pollution loads the species would lose its feeding ground and breeding area. Moreover, the direct loss of habitat worth the core area is also an irreversible loss to the species. Therefore, changes in overall habitat qualities in the buffer area are likely to affect these species. The direct disturbance to these species by vehicle traffic, poaching by workers, and human intrusion in wildlife habitat is also issue of some concern.

Recommendations: It is recommended that AEL shall comply with all the pollution control and other conditions imposed in the environmental clearance by MoEF&CC. Compliance of all the conditions in environment clearance by MoEF&CC would take care of major issue of habitat degradation for the species. AEL shall instruct their own staff members and workers not to indulge in chasing or killing of Chinkara in the study area. AEL

shall also support forest department in conducting awareness of local people towards wildlife conservation and law reinforcement and anti poaching activities in the study area. AEL shall support forest department in installing sign boards on roads and strategic locations of villages informing prohibition of killing, poaching etc. under wildlife protection act 1972.

6.3. IMPACT – MITIGATION MATRIX & CONSERVATION PLAN

Based on our observation, literature review and consultation with local people, and NGO, we formulated following impact *vs* mitigation matrix (Table-6.2). The matrix is created using information and data collected during our field visits and the information available in public domain. We calculated distances of sensitive ecological receptors such as protected areas, their eco-sensitive zones, biodiversity heritage sites, important bird areas, mangrove, reserve forests, wetlands, rivers etc. from project core areas. Professional judgements and recommendations are made based on our experiences and the parameters used for predicting impacts.

6.4. WILDLIFE MITIGATION MEASURES & RECOMMENDATIONS

Based on our field study, information collected and consultation with project proponent, local community etc. we recommend following mitigation measures as self regulatory, monitoring and compensatory measures for protection, conservation and betterment of wildlife and ecology in the surrounding area of project site.

6.4.1. REGULATORY MITIGATION MEASURES & RECOMMENDATIONS

i. Since project deals with heavy metals, acids and hazardous materials, it is recommended that strict control on fugitive emission, dust pollution shall be carried out using state of the art methods and technologies. Maximum area under intensive use shall be made of hard floor. Professional dust suction system from the area under intensive use shall be placed.

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Table-6.2: General Impacts vs. mitigation matrix & Conservation plan.

Issue		Status	Impacts	Mitigation
Ecosystems	Protected Areas	All the protected areas of Kutch are located beyond 70 km from the proposed project area. Marine National Park and Sanctuary areas are located beyond 30 km south of the proposed project in Gulf of Kutch.	No impacts are envisaged, as these areas are located at greater distances.	• Nil
	Eco-sensitive zone	No eco-sensitive zones of any Wildlife Sanctuary or Naitonal park are located within 30 km from the proposed project area.	No impacts are envisaged, as these areas are located at greater distances.	• Nil
	Wetlands & waterbodies	No major inland wetlands are located within study area. Marine wetlands include Kotdi creek (0.5 km, S), Baradimata creek (4.0km SE), Gulf of Kutch (3.9 km, S), Seasonal drainage/rivers are Nagavanti Nadi (4.7 km, E) and Phot Nadi (8.7 km, ENE), Khari Nadi (1.9 km, W), A drainage known as Dhaneshri Nadi flows through the western part of the project site and it drains into Kotdi Creek system. Small check-dams and nallah are present in the study area at distance.	• Kotdi creek system has sparse and dense mangrove growth on both sides. • Dhaneshri river/drainage may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity in mangrove habitats. • If dusting, fugitive emission are not controlled, it could cause major damage to mangroves.	• Therefore, it is recommended that Dhaneshri River should be trained in such a way so that it does not carry pollutants with runoff from the project area. • Install state of the art technologies so that pollution from the project area remains within applicable standards. • Check health of mangrove eco-system at regular intervals. • Prepare a comprehensive mangrove conservation plan for Kotdi and Baradimata creek system's mangroves located in the study area.

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	Important Bird Areas	Banni & Naliya grasslands are two major IBAs of Kutch	No impacts are envisaged, as these IBAs are located far away, 70 km from the project site.	Nil
	Forest Area	Reserve Forest, Unclassed forest areas are located adjacent to proposed project area. In fact part of the project area would be located on diverted Forest land of Siracha village. The south of the proposed project area there are mangroves which are also declared as reserve forest areas by state forest department. Navinal reserve forest area is also located at 500 mtrs distance only from the proposed project area in east direction.	Direct loss of forest land worth 102.39 ha. Pollution loads from project activities could potentially degrade remaining forest land located in Siracha village, Navinal forest area and mangrove reserve forests. As per EIA/air modelling, it is learnt that 2.2 km North-East direction there will be impacts of air pollution. This means it would affect reserve forest area of Navinal. As per literature survey, Navinal area has presence important native species of plants. This forest area would be affected due to chronic air pollution impacts.	• Compensate loss or damage to Forest area due to pollution by taking up plantation of native species. • Construct tall wall around project boundary so that dusting, possibility of fire etc. are minimized. • No roads or trespassing shall be done by staff or workers through Forest area. • No collection of fuel wood from forest land shall be allowed. • No worker camps, dumping of solid waste, over burden inside forest land shall be allowed. • Fire and safety precautions shall be in place during construction and operation phases. • Green belts as per conditions of Environment Clearance shall be created using native species of plants in the periphery of project area. • Install state of the art technologies so that pollution from the project area remains within applicable standards.
	Mangroves	Mangroves are located at 170 mtrs from the project boundary in Kotdi and Baradimata creek systems on the coast of Gulf of Kutch	• Kotdi creek system has sparse and dense mangrove growth on both sides. • Dhaneshri river/drainage may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity in mangrove habitats.	• It is recommended that Dhaneshri River should be trained in such a way so that it does not carry pollutants with runoff from the project area. • Ensure that strict pollution control measures are implemented in the project. • Check health of mangrove eco-system at regular intervals. • Prepare a comprehensive mangrove

			• If dusting, fugitive emission are not controlled, it could cause major damage to mangroves.	conservation plan for Kotdi and Baradimata creek system's mangroves located in the study area. • Take up mangrove restoration and afforestation activities in consultation with Kutch East forest division.
	Ramsar Site	There are no Ramsar Sites in Kutch district.	Nil	Nil
Flora	General Vegetation	This area has native vegetation representative of semi arid zones. These include typical tropical thorn forest area comprising of *Acacia, Salvadora, Caparis, Ziziphus, Commphora species.*	There will be irreversible loss of native vegetation from the core area i.e. 256.58 ha. The native vegetation from the immediate surroundings of the proposed project site would also be affected due to pollution load.	• Remove minimum vegetation from core area. • Install state of the art technologies so that pollution from the project area remains within applicable standards. • Vehicle movements shall be minimum. • No vegetation shall be cut by workers from surrounding area. • No collection of fuel wood from surrounding land shall be allowed. • Fire and safety precautions shall be in place during construction and operation Thick green belts shall be created using native species of plants in the periphery of project site.
	Important plant Species	*Commiphora wightii is* an important plant which is listed as Critically Endangered by IUCN. This plant is present in core and buffer area.	This important plant species would be affected in the surrounding area due to air and water pollution loads from project activities. As per EIA/air modelling, it is learnt that 2.2 km North-East direction there will be impacts of air pollution. Chronic air pollution would affect plant growth in this area.	• Thick green belts shall be created using native species of plants in the periphery of project area. • In order to compensate for the potential damage/degradation of *Commiphora wightii* habitats AEL shall carry out plantation through Kutch-East Forest Division, Bhuj.

Fauna	Threatened or Endemic fauna Species	No threatened fauna species are reported from the study area during survey. i.e. core or buffer area during study.	Though, not reported during the present study, there may be presence of these species in future. Degradation of overall habitat could affect these species.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Thick green belts shall be created using native species of plants in the periphery of project site. • Carryout biophysical monitoring of intertidal zone located south of project area at every 6 months.
	Schedule-I Reptiles	The Indian Flap shell Turtle (*Lissemys punctata*) is present in ponds and small wetlands of buffer area. Indian Monitor Lizard is present in agriculture, open scrubland and thorny bushes in the project area.	Degradation of overall terrestrial and aquatic habitat qualities in the buffer area are likely to affect these species and their distributions.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Monitoring of biodiversity including these species and take corrective measures if needed. • Carry out habitat improvement activities through forest department in surrounding reserve forest areas, which would ensure their long term survival in the region.
	Schedule-I Birds	Indian peafowl and 5 Schedule-I bird species i.e. terrestrial Raptors are present in study area.	Pollution load, overall habitat degradation, direct loss of habitat worth 256.58 ha. and direct disturbance due to vehicle movements, illuminations and project activities could displace and disturb these species from the immediate surroundings of the project area.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Maintain machinery so minimum vibrations and noise is controlled within the applicable standards at the boundary of the project. • Adjust lightings in the core area so minimum illumination spread outside core area. • Thick green belts shall be created using native species of plants in the periphery of project boundary. • Cary out tree plantations in surrounding villages to augment habitat for Indian Peafowl and other schedule-I birds species.

			• Monitor biodiversity including bird species and take corrective measures accordingly. • Carryout habitat improvement activities through forest department in surrounding reserve forest areas, which would ensure their long term survival in the region.
Schedule-I Mammals	Only one species of Schedule-I mammal is reported i.e. Chinkara from the study area. None from core area. It is mostly reported from the reserve forest areas within the study area.	Overall degradation of habitat due to pollution. Direct disturbance due to Noise, vibration due to vehicle movements could displace or deter this species. Lighting and illumination could displace the species from surrounding area. Hunting, chasing, killing by workers, road kills etc. are also envisaged.	• Install state of the art technologies so that pollution from the project area remains within applicable standards. • Maintain machinery so minimum vibrations and noise is generated. • Adjust lightings in the core area so minimum illumination spread outside core area. • Thick green belts shall be created using native species of plants in the periphery of project area. • Monitor biodiversity including mammal species and take corrective measures accordingly. • Provide funds for habitat improvement activities by the forest department in surrounding reserve forest areas, this could ensure their long term survival in the region.
Wildlife Corridors	No wildlife corridor is identified under any legal framework in the study area.	Nil	• Nil

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ii. Ambient noise pollution and vibrations during construction and operation phases of copper refinery plant shall be within limits of the standards mentioned.

iii. Plantation of thick green belt on periphery of the project site shall be created using native and hardy tree species.

iv. Ensure no movement of vehicles or people through Forest Areas located immediate north (Siracha) and east (Navinal) of proposed copper refinery plant area.

v. Ensure zero discharge of waste water from the project site into surrounding area.

vi. Ensure safe passage of runoff through drainages located within and nearby the project area. It is recommended that a seasonal drainage/river (Dhaneshri River) should be trained in such a way so that it does not carry pollutants from the project site into mangrove eco-system located immediate south of the project boundary.

vii. Ensure no dust, fly ash, sediments, or any raw materials spill out from project areas and flow into nearby drainage, forest areas during the operation phase of the project.

viii. AEL shall ensure that their construction workers and other staff during construction or operational phase shall not be involved in poaching and hunting activities of birds, reptiles or mammals around the project site.

ix. Implement state of the art technologies to control pollution caused form the proposed project.

x. No trespassing or vehicle or people shall be allowed through, surrounding forest area or the mangrove eco-system. This shall be instructed to the workers and staff in advance.

xi. No workers camps shall be established within the surrounding forest area. This shall be instructed to the workers and staff in advance.

xii. No resources (i.e. fuel wood, stones, sand, soil etc.) from the surrounding forest area shall be collected by staff or workers. This shall be instructed to the workers and staff in advance.

xiii. No workers or staff members shall be involved in poaching or killing of any wild animals throughout the project life cycle. This shall be instructed to

the workers and staff in advance and sign boards to this effect within project area.

6.4.2. MONITORING MEASURES & RECOMMENDATIONS

xiv. AEL shall regularly monitor health of the forest areas (Siracha and Navinal village), mangrove eco-system (Kotdi and Baradimata creeks) and biodiversity in the study area.

xv. AEL shall carryout annual monitoring of mangrove eco-system in Kotdi and Baradimata creeks. Details of monitoring are provided in mangrove conservation plan.

xvi. After commencement of the project AEL shall carryout comprehensive ecological & biodiversity monitoring at every 2 years for 10 years. The monitoring shall include status of flora, fauna and health of reserve forests and mangrove eco-system present in the immediate proximity of the proposed project site. In case any changes, damage is reported to them AEL shall take necessary corrective measures accordingly. AEL shall bear the cost of third party monitoring.

xvii. Overall official monitoring would be carried out by Kutch-East Forest Division, Bhuj. AEL shall pay the administrative and monitoring cost for the same.

6.4.3. COMPENSATORY MEASURES & RECOMMENDATIONS

xviii. In view of the probable impacts of construction and operation of copper refinery project on mangroves of Kotdi and Baradimata creek areas, AEL shall chalk out Mangrove Conservation plan.

xix. In order to compensate for the potential damage/degradation of *Commiphora wightii* habitats AEL shall carry out 10.0 ha. of plantation through Kutch-East Forest Division, Bhuj.

xx. In view of the distribution of species of higher conservation significance and the Schedule-I species, in the study area particularly within the reserve forests around the project area, it is recommended that AEL shall financially support wildlife habitat improvement activities being carried out by Kutch East Forest Division.

6.5. IMPLEMENTATION OF MITIGATION PLAN

- Since the project is located away from protected area and their eco-sensitive zones, most of the wildlife mitigation recommendations are self regulatory for user agency, therefore the implementation of these mitigation measures shall be carried out by the user agency (AEL) through their own staff and CER budget.
- A special emphasis on ecological conservation shall be given by extending special responsibility to senior environment authority within the management of the proposed project authority. A senior ecologist shall be employed / consulted on regular basis to oversee ecological/wildlife conservation activates under CER. The senior personal responsible for the conservation of ecology shall report directly to the head of the organization.
- Substantial budget shall be allocated to carryout ecological conservation activities by the user agency (AEL).
- Any additional conditions towards wildlife mitigation activities by any of the Environment Appraisal Committees at state or central levels or by the Forest department shall be complied with.
- Annual Compliance report for these activities shall be submitted to Kutch West East Forest Division, Bhuj, Gujarat.

6.6. MONITORING OF MITIGATION & COMPLIANCES

Though, most of the recommendations are self regulatory for user agency, monitoring of these recommendations and other conditions imposed by various agencies towards wildlife mitigation measures shall be monitored by a third party agency. Third party monitoring would involve comprehensive ecological/biodiversity study at interval of 2 years for 10 years. These studies would be carried out to evaluate long term impacts of the proposed project activities on the wildlife, biodiversity, ecology and forest areas present in the 10 km periphery of the project site. Therefore, as per guidelines issued by the Principle Chief Conservator of Forests, Wildlife dated 13th August 2018, user agency shall allocate up to 5% of the total cost of mitigation plan as third party

monitoring cost. Total Rs. 443.5 Lakh shall be allocated by the AEL for monitoring of mitigation plan for the period of 10 years.

Since the area falls under the jurisdiction of Kutch East Forest Division, the overall official monitoring of the implementation of mitigation plan would be carried out by the Kutch East Forest Division, Bhuj. Therefore, as per guidelines issued by the Principle Chief Conservator of Forests, Wildlife dated 13th August 2018, user agency shall allocate and pay the monitoring and administrative cost to the forest department. For carrying out overall monitoring activities, user agency shall pay monitoring and administrative cost to the authorities of Kutch East Forest Division.

7. MANGROVE CONSERVATION PLAN

7.1. Background

M/s. Adani Enterprises Limited (AEL) intends to set up a Greenfield copper refinery project of 1.0 MTPA (10 LTPA) capacity which would include facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel, etc. with the state of the art environment friendly technology. These facilities would be located in 256.58 ha. of land which include 154.19 ha of APSEZ land and 102.39 ha. forest land. The Gulf of Kutch sea coast is located at 3.9 km south from the proposed project site.

As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category-'A' of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. The application for prior EC for the proposed project has been submitted to MoEF&CC Terms of Reference (TORs) has been issued by MoEF&CC. The proposed industry is for handling heavy metals and hazardous chemicals which could lead to severe impacts on the surrounding environment and health of eco-systems if not done carefully. In view of the nature of proposed industry and processes involved, it is imperative to consider impacts of such industry on the surrounding eco-systems and take appropriate mitigation measures. Since mangrove eco-system is present south of project boundary, an action plan is proposed to protect and conserve the same.

7.2. Importance of Mangroves

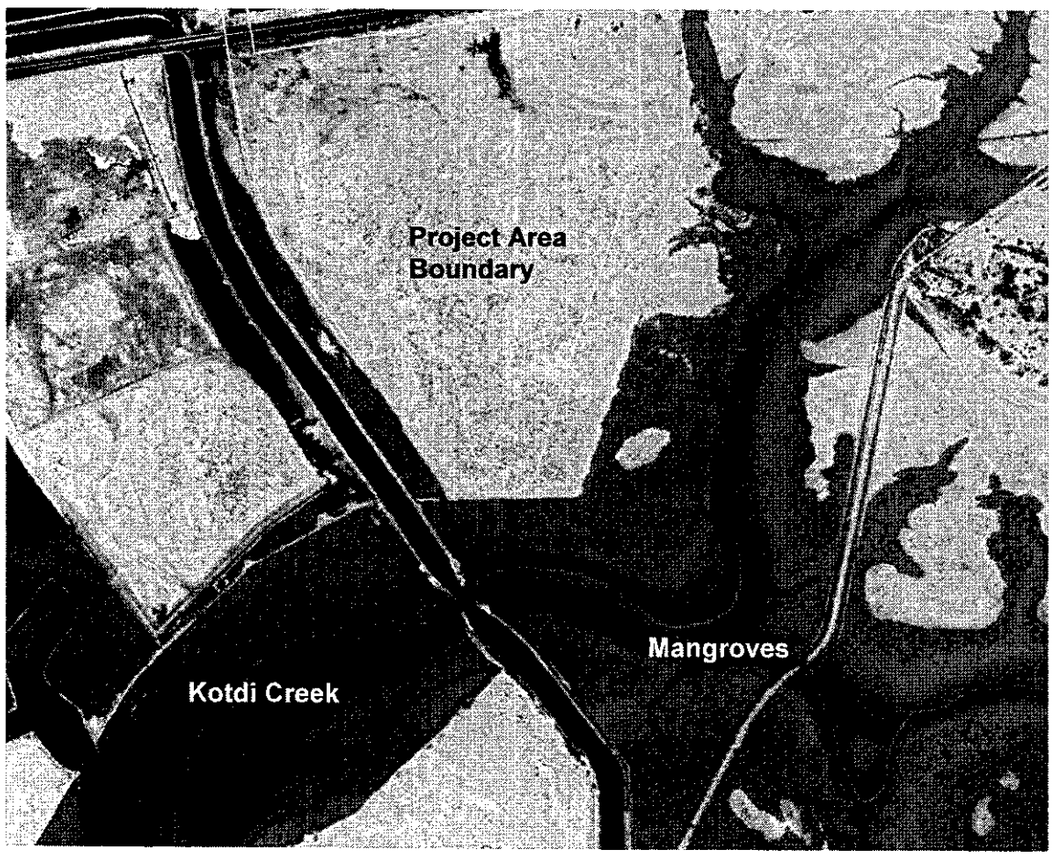
In general, mangroves are known to provide multifold eco-system benefits to mankind. Mangrove ecosystems represent natural capital capable of producing a wide range of goods and services for coastal environments and communities and society as a whole. Some of these include protection of coast from cyclones and disasters, resistant against coastal erosion, carbon sequestration, provide fodder, timber, honey etc. Improved fish production in area where mangroves are present is also reported by many studies. Mangroves are

believed to be the bio-filters of pollutants. Most importantly it provides substratum to a wide range of associated micro& macro flora and fauna which in turn constitutes a dynamic and functional mangrove eco-system that provides multifold socio-economic and environmental benefits to mankind.

7.3. Status of Mangroves Around Project Site

The baseline information suggests that the coastal area of Tunda, Navinal, Shiracha, Jarpara and Tragdi villages have patches of scattered, sparse and dense mangroves. Most of the mangrove areas are located in the notified reserve Mangrove Forest areas of Navinal, Shiracha and Jarpara village coasts. Closest mangrove distribution is located at 170 meters South form the project area on the bank of Kotdi creek (Plate-4.1, Map-4.2). The mangrove on the banks of Kotdi-I, Kotdi-II, Baradimata and Tragdi creeks fall within 10 km radius of the proposed project area. The mangroves of Kotdi–I and Kotdi-II creeks are closest mangrove (Map-7.1, Map-7.2).

Map-7.1: Mangroves of Kotdi Creek south of Project boundary.



There are total 3 species of mangroves present in the total three species of mangroves present these include *Avicennia marina, Ceriops tagal and Rhizophora mucronata*. A study carried out by National Centre for Sustainable Coastal Management (NCSCM), Chennai in year 2018, the total mangrove cover in Kotdi-I and Kotdi-II creeks was about 410 ha. out of which dense mangroves occurred to the extent of only 50 ha (12%), followed by sparse mangroves, distributed in 189 ha. The scattered mangrove covered an area of 171 ha. (Map-7.1). The above mentioned study reported an increase of 30.0 ha between year 2011 and 2016. A study by Thivakaran and Sawale (2016) reported 47 species of macrofauna in the Mundra mangrove eco-system. Total 12 species of gastropods, 14 species of crustaceans, 9 species of bivalves, 8 species of polychaetes and 4 species belonged to the category "others". Increasing spread of mangrove area and high species richness of macrofauna suggests healthy and dynamic condition of mangrove ecosystem in this area.

Map-7.2: Status of mangroves of Kotdi – I & Kotdi – II creek systems in 2016-17. (Map source: study by NCSCM 2018).

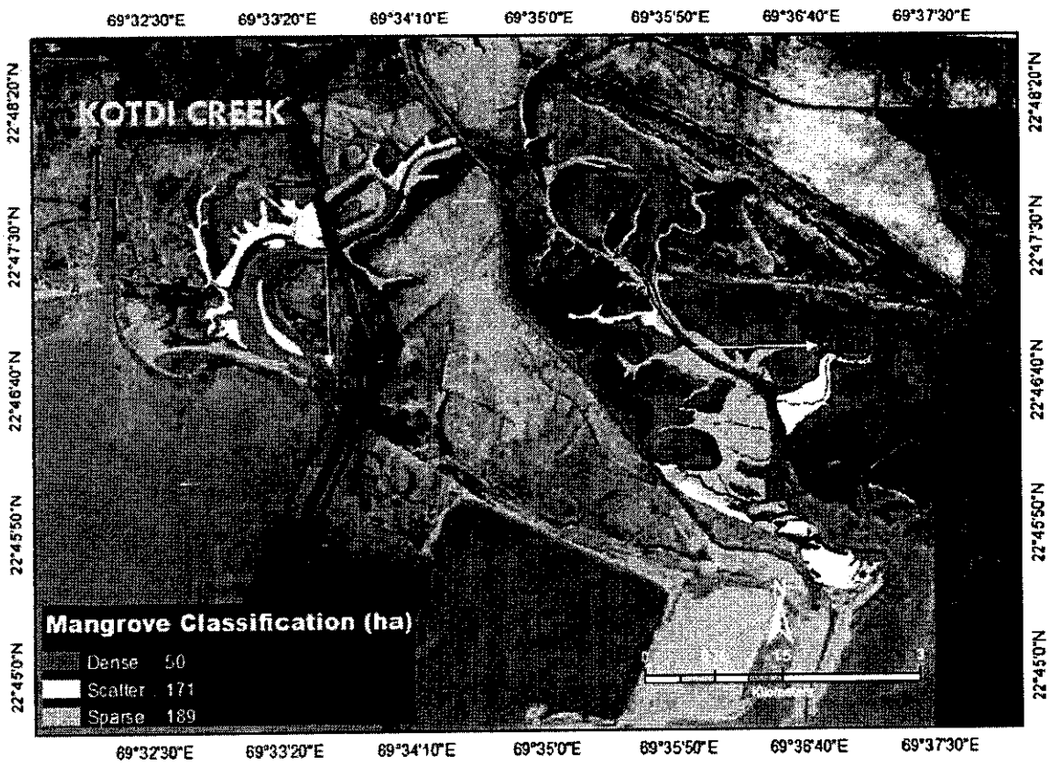
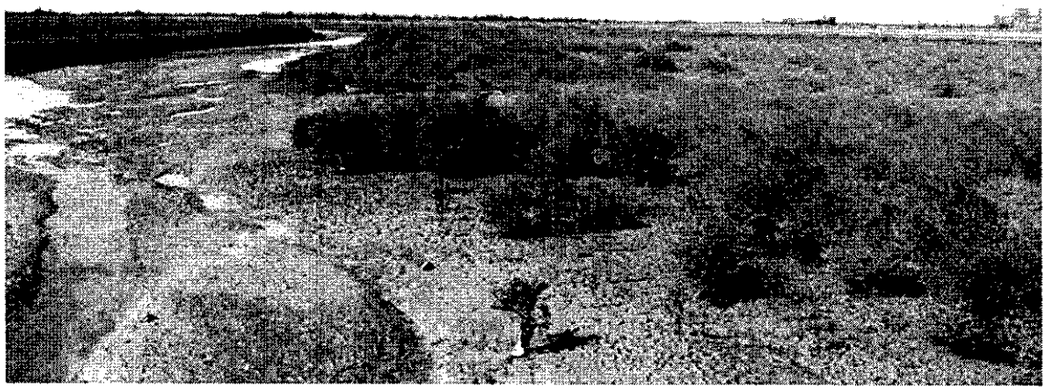


Plate-7.1: Mangroves of Kotdi-I creek.



7.4. Potential Impacts on Mangroves

Based on our survey and existing literature it is established that there are patches of scattered, sparse and dense mangroves located close to southern boundary of project area. The mangroves are located in Kotdi-I, Kotdi-II, Baradimata creeks. Since proposed project would involve large scale handling of heavy metals, hazardous chemicals and hazardous processes it could potentially affect mangroves located in the study area. Therefore, these mangroves which are located south of the project site are at higher risk of damage due to following impacts.

Air pollution: Though, the predominant wind direction is from south-west in the region, there are still chances of mangrove located on immediate southern boundary being impacted due to its close distance from the project site. Chances of damage to mangroves by fugitive emissions are high. The main sources of air pollution from the project will be from the processes and stacks. The pollutants from the plant include sulphur dioxide and particulate matter. Suspended particulate matter produced during construction and operational phases of the copper refinery plant would deposit in the surrounding mangrove ecosystem. Their direct deposition on mangrove could cause loss of chlorophyll content in leaves, arrest of photosynthesis process, leaf injuries resulting in restricted growth and regeneration of mangrove plants. Toxic metal fumes could also increase heavy metal toxicity of the mangrove eco-system.

Water pollution: There is a drainage known as 'Dhaneshri Nadi' flows through the western part of the project site and it drains into Kotdi Creek system. Kotdi creek system has sparse and dense mangrove growth on both sides. Therefore, if the Dhaneshri river/drainage is not trained suitably, it may carry spilled out pollutant load from the project area to the mangrove eco-system of Kotdi creek. This may increase heavy metal toxicity to mangrove eco-system and its components. Among the various types of pollutants released from such industry, heavy metals are one of the most serious pollutants owing to their toxicity, persistence and bioaccumulation problems (Macfarlane & Burchett, 2002). The metal contamination is a major environmental problem as the metals in contaminated sediments may accumulate in the various organisms of the estuarine ecosystem and ultimately enter the food chain, thereby affecting the human well-being (Shakeri & Moore, 2010). The concentrations of heavy metals in the sediments usually exceed that of the overlying water (Zabetoglouet et al., 2002) and the high concentrations of these metals in water and sediments affect both plants and animals (Doganlar & Atmaca, 2011). Chronic heavy metal toxicity could prove to be lethal for a range of fauna present in the mangrove habitat and affect the overall function of mangrove eco-system.

7.5. MITIGATION MEASURES

In view of the above mentioned status, importance and role of mangroves and potential impacts of proposed copper refinery plant on mangroves, it is recommended to take up following measures so that the mangroves are not harmed and their health and spread improves in the study area.

7.5.1. Mitigation of Air Pollution:

- It is recommended that a tall wall around the project boundary be constructed so that dusting is controlled during construction and operation phases.
- Thick green belt around the project boundary shall be created so that particulate matters are arrested.
- State of the art technology for arresting dust pollution shall be implemented for controlling different types of pollutions from various sources in the plant areas.

7.5.2. Mitigation of Water Pollution:

- State of the art water pollution control measures shall be in place including treating industrial effluents with heavy metals.
- Train Dhaneshri river/drainage in such a way so that it does not carry spilled out pollutants from the project area to the mangrove eco-system of Kotdi creek.
- Do not release untreated sewage or effluents in to the creek areas having mangroves.

7.5.3. Plantation of Mangroves to Mitigate Heavy Metal Toxicity

Mangroves are considered as best natural bio-filters of pollutants. Mangrove trees are reported to tolerate high levels of heavy metals (MacFarlane, 2007) with *Avicennia* species exhibiting greater tolerance and accumulative properties to numerous metals than other mangrove species (MacFarlane and Burchett, 2002). The inorganic industrial waste composed basically by heavy metals do not degrade and although they can be diluted in the long run they will always be responsible for the environmental damage even if the source has ceased to operate. Mangroves have natural ability to act as a sink of anthropogenic and industrial pollutants. Mangroves are also known to arrest and carryout bioremediation of certain pollutants in local environment. Mangroves not only act as a sink or transfer the pollutants but they also oxidize the metals present in the sediment by exuding oxygen into the anoxic soil through aerial roots. Mangrove wetlands are therefore considered as low cost waste disposal site.

It is in this context, not only preservation of Kotdi and Baradimata creek mangroves are important but there is a need to increase mangrove spread in this area so that it can mitigate the impacts of proposed industry on marine water and their biota. Therefore, it is recommended that AEL shall take up intensive mangrove plantation drive particularly on the bank of Kotdi-I, Kotdi-II and Baradimata creek systems. Total 50 ha. of plantation every year shall be taken up for 10 years period. It is recommended that mangrove plantation shall be carried out by Kutch East Forest Division as the area is under their jurisdiction and the staff has vast experience in mangrove plantation and management.

7.5.4. Monitor Health of Mangroves:

- It is important to regularly check the health of mangrove eco-system located in the Kotdi-I, Kotdi-II and Baradimata creek systems.
- It is recommended to carryout monitoring of heavy metal contents in the sediments and mangrove plants (root & stem) at every 6 months intervals in the Kotdi-I, Kotdi-II and Baradimata creek systems. A minimum of 20 samples of sediments shall be collected and analyzed each time. The samples shall be collected at every 200 to 500 meters distances starting from northern most part of creeks to southern area.
- It is recommended to monitor the spread of mangroves in the Kotdi-I, Kotdi-II and Baradimata creek systems. This shall be done at the interval of every 2 years using standard high resolution satellite imageries and Remote-sensing & GIS techniques.
- The monitoring of floristic structure of mangrove stock shall be carried out annually to check if there are changes in its composition in terms of heights, girth and regeneration classes of Kotdi-I, Kotdi-II and Baradimata creek systems. This would enable us to check if the mangroves are degrading or healthy.
- It is recommended to monitor diversity and density of mangrove associated flora as well as macrofauna annually. This would help us monitor the functioning of food chains and food webs operating in mangrove eco-system of Kotdi-I, Kotdi-II and Baradimata creek systems. An initial baseline data shall be generated on this prior to commencement of the construction of the proposed project. It is recommended to fix the location of sample plots and follow the same locations for subsequent monitoring efforts.
- It is recommended that the biological parameters of the mangrove eco-systems i.e. spread of mangroves, floristic structure, diversity, density, as well as diversity of mangrove associated flora and fauna shall be monitored by and independent NABET accredited experts.
- The samples collected from the mangrove plant and mangrove habitat sediments shall be analyzed only through NABL accredited laboratory.

7.5.5. Indicators for Monitoring of Mangroves.

Following are the indicators for monitoring of conservation plan. These indicators shall be monitored and the effectiveness of mangrove conservation plan shall be determined (Table-7.1.).

Table-7.1: Indicators for monitoring of Mangrove Conservation Plan.

No	Monitoring	Frequency	Negative Impacts	No Impacts
1	Spread of mangroves (area in ha.)	2 years	Decrease	Increase
2	Content of heavy metals in sediments	6 months	Increase	no increase
3	Content of heavy metals in mangrove plants	6 months	Increase	no increase
4	Mangrove stock structure (height, girth and regeneration classes)	Annual	Altered with decrease of area	Altered with increase area
5	Diversity of mangrove associate flora	Annual	Decrease	no increase or increase
6	Diversity of mangrove associated fauna	Annual	Decrease	no increase or increase

8. FINANCIAL LAYOUT

8.1. FINANCIAL ALLOCATION FOR WILDLIFE CONSERVATION ACTIVITIES

Following is the proposed budget estimated in consultation with forest department for 10 years towards wildlife conservation plan after approval from all statutory bodies permitting the project (Table-8.1).

Table-8.1: Proposed financial allocation for mitigation and conservation measures.

Sl	Activity	Implementing Agency	Duration Years	Rate/ Year (Lakh)	Total Amount (Lakh)
A	**Implementation Activities**				
1	Carry out Mangrove Plantation activities through Forest Dept. 50 ha. per year for 10 years. by AEL @ Rs. 30000/ha.	KEFD	10 years	15.0	150.0
2	Mangrove monitoring by third party	Project Proponent	10 years	10.0	100.0
3	Habitat improvement for Schedule-I species in Reserve Forest areas	KEFD	10 yeas	10.0	100.0
4	Carryout plantation of *Commiphora wightii* 10.0 ha. in the first years with maintenance (to be paid by AEL) @ Rs.95000/ha.	KEFD	First Year	9.5	28.5
5	Carry out tree plantation in surrounding villages for birds and Indian Peafowl	Project Proponent	10 years	1.0	10.0
				Subtotal	**388.5**
B	**Monitoring & Compliances Activities**				
7	Comprehensive ecological & Biodiversity monitoring by third party once every 2 years for 10 years after commencement of project	Project Proponent	@ 2 year for 10 years	5	25.0
8	Monitoring and administrative activity cost (5% to be paid by AEL to KEFD) to Kutch East Forest Division	KEFD	10	2.0	20.0
9	Documentation and preparation of Annual compliance report. 10 years	Project Proponent	Annual	1	10.0
				Subtotal	**55.0**
	Total (A+B) amount in Lakh				**443.5**

AEL= Adani Enterprise Limited

KEFD- Kutch East Forest Division

8.2. JUSTIFICATION FOR FINANCIAL ALLOCATION

The present wildlife conservation plan is prepared as part of Environment Clearance process for the proposed Greenfield Copper Refinery project by Adani Enterprise Limited. As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category-A" of project activity 3(a) and requires prior Environmental Clearance (EC) to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. Terms of Reference for EIA preparation has been issued by MoEF&CC vide letter reference F.No.J-11011/113/2016-IA.II(I) dated 21st June 2016. Approved ToR No. 5(v) reads as "*Wildlife Conservation Plan duly authenticated by the Chief Wildlife Warden of the State Government for conservation of Schedule-I fauna, if any exists in the study area is to be prepared*".

The present document is a wildlife conservation plan prepared after primary and secondary survey of flora and fauna in the study area by a NABET accredited consultant. Since the present study identified several Schedule-I species of reptiles, birds and mammals, along with plant species of higher conservation significance (*Commiphorawightii* and Mangroves) in the study area of 10 km radius, several activities are proposed for their conservation and management.

The Stage-1 Forest Clearance has been obtained by the M/s APSEZ for 1576.81 Ha Forest Land in various patches. M/s APSEZ is under obligation to comply with all conditions of this Forest Clearance to secure Stage-2 clearance.

Copper project is proposed by separate company "M/s AEL" for which land shall be provided by M/s APSEZ as a clear land after all clearance. M/s AEL has obtained the TOR from MoEFCC for EIA of Copper Project and this Wildlife and Mangrove Conservation Plan is being prepared Condition No 5 (v) of the TOR received by M/s AEL. This conservation plan scope is to identify Schedule-I Fauna if any exist in the study area (10Km radius) and identify if may get impacted by the proposed copper project and prepare conservation plan for the same.

Proposed Copper project boundary does not fall inside any protected area or any ESZ of any protected area. There is guideline for wildlife conservation plan budget on the basis of percentage of total project cost only in case a project involves diversion of forest land in protected area which is not the case for Copper project of M/s AEL.

Hence, the conservation cost for wildlife and the mangroves for proposed Copper project has been arrived on the basis of scientific study and estimate for Schedule—I species in the study area (10 Km radius of copper project). Total Rs 443.5 Lakhs has been proposed as budget for conservation activities. Total project cost shall be Rs 10,000 Cr.

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Annexure-I: Coordinates of sampling locations in Buffer and Core areas of the study area.

Core area Sample Locations			
Plot No	**North**	**East**	**Habitat type**
1	22°48'43.26"N	69°34'26.89"E	Open saline land
2	22°48'47.78"N	69°34'36.48"E	Open saline land
3	22°48'40.92"N	69°34'13.65"E	Open saline land
4	22°49'30.25"N	69°34'50.59"E	Open land
5	22°49'27.38"N	69°34'34.17"E	Open scrubland
6	22°49'20.13"N	69°34'26.52"E	Open scrubland
7	22°49'16.23"N	69°34'20.21"E	Open scrubland
8	22°49'0.08"N	69°34'12.49"E	Dense Scrubland
9	22°49'21.99"N	69°34'12.60"E	Open scrubland
10	22°49'31.29"N	69°34'13.50"E	Open scrubland
Buffer area Sample Locations			
1	22°49'16.23"N	69°35'25.35"E	Open Scrubland
2	22°48'47.15"N	69°35'39.74"E	Open Scrubland
3	22°49'49.35"N	69°36'22.90"E	Fallow Agriculture
4	22°50'5.46"N	69°37'25.37"E	Open Scrubland
5	22°50'15.41"N	69°38'14.63"E	Open Scrubland
6	22°50'34.88"N	69°34'30.17"E	Open Scrubland
7	22°50'29.27"N	69°33'0.13"E	Fallow Agriculture
8	22°49'56.48"N	69°31'17.98"E	Open wetland edge
9	22°49'50.35"N	69°30'37.38"E	Open Scrubland
10	22°49'35.06"N	69°29'48.16"E	Open Scrubland
11	22°49'33.20"N	69°28'56.54"E	Fallow Agriculture
12	22°50'11.94"N	69°29'0.95"E	Open Scrubland
13	22°48'55.92"N	69°28'43.35"E	Dense Scrubland
14	22°51'50.67"N	69°32'15.60"E	Open Scrubland
15	22°52'25.78"N	69°32'32.67"E	Fallow Agriculture
16	22°53'13.44"N	69°32'51.48"E	Open Scrubland
17	22°53'38.09"N	69°32'44.84"E	Open Scrubland
18	22°53'4.82"N	69°34'12.08"E	Open Scrubland
19	22°52'57.20"N	69°34'35.93"E	Fallow Agriculture
20	22°53'0.63"N	69°37'22.55"E	Dry River bed
21	22°51'47.01"N	69°37'30.81"E	Dry River bed
22	22°50'29.42"N	69°37'35.47"E	Dry River bed
23	22°50'19.32"N	69°37'34.24"E	Dry River bed
24	22°48'18.47"N	69°36'19.97"E	Open saline land
25	22°48'21.81"N	69°37'0.83"E	Open saline land
26	22°48'15.62"N	69°37'42.99"E	Wet mudflat
27	22°48'23.89"N	69°37'39.89"E	Open saline land
28	22°48'15.97"N	69°38'41.74"E	Open saline land
29	22°48'45.25"N	69°38'58.00"E	Dense Scrubland
30	22°49'30.21"N	69°38'58.00"E	Open saline land

EAC OBSERVATION NO.-6

3295

EAC OBSERVATION

Storage arrangements made for the raw materials are found to be not adequate. Open storage of raw materials such as coal, limestone etc., shall be avoided.

REPLY:

Raw Material Storage Plan

Copper Ore Concentrate & Rock Phosphate:

Copper ore concentrate & rock phosphate will be unloaded from the vessel and transported to port storage godown by closed conveyor system. Godown at the port and plant will be a concrete walled with covered roof and paved with concrete. All the transfer points will be fitted with dust extraction/ suppression system to control dust emission.

A preliminary drawing is shown in **Annexure-6**.

Other Raw Materials in Copper Smelter:

Open storage of raw materials such as coal, limestone etc. will be avoided. Quartz sand, quartz chips, lime stone powder, crushed and powdered reverts will be received by covered trucks/ tippers and will be unloaded in the covered storage godown, which is paved with concrete and covered with roof. All the transfer points will be fitted with dust extraction/ suppression system to control dust emission.

A preliminary drawing is shown below in **Annexure-6**.

Concentrate Warehouse Dust Collection and Dust Suppression

There are dispersed fly dust points in the concentrate warehouse and are likely to emit dust during unloading through belt conveyor, truck unloading and loading through loader. Thereby, humidification for dust prevention as well as dust collection is the relatively applicable.

a) Concentrate Unloading in the storage yard:

Sets of fluid spray and dust suppression system will be set in the indoor storage yard for the concentrate warehouse. The principle of fluid spray and dust suppression system is as follows:

- Moisture, is transmitted to the spray head through the micro-mist device at proper pressure and flow, and then the water mist will be sprayed by the spray head in the form of molecule with the particle size lower than 10 μm, so as to achieve dust suppression.
- The particle size of water mist can be adjusted through regulating the mix ratio of compressed air to water, to achieve the optimal dust-suppression effect.

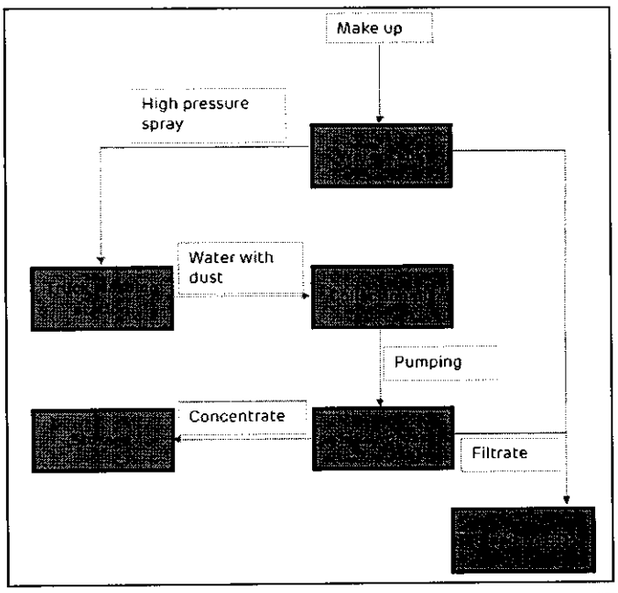
- Concentrate humidification is carried out, to keep its water content within the reasonable range and prevent fly dust from appearing in the follow-up production section.
- Preliminary capacity of the spray humidification capacity is 60~100 L/min, with the range ≤50 m; the horizontal rotating angle of spray unit is ±90° and the pitch angle is within -10° ~ +30°.

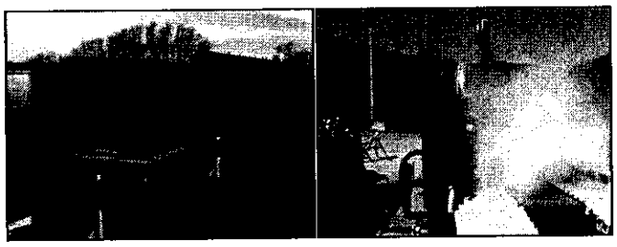
b) Concentrate Loading Hopper:

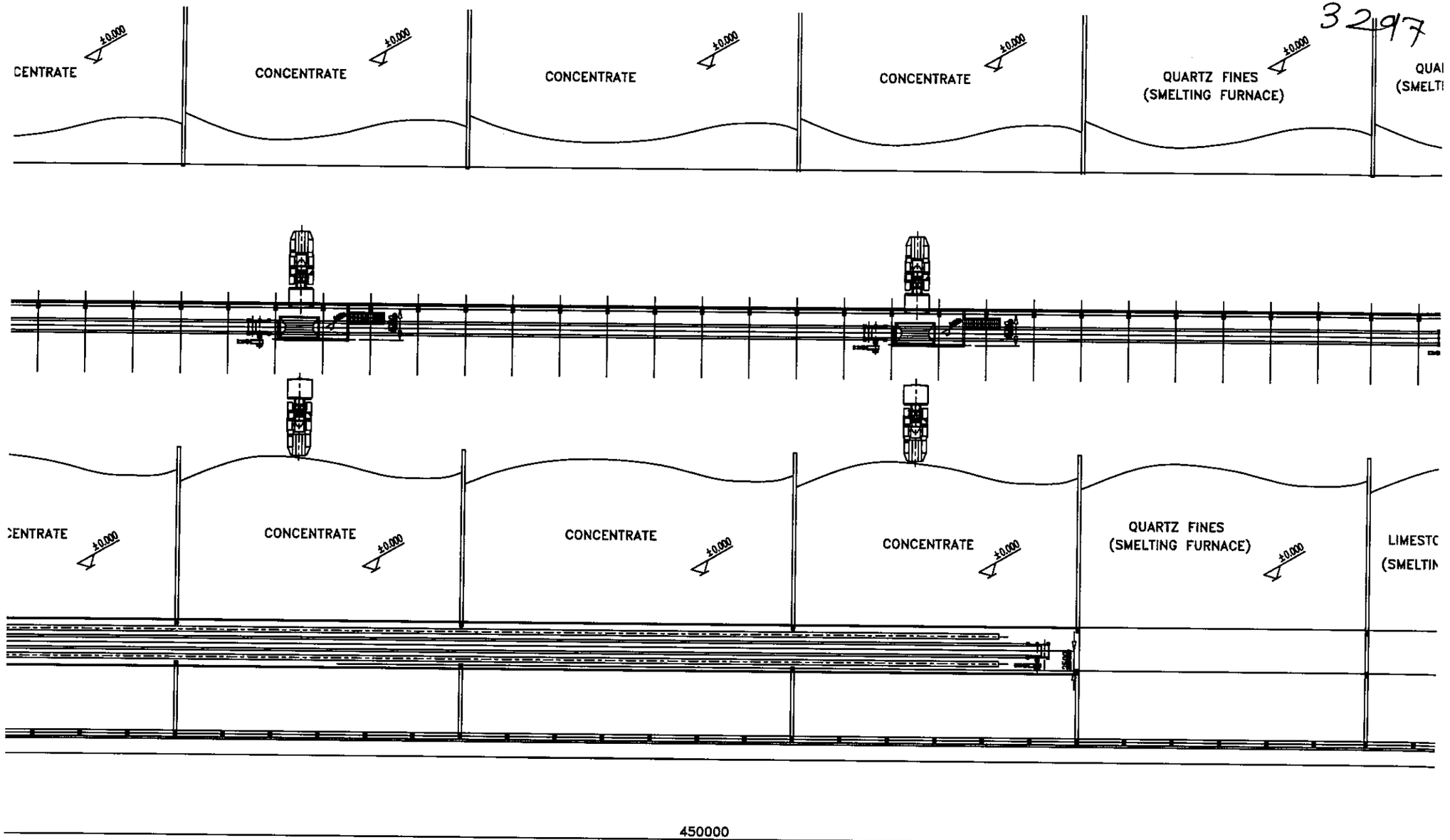
- Dust collection system connected to bag filter will be installed at every loading point around the loading hopper and in the guide chute of belt conveyor.
- Dust from bag filter will collected in a bin and same will be recycled to concentrate storage yard for consumption.

c) TRUCK WASHING FACILITY

- Trucks which will be transporting the Copper Concentrate from Port warehouse to plant warehouse, will be washed post unloading the copper concentrate to recover the material stuck to the truck body as well as tyres.
- The washed water will be collected in the collection pit and fed to filter press for recovering solids of copper concentrate.
- Recovered copper concentrate will be sent back to concentrate storage area.
- Based on filter water quality bleed will be sent for further treatment to ETP.
- This will help to support environmental protection from land contamination perspective.





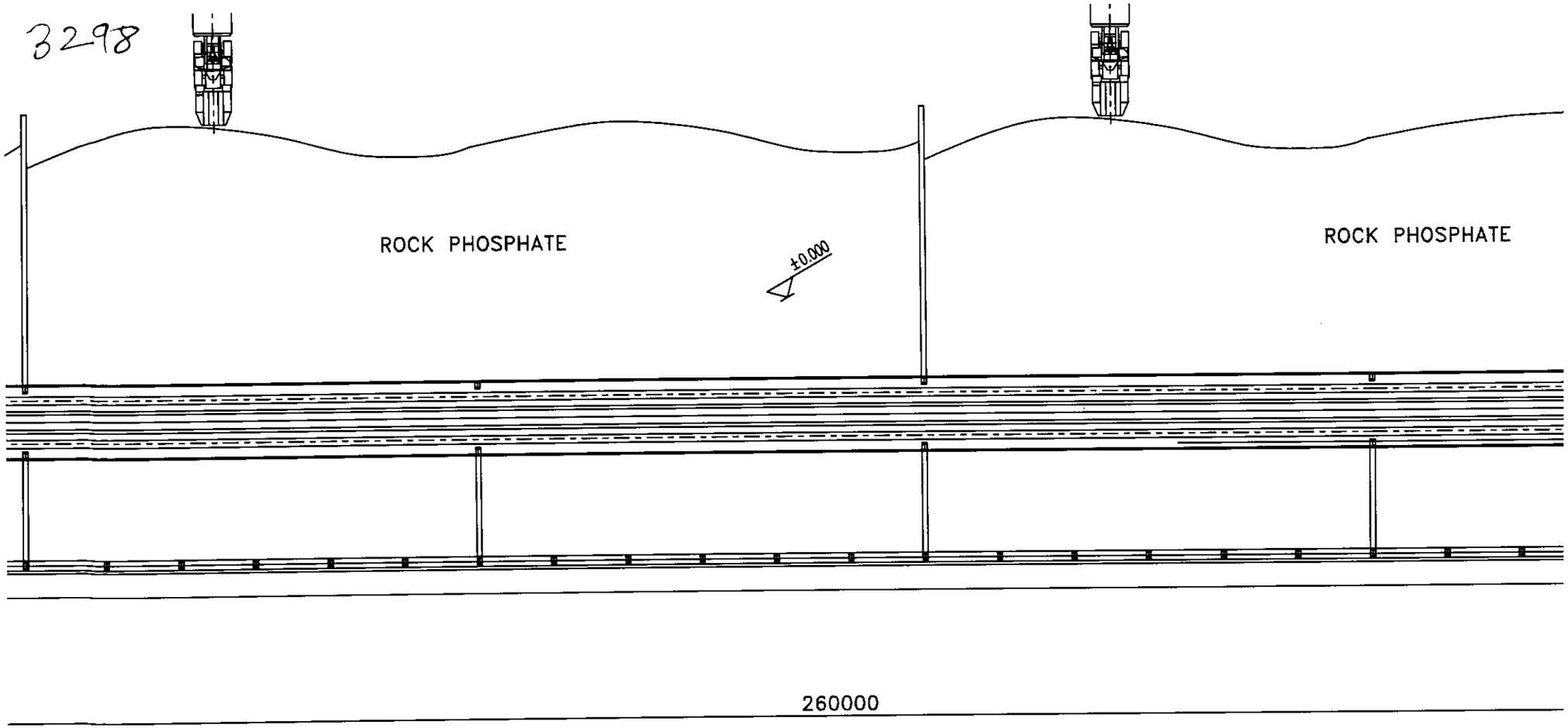


II–II

DUST SUPPRESSION SYSTEM

III–

3298



TELESCOPIC CHUTE ARRANGEMENT FOR
UNLOAD ING ROCK PHOSPHATE FROM
CONVEYOR

2998

3299

EAC OBSERVATION NO.-7

EAC OBSERVATION:

Sulphur balance of the copper smelter unit has not been submitted.

REPLY:

Sulphur is one of the major ingredient in the copper concentrate. Sulphur from the copper concentrate will be largely converted as Sulphur DI- Oxide during smelting process which will be input raw material for Sulphuric Acid plant for production of Sulphuric Acid with 98% concentration. Sulphuric Acid plant is designed to convert 99.92% of SO_2 into concentrated Sulphuric Acid.

A detail sulphur balance has been reworked out considering various input and output material characteristics. Sulphur from various sources such as Copper concentrate, Furnace Oil, Met Coke will largely (~ 97%) converted into concentrated Sulphuric Acid and rest will be available in by product (Copper slag) and waste material such as chemical gypsum and ETP sludge. Residual Off- gas from Sulphuric Acid plant and Flue Gas Desulphurization system will have SO_2 ~ 300 mg/Nm^3.

The following pollution control measures are proposed to reduce SO_2 around ~300 mg/Nm^3 from Sulphuric Acid Plant (SAP) and Flue Gas Desulphurization (FGD):

SAP	FGD
SO_2 emission of ~300 mg/Nm^3 from the residual off-gases coming out of sulphuric acid plant stack will be achieved by: a) Catalytic converter bed configuration of 3+2 with Double Conversion Double Absorption (DCDA) process, for the sulphuric acid plant; with SO_2 conversion efficiency of 99.92%. b) Use of super cesium sulphuric acid catalyst in the final bed of the catalytic converter, which has better conversion efficiency at a temperature lower than 400 ^{0}C. c) Tail gas scrubber to scrub the residual gases coming out of the final absorption tower.	SO_2 emission of ~300 mg/Nm^3 from the residual off-gases coming from Flue Gas Desulphurization system connected to treat smelter secondary off gases, following system will be achieved by: a) Scrubber with amine technology will be installed for treating secondary off gases from smelting furnace, PS converter and slag cleaning furnace. b) Lime scrubber will be installed for treating secondary off gases from electric furnace, anode Furnace and scrap melting furnace.

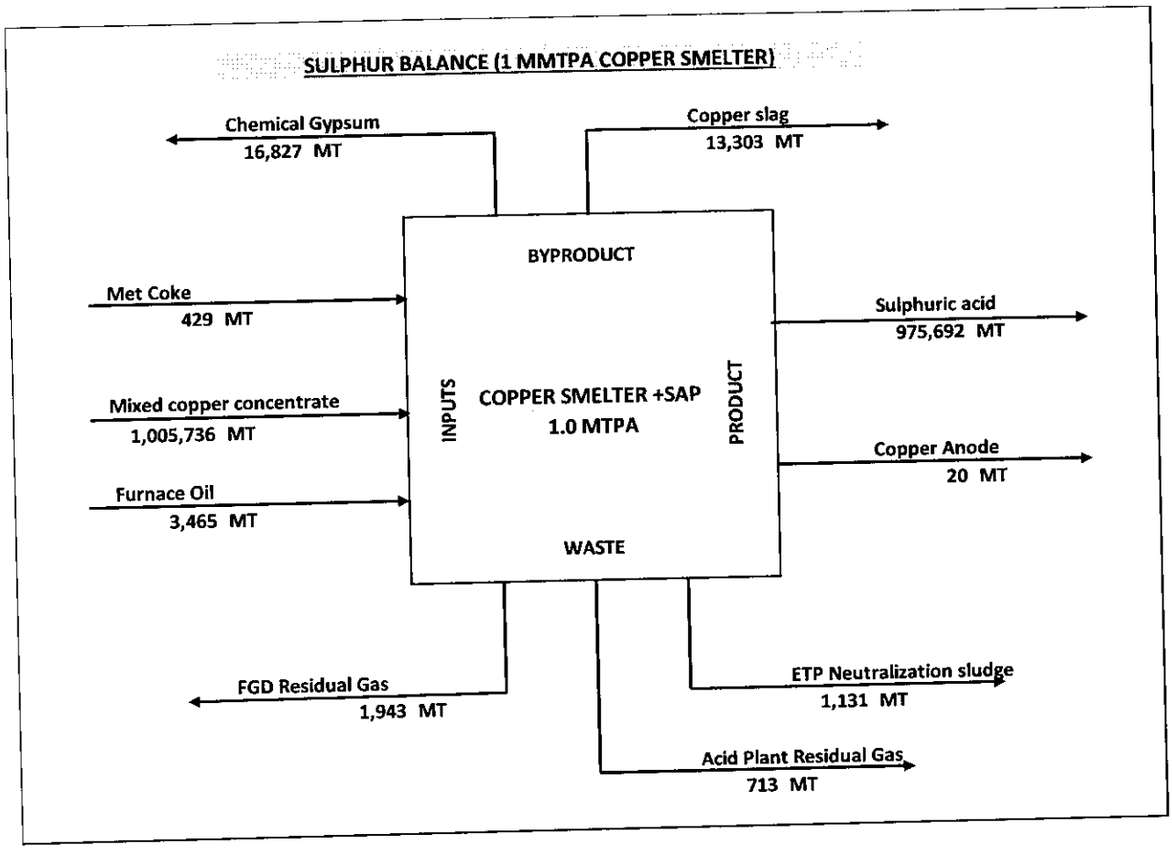
3300

EAC OBSERVATION NO.-7

3000

Sulphur Balance - for 1 MTPA copper plant						
No.	Material description	Qty. (t/a)	S content (%)	S amount (t/a)	% Distribution
A	**Input**				
1	Mixed copper concentrate	3,142,924	32.00	1,005,736	99.61%
2	Furnace Oil	99,000	3.5	3,465	0.34%
3	Met Coke	33,000	1.3	429	0.04%
	Total	**3,274,924**	**30.83**	**1,009,630**	**100.00%**
B	**Output**				
1	Sulphuric acid	2,988,058	32.65	975,692	96.64%
2	Copper Anode	1,003,009	0.002	20	0.00%
3	Copper slag	1,900,373	0.70	13,303	1.32%
4	Chemical Gypsum	156,968	10.72	16,827	1.67%
5	ETP Neutralization sludge	43,348	2.61	1,131	0.11%
6	FGD Residual Gas	~ 1,643,038 Nm3/hr	300 mg/Nm3*	1,943	0.19%
7	Acid Plant Residual Gas	~ 603,040 Nm3/hr	300 mg/Nm3*	713	0.07%
	Total			**1,009,630**	**100.00%**

* Denotes SO_2 Content



EAC OBSERVATION NO.-8

3301

EAC OBSERVATION:

Copper slag disposal site co-ordinates, concrete mode of utilization, maximum time frame envisaged for the storage at the disposal yard i.e., one month (or) 15 days has not been submitted.

REPLY:

Copper slag disposal site co-ordinates are marked in Plot Plan in **Annexure-8(a).**

Copper slag from smelting furnace and PS converter will be treated in electric furnace and slag cleaning furnace for recovery of the copper. Copper slag is known as ferro sand in Japan and Korea. In Europe it is also called as Iron Silicate.

Typical analysis is as below:

Sr. No.	Parameter	UOM	Value
1	Cu	%	< 1
2	Fe	%	40 - 50
3	SiO_2	%	26 - 35
4	CaO	%	< 4
5	Al_2O_3	%	1 - 4
6	MgO	%	0.5 - 2
7	S	%	< 0.5

In India Copper slag is used in the following application:

- Abrasive Blasting Grit
- Aggregates for Concrete Mix
- Cement Manufacturing
- Pavement: As an additive to improve sintering and abrasion resistance.
- Road Construction: As an additive in bed structure stabilisation and substitute for stone flour in asphalt.

Utilization of Copper slag is planned in line with Directive from National Highway Authority of India (NHAI) is attached for ready reference in **Annexure-8(b) and 8(c).**

Copper Slag/ Ferro Sand/ Iron Silicate is used in the following applications in European Countries, South East Asia and China:

- Abrasive Blasting Grit
- Aggregates for Concrete Mix
- Cement Manufacturing
- Pavement: As an additive to improve sintering and abrasion resistance.
- Reinforcement : Coastal, Riverside and land slide
- Road Construction: As an additive in bed structure stabilisation and substitute for stone flour in asphalt.
- Bricks: Partial substitute for natural clay – reduces shrinkage and enhances colour.
- Iron Making: Iron bearing material for sinter and pellet production.
- Backfilling: Additive for underground mine and road construction.

Total Area allocated for storage of Copper Slag is around 15 ha. Base of the storage will be prepared to take the load of copper slag to the height of minimum 15 m. This area is sufficient for 6 years, considering NO sales. Greenbelt of 15 m width will be developed all around the storage area and 100 m width along the river side.

For concrete mode of utilization of copper slag MoU's (attached as **Annexure-8(d)**) with following cements and road construction companies were signed:

1) Adani Infra (India) Limited
2) Sanghi Cement Limited
3) EKK Infrastructure Limited
4) Chevrox Construction Private Limited
5) Radheshyam Agrawal

Copper Slag Quality Requirement as per NHAI for Road Making:

Copper slag as Aggregates:

Copper slag is produced as a by-product from copper smelter, while producing copper from copper concentrate (copper pyrite) through pyrometallurgical process. In the process of smelting, the iron present in the copper concentrate combines chemically at 1200°C with silica present in flux materials such as river sand/silica sand/ quartz fines to form iron silicate, which is termed as copper slag. The copper slag thus generated is quenched with water to produce granulated copper slag. Copper slag is a blackish granular material, similar to medium to coarse sand having size ranging from 150 µm to 4.75 mm.

Bureau of Indian Standards as per IS 383:2016 is enclosed as **Annexure-8(e)**, Indian Standard for Coarse and Fine Aggregate is as follow:

SPECIFICATIONS FOR COPPER SLAG AGGREGATE

Sr. No.	Characteristic	Unit of Measurement	Content (max)
1	Calcium oxide as CaO	%	12
2	Total sulphur as S	%	2
3	Total iron as FeO	%	70
4	Chorine as NaCl	%	0.03
5	Cadmium	mg/l	150
6	Lead	mg/l	150
7	Hexavalent chromium	mg/l	250
8	Mercury	mg/l	15
9	Selenium	mg/l	150
10	Fluorine	mg/l	4000
11	Boron	mg/l	4000
12	Sieve analysis	mm	0.15 - 4.75

Environmental Safety & Quality Standards using Iron, Steel & Copper Slag Aggregates:

The technique commonly in use are Inductively Coupled Plasma (ICP) spectroscopy and Atomic Absorption Spectrophotometer (AAS) for checking hazardous substances.

3303

EAC OBSERVATION NO.-8

COPPER SLAG MAXIMUM UTILIZATION AS PER NHAI FOR ROAD MAKING

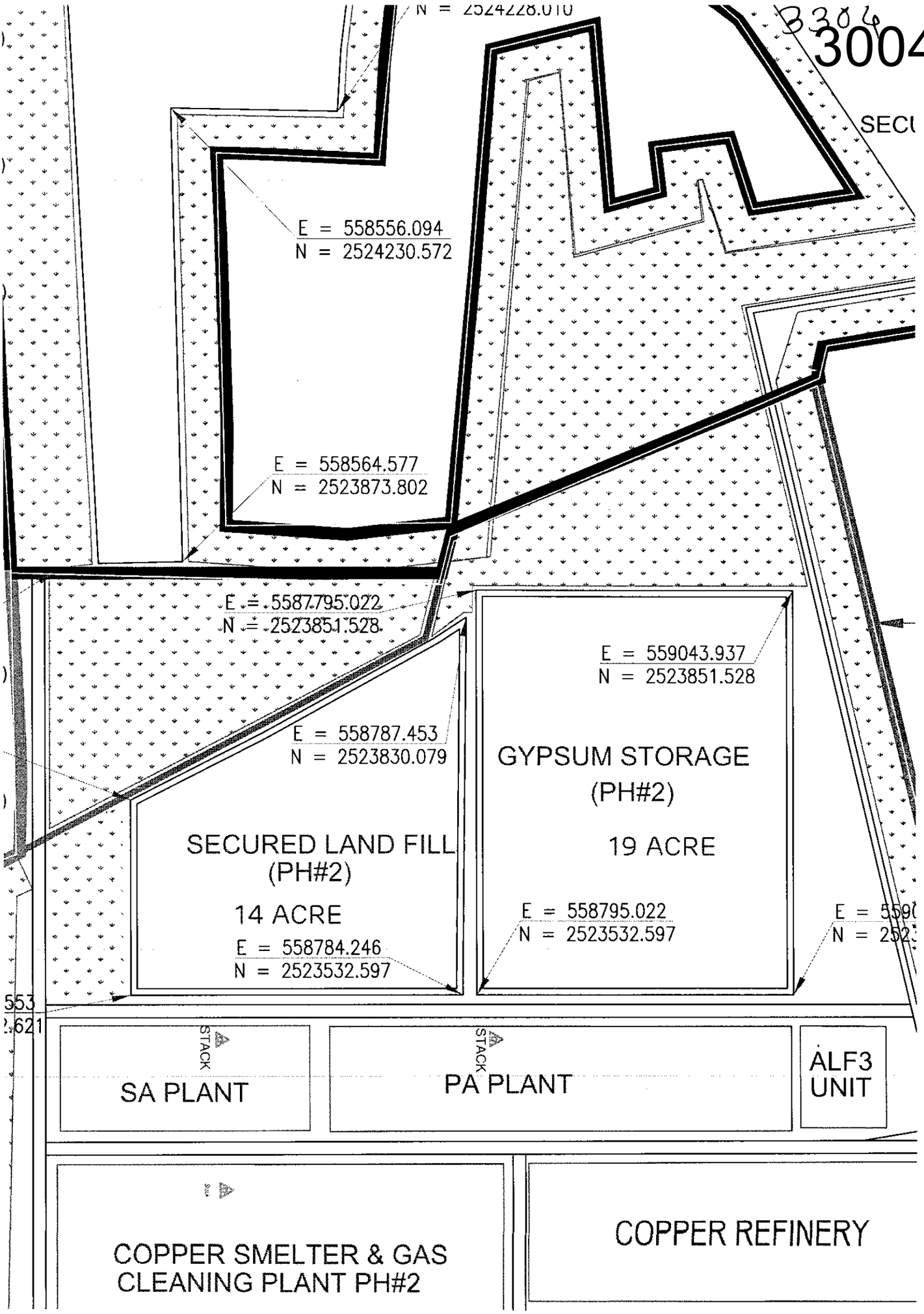
Sr. No.	Type of Aggregate	Maximum Utilization		
		Plain Concrete (%)	Reinforced Concrete (%)	Lean Concrete (<M15, %)
1	**Coarse aggregate**			
a	Iron slag aggregate	50	25	100
b	Steel slag aggregate	25	Nil	100
c	Recycled concrete aggregate (RCA)	25	20 (Only upto M25 grade)	100
d	Recycled aggregate	Nil	Nil	100
e	Bottom ash Thermal Power Plants	Nil	Nil	25
2	**Fine aggregate**			
a	Iron slag aggregate	50	25	100
b	Steel slag aggregate	25	Nil	100
c	Copper slag aggregate	40	35	50
d	Recycled concrete aggregate (RCA)	25	20 (Only upto M25 grade)	100

The increase in density of concrete due to use of copper slag and steel slag aggregates need to be taken into consideration in the design of structures. Copper slag having higher specific gravity (up to 3.8) shall be permitted for part replacement of aggregates and the average specific gravity of the fine aggregate is not more than 3.2.

Abstract from NHAI letter dated 19th July 2016 directing list of new material/ technologies with use and benefits on National Highways.

Name of the New Material / Technology	General use and Benefits	Suitability
Copper slag	**Copper slag is non-hazardous and best suited for:** 1) Land reclamation 2) Cement & concrete application **Benefits:** 1) Huge saving on natural resources 2) Non-toxic and non-leachable in nature	It can be used as sub-base layer after mixing with pond ash. It can also be used in different bituminous mixes.

Source: Directive from National Highway Authority of India for utilization of copper slag


N = 2524228.010
B306
3004
SECU
E = 558556.094
N = 2524230.572
E = 558564.577
N = 2523873.802
E = 558795.022
N = 2523851.528
E = 559043.937
N = 2523851.528
E = 558787.453
N = 2523830.079
GYPSUM STORAGE
(PH#2)
19 ACRE
SECURED LAND FILL
(PH#2)
14 ACRE
E = 558795.022
N = 2523532.597
E = 558784.246
N = 2523532.597
STACK
SA PLANT
STACK
PA PLANT
ALF3
UNIT
COPPER SMELTER & GAS
CLEANING PLANT PH#2
COPPER REFINERY

Annexure-8(b)

3305

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Road Transport and Highways)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली-110075
G-5 & 6, Sector-10, Dwarka, New Delhi-110075

दूरभाष / Phone : 91-11-25074100/25074200
फैक्स / Fax : 91-11-25093507 / 25093514

No. NHAI/TIC/R&D/2016-85846

19th July'16

To,
ALL Regional Officers
National Highways Authority of India.

Sub : Use of alternative material such as Steel Slag in road construction.

Sir,

The Hon'ble Minister of RT&H has shown his keen interest in use of alternative waste material in road construction such a Steel Slag etc.

2. In this regard, it is to inform that MoRT&H vide OM No. RW/NH-35075/1/2010-S&R (R) dated 6th August'14 **(copy enclosed)** has accredited the use of Processed steel slag Aggregate on trial basis as a replacement for natural aggregates in Bitumen roads. This will provide better bonding with bitumen, high abrasion resistance, improved skid resistance, cost effective alternative to natural aggregates and safe non-hazardous recycled material.

3. Further, Bureau of Indian Standards as per IS 383 :2016, Indian Standard for Coarse and Fine Aggregate for Concrete—Specification (Third Revision) vide para 4.2.2 (Table 4.2.1) has provision of following :

Sr. No.	Type of Aggregate	Maximum Utilization		
		Plain concrete	Reinforced concrete percent	Lean concrete (less than M15 Grade percent
(1)	(2)	(3)	(4)	(5)
i) Coarse aggregate	a) Iron slag aggregate	50	25	100
	b) Steel Slag aggregate	25	Nil	100
	c) Recycled concrete aggregate (RCA) (see note 1)	25	20 (only upto M25 grade)	100
	d) Recycled aggregate (RA)	Nil	Nil	100
	e) Bottom ash from Thermal Power Plants	Nil	nil	25
ii) Fine Aggregate	a) Iron Slag Aggregate	50	25	100
	b) Steel slag aggregate	25	Nil	100
	c) Copper slag aggregate	40	35	50
	d) Recycled concrete aggregate (RCA) (see note 1)	25	20 (only upto M25 Grade)	100

8609
19/7/16

MoRT(SN) Dt 4 2017 To all PD's for n.a.

Amitav PJ M.A. A.p.u.

3306

See A-3 for brief information on recycled aggregates (RA) and recycled concrete aggregates (RCA)

Notes :

1. It is desirable to sources the recycled concrete aggregates from site being redeveloped for use in the same site.
2. In any given structure, only one type of manufactures coarse aggregate and one type of manufactured fine aggregate shall be used.
3. The increase in density of concrete due to use of copper slag and steel slag aggregates need to be taken into consideration in the design of structures.
4. While using manufactured aggregate as part replacement for natural aggregate, it should be ensured that the final grading meets the requirements specified in table 7 table 8 and table 9.

4. The same has also been accredited by Indian Road Congress (IRC) as per IRC letter no. IRC-24 (12)/2014 (ACC-129) dated 26th June 2014.

5. In view of the above, you are suggested to use steel slag in upcoming / on-going projects as per requirement and intimate the performance on the use of steel slag to the undersigned. Further, a quarterly statement to the extent of use of steel slag be provided to this office for record & perusal.

6. This may please be noted that NHAI should not bear any contractual implications on this account. The regulation of use of above material shall be kept in line with the existing provision of contract/ concessionaire Agreements. Deviation, if any should be got approved from competent Authority accordingly.

7. This issues with the approval of Competent Authority.

Yours faithfully,

Sabharwal 19/7/16

(Ajay Kumar Sabharwal)
General Manager (TIC)

3307

Annexure - I

GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT & HIGHWAYS

Parivahan Bhavan,
1, Sansad Marg
New Delhi-110001

No. RW/NH-35075/1/2010- S&R (R) Dated: 6th August, 2014

OFFICE MEMORANDUM

Subject: Use of emerging new materials and techniques in construction of National Highways.

In continuation of SR&T (Roads) Zone's OM of even number dated 08.10.2013, the minutes of the meeting of Coordination Committee dated 22nd May, 2014 in respect of newly accredited materials/ techniques such as Instant road repair cold mix compound – INSSTAPATTCH, Anti stripping additive (Zycosoil) & water proofing compounds – Terrasil, Terraprime and IPPL SS –IX - Soil Stabilizer, containing merits and demerits were circulated to all project zones vide SR&T (Roads) Zone letter of even number dated 30th May, 2014 with the request to incorporate and utilize considering their suitability in different States on trial basis. The list of new accredited materials/ techniques, as on date, is as below:

(i) Geocells,
(ii) Warm Mix Asphalt Technology,
(iii) Water Proofing Membranes,
(iv) Non-woven, Woven Geotextiles & Techglass,
(v) Jarofix,
(vi) Thiopave – Asphalt Modifier,
(vii) Infrared Recycling Pothole Repair System,
(viii) Water proofing for Bridge decks and pavements,
(ix) Copper Slag,
(x) Processed Steel Slag Aggregates,
(xi) RoadstaB Technology,
(xii) Evercrete Deep Penetrating Sealer,
(xiii) RBI Grade-81,
(xiv) Tenax 3D Grids and
(xv) Roadcem
(xvi) Instant road repair cold mix compound - INSSTAPATTCH
(xvii) Anti stripping additive (Zycosoil) and water proofing compounds – Terrasil, Terraprime
(xviii) IPPL SS –IX - Soil Stabilizer

2. It is requested that the status of utilization of the new materials/ techniques along with performance feedback, if any, may be provided to SR&T (Roads) Zone for necessary action. The specific use and suitability of the new materials/ techniques is enclosed at Annex-I.

Gulshan 6/8/14
[Gulshan]
Assistant Executive Engineer (R) (S, R&T)
For Director General (Road Development) & SS

Enclosure: Annex-I

Contd. on P-2/-

To:

1. CE (P-1)/ CE (P-2)/ CE (P-3)/ CE (P-4)/ CE (P-5)/ CE (P-6)/ CE (P-7)/ CE (NHDP-IV)/ CE (NE)/ CE (EAP)/ CE (LWE)
2. Sr. Tech. Director (NIC) – For uploading on Ministry's website under "Roads & Highways → Circulars/ Notices on National Highways" and "What's New".

Copy for kind information to:

1. PPS to DG (Roads)
2. PPS to ADG-I/ PPS to ADG-II/ PPS to ADG-III

3309

Annex-I

List of new materials/ technologies with their use and benefits on National Highways

S. No.	Name of the New material / Technology	General use and Benefits	Suitability
1.	Geocells	StrataWeb® is a 3D cellular confinement system which confines the infill material and improves the load bearing capacity of the base.	Over weak soils – expansive soils, clays and soils with low CBR values
2.	Warm Mix Asphalt Technology	Allows mix production at about 30°C lower temperatures that conventional hot mix, thus imparting performance benefits, constructability advantages and environmental benefits as well.	For bituminous woks.
3.	Water Proofing Membrane	Super Thermolay APP PMT Membranes are ideal for a wide range of water proofing applications including roofs, reservoirs, basements, basement roof, sunken slabs, tunnels, terrace garden and car parking. Advantages: (i) Total impermeability (ii) Excellent resistance to ageing and weathering. (iii) Outstanding bond-ability and seam integrity. (iv) Stability at high temperatures	To prevent the intrusion of corrosive substance into the concrete, which will result in deterioration of the structures, leading to spalling of concrete
4 (i).	Woven geo-textiles	Filtration / Separation and Soil Stabilization	It can be used between granular sub-base / base course and the sub-grade.
4 (ii).	Non-Woven geo-textiles	Filtration / Separation, Paving fabrics / Slope protection	It can be used in side drainage for its functions.
4 (iii).	Techglass	Rehabilitation & Preservation of Pavements	Used to reduce the development of reflection cracks.
5.	Jarofix	It is at par with conventional material and also the material is on OMC.	In embankment and sub-grade construction.
6.	Shell Thiopave	In cold and seasonal climates where thermal cracking is an issue, Shell Thiopave allows the use of softer bitumen with improved low temperature properties without sacrificing high temperature properties. In hot climates, where conventional bitumen often do not deliver the high level of stiffness required, Shell Thiopave improves anti-rutting performance while still allowing the effective use of locally available bitumen.	For bituminous woks
7.	Nu-phalt Infrared Recycling Pothole Repair System	(i) It rejuvenates the existing asphalt, thereby, saving on material and making the process eco-friendly. (iii) This system allows the surface to be heated to about 150 to 160 °C without damaging, destroying or burning the existing asphalt.	Suitable for potholes, failed joints, cracked and undulated road surface.

8.	Polyguard NW-75 for Bridge Decks or pavement waterproofing	It can be applied to highways, bridge decks, parking garages etc. prior to overlay, Polyguard under seal provides an impermeable layer protecting seal rebar from moisture and corrosion.	For highways, bridge decks, parking garages
9.	Copper slag	Copper slag is non hazardous and best suited for (i) Land reclamation. (ii) Cement & concrete application. Benefits: (i) Huge saving on natural resources. (ii) Non-toxic and non leachable in nature.	It can be used as sub-base layer after mixing with pond ash. It can also be used in different bituminous mixes.
10.	Processed Steel Slag Aggregate	1. Intended use: As a replacement for natural aggregates in Bitumen roads. 2. Benefits: (i) Better bonding with Bitumen (ii) High abrasion resistance (iii) Improved skid resistance (iv) Cost effective alternative to natural aggregate (v) Safe / Non-hazardous recycled material.	In bituminous roads
11	RoadstaB Technology	RoadstaB Technology can be used in bases and sub-bases of the road crust.	For soil stabilization.
12.	Evercrete Deep penetrating Sealer	Evercrete Deep Penetrating Sealer (DPS), is water based, ready to use, concrete sealer that strengthens, preserves and enhances life of concrete structures.	It prevents concrete from chlorides ion ingress, corrosion and hence enhances the life of concrete structures.
13.	RBI Grade 81 – Soil Stabilizer	It reduces requirement construction materials like aggregates; borrow pit soil etc. thus reducing the transportation cost it also reduces Life Cycle Cost.	It can be used in various pavement layers i.e. for sub-grade, sub-base and base layers.
14.	Tenax 3D Grids	To increase the interlocking and bearing capacity of the unbound layers within Indian Highway Road Construction Layers (Sub-grade, GSB, WMM and DBM). Benefits: (1) Reduce the thickness of WMM and DBM thereby reducing the overall cost of the road pavement (2) Improve bearing capacity of soil.	It can be used in Sub-grade, GSB, WMM and DBM layers.
15.	RoadCem	It is used in combination with cement and sometimes fly-ash to form a base for a road with the soil available on site. Benefits: (1) No damage from water (2) High quality road with a low maintenance cycle (3) Faster construction (4) Stabilization of Black Cotton Soil (5) Environmental feasibility	
16.	Instant road repair cold mix compound - INSSTAPATTCH	INSSTAPATTCH can be used for Instant repairs of Potholes and Patches on city roads and Highways. Potholes repaired by INSSTAPATTCH are time saving, cost saving, does not cause any traffic hindrance and is environmental friendly.	For road repairs

3311

17.	Zycosoil Nano Technology Terrasil Terraprime	Reactive anti-strip additive in hot mix binder and Soil & aggregate waterproofing Sub-grade multilayer waterproofing to eliminate capillary rise Penetrative waterproofed prime coat	Reactive anti-strip additive for asphalt layers Waterproofing of in-situ soil Waterproofing of soil/ stone base of WMM/ WBM
18	IPPL SS – IX (SoilTech MK-III) Soil Stabilizer	The product is used for stabilizing the base and sub-base layers of roads, Mine Haul Roads, Parking lots, hard stands and Container Depots. Benefit: The product intends to substantially reduce the quantity of aggregates from quarries / borrow pits. Due to the flexible nature of the Polymers, the pavement surface allows a certain amount of flexibility on the road and does not become brittle which dramatically reduces the maintenance of the stabilized roads.	The IPPL SS – IX Polymer stabilizer is water based which can be used extensively for stabilizing the base and sub-base layers of road. The product gains excellent strength from mechanical compaction and is an excellent solution for heavily trafficked roads and hard stands.

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Drafts [27]
Inbox (3)
Junk E-mail [39]
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FW: Use of alternative material such as Steel Slag in raod construction.

Web Admin

Sent: 19 July 2016 17:45
To: ALL_RO
Cc: Sabharwall Ajay, GM(T)
Attachments: 85846 (1).PDF (330 KB) (Preview on web)

-----Original Message-----
From: Sabharwall Ajay, GM(T)
Sent: Tuesday, July 19, 2016 5:43 PM
To: Web Admin
Subject: Use of alternative material such as Steel Slag in raod construction.

Kindly forward the above mail to all RO's.

Regards,

(Ajay Kumar Sabharwall)
General Manager (Tech.)
TIC Division
Extn: 1810

Received on 8609
Not Verified 19.7.16
भा.रा.रा.प्रा. क्षेत्रीय कार्यालय, कोलकाता
NHAI, Regional Office, Kolkata

Connected to Microsoft Exchange

Annexure-8(c) 3313

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(पोत परिवहन, सड़क परिवहन और राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Shipping, Road Transport and Highways)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली-110 075
G-5 & 6, Sector-10, Dwarka, New Delhi-110075

दूरभाष / Phone : 91-11-25074100/25074200
फैक्स / Fax : 91-11-25093507 / 25093514
एक्स. / Extn.: 2223 / 2318 / 2468 / 2553

No.: 11041/218/2007-Admn. **8th January 2010**

POLICY MATTERS – TECHNICAL (41/2010)
(Decision taken on TIC Division's File No. NHAI/Tech/TIC/Genl/2009)

Sub: Encouraging the use of Slag Aggregate in Granular Sub-Base (GSB).

The Steel Plants in the country generate large amount of slag which remains unutilized. Reference have been received from various steel plants such as Bokaro Steel Plant to use slag aggregates in road projects as an environmental friendly measure. Specification for Road and Bridge works issued by Ministry of Road Transport and Highways also allow the use of crushed slag for Granular Sub-Base (GSB).

2. It has been therefore, decided to use steel furnace/blast furnace/copper slag aggregates in Granular Sub-Base provided that the same satisfies the physical requirements/gradings etc. as stipulated in the specifications. The Contractors/Concessionaires shall use slag aggregates in GSB especially in the projects lying in the regions of these types of slag production.

3. This issues with the approval of Chairman, NHAI.

K. Venkata Ramana

(K. Venkata Ramana)
General Manager (Coord.)-I

To:

1. PS to Chairman
2. PS to All Members
3. PS to All CGMs/CVO
4. All GMs/DGMs/Managers
5. All PIUs/CMUs/SPVs
6. Librarian/Hindi Officer

3314

3014

adani

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 09 day of April Month 2019 Year between **Adani Enterprises Limited**, a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART**.

AND

Adani Infra (India) Limited, a Company registered under the Company's Act 1956 and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AIIL"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART**.

Both AEL and AIIL may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as **"CP"**) and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **"Slag"**) which can be utilized in road construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

The Parties hereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of AIIL from the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL & AIIL shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

ADANI ENTERPRISES LTD. AHMEDABAD

Adani Infra (India) Ltd.

Adani Infra (India) Ltd
Adani House
Shantigram, S G Highway
Ahmedabad 382 421
Gujarat, India
CIN: U45204GJ2010PLC059226

Tel +91 79 255[illegible]
Fax +91 79 25[illegible]77
info@adani.com
www.adani.com

3315

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYAPRAKASH

ADANI ENTERPRISES LTD. AHMEDABAD

For AIIL

Signed and delivered by the

Signature: _____

Name: VISHAL KUMAR

Adani Infra (India) Ltd.

Witness:

Signature: _____

Name: RAVI KAPADIA

Witness:

Signature: _____

Name: Ambaram parbadar.

EKK INFRASTRUCTURE LIMITED

CIN : U45201TN2015PTC100062
Corporate Office: II[nd] Floor - Municipal Building,
A.M. Road, Perumbavoor-683 542, Ernakulam Dist.,
Kerala, Tele Fax : 0484 : 2523603, 8111888811
Email: info@ekk.co.in, www.ekk.co.in

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 04 day of April Month 2019 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

EKK INFRASTRUCTURE LTD, a Company registered under the Company's Act 1956 and having its registered office at Second Floor, Municipal Building, A.M Road, Perumbavoor, Ernakulam, Kerala (hereinafter referred to as **"EKK INFRASTRUCTURE LTD"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and EKK INFRASTRUCTURE LTD may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as **("CP")** and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **("Slag")** which can be utilized in road construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

.The Parties hereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of M/s EKK Infrastructure Ltd from the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL &M/s EKK Infrastructure Ltd shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

ADANI ENTERPRISES LTD. AHMEDABAD

EKK INFRASTRUCTURE LIMITED PERUMBAVOOR 683 542 VI/556

3317

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: P.A.Surya Rao

Name: PRASAD SURYARAO

Witness:

Signature: Rajesh

Name: RAVI KAPADIA

ADANI ENTERPRISES LTD. AHMEDABAD

For M/s EKK INFRASTRUCTURE LTD

Signed and delivered by the

Signature: Jain

Name: SANJU MUHAMMED

EKK INFRASTRUCTURE LIMITED PERUMBAVOOR 683 542

Witness:

Signature:

Name: SUNISH SUDHAKARAN

MEMORANDUM OF UNDERSTANDING (MOU) FOR SUPPLY OF COPPER SLAG

This MOU is entered on this 24th Day of January 2019 between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

Sanghi Cement Ltd, a Company registered under the Company's Act 2013 and having its office at 10th Floor, Kataria Arcade, Off S.G. Highway, Makarba, Ahmedabad-380051, India (hereinafter referred to as **"SANGHI"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and SANGHI may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Refinery Complex at Mundra, Gujarat (hereinafter referred to as **"Project)** and shall be generating in process, 2.0 Million Ton per annum quantity of copper slag (hereinafter referred to as **"Slag"**) which can be utilized in cement for manufacturing and Ready mix concrete (RMC), Paver Blocks Manufacturing, Replacement of Sand for metal surface blasting purpose, Road Construction, etc.

AEL & SANGHI after discussion hereto have decided to enter into an MOU for utilizing this Slag in the SANGHI's cement plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available to SANGHI, the Slag that will be generated from its Project from the commercial date of operation. The quantity, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation.

2.0 AEL & SANGHI shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

SANGHI IND. LTD. AHMEDABAD

ADANI ENTERPRISES LTD. AHMEDABAD

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TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature:

Name: PRASAD SURYA

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature:

Name:

For SANGHI

Signed and delivered by the

Signature:

Name: R. K. Chaturvedi

SANGHI IND. LTD. AHMEDABAD

Witness:

Signature:

Name: Amit Kumar Ghosh

M/s Radheshyam Agrawal
A - Class Govt. Civil Contractor
Shri Shyam Tower,Kavita Nagar,Main Road
Avanti Vihar, Raipur (C.G.) 492001
Phone : 0771-4048777, Mob.: 94252-50314
BRANCH : Near Girls College, Seva Kunj Road ,
RAIGARH 496001 (C.G.) Ph.: 07762-225919
GST No. 22AACFR8916J1Z3

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 09th day of April Month 2019 Year between **AdaniEnterprises Limited,** a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

M/s Radheshyam Agrawal a Company registered under the Company's Act 1956 and having its registered office at Raigarh (hereinafter referred to as **"RSA"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

BothAEL and RSA may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as "CP") and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **"Slag"**) which can be utilizedinroad construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

The Partieshereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of RSAfrom the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL &RSA shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

ADANI ENTERPRISES LTD. AHMEDABAD

M/s. RADHESHYAM AGRAWAL Raipur (C.G.)

3321

M/s Radheshyam Agrawal

A - Class Govt. Civil Contractor
Shri Shyam Tower,Kavita Nagar,Main Road
Avanti Vihar, Raipur (C.G.) 492001
Phone : 0771-4048777, Mob.: 94252-50314

BRANCH : *Near Girls College, Seva Kunj Road ,*
RAIGARH 496001 (C.G.) Ph.: 07762-225919

GST No. 22AACFR8916J1Z3

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYARAO

Witness:

Signature: _____

Name: RAVI TAPARIA

ADANI ENTERPRISES LTD. AHMEDABAD

For RSA

Signed and delivered by the

Signature: _____

Name: SANJAY KUMAR AGRAH

Witness:

Signature: _____

Name: Rahul Agrawal

M/s. RADHESHYAM AGRAWAL Raipur (C.G.)

MEMORANDUM OF UNDERSTANDING (MOU) FOR UTILISATION OF COPPER SLAG

THIS MOU is entered on this 09th day of April Month 2019 Year between **Adani Enterprises Limited,** a company registered under the Companies Act, 1956, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

M/s Chevrox Constructions Private Limited a Company registered under the Company's Act 1956 and having its registered office at Ahmedabad (hereinafter referred to as **"CCPL"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and CCPL may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Smelter Complex at Mundra, Gujarat (hereinafter referred to as **"CP"**) and shall be generating in process, 2 Million Ton per annum quantity of copper Slag (hereinafter referred to as **"Slag"**) which can be utilized in road construction activity and ready mix concrete (RMC), paver blocks manufacturing etc.

The Parties hereto have decided to enter into an MOU on the following terms and conditions:

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available Slag that will be generated from its copper smelter as per the requirement of CCPL from the commercial date of operation. The quantities, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation

2.0 AEL & CCPL shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

ADANI ENTERPRISES LTD. AHMEDABAD

3323

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYARAO

Witness:

Signature: _____

Name: RAVI PAPARIA

ADANI ENTERPRISES LTD. AHMEDABAD

for CCPL

Signed and delivered by the

Signature: _____

Name: Kishan Prakash

Witness:

Signature: _____

Name: Bharat Gandhi

CHEVROL CONSTRUCTIONS PVT. LTD. AHMEDABAD

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Annexure-8(e)

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IS 383 : 2016

भारतीय मानक
Indian Standard

कंक्रीट के लिए मोटे व महीन मिलावा — विशिष्टि

(तीसरा पुनरीक्षण)

Coarse and Fine Aggregate for Concrete — Specification

(Third Revision)

ICS 91.100.30

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Cement and Concrete Sectional Committee, CED 02

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

Aggregates are important components for making concrete and properties of concrete are substantially affected by various characteristics of the aggregates used. Aggregates from natural sources form the major variety used for making concrete, mortar and other applications. This Indian Standard has been formulated to cover requirements for aggregates derived from natural sources and other than natural sources, for use in production of concrete.

Whilst the requirements specified in this standard generally meet the normal requirements for most of the concrete works, there might be special cases where certain requirements other than those specified in the standard might have to be specified; in such case, such special requirements, the tests required and the limits for such tests may be specified by the purchaser.

This standard was first published in 1952 and subsequently revised in 1963 and 1970. This revision has been taken up to incorporate the modifications found necessary in the light of experience gained in its use and also to bring it in line with the latest development on the subject. Significant modifications in this revision include,

a) scope of the standard has been widened to cover aggregates from other than natural sources;
b) definitions of various terms have been rationalized;
c) limits for mica as deleterious material for muscovite and muscovite plus biotite varieties have been included;
d) the requirements for crushing value, impact value and abrasion value have been classified under a common head of mechanical properties;
e) requirement for flakiness and elongation has been specified for which a combined index has been introduced along with the procedure for determination of the same;
f) provisions on alkali aggregate reactivity have been included to bring coherence of the same with IS 456 : 2000 'Code of practice for plain and reinforced concrete (*fourth revision*)' and requirements for compliance for the same have been included; and
g) mixed sand has been included along with crushed sand.

Of late, scarcity in availability of aggregates from natural sources is being faced in some parts of the country. This may require supplementing the use of aggregates from natural sources with the use of aggregates from other sources. This revision therefore also covers provisions regarding quality requirements and those relating to the extent of utilization of iron slag, steel slag, copper slag, bottom ash from thermal power plants recycled concrete aggregates (RCA) and recycled aggregate (RA), along with necessary provisions relating to their utilization. RCA and RA may in turn be sourced from construction and demolition wastes. A brief note on manufacture of various types of such manufactured aggregates is given at Annex A. A crusher dust (or quarry dust) produced from the fine screening of quarry crushing cannot be called crushed sand as per **3.1.2**. It may not be generally in conformity to the requirement of crushed sand as per the standard and is not expected to perform as efficiently as properly crushed sand, unless it is processed to meet the requirement of this standard.

This standard contains clauses such as **8.1, 8.2, 8.3, 8.4, 9.1** and **9.2** which call for agreement between the purchaser and the supplier and require the supplier to furnish technical information as given in Annex B.

The composition of the Committee responsible for the formulation of this standard is given in Annex F.

For the purpose of deciding whether a particular requirement of this standard is compiled with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that specified value in this standard.

Indian Standard

COARSE AND FINE AGGREGATE FOR CONCRETE — SPECIFICATION

(Third Revision)

1 SCOPE

This standard covers the requirements for aggregates, crushed or uncrushed, derived from natural sources, such as river terraces and riverbeds, glacial deposits, rocks, boulders and gravels, and manufactured aggregates produced from other than natural sources, for use in the production of concrete for normal structural purposes including mass concrete works.

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
2386	Methods of test for aggregates for concrete:
(Part 1) : 1963	Particle size and shape
(Part 2) : 1963	Estimation of deleterious materials and organic impurities
(Part 3) : 1963	Specific gravity, density, voids, absorption and bulking
(Part 4) : 1963	Mechanical properties
(Part 5) : 1963	Soundness
(Part 6) : 1963	Measuring mortar making properties of fine aggregate
(Part 7) : 1963	Alkali aggregate reactivity
(Part 8) : 1963	Petrographic examination
2430 : 1986	Methods for sampling of aggregates for concrete (*first revision*)
4032 : 1985	Method of chemical analysis of hydraulic cement (*first revision*)
4905 : 1968	Methods for random sampling
6461 (Part 1) : 1972	Glossary of terms relating to cement concrete: Part 1 Concrete aggregates
9198 : 1979	Specification for compaction rammer for soil testing
9669 : 1980	Specification for CBR moulds and its accessories
14959 (Part 2) : 2001	Method of Test determination of water soluble and acid soluble chlorides in mortar and concrete: Part 2 Hardened mortar and concrete

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 6461 (Part 1) and the following shall apply.

3.1 Fine Aggregate — Aggregate most of which passes 4.75 mm IS Sieve and contains only so much coarser material as permitted in **6.3**.

3.1.1 *Natural Sand* — Fine aggregate resulting from the natural disintegration of rock and which has been deposited by streams or glacial agencies. This may also be called as uncrushed sand.

3.1.2 *Crushed Sand*

3.1.2.1 *Crushed stone sand* — Fine aggregate produced by crushing hard stone.

3.1.2.2 *Crushed gravel sand* — Fine aggregate produced by crushing natural gravel.

3.1.3 *Mixed Sand* — Fine aggregate produced by blending natural sand and crushed stone sand or crushed gravel sand in suitable proportions.

3.1.4 *Manufactured Fine Aggregate (Manufactured Sand)* — Fine aggregate manufactured from other than natural sources, by processing materials, using thermal or other processes such as separation, washing, crushing and scrubbing.

NOTE — Manufactured fine aggregate may be Recycled Concrete Aggregate (RCA) (*see* Annex A).

3.2 Coarse Aggregate — Aggregate most of which is retained on 4.75 mm IS Sieve and containing only so much finer material as is permitted for the various types described in this standard.

NOTE — Coarse aggregate may be,

a) uncrushed gravel or stone which results from natural disintegration of rock;

b) crushed gravel or stone when it results from crushing of gravel or hard stone; and

c) partially crushed gravel or stone when it is a product of the blending of (a) and (b);

d) manufactured from other than natural sources, by processing materials, using thermal or other processes such as separation, washing, crushing and scrubbing. Manufactured coarse aggregate may be Recycled Concrete Aggregate (RCA) or Recycled Aggregate (RA) (*see* Annex A).

3.3 All-in-Aggregate — Material composed of fine aggregate and coarse aggregate.

4 CLASSIFICATION

The aggregate shall be classified as given in **4.1** and **4.2**. In case of mixed sand (*see* **3.1.3**), the manufacturer/ supplier should supply the individual sands to be mixed at site, at the time of batching.

4.1 Aggregates from Natural Sources

These shall be coarse and fine aggregates as defined in **3.1.1, 3.1.2, 3.1.3** and **3.2** [*see also* Note under **3.2**(a), (b) and (c)]

4.2 Manufactured Aggregates and Extent of Utilization

4.2.1 These shall be coarse and fine aggregates as defined in **3.1.4** and **3.2** [*see also* Note under **3.2**(d)].

The manufactured aggregates shall be permitted with their extent of utilization as percent of total mass of fine or coarse aggregate as the case may be, as indicated in Table 1 against each, for use in plain and reinforced concrete and lean concrete.

4.2.2 Manufactured aggregates shall not be permitted for use in prestressed concrete.

5 QUALITY OF AGGREGATE

5.1 General

Aggregate shall be naturally occurring (crushed or uncrushed) stones, gravel and sand or combination thereof or produced from other than natural sources. They shall be hard, strong, dense, durable, clear and free from veins; and free from injurious amounts of disintegrated pieces, alkali, free lime, vegetable matter and other deleterious substances as well as adherent coating. As far as possible, scoriaceous, flaky and elongated pieces should be avoided.

5.2 Deleterious Materials

Aggregate shall not contain any harmful material, such as pyrites, coal, lignite, mica, shale or similar laminated material, clay, alkali, free lime, soft fragments, sea shells and organic impurities in such quantity as to affect the strength or durability of concrete. Aggregate to be used for reinforced concrete shall not contain any material liable to attack the steel reinforcement.

5.2.1 *Limits of Deleterious Materials*

The maximum quantity of deleterious materials shall not exceed the limits specified in Table 2. However, the engineer-in-charge at his discretion, may relax some of the limits as a result of some further tests and evidence of satisfactory performance of the aggregates.

Table 1 Extent of Utilization
(*Clause* 4.2.1)

Sl No.	Type of Aggregate	Maximum Utilization		
		Plain Concrete Percent	Reinforced Concrete Percent	Lean Concrete (Less than M15 Grade) Percent
(1)	(2)	(3)	(4)	(5)
i) Coarse aggregate:				
a)	Iron slag aggregate	50	25	100
b)	Steel slag aggregate	25	Nil	100
c)	Recycled concrete aggregate[1)] (RCA) (*See* Note 1)	25	20 (Only upto M25 Grade)	100
d)	Recycled aggregate[1)] (RA)	Nil	Nil	100
e)	Bottom ash from Thermal Power Plants	Nil	Nil	25
ii) Fine aggregate:				
a)	Iron slag aggregate	50	25	100
b)	Steel slag aggregate	25	Nil	100
c)	Copper slag aggregate	40	35	50
d)	Recycled concrete aggregate[1)] (RCA) (*See* Note 1)	25	20 (Only upto M25 Grade)	100

[1)] *See* **A-3** for brief information on recycled aggregates (RA) and recycled concrete aggregates (RCA).

NOTES

1 It is desirable to source the recycled concrete aggregates from sites being redeveloped for use in the same site.

2 In any given structure, only one type of manufactured coarse aggregate and one type of manufactured fine aggregate shall be used.

3 The increase in density of concrete due to use of copper slag and steel slag aggregates need to be taken into consideration in the design of structures.

4 While using manufactured aggregate as part replacement for natural aggregate, it should be ensured that the final grading meets the requirements specified in Table 7, Table 8 and Table 9.

Table 2 Limits of Deleterious Materials

(*Clause* 5.2.1)

Sl No.	Deleterious Substance	Method of Test, Ref to	Fine Aggregate Percentage by Mass, *Max*			Coarse Aggregate Percentage by Mass, *Max*		
			Uncrushed	Crushed/ Mixed	Manufactured	Uncrushed	Crushed	Manufactured
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Coal and lignite	IS 2386 (Part 2)	1.00	1.00	1.00	1.00	1.00	1.00
ii)	Clay lumps	IS 2386 (Part 2)	1.00	1.00	1.00	1.00	1.00	1.00
iii)	Materials finer than 75 µm IS Sieve	IS 2386 (Part 1)	3.00	15.00 (for crushed sand) 12.00 (for mixed sand) *see* Note 1)	10.00	1.00	1.00	1.00
iv)	Soft fragments	IS 2386 (Part 2)	—	—	—	3.00	—	3.00
v)	Shale	(*see* Note 2)	1.00	—	1.00	—	—	—
vi)	Total of percentages of all deleterious materials (except mica) including Sl No. (i) to (v) for col 4, 7 and 8 and Sl No. (i) and (ii) for col 5, 6 and 9	—	5.00	2.00	2.00	5.00	2.00	2.00

NOTES

1 The sands used for blending in mixed sand shall individually also satisfy the requirements of Table 2. The uncrushed sand used for blending shall not have material finer than 75 µm more than 3.00 percent.

2 When the clay stones are harder, platy and fissile, they are known as shales. The presence and extent of shales shall be determined by petrograpy at the time of selection and change of source.

3 The presence of mica in the fine aggregate has been found to affect adversely the workability, strength, abrasion resistance and durability of concrete. Where no tests for strength and durability are conducted, the mica in the fine aggregate may be limited to 1.00 percent by mass. Where tests are conducted to ensure adequate workability, satisfactory strength, permeability and abrasion (for wearing surfaces), the mica up to 3.00 percent by mass for muscovite type shall be permitted. In case of presence of both muscovite and biotite mica, the permissible limit shall be 5.00 percent, maximum by mass. This is subject to total deleterious materials (including mica) being limited to 8.00 percent by mass for col 4 and 5.00 percent for col 5.

Till a method is included in IS 2386 (Part 2), for determination of mica content, suitable methodology may be used for the same. Normally, petrographic density separation and wind blowing methods can be used.

4 The aggregate shall not contain harmful organic impurities [tested in accordance with IS 2386 (Part 2)] in sufficient quantities to affect adversely the strength or durability of concrete. A fine aggregate which fails in the testing of organic impurities may be used, provided that, when tested for the effect of organic impurities on the strength of mortar, the relative strength at 7 and 28 days, reported in accordance with IS 2386 (Part 6) is not less than 95 percent.

5.3 Combined Flakiness and Elongation Index

Flakiness and elongation shall be determined in accordance with IS 2386 (Part 1) on the same sample. After carrying out the flakiness index test, the flaky material shall be removed from the sample and the remaining portion shall be used for carrying out elongation index. Indices so worked out shall be added numerically to give combined flakiness and elongation index. The combined flakiness and elongation index so obtained shall not exceed 40 percent for uncrushed or crushed aggregate. However, the engineer-in-charge at his discretion may relax the limit keeping in view the requirement, and availability of aggregates and performance based on tests on concrete.

5.4 Mechanical Properties

5.4.1 *Aggregate Crushing Value/Ten Percent Fines Value*

The aggregate crushing value/ten percent fines value, when determined in accordance with IS 2386 (Part 4) shall be as follows:

a) For aggregates to be used in concrete for wearing surfaces, (such as runways, roads, pavements, tunnel lining carrying water, spillways and stilling basins) : 30 percent, *Max*

b) For aggregates to be used in concrete other than for wearing surfaces	:	In case the aggregate crushing value exceeds 30 percent, then the test for 'ten percent fines' should be conducted and the minimum load for the ten percent fines should be 50 kN

5.4.2 *Aggregates Impact Value*

As an alternative to **5.4.1**, the aggregate impact value may be determined in accordance with the method specified in IS 2386 (Part 4). The aggregate impact value shall not exceed the following values:

a) For aggregates to be used in concrete for wearing surfaces, (such as runways, roads, pavements, tunnel lining carrying water, spillways and stilling basins)	:	30 percent
b) For aggregates to be used in concrete other than for wearing surfaces	:	45 percent

NOTE — For concrete of grades M 65 and above, stronger aggregates are required and hence the maximum aggregate crushing value and aggregate impact value shall not exceed 22 percent.

5.4.3 *Aggregate Abrasion Value*

The aggregate abrasion value, when determined in accordance with IS 2386 (Part 4) using Los Angeles machine, shall not exceed the following values:

a) For aggregates to be used in concrete for wearing surfaces, (such as runways, roads, pavements, spillways, tunnel lining carrying water and stilling basins)	:	30 percent
b) For aggregates to be used in concrete other than for wearing surfaces	:	50 percent

5.5 Soundness of Aggregate

5.5.1 For concrete liable to be exposed to the action of frost, the coarse and fine aggregates shall pass a sodium or magnesium sulphate accelerated soundness test specified in IS 2386 (Part 5), the limits being set by agreement between the purchaser and the supplier.

NOTE — As a general guide, it may be taken that the average loss of mass after 5 cycles shall not exceed the following:

a) For fine aggregate	:	10 percent when tested with sodium sulphate (Na_2SO_4), and 15 percent when testing with magnesium sulphate ($MgSO_4$)
b) For coarse aggregate	:	12 percent when tested with sodium sulphate (Na_2SO_4), and 18 percent when tested with magnesium sulphate ($MgSO_4$)

5.5.2 For slag aggregates, following additional tests shall be carried out:

a) *Iron unsoundness* — When chemical analysis of aggregates shows that the ferrous oxide content is equal to or more than 3.0 percent, and sulphur content is equal to or more than 1.0 percent, the aggregate shall be tested for iron unsoundness. The iron unsoundness of the slag aggregate when tested as per the procedure given in Annex D, shall not exceed 1 percent.

b) *Volumetric expansion ratio* — It shall not be more than 2.0 percent. The procedure shall be as given in Annex E.

c) *Unsoundness due to free lime* — Prior to use of iron slag (for production of aggregates) from a new source or when significant changes in furnace chemistry occur in an existing source which may result in the presence of free lime, the potential for pop-out formation shall be assessed by determining the free-lime content of the slag by petrographic examination or quantitative x-ray diffractometry on a representative sample.

If the number of particles containing free lime exceeds 1 in 20, then weathering of the slag stockpile (in moist condition or at/near saturated surface dry condition) represented by the test sample shall be continued until further testing shows that the level has fallen below 1 in 20.

5.6 Alkali Aggregate Reaction

Some aggregates containing particular varieties of silica may be susceptible to attack by alkalies (Na_2O and K_2O) originating from cement and other sources, producing an expansive reaction which can cause cracking and disruption of concrete. Damage to concrete from this reaction will normally only occur when all the following are present together:

a) A high moisture level within the concrete.

b) A cement with high alkali content, or another source of alkali.

c) Aggregate containing an alkali reactive constituent.

NOTE — The aggregates containing more than 20 percent strained quartz and undulatory extinction angle greater than 15°, causing deleterious reaction and also possibly showing presence of microcrystalline quartz is known as slowly reactive aggregates.

The aggregate shall comply with the requirements as follows, when tested in accordance with IS 2386 (Part 7):

1) *Chemical method*— The aggregate when tested in accordance with the chemical method, shall conform to the requirement as specified in IS 2386 (Part 7). If test results indicate deleterious or potentially deleterious character, the aggregate should be tested using mortar bar method as specified in IS 2386 (Part 7) to verify the potential for expansion in concrete. This chemical method (for determination of potential reactivity) however, is not found to be suitable for slowly reactive aggregates or for aggregate containing carbonates (limestone aggregates) or magnesium silicates, such as antigorite (serpentine). Therefore, petrographic analysis of aggregates shall be carried out to find out the strained quartz percentage, undulatory extinction angle and its mineral composition before conducting the test.

2) *Mortar bar method*

   i) *Using 38°C temperature regime* — The permissible limits for mortar bar expansion at 38°C shall be 0.05 percent at 90 days and 0.10 percent at 180 days. For slowly reactive aggregates (as explained in NOTE above) mortar bar method using temperature regime of 38°C shall not be used for determination of potential reactivity. Such slowly reactive aggregates shall be tested using 60°C temperature regime. Therefore, petrographic analysis of aggregates shall be carried out to find out the strained quartz percentage, undulatory extinction angle and its mineral composition before conducting the test.

   ii) *Using 60°C temperature regime* — The permissible limit mortar bar expansion at 60°C shall be 0.05 percent at 90 days and 0.06 percent at 180 days for slowly reactive aggregates.

3) *Accelerated mortar bar method* — The accelerated mortar bar test shall be carried out at 80°C using 1N NaOH. The test is found to be specially suitable for slowly reactive aggregate. The criteria for this test is as under:

   i) Expansions of less than 0.10 percent at 16 days after casting are indicative of innocuous behavior in most cases (*see* Note).

      NOTE — Some granitic gneisses and metabasalts have been found to be deleteriously expansive in field performance even though their expansion in this test was less than 0.10 percent at 16 days after casting. With such aggregate, it is recommended that prior field performance be investigated. In the absence of field performance data, mitigative measures should be taken.

   ii) Expansions of more than 0.20 percent at 16 days after casting are indicative of potentially deleterious expansion [*see* **4.2.2** of IS 2386 (Part 7)].

   iii) Expansions between 0.10 and 0.20 percent at 16 days after casting include both aggregate that are known to be innocuous and deleterious in field performance. For these aggregate, it is particularly important to develop supplemental information as described in **4.2.2** of IS 2386 (Part 7). In such a situation, it may also be useful to take comparator reading until 28 days. It may be useful to support this test with test by mortar bar method at 38°C and 60°C, as applicable.

In few locations in the country, dolomitic and limestone aggregates are encountered. In such cases, concrete prism test shall be preferred over mortar bar test. The test should cover the determination by measurement of length change of concrete prisms, the susceptibility of cement-aggregate combinations to expansive alkali-carbonate reaction involving hydroxide ions associated with alkalis (sodium and potassium) and certain calcitic dolomites and dolomitic limestones. Till this test is included in IS 2386 (Part 7), specialist literature may be referred for the test and applicable requirement.

5.7 Manufactured aggregates shall meet the additional requirements as given in Table 3, Table 4, Table 5 and Table 6.

Table 3 Additional Requirements for all Manufactured Aggregates
(*Clause* 5.7)

Sl No. (1)	Characteristic (2)	Requirement (3)
i)	Total alkali content as Na_2O equivalent, percent, *Max*	0.3
ii)	Total sulphate content as SO_3, percent, *Max*	0.5
iii)	Acid soluble chloride content, percent, *Max*	0.04
iv)	Water absorption, percent, *Max*	5 (*see* Note 1)
v)	Specific gravity	2.1 to 3.2 (*see* Notes 2 and 3)

NOTES

1 For recycled concrete aggregate and recycled aggregate, higher water absorption up to 10 percent may be permitted subject to pre-wetting (saturation) of aggregates before batching and mixing.

2 The limits are intended for use of aggregate in normal weight concrete.

3 Copper slag having higher specific gravity (up to 3.8) shall be permitted for part replacement of aggregates in accordance with **4.2.1**, such that the average specific gravity of the fine aggregate is not more than 3.2.

Table 4 Additional Requirements for Iron and Steel Slag Aggregates
(*Clause* 5.7)

Sl No. (1)	Characteristic (2)	Requirement (3)
i)	Calcium oxide as CaO, percent, *Max*	45.0
ii)	Total sulphur as S, percent, *Max*	2.0
iii)	Total iron as FeO, percent, *Max*	3.0

NOTE — Stockpiling of slag aggregate: Crushed slag aggregate should be stockpiled in moist condition at or near the saturated surface dry (SSD) condition before use, with the moisture condition being maintained by sprinkling with water.

Table 5 Additional Requirements for Electric Furnace Oxidation Slag Coarse Aggregate
(*Clause* 5.7)

Sl No. (1)	Characteristic (2)	Requirement (3)
i)	Calcium oxide as CaO, percent, *Max*	40
ii)	Magnesium oxide as MgO, percent, *Max*	10
iii)	Total iron as FeO, percent, *Max*	50
iv)	Basicity as CaO/SiO_2, percent, *Max*	2

Table 6 Additional Requirements for Copper Slag Aggregate
(*Clause* 5.7)

Sl No. (1)	Characteristic (2)	Requirement (3)
i)	Calcium oxide as CaO , percent, *Max*	12.0
ii)	Total sulphur as S, percent, *Max*	2.0
iii)	Total iron as FeO, percent, *Max*	70
iv)	Chlorine as NaCl, percent, *Max*	0.03

6 SIZE AND GRADING OF AGGREGATES

6.1 Single-Sized Coarse Aggregates

Coarse aggregates shall be supplied in the nominal sizes given in Table 7. For any one of the nominal sizes, the proportion of other sizes, as determined by the method described in IS 2386 (Part 1) shall also be in accordance with Table 7.

6.1.1 *Coarse Aggregate for Mass Concrete*

Coarse aggregate for mass concrete works shall be in the sizes specified in Table 8.

6.2 Graded Coarse Aggregates

Graded coarse aggregates may be supplied in the nominal sizes given in Table 7.

6.3 Fine Aggregate

The grading of fine aggregate, when determined as described in IS 2386 (Part 1) shall be within the limits given in Table 9 and shall be described as fine aggregate, Grading Zones I, II, III and IV. Where the grading falls outside the limits of any particular grading zone of sieves other than 600 µm IS Sieve by an amount not exceeding 5 percent for a particular sieve size, (subject to a cumulative amount of 10 percent), it shall be regarded as falling within that grading zone. This tolerance shall not be applied to percentage passing the 600 µm IS Sieve or to percentage passing any other sieve size on the coarse limit of Grading Zone I or the finer limit of Grading Zone IV.

6.4 All-in-Aggregate

If combined aggregates are available they need not be separated into fine and coarse. The grading of the all-in-aggregate, when analyzed, as described in IS 2386 (Part 1) shall be in accordance with Table 10. Necessary adjustments may be made in the grading by the addition of single-sized aggregates

7 SAMPLING AND TESTING

7.1 Sampling

The method of sampling shall be in accordance with

Table 7 Coarse Aggregates
(*Clauses* 6.1 *and* 6.2)

Sl No.	IS Sieve Designation	Percentage Passing for Single-Sized Aggregate of Nominal Size						Percentage Passing for Graded Aggregate of Nominal Size			
		63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm	40 mm	20 mm	16 mm	12.5 mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	80 mm	100	-	-	-	-	-	100	-	-	-
ii)	63 mm	85 to 100	100	-	-	-	-	-	-	-	-
iii)	40 mm	0 to 30	85 to 100	100	-	-	-	90 to 100	100	-	-
iv)	20 mm	0 to 5	0 to 20	85 to 100	100	-	-	30 to 70	90 to 100	100	100
v)	16 mm	-	-	-	85 to 100	100	-	-	-	90 to 100	-
vi)	12.5 mm	-	-	-	-	85 to 100	100	-	-	-	90 to 100
vii)	10 mm	0 to 5	0 to 5	0 to 20	0 to 30	0 to 45	85 to 100	10 to 35	25 to 55	30 to 70	40 to 85
viii)	4.75 mm	-	-	0 to 5	0 to 5	0 to 10	0 to 20	0 to 5	0 to 10	0 to 10	0 to 10
ix)	2.36 mm	-	-	-	-	-	0 to 5	-	-	-	-

Table 8 Sizes of Coarse Aggregates for Mass Concrete

(*Clause* 6.1.1)

Sl No. (1)	Class and Size (2)	IS Sieve Designation (3)	Percentage Passing (4)
i)	Very large, 150 to 80 mm	160 mm	90 to 100
		80 mm	0 to 10
ii)	Large, 80 to 40 mm	80 mm	90 to 100
		40 mm	0 to 10
iii)	Medium, 40 to 20 mm	40 mm	90 to 100
		20 mm	0 to 10
iv)	Small, 20 to 4.75 mm	20 mm	90 to 100
		4.75 mm	0 to 10
		2.36 mm	0 to 0.2

Table 9 Fine Aggregates

(*Clause* 6.3)

Sl No.	IS Sieve Designation	Percentage Passing			
		Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
(1)	(2)	(3)	(4)	(5)	(6)
i)	10 mm	100	100	100	100
ii)	4.75 mm	90-100	90-100	90-100	95-100
iii)	2.36 mm	60-95	75-100	85-100	95-100
iv)	1.18 mm	30-70	55-90	75-100	90-100
v)	600 µm	15-34	35-59	60-79	80-100
vi)	300 µm	5-20	8-30	12-40	15-50
vii)	150 µm	0-10	0-10	0-10	0-15

NOTES

1 For crushed stone sands, the permissible limit on 150 µm IS Sieve is increased to 20 percent. This does not affect the 5 percent allowance permitted in **6.3** applying to other sieve sizes.

2 Fine aggregate complying with the requirements of any grading zone in this table is suitable for concrete but the quality of concrete produced will depend upon a number of factors including proportions.

3 As the fine aggregate grading becomes progressively finer, that is, from Grading Zones I to IV, the ratio of fine aggregate to coarse aggregate should be progressively reduced. The most suitable fine to coarse ratio to be used for any particular mix will, however, depend upon the actual grading, particle shape and surface texture of both fine and coarse aggregates.

4 It is recommended that fine aggregate conforming to Grading Zone IV should not be used in reinforced concrete unless tests have been made to ascertain the suitability of proposed mix proportions.

IS 2430. The amount of material required for each test shall be as specified in the relevant method of test given in IS 2386 (Part 1) to IS 2386 (Part 8).

7.2 Chemical tests like alkalies (Na_2O equivalent), sulphate (SO_3), calcium oxide, sulphur (S), iron (FeO), magnesium oxide (MgO), silica (SiO_2) and chlorine (NaCl), can be carried out as per IS 4032 and water soluble chloride test can be carried out as per IS 14959 (Part 2). All other tests shall be carried out as described in IS 2386 (Part 1) to IS 2386 (Part 8) and in this standard.

7.2.1 In the case of all-in-aggregate, for the purpose of tests to verify its compliance with the requirements given in Table 2, and when necessary for such other tests as required by the purchaser, the aggregate shall be first separated into two fractions, one finer than 4.75 mm IS Sieve and the other coarser than 4.75 mm IS Sieve, and the appropriate tests shall be made on samples from each component, the former being tested as fine aggregate and the latter as coarse aggregate.

Table 10 All-in-Aggregate Grading

(*Clause* 6.4)

Sl No.	IS Sieve Designation	Percentage Passing for All-in-Aggregate of	
		40 mm Nominal Size	20 mm Nominal Size
(1)	(2)	(3)	(4)
i)	80 mm	100	—
ii)	40 mm	95 to 100	100
iii)	20 mm	45 to 75	95 to 100
iv)	4.75 mm	25 to 45	30 to 50
v)	600 µm	8 to 30	10 to 35
vi)	150 µm	0 to 6	0 to 6

8 SUPPLIER'S CERTIFICATE AND COST OF TESTS

8.1 The supplier shall satisfy himself that the material complies with the requirements of this standard and, if requested, shall supply a certificate to this effect to the purchaser.

8.2 If the purchaser requires independent tests to be made, the sample for such tests shall be taken before or immediately after delivery according to the option of the purchaser, and the tests carried out in accordance with this standard and on the written instructions of the purchaser.

8.3 The supplier shall supply free of charge, the material required for tests.

8.4 The cost of the tests carried out under **8.2** shall be borne by,

a) the supplier, if the results show that the material does not comply with this standard; and

b) the purchaser, if the results show that the material complies with this standard.

9 DELIVERY

9.1 Supplies of aggregate may be made in bulk in suitable quantities mutually agreed upon between the purchaser and the supplier. Where so required by the purchaser, the aggregate may be supplied in bags (jute, jute-laminated, polyethylene lined or as may be mutually agreed between the purchaser and the supplier) bearing the net quantity (may be 25 kg, 50 kg, 300 kg,

600 kg or as agreed to between the purchaser and the supplier). The tolerance on the quantity of aggregate in each bag or consignment shall be as per **9.2** unless mutually agreed upon between the purchaser and the supplier.

9.2 Tolerance Requirements for the Quantity of Aggregate Packed in Bags

9.2.1 The average of net quantity of aggregate packed in bags at the plant in a sample shall be equal to or more than 25 kg, 50 kg, 300 kg, 600 kg, etc, as applicable. The number of bags in a sample shall be as given below:

Batch Size	*Sample Size*
100 to 150	20
151 to 280	32
281 to 500	50
501 to 1 200	80
1 201 to 3 200	125
3 201 and over	200

The bags in a sample shall be selected at random (*see* IS 4905).

9.2.2 The number of bags in a sample showing a minus error greater than 2 percent of the specified net quantity shall be not more than 5 percent of the bags in the sample. Also the minus error in none of such bags in the sample shall exceed 4 percent of the specified net quantity of aggregate in the bag.

9.2.3 In case of a wagon or truck load of 5 to 25 t, the overall tolerance on net quantity of aggregate shall be 0 to + 0.5 percent.

10 MARKING

10.1 Each consignment/bag of aggregate shall be legibly and indelibly marked with the following information:

a) Manufacturer's name and his registered trade-mark, if any;
b) Net quantity, in kg;
c) Words 'Use no Hooks' on the bags;
d) Batch/control unit number;
e) Address of the manufacturer;
f) Month and year of consignment/packing;
g) Type of aggregate, such as 'Coarse Aggregate' or 'Fine Aggregate';
h) In case the aggregates are from natural sources, the words 'Natural Aggregate';
j) In case of aggregates from other than natural sources, the type of coarse/fine aggregate (*see* Table 1);
k) In case of coarse aggregate, the nominal size along with the words, 'Single Sized' or 'Graded', as the case may be; and
m) In case of fine aggregate, the grading zone.

10.2 Similar information shall be provided in the delivery advices accompanying the shipment of aggregate in bulk (*see* **10.3**).

10.3 BIS Certification Marking

The aggregate may also be marked with the Standard Mark.

10.3.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which a license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(*Foreword*)

BRIEF INFORMATION ON AGGREGATES FROM OTHER THAN NATURAL SOURCES

A-1 IRON AND STEEL SLAG AGGREGATES

A-1.1 Iron Slag Aggregate

A-1.1.1 Iron slag is obtained as a byproduct, while producing iron in blast furnaces or basic oxygen furnaces in integrated iron and steel plants. The lime in the flux chemically combines with the aluminates and silicates of the iron ore and coke ash to form a non-metallic product called iron/blast furnace slag. The molten slag at a temperature of approximately 1 500°C is taken out of the furnace and cooled to form different types of slag products.

A-1.1.2 *Air Cooled Iron Slag Aggregate*

Molten slag is allowed to flow from the furnace into open pits located beside the furnaces where the material is quenched with water to facilitate cooling and crystallization. The slag after cooling can be further crushed and screened to produce different sizes of aggregates. During its usage, care should be taken to ensure that the slag passes the test for 'iron unsoundness' and is pre-wetted prior to its use. Figure 1 shows typical air-cooled iron slag aggregate.

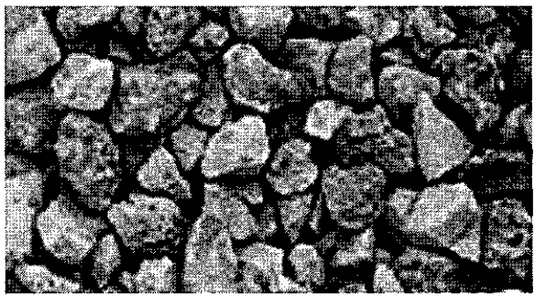


FIG. 1 AIR COOLED IRON SLAG AGGREGATE

A-1.1.3 *Granulated Iron Slag Aggregate*

In this case, molten slag is allowed to flow through the launders into a granulation plant, where molten slag is quenched rapidly with large volume of water. This results in vitrified (glassy) material with a sand-like appearance, with particles typically 1 mm to 5 mm size. It is a light weight aggregate, which needs further processing to improve the bulk density to more than 1.35 kg/l for its use as normal weight aggregate. Figure 2 shows typical granulated iron slag aggregate.

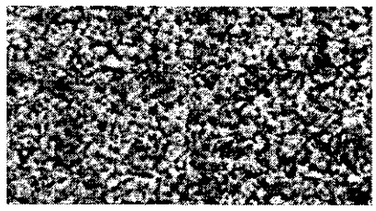


FIG. 2 GRANULATED IRON SLAG AGGREGATE

A-1.2 Steel Slag Aggregate

Steel slag is a byproduct produced in steel making operations in integrated iron and steel plants. The calcined lime used as flux combines with the silicates, aluminum oxides, magnesium oxides, manganese oxides and ferrites to form steel furnace slag, commonly called steel slag. Slag is poured in a cooling yard from the furnace at a temperature of 1 400 °C - 1 700 °C and cooled by air and sprinkling of water. Steelmaking slag contains about 10 to 20 metallic iron percent by mass, and is recovered by magnetic separation. The metal free slag is crushed and screened to different sizes for use as aggregates. For use as aggregates, the steel slag is subjected to weathering process (natural or accelerated) to reduce the free lime content in the slag. Figure 3 shows typical steel slag aggregate.

NOTE — Air Cooled Blast furnace Slag (ACBFS) has unique chemical and physical properties that influence its behaviour as an aggregate in concrete. Several of the key chemical properties are provided but the physical property of greatest concern is the high level of porosity compared to that present in naturally derived aggregates, which contributes to high absorption capacities. This is important during construction, as the moisture condition of the aggregate will impact workability and early-age, shrinkage-related cracking, if the aggregate is not kept sufficiently moist prior to batching. It may also have long-term ramifications on in service durability, depending on the level of saturation those aggregates are subjected to either at the bottom of the slabs or in the vicinity of joints and cracks.

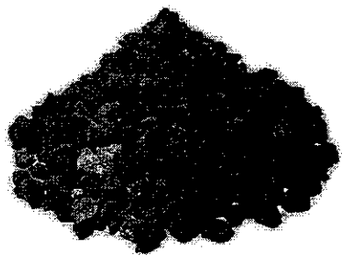


FIG. 3 STEEL SLAG AGGREGATE

A-2 COPPER SLAG AS AGGREGATES

Copper slag is produced as a byproduct from copper smelter, while producing copper from copper concentrate (copper pyrite) through pyrometallurgical process. In the process of smelting, the iron present in the copper concentrate combines chemically at 1 200°C with silica present in flux materials such as river sand/silica sand/ quartz fines to form iron silicate, which is termed as copper slag. The copper slag thus generated is quenched with water to produce granulated copper slag.

Copper slag is a blackish granular material, similar to medium to coarse sand having size ranging from 150 µm to 4.75 mm. This aggregate has potential for use as fine aggregate in accordance with provisions of this standard (*see* Fig. 4).



FIG. 4 TYPICAL COPPER SLAG AGGREGATE

A-3 CONSTRUCTION AND DEMOLITION (C&D) WASTE

Use of construction and demolition (C&D) waste for manufacture of aggregates is a step towards effective management and utilization of this waste. This however, requires necessary care while producing aggregates to ensure their efficacy in their use as part of concrete. These aggregates may be of two types namely Recycled Aggregate (RA) and Recycled Concrete Aggregate (RCA). RA is made from C&D waste which may comprise concrete, brick, tiles, stone, etc, and RCA is derived from concrete after requisite processing.

Recycled concrete aggregate (RCA) contain not only the original aggregate, but also hydrated cement paste adhering to its surface. This paste reduces the specific gravity and increases the porosity compared to similar virgin aggregates. Higher porosity of RCA leads to a higher absorption. Recycled aggregate (RA) will typically have higher absorption and lower specific gravity than natural aggregate. The concrete rubble has to be properly processed, including scrubbing to remove the adhered hydrated cement as much as possible.

The broad steps involved in the manufacture of aggregates from C&D waste may be:

a) Receipt and inspection of C&D waste at the plant.
b) Weighing of waste.
c) Mechanical and manual segregation and resizing - this may involve segregation of various types of wastes such as bricks, stones, concrete, steel, tiles, etc.
d) Dry and wet processing.

Figure 5, Figure 6A and Figure 6B show typical C&D waste, recycled concrete aggregate and recycled aggregate obtained there from.

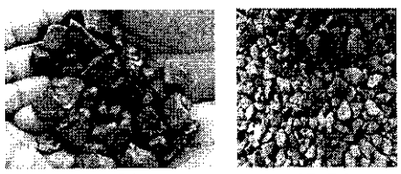
RA can be used as coarse aggregate and RCA can be used as coarse and fine aggregates in accordance with this standard.

A-4 ENVIRONMENTAL SAFETY AND QUALITY STANDARDS USING IRON AND STEEL AND COPPER SLAG AGGREGATES

The engineer-in-charge may get the iron and steel and copper slag aggregates checked for hazardous substances, at appropriate frequency. Specialist literature may be referred for the test method, the technique commonly in use are Inductively Coupled Plasma (ICP) spectroscopy and Atomic Absorption Spectrophotometer (AAS). As a guide the values given in Table 11 may be followed as the permissible values.



FIG. 5. DEMOLITION WASTE BEFORE PROCESSING



6A RCA 6B RA

FIG. 6 RECYCLED CONCRETE AGGREGATE AFTER PROCESSING AND RECYCLED AGGREGATE AFTER PROCESSING

Table 11 Environmental Safety and Quality Standards Using Iron and Steel and Copper Slag Aggregates
(*Clause* A-4)

Sl No. (1)	Item (2)	Elution volume, *Max* mg/kg (3)	Content, *Max*, mg/l (4)
i)	Cadmium	0.01	150
ii)	Lead	0.01	150
iii)	Hexavalent chromium	0.05	250
iv)	Arsenic	0.01	150
v)	Mercury	0.000 5	15
vi)	Selenium	0.01	150
vii)	Fluorine	0.8	4 000
viii)	Boron	1	4 000

ANNEX B

(*Foreword*)

INFORMATION TO BE FURNISHED BY THE SUPPLIER

B-1 DETAILS OF INFORMATION

When requested by the purchaser or his representative, the supplier shall provide the following particulars:

a) Source of supply, that is, precise location of source from where the materials were obtained;

b) Trade group of principal rock type present, in case of aggregates from natural sources (*see* Annex C);

c) Physical characteristics, in case of aggregates from natural sources (*see* Annex C);

d) In case of manufactured aggregates, the brief manufacturing process, source of parent material and special characteristics having bearing on concrete properties, such as presence of adhered coating in case of recycled concrete aggregate, to the extent possible.

e) Presence of reactive minerals;

f) Service history, if any and in particular, in case of manufactured aggregates, the name of projects where used and the performance including in recently completed projects; and

g) In case of manufactured aggregates, special precautions, if any, to be observed during concrete production.

ANNEX C

(*Clause* B-1.1)

DESCRIPTION AND PHYSICAL CHARACTERISTICS OF AGGREGATES FROM NATURAL SOURCES, FOR CONCRETE

C-1 GENERAL HEADINGS

To enable detailed reports on aggregate, the petrographic examination as per IS 2386 (Part 8) may be carried out and information in the following general headings may be given, are suggested as a guide:

a) *Trade group* — For example, granite, limestone and sandstone (*see* **C-2.2**);

b) *Petrological name and description* — The correct petrological name should be used and should be accompanied by a brief description of such properties as hardness, colour, grain, imperfections, etc;

c) *Description of the bulk* — The degree of cleanliness, that is, freedom from dust, should be stated and reference made to the presence of any pieces not representative of the bulk;

d) *Particle shapes* — *See* **C-3**; and

e) *Surface texture* — *See* **C-3**.

C-2 NOMENCLATURE OF ROCK

C-2.1 The technical nomenclature of rocks is an extensive one and for practical purposes it is sufficient to group together with those rocks having certain petrological characteristics in common. Accordingly, the list of trade groups given in **C-2.2** is adopted for the convenience of producers and users of aggregates.

C-2.2 Trade Groups of Rocks Used as Concrete Aggregate

The list of rocks placed under appropriate trade groups is given below:

a) IGNEOUS ROCKS

1) *Granite Group*

Granite	Granodiorite
Gmnophyre	Diorite
	Syenite

2) *Gabbro Group*

Gabbro	Peridotite
Norite	Pyroxenite
Anorthosite	Epidiorite

3) *Aplite Group*

Aplite	Quartz reef
Porphyry	

4) *Dolerite Group*

Dolerite	Lamprophyre

5) *Rhyolite Group*

Rhyolite	Felsite
Trachyte	Pumicite

6) *Basalt Group*

Andesite	Basalt

b) SEDIMENTARY ROCKS

1) *Sandstone Group*

Sandstone	Arkose
Quartzite	Graywacke
	Grit

2) *Limestone Group*

Limestone	Dolomite

c) METAMORPHIC ROCKS

1) *Granulite and Gneiss Groups*

Granite gneiss	Amphibolite
Composite gneiss	Granulite

2) *Schist Group*

Slate	Phyllite
	Schist

3) *Marble Group*

Marble	Crystalline limestone

The correct identification of a rock and its placing under the appropriate trade group shall be left to the decision of the Geological Survey of India or any competent geologist.

C-3 PARTICLE SHAPE AND SURFACE TEXTURE

C-3.1 The external characteristics of any mixture of mineral aggregate include a wide variety of physical shape, colour and surface condition. In order to avoid lengthy descriptions, it may be convenient to apply to distinctive group types of aggregates some general term which could be adopted.

C-3.2 The simple system shown in Table 12 and Table 13 has, therefore, been devised for facilitate defining the essential features of both particle shape and surface characteristics.

Table 12 Particle Shape
(*Clause* C-3.2)

Sl No.	Classification	Description	Illustrations of Characteristic Specimens	Example
(1)	(2)	(3)	(4)	(5)
i)	Rounded	Fully water worn or completely shaped by attrition	Fig. 7	River or seashore gravels; desert, seashore and windblown sands
ii)	Irregular or partly rounded	Naturally irregular, or partly shaped by attrition, and having rounded edges	Fig. 8	Pit sands and gravels; land or dug flints; cuboid rock
iii)	Angular	Possessing well-defined edges formed at the inter-section of roughly planar faces	Fig. 9	Crushed rocks of all types; talus; screes
iv)	Flaky	Material, usually angular, of which the thickness is small relative to the width and/or length	Fig. 10	Laminated rocks

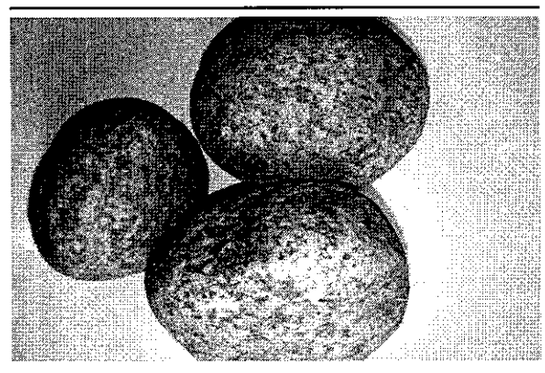


FIG. 7 PARTICLE SHAPE - ROUNDED

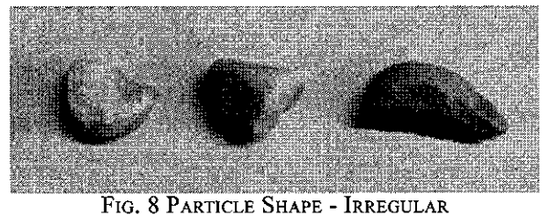


FIG. 8 PARTICLE SHAPE - IRREGULAR

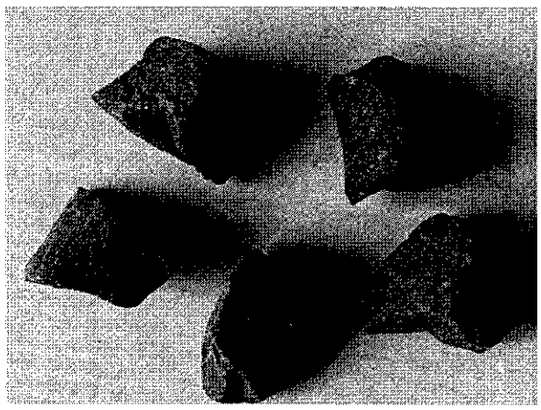


FIG. 9 PARTICLE SHAPE - ANGULAR



FIG. 10 PARTICLE SHAPE - FLAKY

C-3.3 Surface characteristics have been classified under five groups in Table 13. The grouping is broad; it does not purport to be a precise petrographical classification but is based upon a visual examination of hand specimens. With certain materials, however, it may be necessary to use a combined description with more than one group number for an adequate description of the surface texture, for example, crushed gravel 1 and 2; oolites 3 and 5.

Table 13 Surface Characteristics of Aggregates
(*Clause* C-3.2)

Sl No.	Group	Surface Texture	Example
(1)	(2)	(3)	(4)
i)	1	Glassy	Black flint
ii)	2	Smooth	Chert, slate, marble, some rhyolite
iii)	3	Granular	Sandstone, oolites
iv)	4	Crystalline	a) *Fine* — Basalt, trachyte, keratophyre b) *Medium* — Dolerite, granophyre, granulite, microgranite, some limestones, many dolomites c) *Coarse* — Gabbro, gneiss, granite, granodiorite, syenite
v)	5	Honey - combed and porous	Scoriae, pumice, trass

ANNEX D

[*Clause* 5.5.2 (a)]

DETERMINATION OF IRON UNSOUNDNESS FOR SLAG AGGREGATES

D-1 Some slags containing more than 3 percent ferrous oxide (FeO) will disintegrate on immersion in water when the sulphur (S) content of the slag is 1 percent or more. Aggregates derived from such slags show iron unsoundness.

D-2 PROCEDURE

Take randomly two test samples of not less than 50 pieces each of aggregate passing 40 mm and retained on 20 mm IS sieve. Immerse the pieces of first sample in distilled or deionized water at room temperature for a period of 14 days. Remove the pieces from the water at the end of the 14 day period and examine them.

D-3 CRITERIA FOR CONFORMITY

If no piece develops the following unsoundness during the storage period, the slag aggregate shall be deemed to be free from iron unsoundness:

a) Cracking (development of a visible crack),

b) Disintegration (physical breakdown of aggregate particle),

c) Shaling (development of fretting or cleavage of the aggregate particle), or

d) Craze cracking at the surface of the aggregate.

The second test sample shall be tested, if any of the pieces (in the above sample) shows cracking, disintegration, shaling or craze cracking at the surface of the aggregate. If not more than one in one hundred pieces (1 percent) of the two test samples tested shows cracking, disintegration, shaling or craze cracking at the surface of the aggregate, the slag shall be regarded as free from iron unsoundness.

ANNEX E

[*Clause* 5.5.2 (b)]

DETERMINATION OF VOLUMETRIC EXPANSION RATIO OF SLAG AGGREGATES

E-1 This test specifies the procedure to calculate the volumetric expansion ratio for the evaluation of the potential expansion of aggregates like steel slag due to hydration reactions. This method can also be used to evaluate the effectiveness of weathering processes for reducing the expansive potential of such aggregate materials.

E-2 APPARATUS AND TOOLS

a) *Moulds with base plate, stay rod and wing nut, perforated plate* — These shall conform to **4.1**, **4.3** and **4.4** of IS 9669.

b) *Metal Rammer* — As specified in **5.1** of IS 9198.

c) *Curing apparatus* — The curing apparatus shall be a thermostat water tank, capable of holding not less than two 15 cm moulds, and able to keep the water temperature at 80 ± 3°C for 6 h.

d) *Sieves* — These shall be 31.5 mm, 26.5 mm, 13.2 mm, 4.75 mm, 2.36 mm, 500 µm and 75 µm IS sieves.

e) *Expansion measuring apparatus* — The expansion measuring apparatus shall be as shown in Fig. 11.

E-3 SAMPLE

E-3.1 Preparation of Sample

The samples of slag shall be collected so as to represent the whole lot. The samples shall be prepared to meet the grading requirement given in Table 14.

Table 14 Grading Distribution
(*Clause* E-3.1)

Sl No. (1)	Sieve Size (2)	Percentage Passing (3)
i)	31.5 mm	100
ii)	26.5 mm	97.5
iii)	13.2 mm	70
iv)	4.75 mm	47.3
v)	2.36 mm	35
vi)	500 µm	20
vii)	75 µm	6

E-3.2 Adjustment of Sample

The adjustment of sample shall be as follows:

a) Add water to approximately 30 kg of sample so that the difference between the moisture content and the optimum moisture content is within 1 percent. Mix it well to make moisture content uniform, and keep it for not less than 24 h.

b) Reduce the above sample and obtain the sample necessary for making three specimens.

E-4 TEST PROCEDURE

E-4.1 Specimen Preparation

The specimens shall be prepared as follows:

a) Attach collar and perforated base plate to the mould, put spacer disc in it, and spread a filter paper on it.

b) The measurement of moisture content shall be conducted on two samples, each sample weighing not less than 500 g. When the measured value of moisture content differs from the value of optimum moisture ratio by not less than 1 percent, new specimens shall be prepared for curing.

c) Pour the samples prepared as in **E-3.2**, in the mould with a scoop keeping a falling height of approximately 50 mm and ram the sample into three layers one upon another so that the depth of each layer after ramming is nearly equal to one another.

d) Ram the layer uniformly by free dropping of the rammer 92 times from a height of 450 mm above each rammed surface. The ramming shall be performed on a rigid and flat foundation such as a concrete floor.

e) Rammed surfaces shall be scratched slightly with a sharp ended steel bar for securing adhesion between layers.

f) After finishing the ramming, remove the collar, shave out the excess sample stuck on upper part of the mould with a straight knife carefully. At this time, holes on the surface due to the removing of coarse grade materials shall be filled with fine grade materials, and the top surface shall be reformed

g) Turn the mould upside down gently pushing the reformed top surface with a lid so that the specimen in the mould does not decay or drop down, then remove the perforated base plate and take out the spacer-disc.

h) Spread a filter paper on the perforated base

plate, turn the mould upside down gently again, connect to the perforated base plate again for securing adhesion to the filter paper.

j) Wipe off the materials of the specimen stuck on the outside of the mould and the perforated base plate, and measure the total mass.

k) From the sum of masses of the rammed specimen, the mould and the perforated base plate, subtract the masses of the mould and the perforated base plate, and divide it by the volume of the mould, which gives the wet density of the rammed specimen.

E-4.2 Curing and Measuring Operation of the Specimen

The curing and measuring operation of the specimen shall be as follows:

a) Place the perforated plate with shaft on the filter paper which is spread on the top surface of the specimen in the mould.

b) Install the dial-gauge and the attaching device (gauge holder) correctly. As shown in Fig. 11, dip it in the curing apparatus, and record the first reading of the dial-gauge after the mould reaches equilibrium with respect to the water bath.

c) For curing, keep it at 80 ± 3°C for 6 h, then leave it to cool in the curing apparatus.

d) Repeat the operation **E-4.2** (c), one time per day for 10 days.

e) On finishing of the curing period, record the last reading of the dial-gauge, remove the gauge holder and the dial-gauge, take out the mould from water, tilt it gently with the perforated plate with shaft on it, and remove the accumulated water. Then, after leaving quietly for 15 min, remove the filter paper and measure the mass.

E-5 CALCULATION

The calculation of volumetric expansion ratio shall be made as follows:

a) The volumetric expansion ratio shall be calculated by the following formula, and be rounded off to the first decimal place:

$$E = 100 \times (D_f - D_i) / H$$

where

E = volumetric expansion ratio, percent,

D_f = last reading of the dial-gauge in mm,

D_i = first reading of the dial-gauge in mm, and

H = initial height of the specimen (125 mm).

b) The test shall be carried out on three specimens prepared from the sample taken at the same time in accordance with **E-3.2**, and the average of the three test results shall be taken. The averaged value shall be rounded off to the first decimal place.

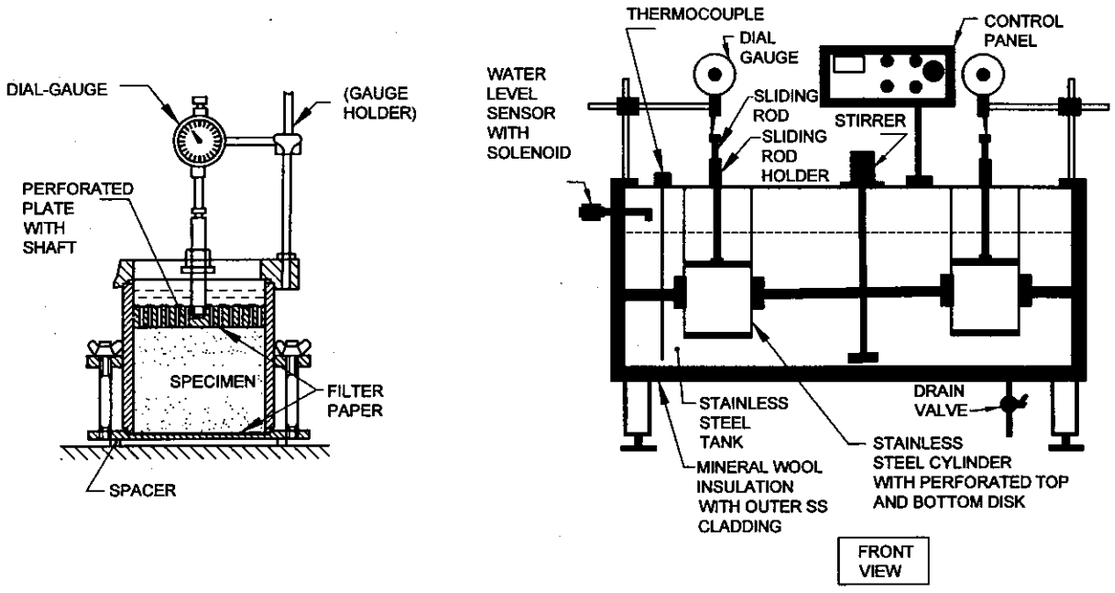


FIG 11: TEST SETUP FOR VOLUMETRIC EXPANSION TEST

ANNEX F

(*Foreword*)

COMMITTEE COMPOSITION

Cement and Concrete Sectional Committee, CED 02

Organization	*Representative(s)*
In Personal Capacity (*7A, Autumn Hue, Seasons, PPD Appartments, Kuravankonam, Trivandrum*)	SHRI JOSE KURIAN (***Chairman***)
ACC Ltd, Mumbai	SHRI S. A. KHADILKAR SHRI RAMAN SADANAND PARULEKAR (*Alternate*)
Ambuja Cements Limited, Mumbai	SHRI J. P. DESAI SHRI C. M. DORDI (*Alternate*)
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Indian Association of Structural Engineers, New Delhi	PROF MAHESH TANDON SHRI GANESH JUNEJA (*Alternate*)
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Indian Institute of Technology Madras, Chennai	DR DEVDAS MENON DR MANU SANTHANAM (*Alternate*)
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Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi

EAC OBSERVATION NO.-9

3345

EAC OBSERVATION:

Phospho-gypsum disposal site co-ordinates, concrete mode of utilization, maximum time frame envisaged for the storage at the disposal yard i.e., one month (or) 15 days has not been submitted.

REPLY:

Phospho-gypsum disposal site co-ordinates are marked in plot plan and is attached in **Annexure-9(a)**

CRITERIA FOR PHOSPHO-GYPSUM STORAGE (AS PER CPCB GUIDELINE 2014-15)

Sr. No.	Description	Locational Criteria	Compliance
1	Lake or Pond	Distance more than 500 m	Storage-I: 850 m from nearest pond Storage-II: 830 m from nearest pond
2	Flood Plan	No construction 100 Year flood Plan	Since no flow data is available for Dhaneshwari Nadi, a tentative estimate of run-off from Dhaneshwari Nadi catchment and discharge at railway line near project site is done based on the catchment characteristics.
3	Habitation	Distance More than 1 km	Storage-I: 1350 m from Navinal Storage-II: 1950 m from Navinal

Phospho-gypsum is widely used in cement manufacturing. MoU's (attached as **Annexure-9(b)**) have been signed with following companies:

1) Adani Cementation Limited
2) Sanghi Cement Limited

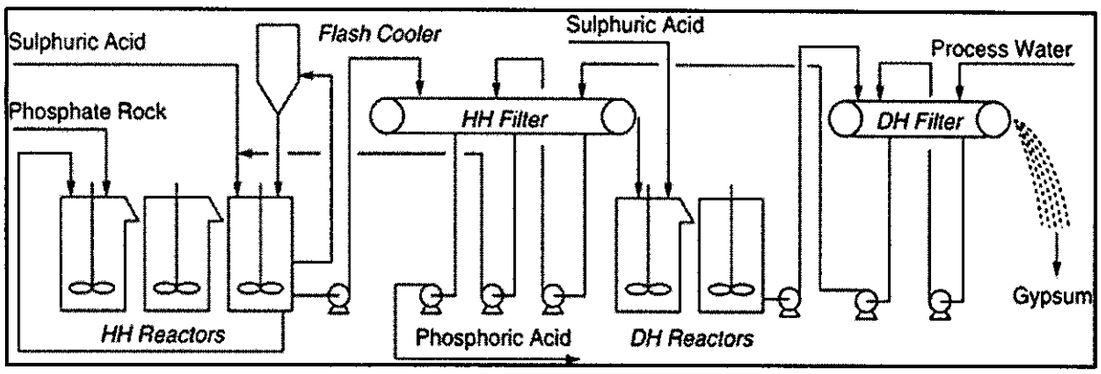
Phospho-gypsum is also used for agriculture purpose and therefore efforts will be made to sell for the agriculture requirement.

Total Area allocated for storage of Phospho-gypsum is around 21 Acres. Gypsum will be stored to 15 meter height above the base of the storage. Greenbelt of 15 m width will be developed all around the storage area.

This area is sufficient for 3 years, considering NO sales.

Phosphoric Acid & Phospho-gypsum Manufacturing Process:

- Hemi-Di-Hydrate (HDH) process for manufacturing of the phosphoric acid.
- This process has unique advantage over the conventional process due to two stage of reaction and filtration (Please refer the diagram below), which produces very high quality phospho-gypsum, which is highly suitable for cement manufacturing, thereby reducing requirement of mined gypsum.



Stage 1 - Reaction & Filtration

Stage 2 - Reaction & Filtration

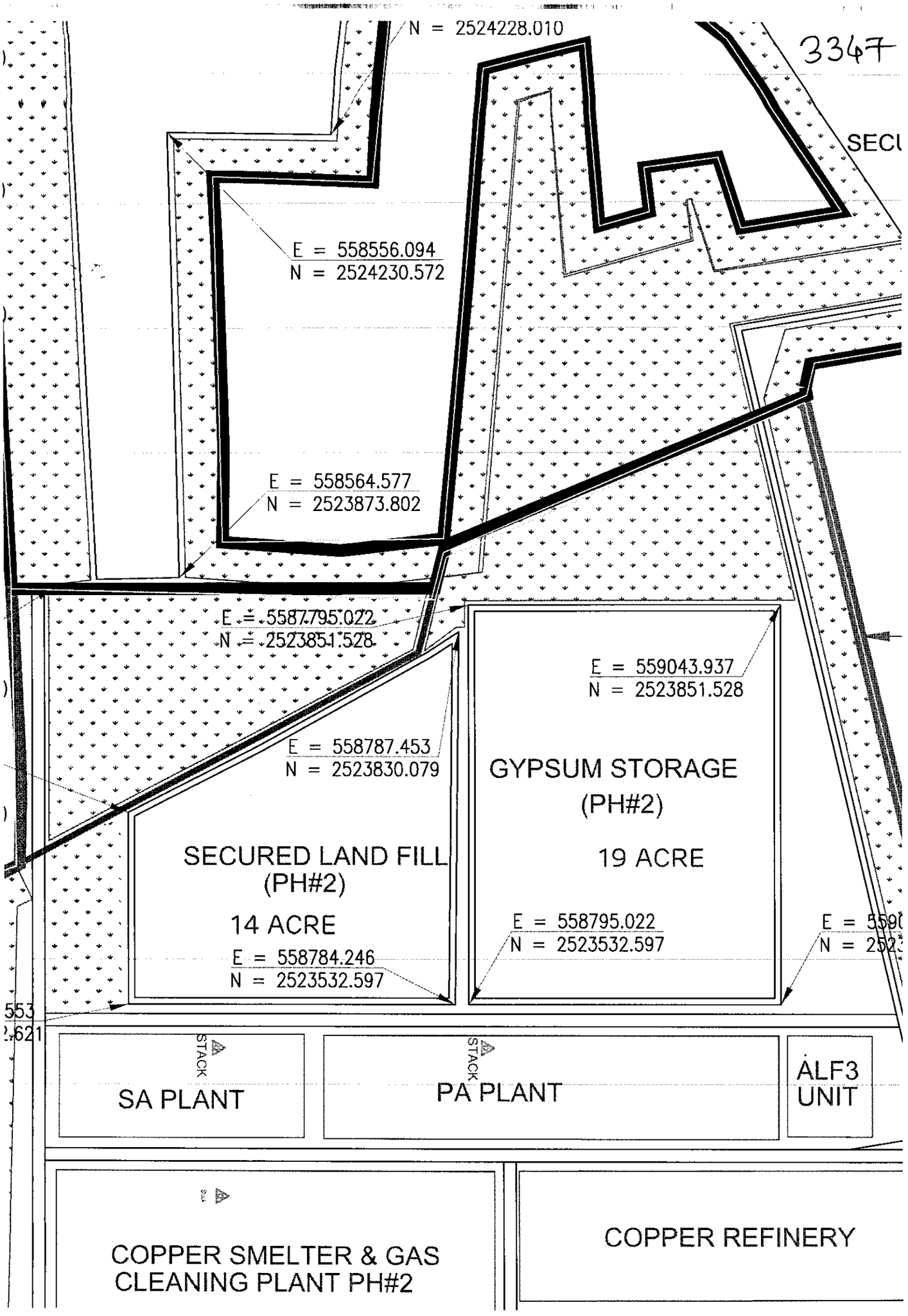
Stage 1: Production of 42% Phosphoric Acid as a product and generation of Phospho-gypsum with P_2O_5 ~ 1.5 %.

Stage 2: Further Recovery of P_2O_5 from 1st stage phospho-gypsum. Production of Superior Quality of Phospho Gypsum by further polishing by additional fresh water wash and reducing P_2O_5 < 0.5% in final phospho-gypsum product..

- The first reaction takes place under hemi-hydrate conditions, followed by filtration to obtain purer product acid of 40-42 percent P_2O_5. As usual, dilute acid from washing the cake returns to the primary reactor.
- The hemi-hydrate filter cake is then re-pulped at a lower temperature in dilute sulphuric acid and held for sufficient time for the hemi-hydrate to re-crystallize to the di-hydrate form. Any occluded rock phosphate particles exposed in the process dissolve in the additional sulphuric acid.
- This process produces a purer form of phosphor-gypsum and filtrate solutions, which are used to wash and re-pulp the hemi-hydrate filter cake.
- Acid with 42% P_2O_5 requires less energy for further evaporation to ~52% P_2O_5 before use for manufacturing of Di-Ammonium Phosphate (DAP), at a much higher P_2O_5 recovery efficiency,
- Typically, P_2O_5 Recoveries are ~98 percent compared to single stage process (~95%).

Typical phospho-gypsum quality produced from the HDH is as follows:

- Purity of Gypsum: >90%
- Total P_2O_5: <0.5%
- Total Fluorine: <0.6%
- Dispatch Phospho-gypsum Moisture: <10%


N = 2524228.010
3347
SECU
E = 558556.094
N = 2524230.572
E = 558564.577
N = 2523873.802
E = 558795.022
N = 2523851.528
E = 559043.937
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GYPSUM STORAGE
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19 ACRE
SECURED LAND FILL
(PH#2)
14 ACRE
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N = 252
553
621
STACK
SA PLANT
STACK
PA PLANT
ALF3
UNIT
COPPER SMELTER & GAS
CLEANING PLANT PH#2
COPPER REFINERY

MEMORANDUM OF UNDERSTANDING (MOU) FOR SUPPLY OF PHOSPHO GYPSUM

THIS MOU is entered on this 31st day of December 2018 between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

Adani Cementation Ltd, a Company registered under the Company's Act 2013 and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"ACL"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and ACL may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Refinery Complex at Mundra, Gujarat (hereinafter referred to as "**CP**") and shall be generating in process, 2.5 Million Ton per annum quantity of Phospho-gypsum (hereinafter referred to as "**Gypsum**") which can be utilized in manufacturing cement, gypsum board fertiliser applications, etc.

AEL & ACL after discussion hereto have decided to enter into an MOU for utilizing this Gypsum in the ACL's cement plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available to ACL 0.30 Million Ton per annum of cement grade Gypsum that will be generated from its CP from the commercial date of operation. The delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation.

2.0 AEL & ACL shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

ADANI ENTERPRISES LTD AHMEDABAD

ADANI CEMENTATION LIMITED AHMEDABAD

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TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE .PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYARAO

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature: _____

Name: _____

For ACL

Signed and delivered by the

Signature: _____

Name: ROHIT VOHRA

ADANI CEMENTATION LIMITED AHMEDABAD

Witness:

Signature: _____

Name: _____

MEMORANDUM OF UNDERSTANDING (MOU) FOR SUPPLY OF PHOSPHO GYPSUM

This MOU is entered on this 24th Day of January 2019 between **Adani Enterprises Limited,** a company registered under the Companies Act, 2013, and having its registered office at Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad 380009, Gujarat, India (hereinafter referred to as **"AEL"**, which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **FIRST PART.**

AND

Sanghi Cement Ltd, a Company registered under the Company's Act 2013 and having its office at 10th Floor, Kataria Arcade, Off S.G. Highway, Makarba, Ahmedabad-380051, India (hereinafter referred to as **"SANGHI"** which expression shall, unless excluded by or repugnant to the context or meaning thereof, be deemed to include its successors and assigns) being the party of the **SECOND PART.**

Both AEL and SANGHI may hereinafter also be referred to jointly as the **'Parties'** and severally as a **'Party'**

WHEREAS

AEL is setting up 1 Million Copper Refinery Complex at Mundra, Gujarat (hereinafter referred to as "**Project**) and shall be generating in process, 2.5 Million Ton per annum quantity of Phospho-gypsum (hereinafter referred to as "**Gypsum**") which can be utilized in manufacturing cement, gypsum board fertiliser applications, etc.

AEL & SANGHI after discussion hereto have decided to enter into an MOU for utilizing this Gypsum in the SANGHI's cement plant.

NOW, THEREFORE, IN CONSIDERATION OF THE ABOVE PREMISES AND OF THE UNDERTAKINGS HEREIN FURNISHED, IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS:

1.0 AEL will make available to SANGHI the cement grade Gypsum that will be generated from its Project from the commercial date of operation. Currently, SANGHI consumes around 0.20 MTPA of Gypsum in their manufacturing process which is likely to be increased to about 0.40 MTPA after their capacity expansion. The quantity, delivery schedule and the other commercial terms & conditions will be mutually decided by both the parties at a date closer to the commercial date of operation.

2.0 AEL & SANGHI shall discuss the further steps to be taken in order to carry out the purpose of this MoU. Both the parties will endeavour to finalize and enter into such requisite Agreements, as may be necessary in line with the related rules, regulation and notifications of State/Central Government Department/Agencies.

EFFECTIVE DATE, COMMENCEMENT DATE & VALIDITY OF THE MOU

1.0 The effective date shall be the date of this MOU.

2.0 This MOU shall remain valid till the time a definitive detailed agreement incorporating all the commercials, scope, penalty and legal related matters is executed between the parties.

AHMEDABAD * SANGHI IND. LTD. *

ADANI ENTERPRISES LTD. AHMEDABAD

3351

TERMINATION

1.0 Any party may terminate this MoU by giving thirty (30) days' notice to the other party during the tenure of this MoU.

SETTLEMENT OF DISPUTES

1.0 In case of any disputes, differences, claims between the parties hereto arising out of this MoU, the same shall be referred to the senior management of each Party for an amicable settlement.

OTHER CONDITIONS:

1.0 Any amendment to this MoU in order to be valid shall be in writing.

2.0 This MoU shall be executed in duplicate and both the counterparts shall be treated as original.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE HEREUNTO SET THEIR RESPECTIVE HANDS AND SEALS THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For AEL

Signed and delivered by the

Signature: _____

Name: PRASAD SURYA

ADANI ENTERPRISES LTD. AHMEDABAD

Witness:

Signature: _____

Name: Rais Tapaie

For SANGHI

Signed and delivered by the

Signature: _____

Name: R K Sanghi

SANGHI IND. LTD. AHMEDABAD

Witness:

Signature: _____

Name: Amit Kumar Ghosh

EAC OBSERVATION:

Lining details for Phospo-gypsum disposal yard, leachate collection system envisaged and details of piezo-well installations has not been made available.

REPLY:

Phosphogypsum storage yard will be developed strictly as per CPCB Guidelines for Management and handling of phosphor-gypsum.

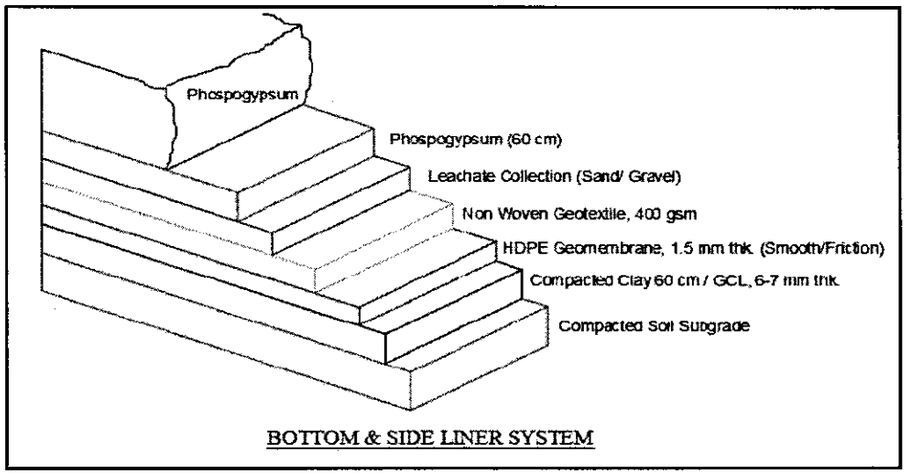
M/s. Garware Technical Fibres Limited (Geosynthetics Division), Pune; has been engaged for preliminary design for construction of gypsum storage yard. Technical report is attached as **Annexure-10(a).**

The thickness of the liner shall be 1.5 mm thick (min) with minimum width of 7.5 m and length of 150 m to reduce the number of joints. Understanding the seriousness of the project Naue –Germany/Equivalent -GSE-Germany make shall be used. HDPE liner make will be laid at the prepared base areas as well as on the dike slopes. A detailed technical specifications has been provided as a part of the technical proposal attached.

Leachate collection system shall be installed and leachate will be recycled back into Phosphoric Acid Plant. Capacity of the leachate collection (Gypsum Return Water Pond) will be ~3000 m^3 per Gypsum storage.

Considering hydrogeology study conducted for this project and solid waste storage locations in the plot layout, piezo well locations have been identified and marked on the plot plan as per **Annexure-10(b).** Additionally, there will be 2 nos. of rainwater collection pond having capacity of 4,000 m^3 from gypsum storage runoff.

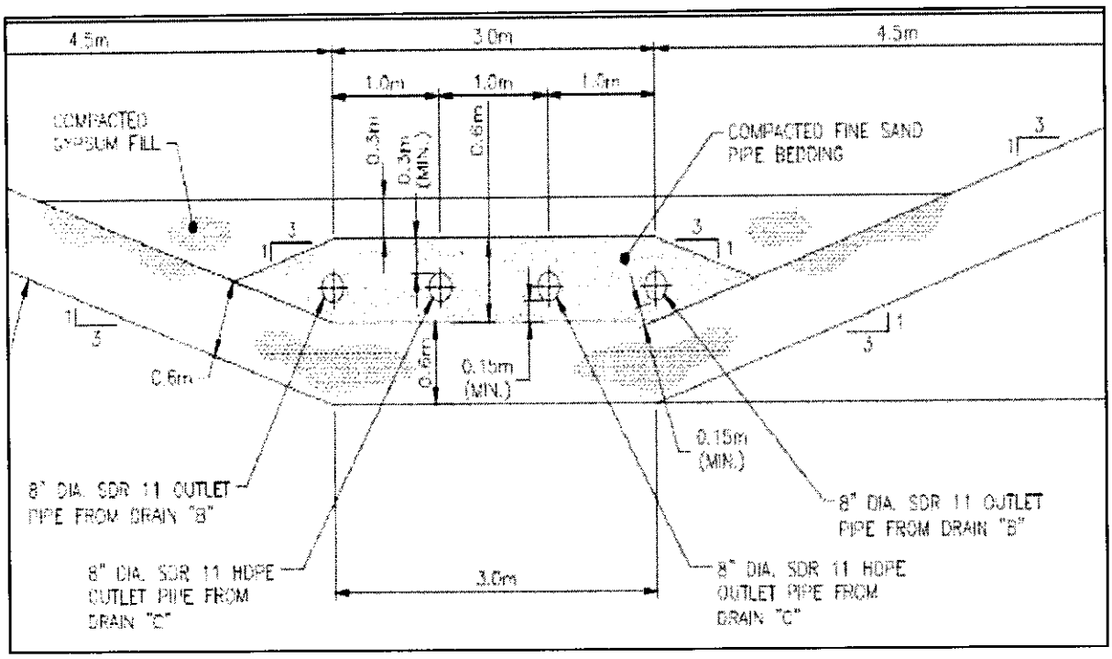
Phospho-gypsum will be stacked in the Gypsum storage yard with a dry stacking method. Phospho-gypsum from the plant will be transported to gypsum storage area by a conveyor system and tippers will be used to spread the phospho-gypsum within the storage area. Leachate collected from the gypsum storage area will be pumped to phosphoric acid plant through a piping system for consumption within the process.



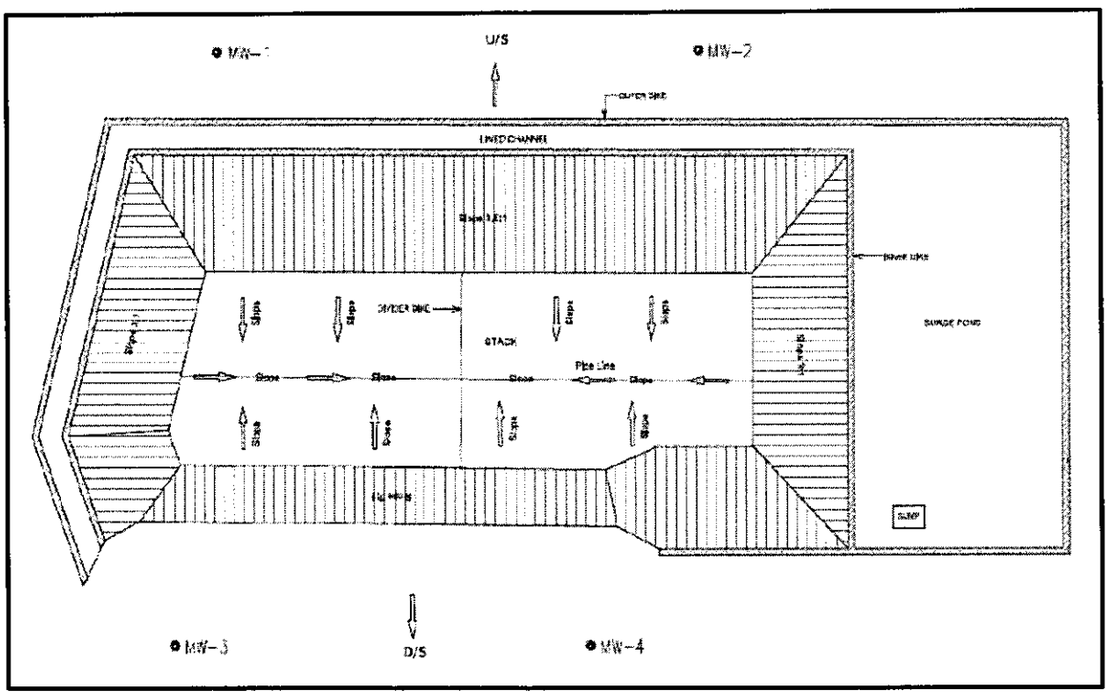
PHOSPHO-GYPSUM STORAGE AREA LINER SYSTEM

3353

EAC OBSERVATION NO.-10



PHOSPHO-GYPSUM STORAGE LEACHATE DRAIN SYSTEM



LEACHATE COLLECTION AND RECYCLING SYSTEM

To collect and convey the leachate to the collection sump and leachate collection system will have the following:

1) Drainage layer.
2) A perforated pipe collector system.
3) Sump collection area.
4) Removal of the leachate.

The leachate drainage is usually achieved using graded under-liner and drains which lead to a collection system/surge pond leading to a sump. From the sump, it is pumped back to phosphoric acid plant for consumption.

A typical layout of the stack area, leachate Channel and surge pond is shown below:

PHOSPHOGYPSUM STORAGE AREA LINER SPECIFICATION

Liner Make: Naue, Germany
Thickness: 1.5 mm-Smooth, Length:150 m, Width:7.5 m

Property	Test Method	Unit	Value
Thickness Nominal	EN-1849-(2)/ASTM D 5199	mm	1.50
Lowest individual value	EN-1849-(2)/ASTM D 5199	mm	1.42
Density	EN ISO 1183/ASTM D 1505	Gm/cc	0.942
Melt Flow Index	EN ISO 1133/ASTM D 1238-190/2.16	Gm/10 min	<1.0
Tensile Strength at Yield	EN ISO 527-3/ASTM D 6693	N/mm	22
Tensile Strength at break	EN ISO 527-3/ASTM D 6693	N/mm	42
Elongation at Yield	EN ISO 527-3/ASTM D 6693	%	12%
Elongation at Break	EN ISO 527-3/ASTM D 6693	%	700
Tear Resistance	ISO 34-1/ASTM D 1004	N	215
Puncture Resistance	ASTM D 4833/EN ISO 12236	N	500
Carbon Black Content	ASTM D 1603	%	>2
Carbon Black Dispersion	ASTM D 5596	Cat	1-2
Dimensional Stability	EN 1107-2/ASTM D 5397	%	+/- 2

Tolerance: 10% on values except thickness, Carbon Black for which a range is given

ANNEXURE-10(a)

3356

Brief Note

on

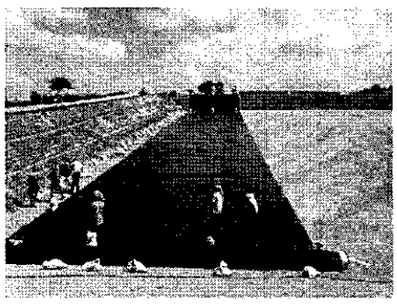
Technical Elements of

Phosphogypsum Stack Project

at

Adani Copper Refinery

Mundra, Gujarat, India





Submitted by

GARWARE
TECHNICAL FIBRES

GARWARE TECHNICAL FIBRES LIMITED
(Geosynthetics Division)

Corporate office: Plot: 11, Block: D-1, MIDC Chinchwad, PUNE: 411019

Date of submission: April- 2019

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1 Cover Note

With reference to the subject cited above, it give us pleasure to receive the enquiry and would like to place on record our desire to associate in the subject project for the construction of the Geosynthetic Lined Gypsum Stack construction. Sir, we at Garware Technical Fibres Ltd (GTFL)-Geosynthetics Divn have been striving tirelessly to Design, supply, install and commission the best Environmental protection Structures for the Waste/Process residue management for the industries as well as municipal corporations. We are also working in many diverse areas of Ground/Geotechnical/Geo-environmental engineering with prime focus on environmental protection, resource Conservation. In specific to the complexity of the project which Adani Enterprises Ltd is planning to undertake, we would like to put forth the following points

GTFL has been associated with similar Phosphogymsum Stack projects in the past for Coramnadal Fertilizers, Paradeep Phosphate and IFFCO (2006-2010).We are also executing Phosphogymsum Stack expansion for Paradeep Phosphate Ltd and IFFCO as per CPCB Guidelines-2014. GTFL has also been involved in design, engineering and execution of large number of Secure Landfill Projects for its customers including Indian Oil, Sterlite Industries, Cairn Energy, HZL, Vedanta Aluminium Ltd, Pimpri Chinchwad Municipal Corporation, KMML-Kerala to name a few.

We have also knowledge of the legal and statutory requirements of the project of such nature and have been associated with various Pollution Control Boards on behalf of the industry and thereby handling and holding hand in explaining the technicalities and compliance related issues.

Above all, our experience of past **20 years in Geosynthetic Lining and related construction with cutting edge technology** has always given industry the confidence to associate with us.

We would be pleased to associate with you to deliver the best available design, products and services for your project

We are also sure that your company will be equally interested to give us an opportunity to demonstrate our Supply/Service capability for the subject project.

2 Brief about Phosphogypsum Stack

The following pages gives only brief outline of key elements of the Phosphogypsum Stack for explanation purpose which Adani Copper Refinery is proposing. Adani Copper Refinery is proposing to construct at its upcoming Copper Refinery located at Mundra, Gujarat. At a later stage, detailed engineering, planning including drawing, material specifications shall be made and the same shall be submitted for approval before starting of the construction of the facility.

2.1 Phosphogymsum Stack Layout

The construction of Phospo Gypsum Stack facility at Adani Copper Refinery site is proposed to be executed with detailed planning and engineering, design of the facility. Broadly it shall consist of Access Road, Perimeter Road, Electrical Lighting, outer/perimeter embankment, inner embankment for disposal of the gypsum, installation of various Geosynthetics materials. drainage trench, outlet and lined channels around the gypsum stack, installation of the Geosynthetic materials, air vent system on the prepared base areas, installation of a 1.5 mm thick smooth & friction high density polyethylene (HDPE) liner-Naue Germany make and as per European standards on the inboard perimeter dike slopes and prepared base areas and construction of the under drains and outlets.

2.2 Site Investigation Criteria

2.2.1 Preliminary Boreholes and Geophysical Investigation:

At each site, as a part of preliminary data collection, one to two boreholes will be drilled and samples collected at every 1.5m interval to a depth of 20m below the ground surface. The following information will be obtained:

(a) soil type and stratification;

(b) permeability of each strata;

(c) strength and compressibility parameters (optional);

(d) ground water level & quality and depth to bedrock.

In addition to preliminary boreholes, geophysical investigations (electrical resistivity/seismic refraction/others) will be undertaken to assess the quality of bedrock at different sites.

A detailed site investigation program will comprise of

(a) subsoil investigation,

(b) ground water/hydrogeological investigation.

(c) hydrological investigation,

(d) topographical investigation and

(e) geological investigation.

The output expected from each investigation is listed below:

a) **Subsoil Investigation:** A detailed investigation plan may be drawn up in consultation with a geotechnical engineer The output from such an investigation should yield the following:

   (i) Stratification of subsoil -type of soil and depth

   (ii) Depth to ground water table and bedrock (if located within 15m of base of landfill)

   (iii) Permeability of various strata beneath the landfill.

   (iv) Strength and compressibility properties of subsoil

(v) Extent of availability of liner material, drainage material, top soil and protective soil in adjacent borrow areas.

(vi) Subsoil properties along approach road.

A minimum of 3 boreholes per hectare of landfill area upto 15m beneath the base of the landfill shall be drilled and in-situ tests as well as laboratory tests shall be performed for permeability, strength, compressibility and classification of soils.

In addition, test pits and boreholes shall be drilled at borrow area for liner and cover materials as well as along approach road.

b) **Ground Water/ Hydrogeological Investigation:** A detailed investigation plan may be drawn up in consultation with a ground water specialist or a hydrogeologist. The output from such an investigation should yield the following:

(i) Depth to groundwater table and its seasonal variations.

(ii) Ground water flow direction

(iii) Baseline ground water quality parameters -all drinking water quality parameters.

c) **Topographical Investigation:** Construction of a landfill involves a large quantity of earthwork. It is essential to have an accurate topographical map of the landfill site to compute earthwork quantities precisely. A map of 0.3m contour interval is considered desirable.

d) **Hydrological Investigation:** The objective of a hydrological investigation is to estimate the quantity of surface runoff that may be generated within the landfill to enable appropriate design of drainage facilities. If additional run off from areas external to the landfill is likely to enter the landfill, this quantity should also be estimated to design interception ditches and diversion channels. Such an investigation shall yield estimates of peak flows if seasonal rivers or streams run close to the site hydrological investigation should indicate the possibility of flooding of the site under one in 100 year flood flows. Surface water samples for water quality analysis may be collected from dUring hydrological studies.

e) **Geological Investigation and Seismic Investigation:** Geological investigations shall delineate the bedrock profile beneath the landfill base, if not confirmed by subsoil investigations. Geophysical surveys may be designed in consultation with a geologist. In hilly areas or in quarried rocks. Geological investigations should indicate the quality of surficial rock, depth to sound rock and the possibility of interconnected aquifers beneath the landfill base In the rock mass. Detailed seismic data may be obtained as a part of geological investigations.

2.2.2 Base Stability, Slope Stability and Seismic Aspects:

For landfills construction on the soil, the base will be checked for stability against bearing failure or excessive settlements.

The stability of side slopes of a landfill shall be checked for the following cases (Fig. 9).

(a) stability of excavated slopes

(b) stability of liner system along excavated slopes

(c) stability of temporary waste slopes constructed to their full height (usually at the end of a phase)

(d) stability of slopes of above-ground portion of completed landfills

(e) stability of cover systems in above ground landfills.

The stability analysis shall be conducted using the following soil mechanics methods depending upon the shape of the failure surface

(a) failure surface parallel to slope;

(b) wedge method of analysis;

(c) method of slices for circular failure surface and

(d) special methods for stability of anchored geomembranes along slopes.

In preliminary design of a landfill section, the following slopes will be adopted.

(a) Excavated soil slopes (2.5 horizontal : 1 vertical)

(b) Temporary waste slopes (3.0 horizontal : 1 vertical)

(c) Final cover slopes (4.0 horizontal : 1 vertical)

Slopes can be made steeper, if found stable by stability analysis results. Acceptable factors of safety may be taken as 1.3 for temporary slopes and 1.5 for permanent slopes.

In earthquake prone areas, the stability of all landfill slopes shall be conducted taking into account seismic coefficients as recommended by BIS codes.

2.3 Lining System

2.3.1 Bottom Liner System

The lining system is additional to the separation or unsaturated zone comprising soil or sand between the wet season high elevation of the ground water and the stack yard. These liner consist of native clayey soil/amended soil/ad-mixture soil. The permeability of the soil / amended soil should be less than or equal to 1×10-7 cm/sec. As an alternative to clay Geosynthetic Clay Liner made from Natural Sodium Bentonite sandwitched between two layer of Geotextile known as Bentofix made by Naue-Germany meeting the regulatory requirement may be used.

A schematic cross section of the bottom Liner system is given in **Figure 1**.

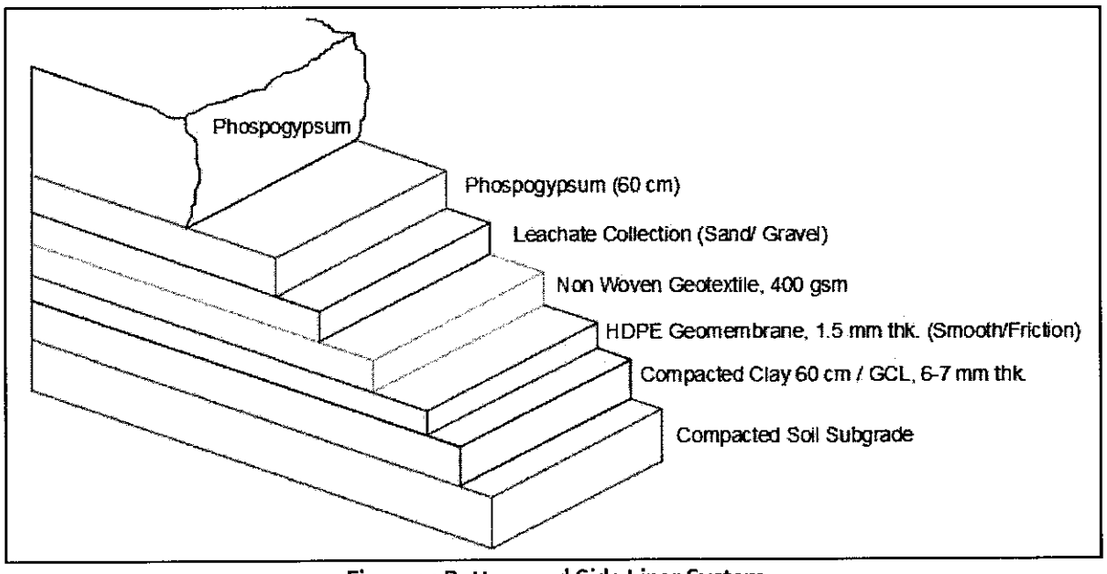


Figure 1: Bottom and Side Liner System

2.3.1.1 Geomembranes

These are flexible sheets made from various plastic materials. The recommended liner along the side as well as the bottom of the facility is HDPE Liner. HDPE lining is effected by overlapping the strips and joining them with a special welding technique.

The thickness of the liner shall be 1.5 mm thick (min) made through flat cast extrusion technology to keep the thickness variation across the rolls to less than 5% and the minimum width of the membrane shall not be less than 7.5 m and length shall not be less than 150 m to reduce the number of joints. Understanding the seriousness of the project Naue –Germany / Equivalent -GSE-Germany make has been recommended for use. Detailed Material Specifications are given in the annexure. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance.

2.3.1.2 Protection Layer (Non Woven geotextile)

To protect the geo membrane against the mechanical stress and failure thereby, non-woven needle punched Geo textile manufactured through mechanically bonding and made from continuous fibres/filaments and made of 100% UV stabilized Polypropylene is to be used on the HDPE Liner on the bed as well as the slopes. For the protection purpose, 400 gsm overlay Non-Woven Geotextile has been recommended. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance. The minimum width of the Non Woven Geotextile shall be 4 m and minimum length shall be 90.0m.

2.3.1.3 Drainage Layer

The Gypsum Stack facility essentially generates significant quantity of leachate due to inherent moisture present in the waste body and the rain water precipitation. This leachate is impregnated with harmful chemicals and pollutants. This is to be collected, removed from the facility and treated. In order to collect the leachate from the waste body a Drainage layer of 30 cm granular material of permeability>1*10-2 cm/sec is put over the protective layer of Geotextiles.

Looking at the following aspects of the Gypsum Stack the following drainage medium has been recommended:

(a) Structural profile and geometry

(b) Bottom and side slope pattern

(c) Performance of various geological and synthetic material for drainage function

Hence for the side slope geocomposite drainage net and for the bottom slopes, Sand/gravel as a drainage medium for the primary and secondary layer of desired specification has been recommended.

2.3.2 Side liner system of Gypsum Stack

The side liner system is on the inner side of soil bunds with slope 1:3 (V: H).The construction procedure of each layer of sideliner system is shown in Figure No: 02.

GCL-Bentofix-Naue Germany make of minimum 6-7mm thickness with powdered bentonite to be used instead of compacted clay as the slope is not so gentle and it is difficult to compact the clay on steep slope.

Moreover on the Non-Woven Geotextile, Geocomposite Drainage Net shall be used as a Drainage Medium instead of Sand/ Gravel. **A schematic sketch of the side liner system anchoring with gas venting system is shown in Figure 2.**

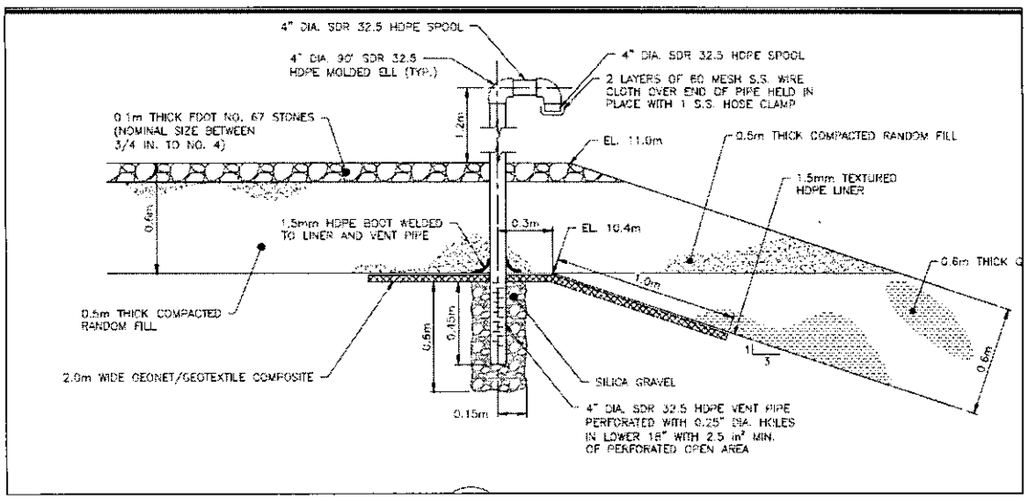


Figure 2: Side Liner System

2.4 Leachate Drainage, Collection & Removal System

In order to collect and convey the leachate generated to the collection sump, a Leachate collection System has been designed. It comprises of the following:

(a) Drainage Layer.

(b) A Perforated Pipe Collector System.

(c) Sump Collection Area.

(d) Removal of the leachate.

The leachate drainage is usually achieved using graded under-liner and drains which lead to a collection system/ Surge Pond leading to a sump. A typical layout of the stack area, leachate Channel and surge pond is shown in **Figure 3**.

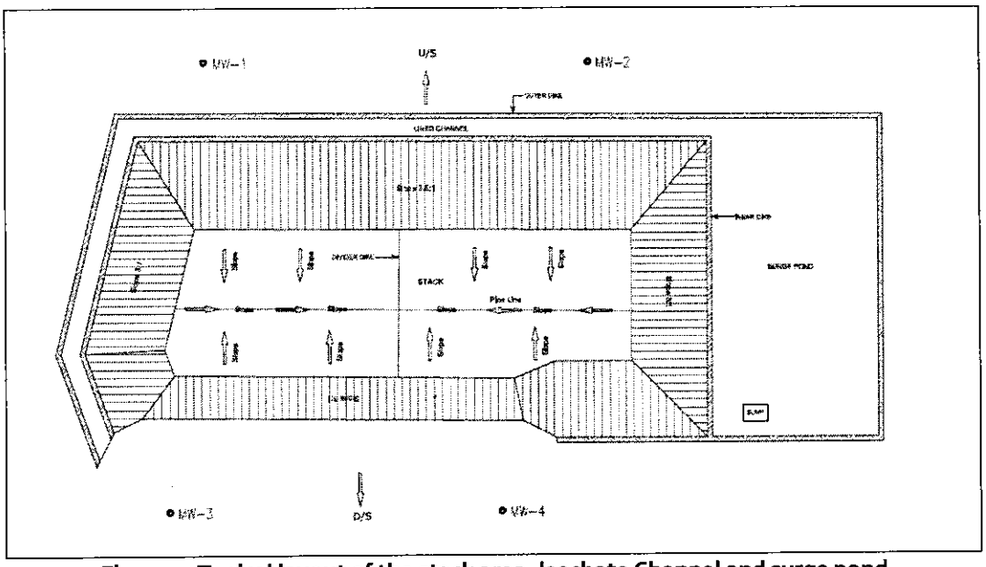


Figure 3: Typical layout of the stack area, leachate Channel and surge pond

The technical details of the leachate drainage are as under:

Thickness of the Drainage Layer should be designed in such a way so that, the leachate can be evacuated quickly. Broadly, 150 mm for arterial pipes for collecting and 200 mm main header line for transporting the leachate from the body of Gypsum stack would be able to carry the leachate to the sump. Gravel/Sand to be used for the smooth drainage of the leachate from the stack area to the piping system. A typical drain section is shown in **Figure 4**.

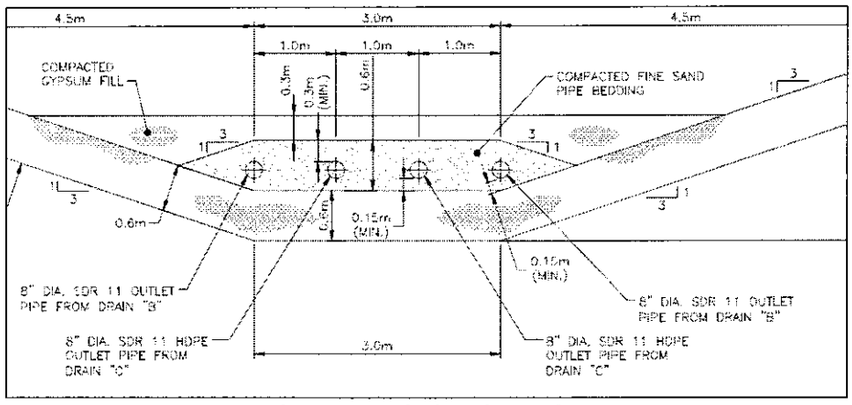


Figure 4: Typical Drain Section

2.5 Construction of Embankment

Embankment shall be designed based on sound engineering practices and also shall be checked for slope stability analysis considering seismic factors of Mundra-Gujarat region.

The embankment shall be constructed to the lines and grades shown on the drawings. Placement of fill shall be performed in an orderly way and in an efficient and workman like manner, so as to produce fills having such quantities of density, strength and permeability as will ensure the highest practicable degree of stability and performance of the embankment.

The slopes of embankment shall be maintained as per specific structures drawing.

2.5.1 Fill Materials

The materials for embankment shall be obtained from the available excavated material. Some earth material available from the excavation in the pond area if found suitable will also be used for the embankment construction. Morrum / Yellow soil or soil which satisfy the accepted civil engineering property of the bund construction shall be accepted.

2.5.2 Placing the fill material Compaction of the Embankment and Base: (IS: 2720)

The combined excavation and placing operations shall be such that the materials when compacted in the fill will be blended sufficiently to produce the specified degree of compaction and stability. The earth obtained from a particular borrow area as far as possible shall be used in forming the complete cross-section of the fill for a particular stretch.

No stones cobbles or rock fragments, having maximum dimensions of more than 5 cm shall be placed in the fill. Such stones and cobbles shall be removed either at the borrow pit or after being transported to the site but before the materials in the fill are rolled and compacted. Such stones or cobbles shall be placed in other portions of embankment if found suitable or rejected as directed. The materials shall be placed in the fill in continuous horizontal layers, stretching right across the whole section, not more than 0.4 m in compacted thickness

Vibratory rollers/static roller shall be used for compacting cohesive materials and pneumatic rollers and vibratory rollers shall be used for compacting cohesion less materials. The compaction in

horizontal layers will be done using standard compaction equipment or in inclined layers using slope compactors/appropriate method.

2.6 Inspection Test

Control tests shall be carried out in laboratory from time to time to determine whether the earth produced by methods employed satisfies the requirements of the specifications and documented for verification by the Officer- in –Charge of the regulatory authority and the work shall be inspected periodically.

Complete documentation of all quality control records and their submission to the GPPCB along with showing satisfactory achievement of acceptance criteria.

The quality control tests for compacted clay layer (or amended soils) as well as the leachate collection/drainage layer will include

(a) In-situ density tests.
(b) in-situ moisture content tests.
(c) Compaction tests.
(d) Permeability tests,
(e) Grain size distribution tests and
(f) Atterberg's limits tests
(g) Others as defined by GPCB.

The quality control tests for geomembrane liners shall be carried at as per QA/QC protocol and shall include the following:

(a) Thickness tests,
(b) Density tests,
(c) Strength tests,
(d) Field seam strength & leak tests

The Officer- in -Charge shall determine whether the desired results are being obtained.

Dressing and Trimming of the slopes

The outer slopes of the embankment shall be neatly dressed to line. Compaction shall extend over the full width of the embankment and the material in the slopes shall be compacted as for the rest of structure. To ensure proper compaction at the outer edge, the fill shall be constructed for a minimum of 0.5 m/1.0m extra width on either edges or the outer edge dressed to true width and slope after compaction. No earth slope shall be left without trimming to design slope.

2.7 Design of Storm Water Drain:

The catchment includes the top or cap of the Gypsum Stack facility as well as the outer slope of embankment and site upto fencing. Hence to divert the incoming water at the surface level as well as the slope and terraces of the Gypsum Stack facility, adequate storm water drainage channels need to be designed, constructed. The channel has to ultimately carry water to the storm water pond for storage or evaporation purpose in case not discharged outside.

2.8 Surface Water Drainage System

Surface water management shall be designed to ensure that rainwater run-off does not drain into the waste from surrounding areas and that there is no waterlogging/ponding on covers of landfills. A schematic surface water drainage system comprising of channels, drains, culverts and basins (Fig8) shall be designed to ensure the following:

(a) Rainwater running off slopes above and outside the landfill area shall be intercepted and channelled to water courses without entering the operational area of the site. This diversion channel may require a low permeability lining to prevent leakage into the landfill
(b) Rain falling on active tipping areas shall be collected separately and managed as leachate, via the leachate collection drain and leachate collection sumps to the leachate treatment and disposal system.
(c) Rainfall on areas within the landfill site, but on final covers of phases which have been completed and are not actively being used for waste disposal shall be diverted in drainage channels away from active tipping areas, and directed through a settling pond to remove suspended silt, prior to discharge.
(d) Any drainage channels or drains constructed on the restored landfill surface shall be able to accommodate settlement, resist erosion and cope with localised storm conditions.
(e) The horizontal surface of the final cover shall be provided a slope of 3 to 5% for proper surface water drainage. The slope of the cover on the sides will be higher and governed by slope stability considerations
(f) All Interceptor channels, drainage channels and settling ponds (storm water basins) shall be designed by a hydrologist using hydrometerological data.
(g) It shall be ensured that water collected by surface water drainage system and leachate collected by the leachate collection system do not get intermixed at any stage of collection or storage This shall apply to the 'active' and 'post closure' periods of the landfill

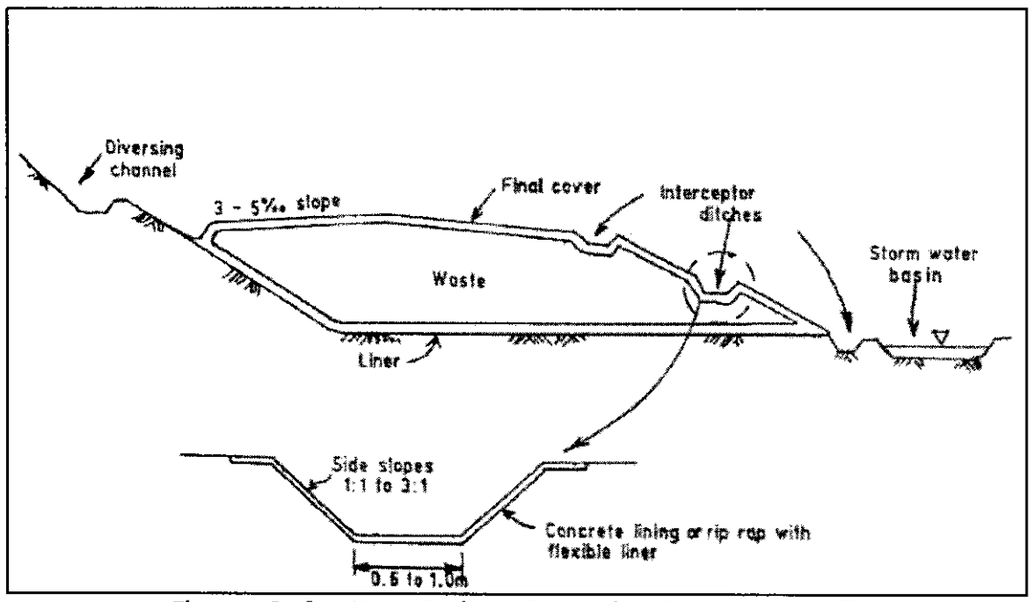


Figure 5: Surface Water Drainage System for a Completed Landfill

The design of following components will be undertaken:

(a) storm water drains, diversion channel
(b) storm water basin
(c) culverts if required

2.9 Piezometric Well

Piezometer shall be constructed to monitor the quality of groundwater. Two piezometers shall be installed on the downstream side of the SLF. Two piezometers shall be installed on the upstream side of the Gypsum Stack. At present, possible locations have been shown where the installation cane be done. But, exact location of the monitoring well shall be finalized in consultation with Gujarat State Pollution Control Board. The piezometer consist of a stand pipe made up of stainless steel/PVC which shall be screened along the entire aquifer depth i.e. the standpipe shall be- screened from a depth of 1 m to 10m or depending on ground water depth. The screened interval shall be encased in a filter zone made up of gravel and sand layer. The function of the filter zone is to allow free flow of groundwater into and out of standpipe and prevent fines from entering the standpipe. Immediately above the screened interval, a clay and bentonite seal shall be placed. The thickness of clay seal shall be 0.5 m. Above the clay and bentonite seal, a grout seal consisting of cement and bentonite shall be constructed which provides a barrier for preventing surface water and ground water from elsewhere from migrating into the screened interval. At the ground level, a steel casing embedded in concrete pad shall be employed. A cap shall be placed on the top of steel casing to prevent rainwater and surface water from entering into the standpipe. The piezometer shall be constructed at a minimum distance of 7 m from outside edge of the embankment. A schematic sketch of a Piezometer is shown in **Figure 6**. The location is shown in figure no 4.

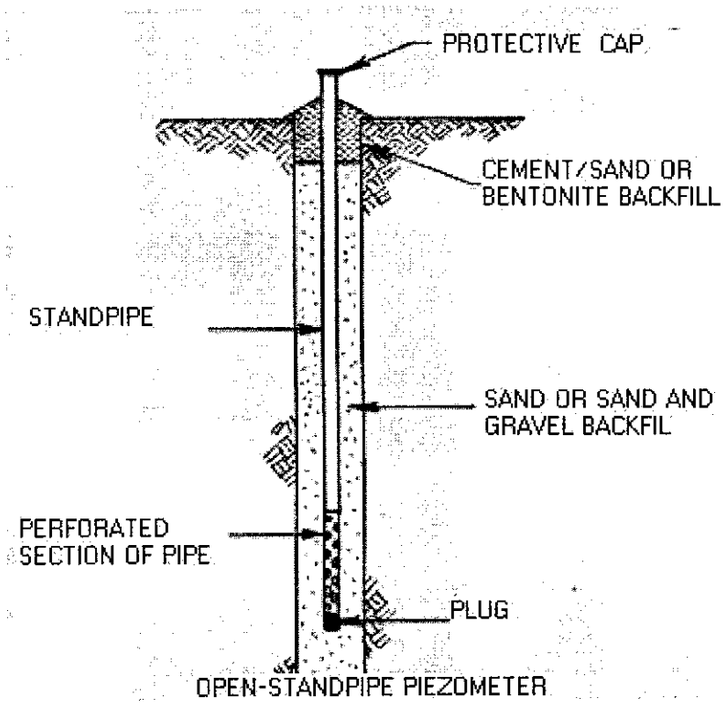


Figure 6: Piezometer

2.10 Annexure

Liner Make: Naue, Germany, Thickness: 1.5 mm-Smooth

Length:150m, Width:7,5m

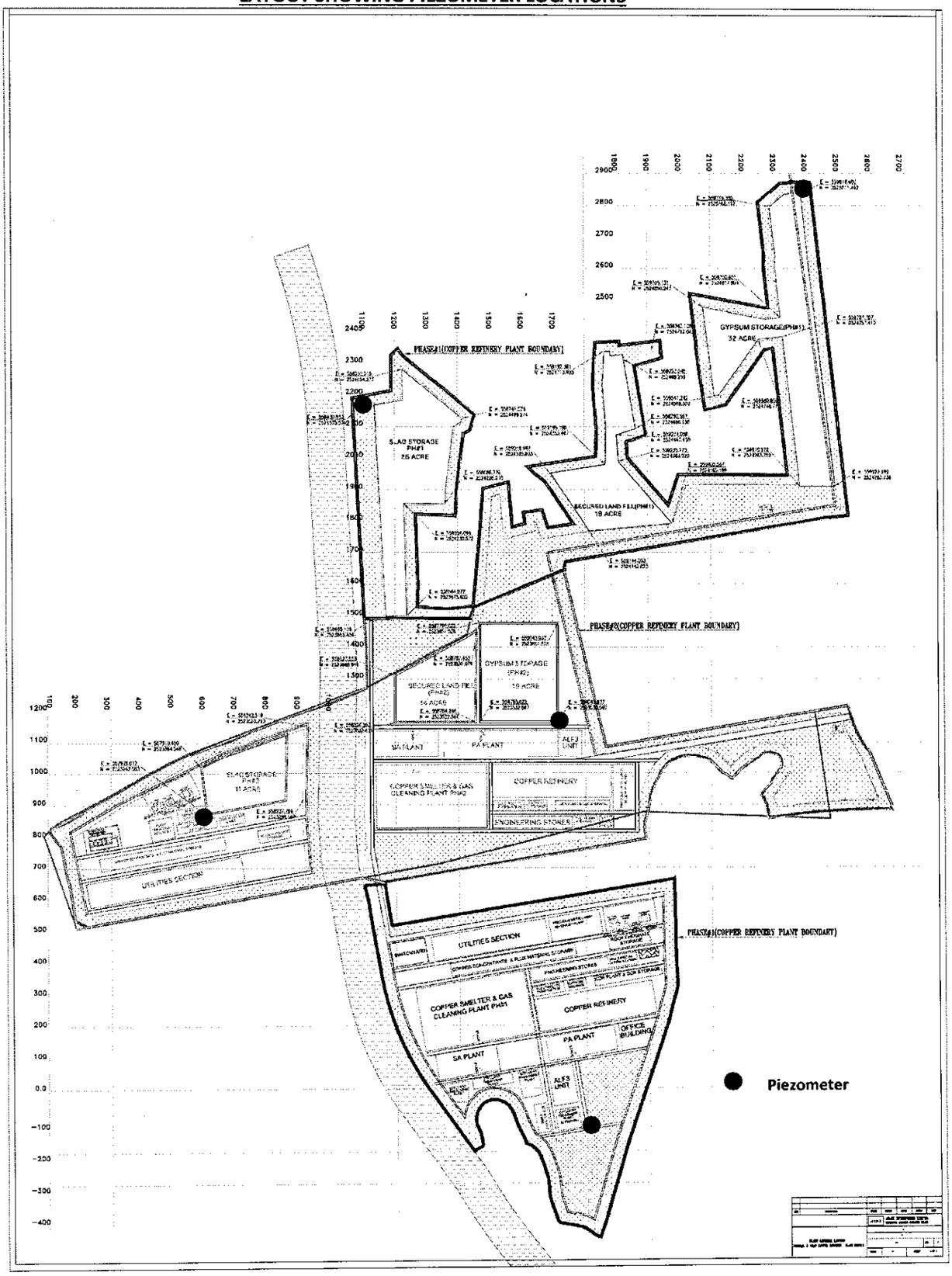
Property	Test Method	Unit	Value
Thickness Nominal	EN-1849-(2)/ASTM D 5199	mm	1.50
Lowest individual value	EN-1849-(2))/ASTM D 5199	mm	1.42
Density	EN ISO 1183/ASTM D 1505	Gm/cc	0.942
Melt Flow Index	EN ISO 1133/ASTM D 1238-190/2.16	Gm/10 min	<1.0
Tensile Strength at Yield	EN ISO 527-3/ASTM D 6693	N/mm	22
Tensile Strength at break	EN ISO 527-3/ASTM D 6693	N/mm	42
Elongation at Yield	EN ISO 527-3/ASTM D 6693	%	12%
Elongation at Break	EN ISO 527-3/ASTM D 6693	%	700
Tear Resistance	ISO 34-1/ASTM D 1004	N	215
Puncture Resistance	ASTM D 4833/EN ISO 12236	N	500
Carbon Black Content	ASTM D 1603	%	>2
Carbon Black Dispersion	ASTM D 5596	Cat	1-2
Dimensional Stability	EN 1107-2/ASTM D 5397	%	+/- 2

Tolerance: 10% on values except thickness, Carbon Black for which a range is given.

3369

Annexure-10(b)

LAYOUT SHOWING PIEZOMETER LOCATIONS



EAC OBSERVATION NO.-11

3370

EAC OBSERVATION:

Secured land fill site co-ordinates, lining details, leachate collection system envisaged and details of piezo-well installation has not been made available.

REPLY:

Site Coordinates are marked in Plot Plan and attached in annexure **Annexure-11(a)**

Secured land fill will be developed strictly as per CPCB Guidelines for Criteria for Hazardous Waste Landfills series: HAZWAMS/17/2000-01.

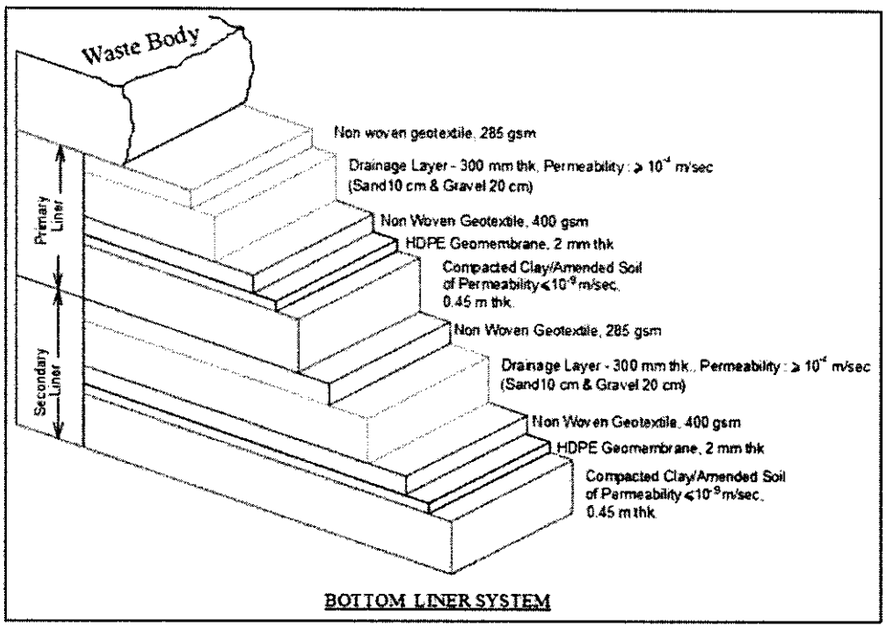
CRITERIA FOR SITE SELECTION FOR STORAGE OF HAZARDOUS WASTE (AS PER CPCB GUIDELINES)

Sr. No.	Description	Locational Criteria	Compliance
1	Lake or Pond	Distance more than 200 m	Storage-I: 550 m from pond located on North West side Storage-II: 850 m from pond located on North Side
2	River	Distance more than 100 m	Storage-I: 640 m from river flowing on West side Storage-II: 50 m from river flowing on West side
3	Flood Plan	No construction 100 Year flood Plan	Since no flow data is available for Dhanesrwari Nadi, a tentative estimate of run-off from Dhanesrwari Nadi catchment and discharge at railway line near project site is done based on the catchment characteristics.
4	Highway	Distance more than 500 m	Storage-I: 850 m from SH-6 which is on North side Storage-II: 1900 m from SH-6 which is on North side
5	Habitation	Distance more than 500 m	Storage-I: 1800 m towards North Storage-II: 2400 m towards North
6	Public Parks	Distance more than 500 m	Storage-I: 1850 m towards North Storage-II: 2450 m towards North
7	Critical Habitat Area	Nothing within critical Habitat areas including reserved forest area	NA
8	Wetlands	No construction within wetlands	Storage-I: 2.5 km from mangrove near Kotri creek Storage-II: 2.0 km from mangrove near Kotri creek
9	Airports	No construction within zone around airports as notified by regulatory authority or aviation authority	Bhuj Airport: 50 km Mundra Airport: 30 km
10	Water Supply Well	Distance more than 500 m	1.7 km from well in Navinal
11	Coastal Regulation Zone	No construction in Coastal Regulatory Zone	Storage-I: 750 m from CRZ Line Storage-II: 600 m from CRZ Line
12	Ground Water Table Level	No construction where ground water table will be less than 2 m below the base of the landfill	<2 m to 10 m

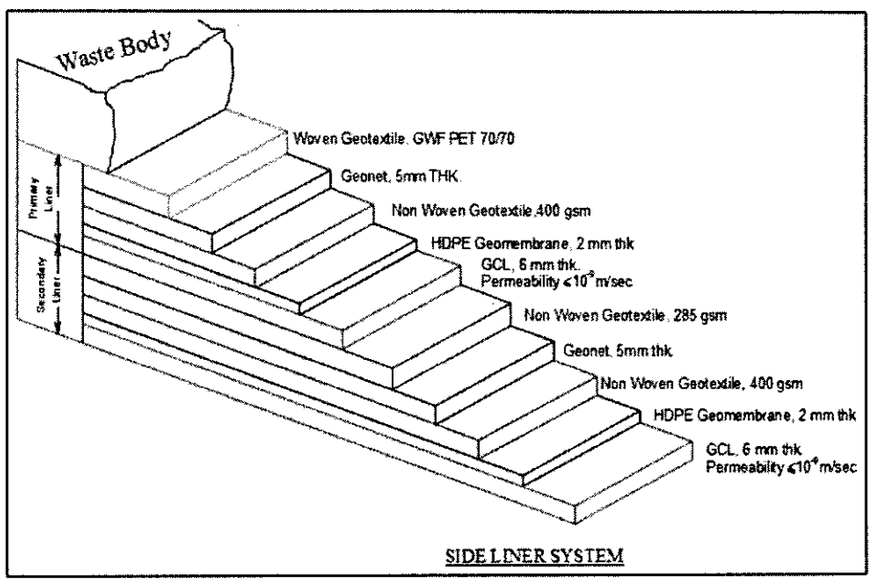
M/s. Garware Technical Fibres Limited (Geosynthetics Division), Pune; has been engaged to carry out a detailed technical study for the construction of the secured land fill and same is attached as **Annexure-11(b).**

The thickness of the HDPE liner shall be 2.0 mm thick (min) with minimum width of 7.5 m and length of 120 m to reduce the number of joints. Understanding the seriousness of the project Naue– Germany/ Equivalent– GSE Germany make shall be used. HDPE liner make will be laid at the prepared base areas as well as on the dike slopes. A detailed technical specification has been provided as a part of the technical proposal attached. Leachate collection system shall be installed and leachate will be treated into effluent treatment plant. A 60 m^3 leachate collection sump for each SLF will be provided along with pumping system to transfer to ETP for treatment and consumption.

Piezo well shall be installed based on the hydrogeology study carried out and location of the Piezo wells have been marked on the plot plan and same is attached as **Annexure-11(a).**



SECURED LAND FILL LINER SYSTEM (BOTTOM LINER)



SECURED LAND FILL LINER SYSTEM (SIDE LINER)

3372

EAC OBSERVATION NO.-11

It comprises of the following:

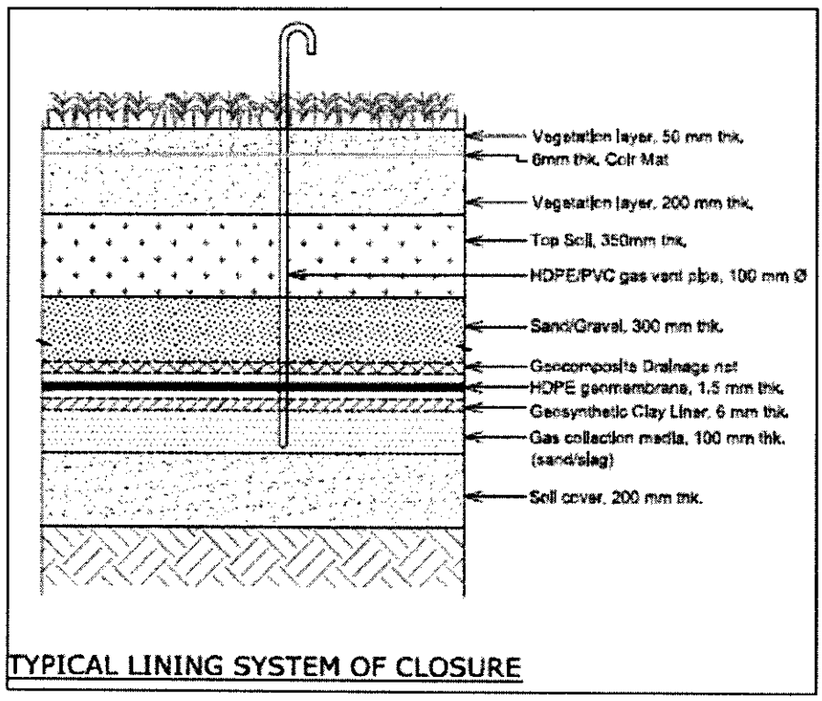
- **Geo-membranes:**
  - Material: HDPE
  - Thickness: 2.0 mm thick (min)
  - Process: Flat cast extrusion
  - Make: Naue – Germany / Equivalent -GSE-Germany.
  - Width/Length: 7.5 m/ 150 m

- **Protection Layer (Non-Woven geotextile)**
  - Material: 100% UV stabilized Polypropylene continuous fibers/filaments
  - Thickness: 400 gsm
  - Width/ Length: 4 m/ 90 m

- **Separation Layer (Non-Woven geotextile)**
  - Material: 100% UV stabilized Polypropylene continuous fibers/filaments
  - Thickness: 285 gsm
  - Width/ Length: 4 m/ 125 m

- **Drainage Layer**

Drainage layer of 30 cm granular material comprising of 10 cm coarse sand and 20 cm of gravel & having permeability>1*10-2 cm/sec will be laid over the protective layer of Geotextiles.



TYPICAL LINING SYSTEM OF CLOSURE

SECURED LAND FILL LINER SYSTEM (TOP LINER)

After the completion of each phase of the operation, the landfill will to be closed /insulated by putting the final cover.

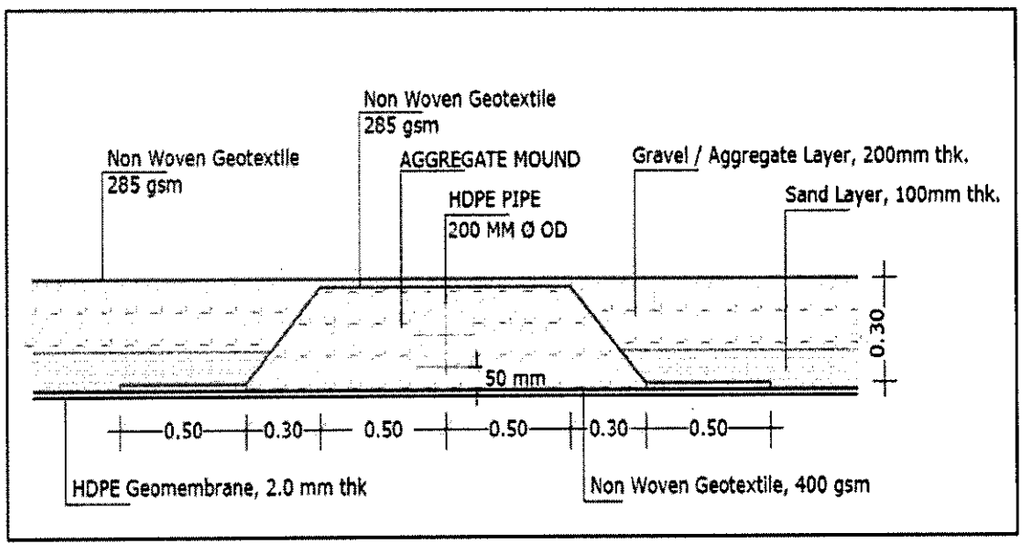
The final cover helps for the following:

- It enhances surface drainage
- Minimizes infiltration
- Vegetation grows on it

Construction of the Final Cover System:

Over the waste body

- Soil cover of 150 mm thick
- Gas collection media of 100 mm thick.
- Geo-synthetic cay liner (GCL of 6 to 7 mm thick) over the Gas collection media.
- Beyond this compacted clay/GCL, HDPE of 1.5 mm is will be laid.
- Over the HDPE, a drainage layer of Geo-composite drainage net will be laid.
- The final top soil layer of 600 mm thick (450 mm soil+150 mm Vegetative soil) will to be put for restricting the soil erosion from the final cover.



LEACHATE DRAINAGE, COLLECTION AND REMOVAL SYSTEM:

It comprises of the following:

- Drainage Layer.
- A Perforated Pipe Collector System.
- Sump Collection Area.
- Removal of the leachate.

The leachate drainage is achieved using graded under-liner and drains which lead to a collection system or a sump.

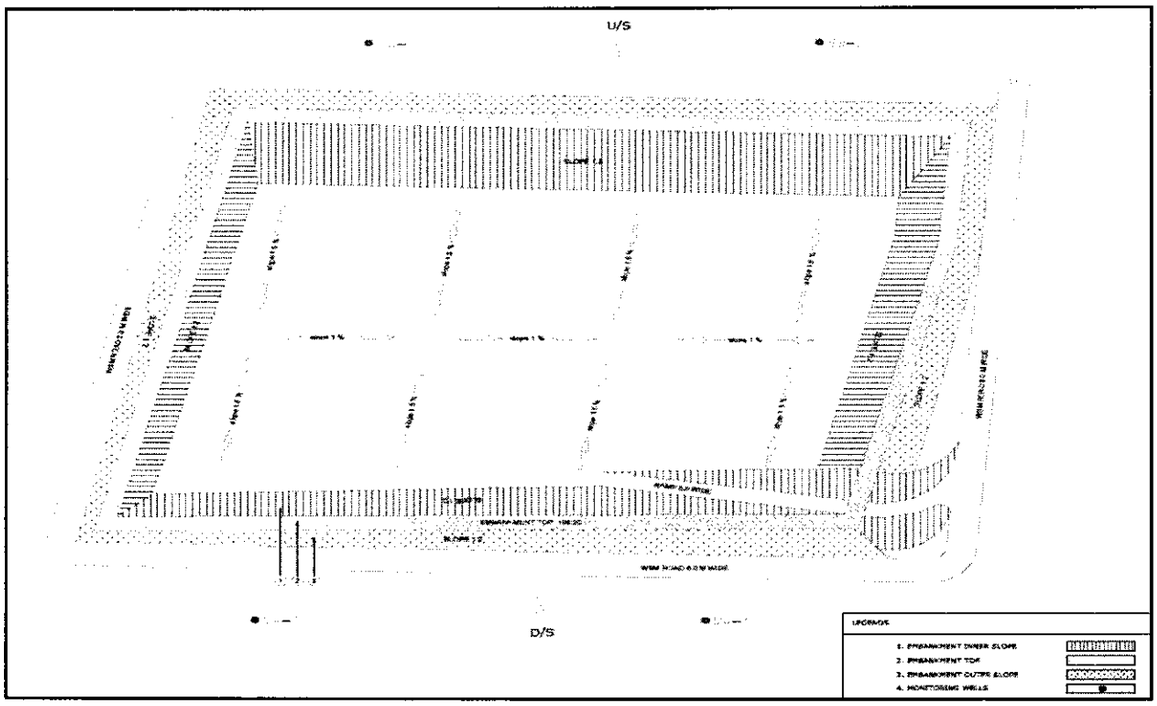
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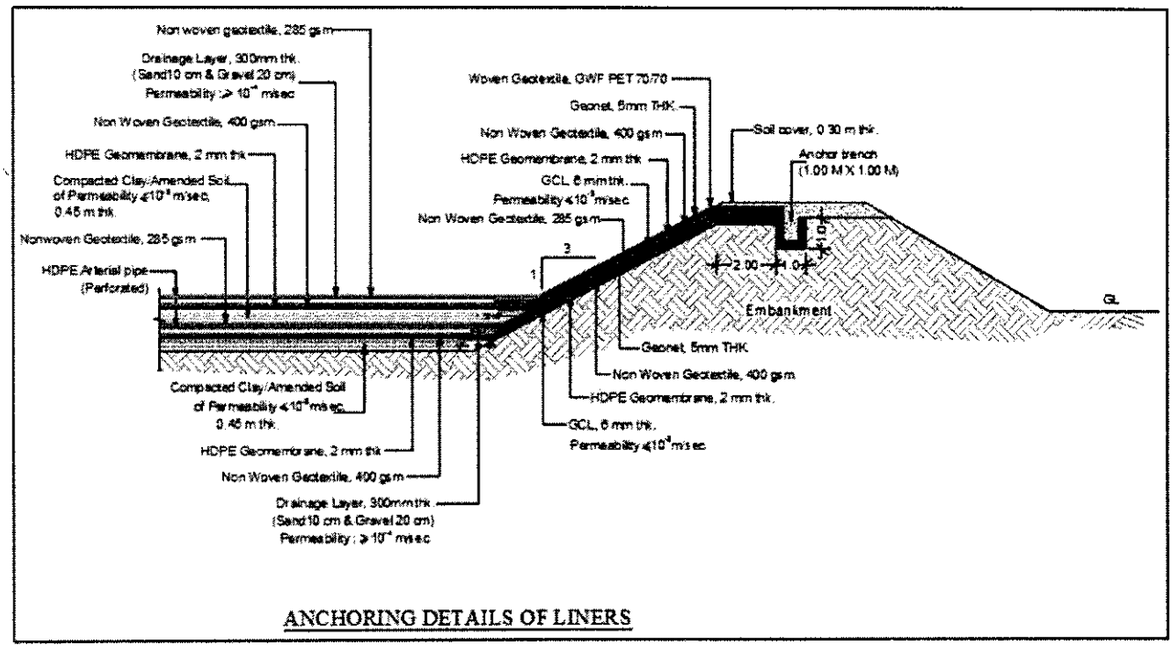
The technical details of the leachate drainage are as under:

- Thickness of the Drainage Layer: 150 mm for arterial pipes for collecting and 200 mm main header line for transporting the leachate from the body of SLF
- Material: Gravel/Sand for secondary bottom liner and geonet for primary bottom liner, primary and secondary side liner
- Permeability: 0.01 cm/sec

Natural slope shall be preferred for the transport of the generated leachate which will be collected in the channel and conveyed to the sump via collector pipe due to the designed longitudinal slope by gravity.



TYPICAL PLAN OF SLF, DRAIN SLOPE AND LOCATION OF GW MONITORING WELL



ANCHORING DETAILS OF LINERS

DETAILS OF LANDFILL LINING AND ANCHORING SYSTEM ALONG WITH PIPING

SLF STORAGE AREA LINER SPECIFICATION

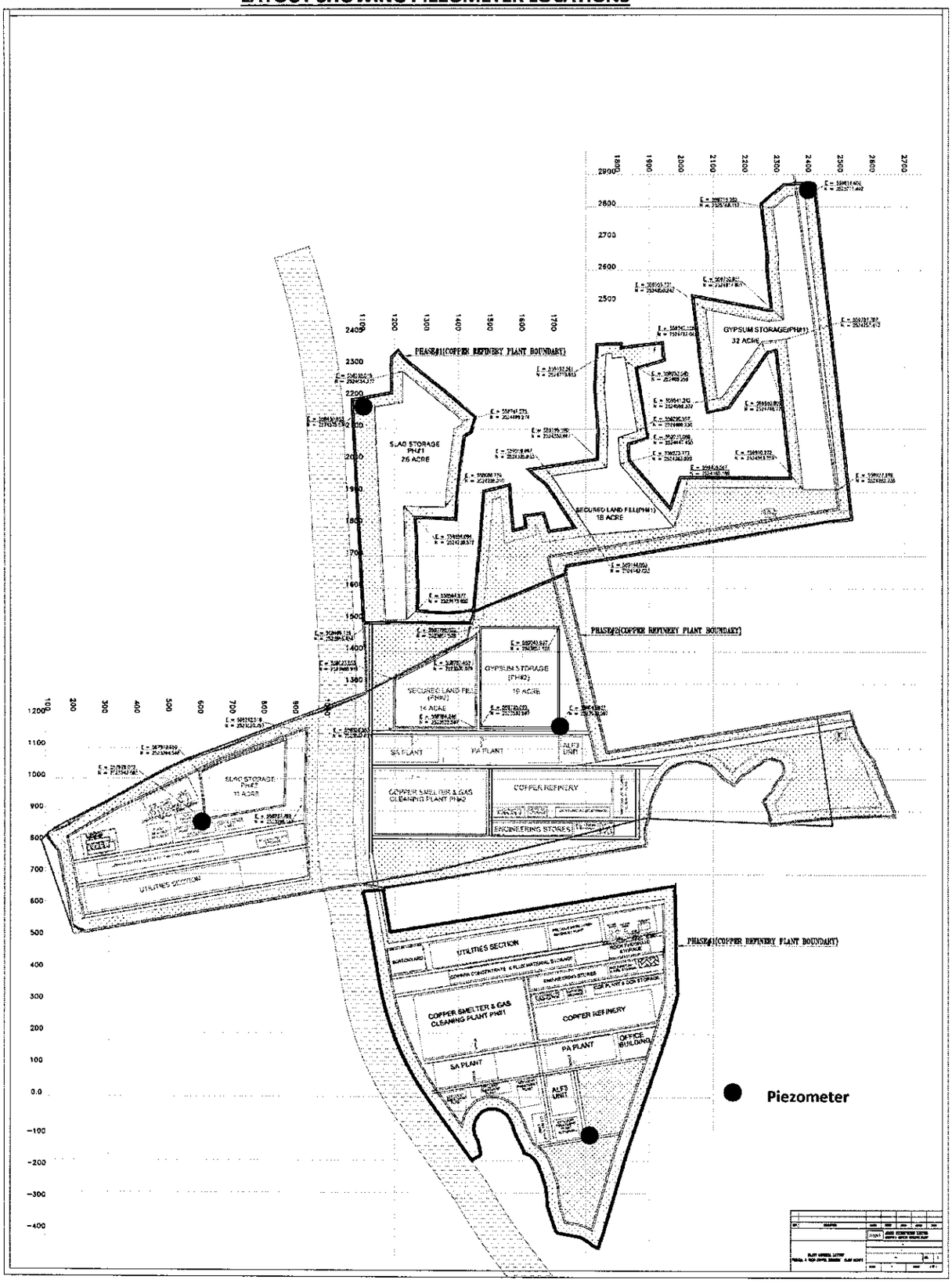
- Liner Make: Naue, Germany
- Thickness: 2.0 mm, Length: 120 m, Width: 7.5 m

Property	Test Method	Unit	Value
Thickness Nominal	EN-1849-(2)/ASTM D 5199	mm	2.00
Lowest individual value	EN-1849-(2)/ASTM D 5199	mm	1.90
Density	EN ISO 1183/ASTM D 1505	Gm/cc	0.942
Melt Flow Index	EN ISO 1133/ASTM D 1238-190/2.16	Gm/10 min	<1.0
Tensile Strength at Yield	EN ISO 527-3/ASTM D 6693	N/mm	33
Tensile Strength at break	EN ISO 527-3/ASTM D 6693	N/mm	60
Elongation at Yield	EN ISO 527-3/ASTM D 6693	%	12%
Elongation at Break	EN ISO 527-3/ASTM D 6693	%	700
Tear Resistance	ISO 34-1/ASTM D 1004	N	250
Puncture Resistance	ASTM D 4833/EN ISO 12236	N	700
Carbon Black Content	ASTM D 1603	%	>2
Carbon Black Dispersion	ASTM D 5596	Cat	1-2
Dimensional Stability	EN 1107-2/ASTM D 5397	%	+/- 2

Tolerance: 10% on values except thickness, Carbon Black for which a range is given.

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Annexure-11(a)
LAYOUT SHOWING PIEZOMETER LOCATIONS



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3076

Brief Note

on

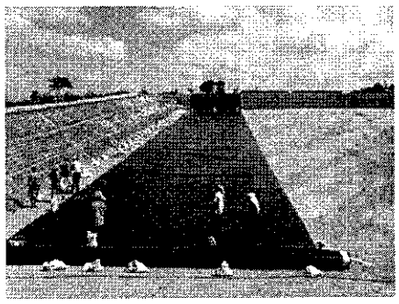
Technical Elements of

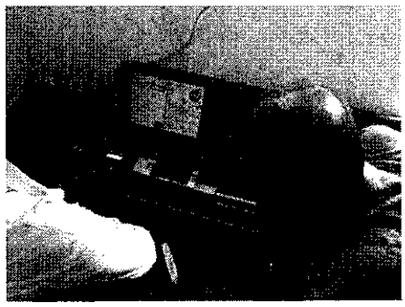
Secure Landfill Facility

at

Adani Copper Refinery

Mundra, Gujarat, India





Submitted by

GARWARE TECHNICAL FIBRES

GARWARE TECHNICAL FIBRES LIMITED
(Geosynthetics Division)

Corporate office: Plot: 11, Block: D-1, MIDC Chinchwad, PUNE: 411019

Date of submission: April- 2019

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1 Cover Note

With reference to the subject cited above, it give us pleasure to receive the enquiry and would like to place on record our desire to associate in the subject project for the Design and Development of Secure Landfill Facility as per the CPCB guidelines. Sir, we at Garware Technical Fibres Ltd (GTFL)-Geosynthetics Divn have been striving tirelessly to Design, supply, install and commission the best Environmental protection Structures for the Waste/Process residue management for the industries as well as municipal corporations. We are also working in many diverse areas of Ground/Geotechnical/Geo-environmental engineering with prime focus on environmental protection, resource Conservation. In specific to the complexity of the project which Adani Enterprises Ltd is planning to undertake, we would like to put forth the following points:

GTFL has been involved in design, engineering and execution of large number of Secure Landfill Facility –Design & Development Projects as per CPCB Guidelines for its customers including Indian Oil, Sterlite Industries, Cairn Energy, HZL, Vedanta Aluminium Ltd, Pimpri Chinchwad Municipal Corporation, KMML-Kerala to name a few.

We have also knowledge of the legal and statutory requirements of the project of such nature and have been associated with various Pollution Control Boards on behalf of the industry and thereby handling and holding hand in explaining the technicalities and compliance related issues to the regulators and other stakeholders.

Above all, our experience of past **20 years in Geosynthetic Lining and related construction with cutting edge technology** has always given industry the confidence to associate with us.

We would be pleased to associate with you to deliver the best available design, products and services for your project We are also sure that your company will be equally interested to give us an opportunity to demonstrate our Supply/Service capability for the subject project.

2 Brief about Secure Landfill Facility

The following pages gives only brief outline of key elements of the Secure Landfill Facility for explanation purpose which Adani Copper Refinery is proposing to construct at its upcoming Copper Refinery located at Mundra, Gujarat. At a later stage, detailed engineering, planning including drawing, material specifications shall be made and the same shall be submitted for approval before starting of the construction of the facility.

2.1 SLF Layout

The site layout shall be designed with the Secure Landfill Facility's construction, closure and end use closely in mind as this decides the final shape or the contours of the landfill. The Landfill broadly consists of the following in its proposed area:

- Body of the Facility where disposal will take place
- Supporting Infrastructure for smooth functioning of the facility.

The supporting infrastructures will also be decided based on the following:

- Size of the Facility. al
- Volume of waste it is going to handle.
- No. of trips the vehicle will make on daily basis.
- Loading and unloading conditions.
- No. of rainy days.
- Legal Requirements.

The processes taking place in a Secured Landfill Facility can be briefly described as the following. The waste coming into the landfill shall be checked and sent to the landfill facility. This waste when in contact with rain water produces leachate which is collected through leachate collection pipe network to the Leachate collection sump and further sent to Solar evaporation pond by pumping.

2.1.1 Associated Infrastructure

1. Main Entrance and Gate
2. Security cabin/ Administration building
3. Fill Soil Area
4. Storm Water Drain
5. Access Road
6. Ground Water Monitoring Well (Piezo metric Well)
7. Fencing & Greenery
8. Waste Stabilization Area of Hazardous Waste

2.1.2 SLF & its Elements

9. Secured Landfill Facility: for Hazardous and Non Hazardous Waste
10. Approach Ramp
11. Leachate Collection Sump
12. Leak Detection Sump

2.1.3 Site Investigation Criteria

2.1.3.1 Preliminary Boreholes and Geophysical Investigation:

At each site, as a part of preliminary data collection, one to two boreholes will be drilled and samples collected at every 1.5m interval to a depth of 20m below the ground surface. The following information will be obtained:

(a) soil type and stratification;
(b) permeability of each strata;
(c) strength and compressibility parameters (optional);
(d) ground water level & quality and depth to bedrock.

In addition to preliminary boreholes, geophysical investigations (electrical resistivity/seismic refraction/others) will be undertaken to assess the quality of bedrock at different sites.

A detailed site investigation program will comprise of:

(a) subsoil investigation,
(b) ground water/hydrogeological investigation.
(c) hydrological investigation,
(d) topographical investigation and
(e) geological investigation.

2.1.3.2 The output expected from each investigation is listed below:

I. **Subsoil Investigation:** A detailed investigation plan may be drawn up in consultation with a geotechnical engineer. The output from such an investigation should yield the following:

(a) Stratification of subsoil -type of soil and depth
(b) Depth to ground water table and bedrock (if located within 15m of base of landfill)
(c) Permeability of various strata beneath the landfill.
(d) Strength and compressibility properties of subsoil
(e) Extent of availability of liner material, drainage material, top soil and protective soil in adjacent borrow areas.
(f) Subsoil properties along approach road.

A minimum of 3 boreholes per hectare of landfill area upto 15m beneath the base of the landfill shall be drilled and in-situ tests as well as laboratory tests shall be performed for permeability, strength, compressibility and classification of soils.
In addition, test pits and boreholes shall be drilled at borrow area for liner and cover materials as well as along approach road.

II. **Ground Water/ Hydrogeological Investigation:** A detailed investigation plan may be drawn up in consultation with a ground water specialist or a hydrogeologist. The output from such an investigation should yield the following:

(a) Depth to groundwater table and its seasonal variations.
(b) Ground water flow direction
(c) Baseline ground water quality parameters -all drinking water quality parameters.

III. **Topographical Investigation:** Construction of a landfill involves a large quantity of earthwork. It is essential to have an accurate topographical map of the landfill site to compute earthwork quantities precisely. A map of 0.3m contour interval is considered desirable.

IV. **Hydrological Investigation**: The objective of a hydrological investigation is to estimate the quantity of surface runoff that may be generated within the landfill to enable appropriate design of drainage facilities. If additional run off from areas external to the landfill is likely to enter the landfill, this quantity should also be estimated to design interception ditches and diversion channels. Such an investigation shall yield estimates of peak flows if seasonal rivers or streams run close to the site hydrological investigation should indicate the possibility of flooding of the site under one in 100 year flood flows. Surface water samples for water quality analysis may be collected from during hydrological studies.

V. **Geological Investigation and Seismic Investigation:** Geological investigations shall delineate the bedrock profile beneath the landfill base, if not confirmed by subsoil investigations. Geophysical surveys may be designed in consultation with a geologist. In hilly areas or in quarried rocks. Geological investigations should indicate the quality of surficial rock, depth to sound rock and the possibility of interconnected aquifers beneath the landfill base In the rock mass. Detailed seismic data may be obtained as a part of geological investigations.

2.1.3.3 Base Stability, Slope Stability and Seismic Aspects:

For landfills construction on the soil, the base will be checked for stability against bearing failure or excessive settlements.

The stability of side slopes of a landfill shall be checked for the following cases (Fig. 9).

(a) stability of excavated slopes
(b) stability of liner system along excavated slopes
(c) stability of temporary waste slopes constructed to their full height (usually at the end of a phase)
(d) stability of slopes of above-ground portion of completed landfills
(e) stability of cover systems in above ground landfills.

The stability analysis shall be conducted using the following soil mechanics methods depending upon the shape of the failure surface.

(a) failure surface parallel to slope;
(b) wedge method of analysis;
(c) method of slices for circular failure surface and
(d) special methods for stability of anchored geomembranes along slopes.

In preliminary design of a landfill section, the following slopes will be adopted.

(a) Excavated soil slopes(2.5 horizontal : 1 vertical)
(b) Temporary waste slopes(3.0 hOrizontal : 1 vertical)
(c) Final cover slopes(4.0 horizontal : 1 vertical)

Slopes can be made steeper, if found stable by stability analysis results. Acceptable factors of safety may be taken as 1.3 for temporary slopes and 1.5 for permanent slopes.

In earthquake prone areas, the stability of all landfill slopes shall be conducted taking into account seismic coefficients as recommended by BIS codes.

2.2 Basic Design of Secured Landfill Elements

2.2.1 Bottom Liner System

The lining system is additional to the separation or unsaturated zone comprising soil or sand between the wet season high elevation of the ground water and the Landfill. These liner consist of native clayey soil/amended soil/ad-mixture soil. The permeability of the soil / amended soil should be less than or equal to 1×10-7 cm/sec.

A schematic cross section of the bottom Liner system is given in **Figure 1.**

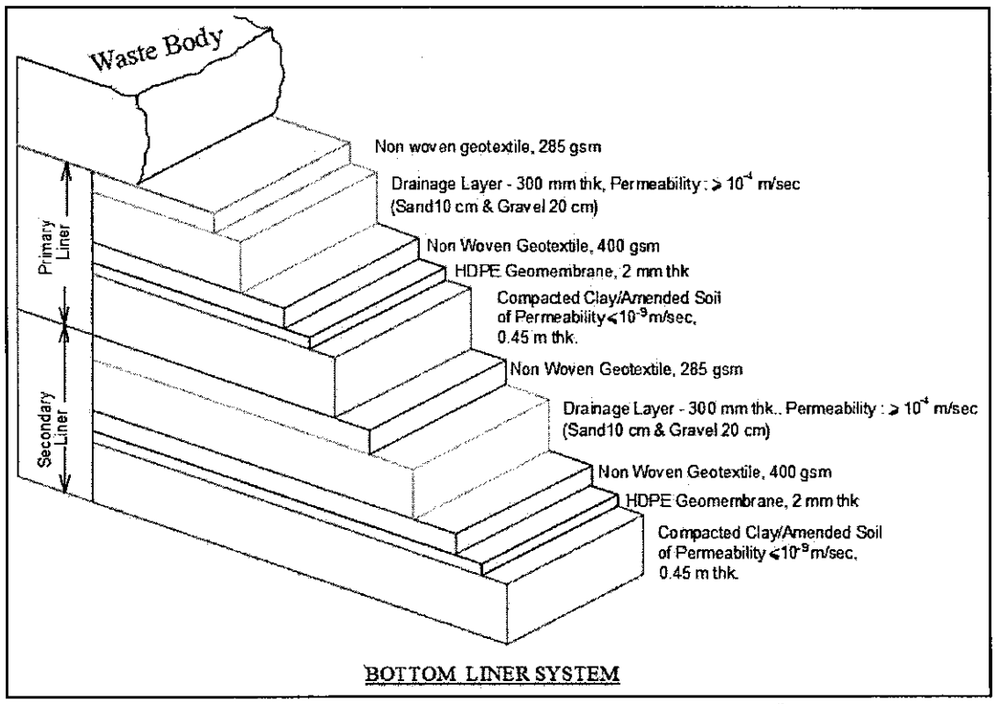


Figure 1: Bottom Liner System (Hazardous Waste Landfill)

2.2.1.1 Geomembranes

These are flexible sheets made from various plastic materials. The recommended liner along the side as well as the bottom of the facility is HDPE Liner. HDPE lining is effected by overlapping the strips and joining them with a special welding technique.

The thickness of the HDPE liner shall be 2.0 mm thick (min) made through flat cast extrusion technology to keep the thickness variation across the rolls to less than 5% and the minimum width of the membrane shall not be less than 7.5 m and length shall not be less than 150 m to reduce the number of joints. Understanding the seriousness of the project Naue –Germany / Equivalent -GSE-Germany make has been recommended for use. Detailed Material Specifications are given in the annexure.. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance.

2.2.1.2 Protection Layer (Non Woven geotextile)

To protect the geo membrane against the mechanical stress and failure thereby, non-woven needle punched Geo textile manufactured through mechanically bonding and made from continuous fibres/filaments and made of 100% UV stabilized Polypropylene is to be used on the HDPE Liner on the bed as well as the slopes. For the protection purpose, 400 gsm overlay Non-Woven Geotextile has been recommended. Equivalent product's details must be shown to the Technical Engineer for

review of its properties/performance. The minimum width of the Non Woven Geotextile shal be 4 m and minimum length shall be 90.0m.

2.2.1.3 Separation Layer (Non Woven geotextile)

After the construction of the primary lining system, separation textile of 285 gsm to be laid over the drainage layer before the waste laying is done. The minimum width of the Non Woven Geotextile shall be 4 m and minimum length shall be 125.0 m.

2.2.1.4 Drainage Layer

The landfill facility essentially generates significant quantity of leachate due to inherent moisture present in the waste body and the rain water precipitation. This leachate is impregnated with harmful chemicals and pollutants. This is to be collected, removed from the facility and treated. In order to collect the leachate from the waste body a Drainage layer of 30 cm granular material comprising of 10 cm coarse sand and 20 cm of gravel & having permeability>$1*10^{-2}$ cm/sec is to be laid over the protective layer of Geotextiles.

Looking at the following aspects of the landfill the following drainage medium has been recommended:

i. Structural profile and geometry

ii. Bottom and side slope pattern

iii. Performance of various geological and synthetic material for drainage function

Hence for the side slope geonet manufactured from Polyethylene and of minimum width of 4.0m to be used and for the bottom slopes, Sand/gravel as a drainage medium for the primary and secondary layer of desired specification has been recommended.

2.2.2 Side liner system of Secured Landfill Facility

The side liner system is on the inner side of soil bunds with slope 1:3 (V: H).The construction procedure of each layer of sideliner system is shown in **Figure 2**Figure 1.

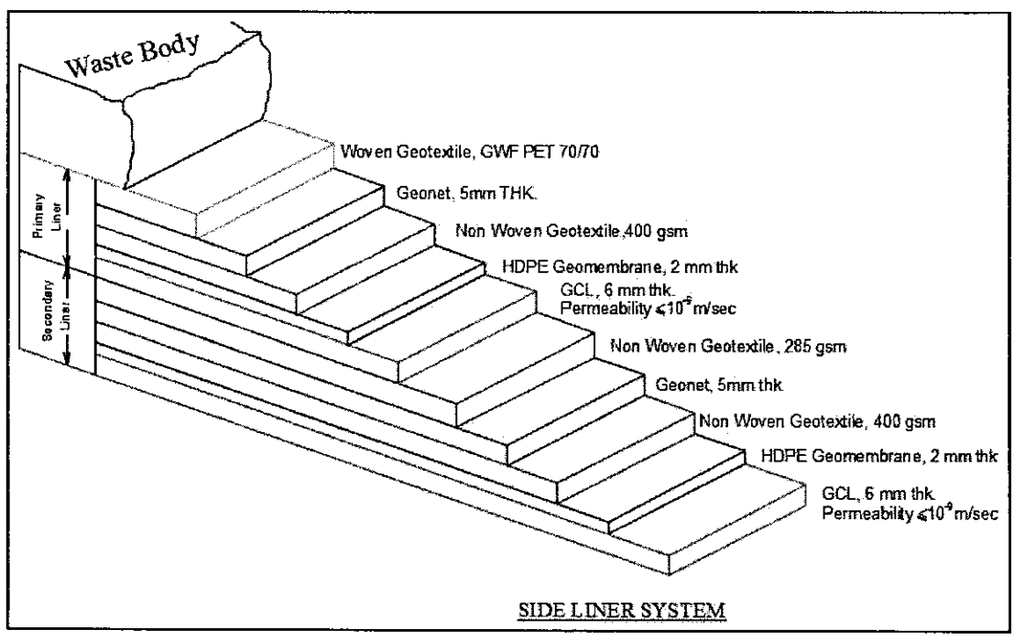


Figure 2: Side Liner system for Hazardous Waste Landfill

GCL-manufactured through use of powdered bentonite sandwitched between two layer of geotextiles and needle punched to keep the bentonite in place such as Bentofix-Naue Germany

make/equivalent of minimum 6-7mm thickness to be used instead of compacted clay as the slope is not so gentle and it is difficult to compact the clay on steep slope. Minimum width of the GCL shall be 5.0m and minimum length shall be 40.0m. Equivalent product's details must be shown to the Technical Engineer for review of its properties/performance.

2.2.3 Top Liner System

After the completion of each phase of the operation, the landfill has to be closed /insulated by putting the final cover. The final cover has the following advantages:

(a) It enhances surface drainage
(b) Minimizes infiltration
(c) Vegetation grows on it

The following Final Cover System is recommended. Over the waste body a soil cover of 150mm thick and a Gas collection media of 100mm thick is proposed. Geosynthetic Clay Liner (GCL of 6 to 7 mm thick) has to be laid over the Gas collection media. Beyond this compacted clay/GCL, HDPE of 1.5 mm is to be laid. Over the HDPE, a drainage layer of Geocomposite drainage net shall be laid. And the final top soil layer of 600 mm thick (450mm soil+150mm Vegetative soil) has to be put for restricting the soil erosion from the final cover.

A cross section of the top liner system is given below in **Figure 3**.

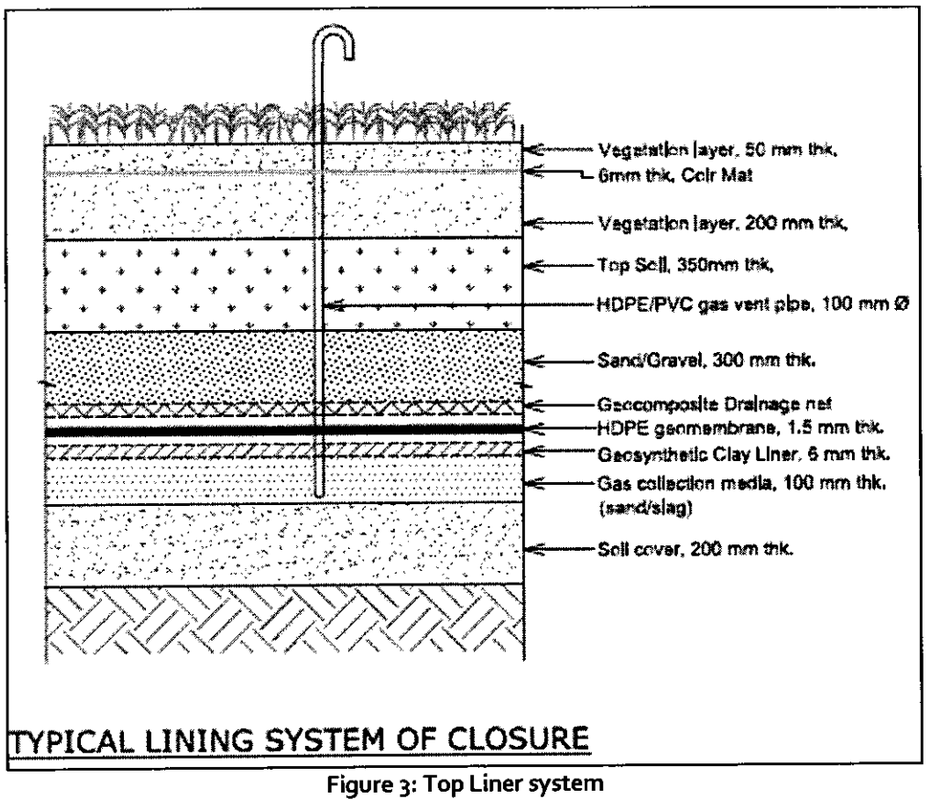


Figure 3: Top Liner system

2.2.4 Leachate Drainage, Collection & Removal System

In order to collect and convey the leachate generated to the collection sump, a Leachate collection System has been designed. It comprises of the following:

(a) Drainage Layer.
(b) A Perforated Pipe Collector System.
(c) Sump Collection Area.

(d) Removal of the leachate.

The leachate drainage is usually achieved using graded under-liner and drains which lead to a collection system or a sump. The technical details of the leachate drainage are as under:

(a) Thickness of the Drainage Layer: 150 mm for arterial pipes for collecting and 200 mm main header line for transporting the leachate from the body of SLF
(b) Material: Gravel/Sand for secondary bottom liner and geonet for primary bottom liner, primary and secondary side liner
(c) Permeability: 0.01 cm/sec

Natural slope shall be preferred for the transport of the generated leachate which will be collected in the channel and conveyed to the sump via collector pipe due to the designed longitudinal slope by gravity. A typical plan is shown in **Figure 4**:

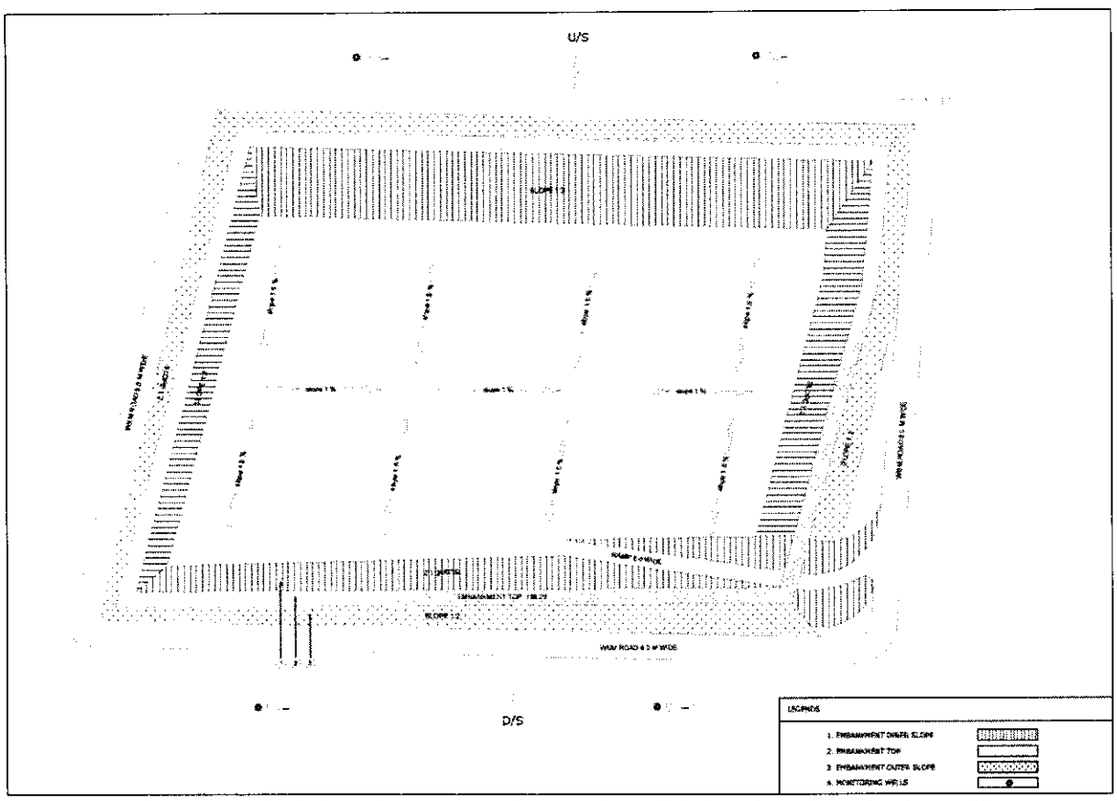


Figure 4: Typical Plan of SLF, Drain Slope and possible location of Monitoring well

The sectional plan for leachate conveyance system comprises of the following:

(a) Central Leachate carrying pipe in conjunction with the drainage layer
(b) Estimation of pipe diameter based on the leachate quantity
(c) Design of slope of Leachate Pipe

A schematic drawing of leachate conveyance is shown in **Figure 5** for reference purposes.

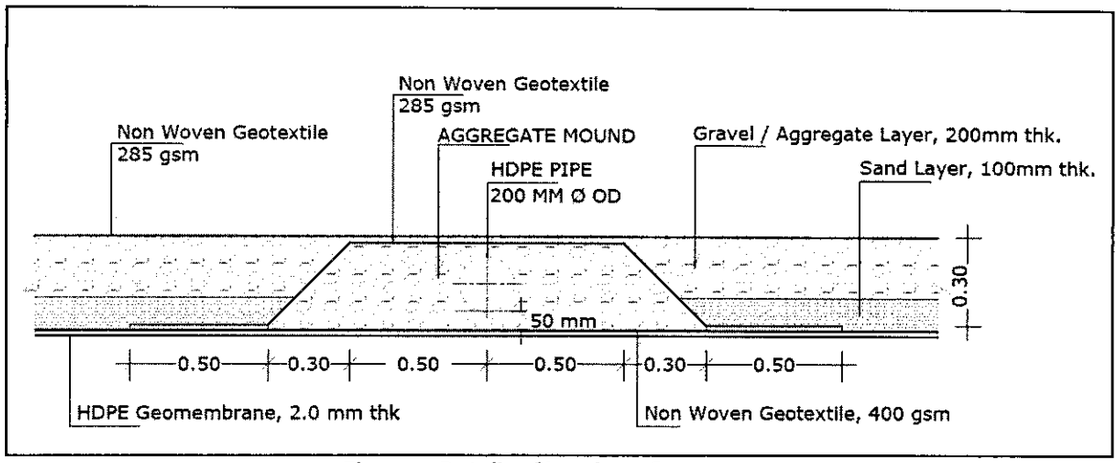


Figure 5: Details of Leachate Conveyance

A typical sectional view of the Landfill lining and anchoring system along with piping is shown below:

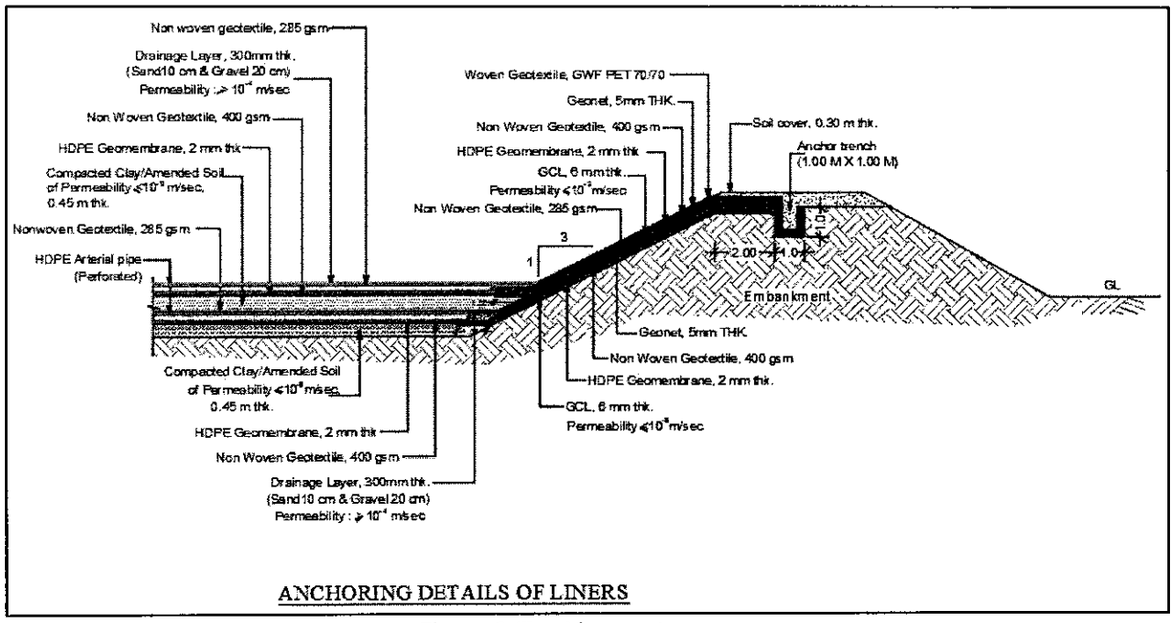


Figure 6: Top Liner system

2.2.5 Surface Water Drainage System

Surface water management shall be designed to ensure that rainwater run-off does not drain into the waste from surrounding areas and that there is no waterlogging/ponding on covers of landfills. A schematic surface water drainage system comprising of channels, drains, culverts and basins (Fig8) shall be designed to ensure the following:

(a) Rainwater running off slopes above and outside the landfill area shall be intercepted and channelled to water courses without entering the operational area of the site. This diversion channel may require a low permeability lining to prevent leakage into the landfill

(b) Rain falling on active tipping areas shall be collected separately and managed as leachate, via the leachate collection drain and leachate collection sumps to the leachate treatment and disposal system.

(c) Rainfall on areas within the landfill site, but on final covers of phases which have been completed and are not actively being used for waste disposal shall be diverted in drainage channels away from active tipping areas, and directed through a settling pond to remove suspended silt, prior to discharge.

(d) Any drainage channels or drains constructed on the restored landfill surface shall be able to accommodate settlement, resist erosion and cope with localised storm conditions.
(e) The horizontal surface of the final cover shall be provided a slope of 3 to 5% for proper surface water drainage. The slope of the cover on the sides will be higher and governed by slope stability considerations
(f) All Interceptor channels, drainage channels and settling ponds (storm water basins) shall be designed by a hydrologist using hydrometerological data.
(g) It shall be ensured that water collected by surface water drainage system and leachate collected by the leachate collection system do not get intermixed at any stage of collection or storage This shall apply to the 'active' and 'post closure' periods of the landfill

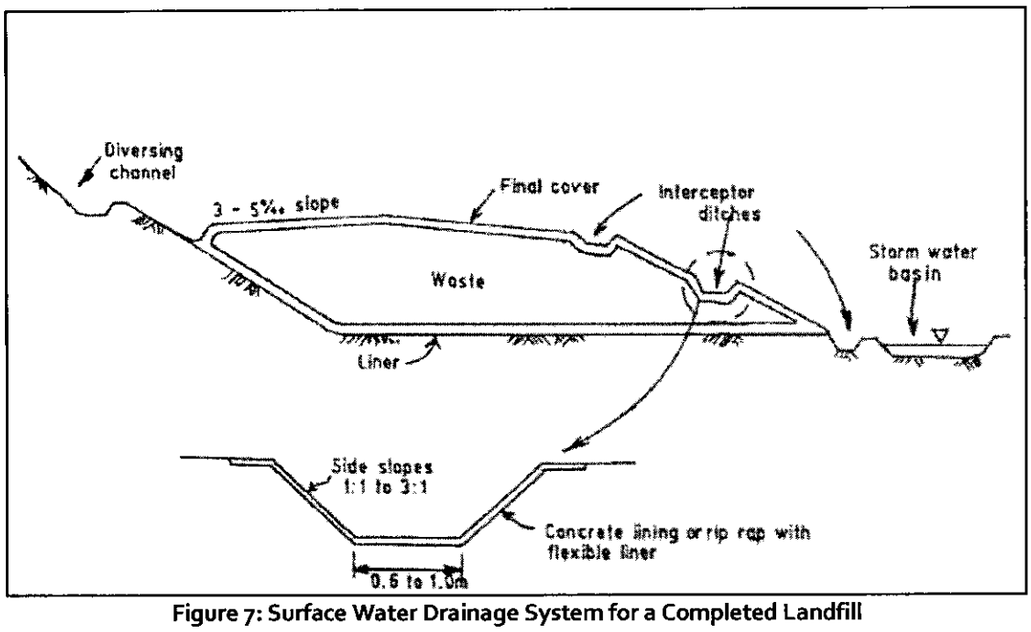


Figure 7: Surface Water Drainage System for a Completed Landfill

The design of following components will be undertaken:

(a) storm water drains, diversion channel
(b) storm water basin
(c) culverts if required

2.2.6 Construction of Embankment

Embankment shall be designed based on sound engineering practices and also shall be checked for slope stability analysis considering seismic factors of Mundra-Gujarat region.

The embankment shall be constructed to the lines and grades shown on the drawings. Placement of fill shall be performed in an orderly way and in an efficient and workman like manner, so as to produce fills having such quantities of density, strength and permeability as will ensure the highest practicable degree of stability and performance of the embankment.

The slopes of embankment shall be maintained as per specific structures drawing.

2.2.6.1 Fill Materials

The materials for embankment shall be obtained from the available excavated material. Some earth material available from the excavation in the pond area if found suitable will also be used for the embankment construction. Morrum / Yellow soil or soil which satisfy the accepted civil engineering property of the bund construction shall be accepted.

2.2.6.2 Placing the fill material, Compaction of the Embankment and Base: (IS: 2720)

The combined excavation and placing operations shall be such that the materials when compacted in the fill will be blended sufficiently to produce the specified degree of compaction and stability. The earth obtained from a particular borrow area as far as possible shall be used in forming the complete cross-section of the fill for a particular stretch.
No stones cobbles or rock fragments, having maximum dimensions of more than 5 cm shall be placed in the fill. Such stones and cobbles shall be removed either at the borrow pit or after being transported to the site but before the materials in the fill are rolled and compacted. Such stones or cobbles shall be placed in other portions of embankment if found suitable or rejected as directed. The materials shall be placed in the fill in continuous horizontal layers, stretching right across the whole section, not more than 0.4 m in compacted thickness.

Vibratory rollers/static roller shall be used for compacting cohesive materials and pneumatic rollers and vibratory rollers shall be used for compacting cohesion less materials. The compaction in horizontal layers will be done using standard compaction equipment or in inclined layers using slope compactors/appropriate method.

2.2.6.3 Inspection Test

Control tests shall be carried out in laboratory from time to time to determine whether the earth produced by methods employed satisfies the requirements of the specifications and documented for verification by the Officer- in –Charge of the regulatory authority and the work shall be inspected periodically.

Complete documentation of all quality control records and their submission to the GPPCB along with showing satisfactory achievement of acceptance criteria.

The quality control tests for compacted clay layer (or amended soils) as well as the leachate collection/drainage layer will include

(a) In-situ density tests.
(b) in-situ moisture content tests.
(c) Compaction tests.
(d) Permeability tests,
(e) Grain size distribution tests and
(f) Atterberg's limits tests
(g) Others as defined by GPCB.

The quality control tests for geomembrane liners shall be carried at as per QA/QC protocol and shall include the following:

(a) Thickness tests,
(b) Density tests,
(c) Strength tests,
(d) Field seam strength & leak tests

Dressing and Trimming of the slopes

The outer slopes of the embankment shall be neatly dressed to line. Compaction shall extend over the full width of the embankment and the material in the slopes shall be compacted as for the rest of structure. To ensure proper compaction at the outer edge, the fill shall be constructed for a minimum of 0.5 m/1.0m extra width on either edges or the outer edge dressed to true width and slope after compaction. No earth slope shall be left without trimming to design slope.

2.2.7 Design of Storm Water Drain

The catchment includes the top or cap of the landfill facility as well as the outer slope of embankment and site upto fencing. Hence to divert the incoming water at the surface level as well as the slope and

terraces of the landfill facility, adequate storm water drainage channels need to be designed, constructed. The channel has to ultimately carry water to the storm water pond for storage or evapoqration purpose in case not discharged outside.

2.3 Piezometric Well

Piezometer shall be constructed to monitor the quality of groundwater. Two piezometers shall be installed on the downstream side of the SLF. Two piezometers shall be installed on the upstream side of the SLF. At present, possible locations have been shown where the installation cane be done. **But, exact location of the monitoring well shall be finalized in consultation with Gujarat State Pollution Control Board.** The piezometer consist of a stand pipe made up of stainless steel/PVC which shall be screened along the entire aquifer depth i.e. the standpipe shall be- screened from a depth of 1 m to 10m or depending on ground water depth. The screened interval shall be encased in a filter zone made up of gravel and sand layer. The function of the filter zone is to allow free flow of groundwater into and out of standpipe and prevent fines from entering the standpipe. Immediately above the screened interval, a clay and bentonite seal shall be placed. The thickness of clay seal shall be 0.5 m. Above the clay and bentonite seal, a grout seal consisting of cement and bentonite shall be constructed which provides a barrier for preventing surface water and ground water from elsewhere from migrating into the screened interval. At the ground level, a steel casing embedded in concrete pad shall be employed. A cap shall be placed on the top of steel casing to prevent rainwater and surface water from entering into the standpipe. The piezometer shall be constructed at a minimum distance of 7 m from outside edge of the embankment. A schematic sketch of a Piezometer is shown in **Figure 8**. The location is shown in figure no 4.

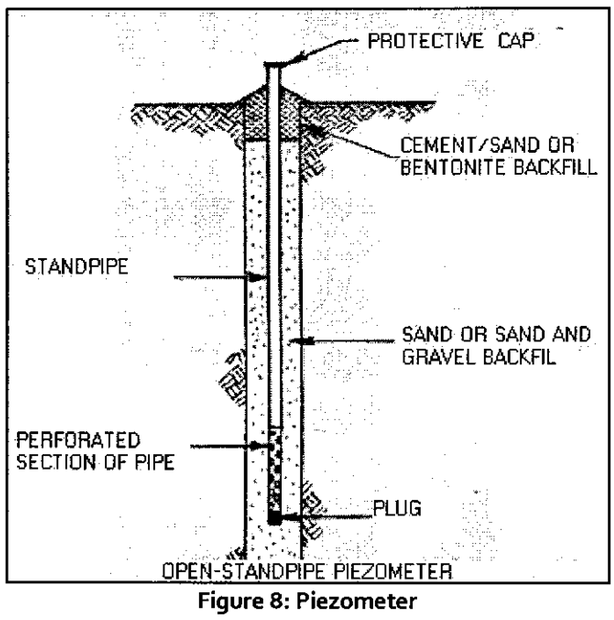


Figure 8: Piezometer

2.4 ANNEXURE

Liner Make: Naue, Germany, Thickness: 2.0 mm
Length:120m, Width:7,5m

Property	Test Method	Unit	Value
Thickness Nominal	EN-1849-(2)/ASTM D 5199	mm	2.00
Lowest individual value	EN-1849-(2))/ASTM D 5199	mm	1.90
Density	EN ISO 1183/ASTM D 1505	Gm/cc	0.942
Melt Flow Index	EN ISO 1133/ASTM D 1238-190/2.16	Gm/10 min	<1.0
Tensile Strength at Yield	EN ISO 527-3/ASTM D 6693	N/mm	33
Tensile Strength at break	EN ISO 527-3/ASTM D 6693	N/mm	60
Elongation at Yield	EN ISO 527-3/ASTM D 6693	%	12%
Elongation at Break	EN ISO 527-3/ASTM D 6693	%	700
Tear Resistance	ISO 34-1/ASTM D 1004	N	250
Puncture Resistance	ASTM D 4833/EN ISO 12236	N	700
Carbon Black Content	ASTM D 1603	%	2-3
Carbon Black Dispersion	ASTM D 5596	Cat	1-2
Dimensional Stability	EN 1107-2/ASTM D 5397	%	+/- 2

Tolerance: 10% on values except thickness, Carbon Black for which a range is given.

EAC OBSERVATION NO.-12

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EAC OBSERVATION:

Baseline health status of the people living in the study area of the project site has not been collected.

REPLY:

Baseline Health Status Study within 10 km Radius of the Proposed Copper Refinery Project has been conducted by M/s TALEEM Foundation (A research unit of ZEE Group), Ahmedabad. The study was conducted based on the secondary data available at PHC, CHC, district hospital and relevant secondary report published by Ministry of Health & Welfare, Govt of India.

M/s. TALEEM Foundation, Ahmedabad has engaged **Prof. Dr. A K Sharma, IIT Kanpur** for technical support for preparation health index.

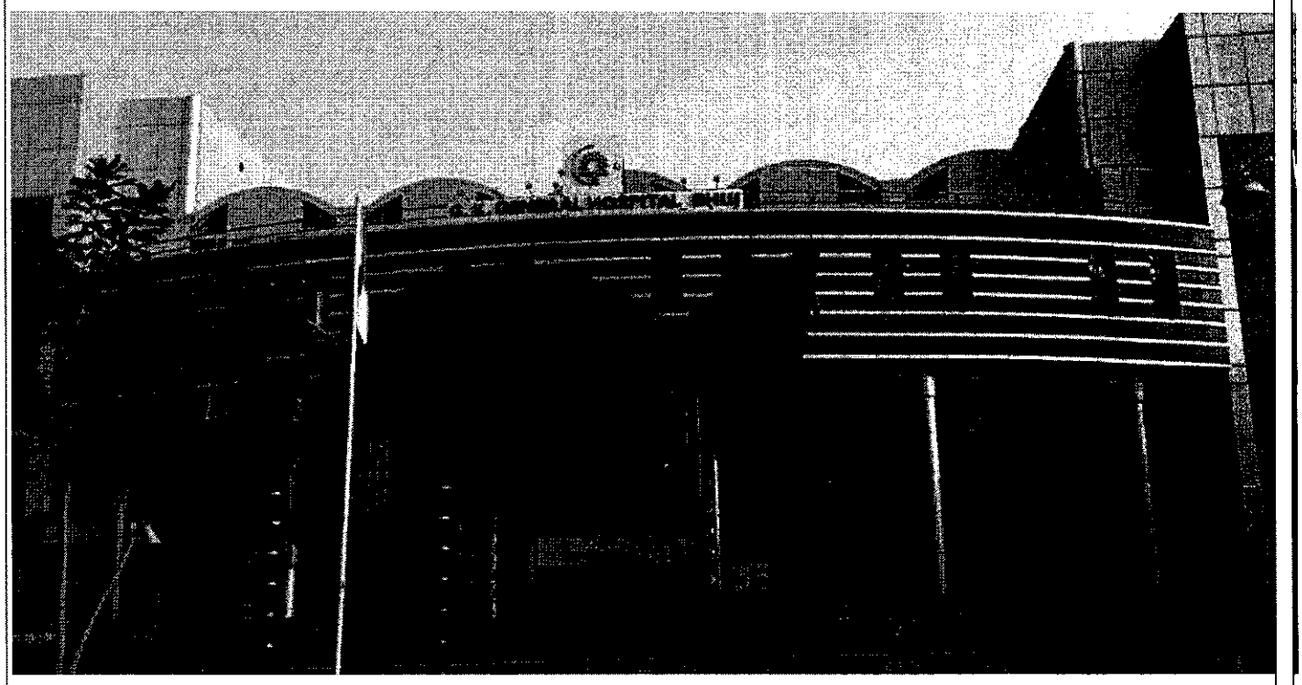
a) The study was conducted based on the data available at PHC, CHC, district hospital and relevant secondary report published by Ministry of Health & Welfare, Govt of India.
b) The community health index has been developed using the statistical method to compare the health performance of project area with the district and state as a whole.
c) Project villages are better than the block average in terms of ANC coverage and live births but lag behind in anaemia among pregnant women and BCG vaccination coverage.
d) Project villages are better than the district in ANC coverage, live births and infants survival but the project villages are not as good as the district in terms of anaemia, TT and BCG.
e) It is observed that Health Index of project villages are 0.81 as compared to block level of 0.75.

A detailed study report is attached as **Annexure-12.**

Study to Establish Community Health Baseline Index within 10 Km Radius of the Proposed Copper Refinery Project in Mundra Taluka of Kutch District (Gujarat)

Submitted to

Adani Enterprise Ltd.
1st Floor, North Block, Adani House,
Shantigram, Near Vaishnodevi Circle,
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By

TALEEM
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Date: April 30, 2019

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Preface and Acknowledgement

At the outset, we are grateful to Adani Enterprises Ltd. (AEL) for having entrusted TALEEM Research Foundation, Ahmedabad for the present study aiming to develop health index for the community residing in 16 villages within 10 kilometres radius of a proposed copper refinery project in Mundra taluka of Kutch district.

The study provides an overall health status of 16 project villages in comparison to block average and the district as a whole. This report is largely based on IDSP and HMIS data of six PHCs, two CHCs and District Hospital. Apart from collecting secondary data, health facility survey was conducted to understand the adequacy of health infrastructure and primary healthcare services. The present report is expected to serve as a baseline to measure the impact of the proposed project and various community development initiatives of AEL in future.

We express our sincere gratitude to the team of AEL for their continuous interaction with the core team of TALEEM and extending support and guidance to complete the study on time.

We express our appreciation to Dr Kashyap M Buch, Chief District Medical Officer (CMO) of District Hospital of Kutch district and MIS staff of PHC, CHC and DH for extending their support and cooperation in providing the relevant information for their respective health facilities. We express our sincere thanks to all of them.

We gratefully acknowledge the participation and technical support provided by Professor A.K. Sharma of IIT, Kanpur for developing health index and Dr Sapan Pandya, Medical Consultant for reorienting the survey team on health facility survey tools.

We greatly acknowledge the untiring efforts of TALEEM core team members and support staff for the timely completion of the study.

Md. Irfan Khan, Ph.D. (IIT, Kanpur)
Director, TALEEM Research Foundation,
Ahmedabad

April 30, 2019

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Chapter 1: Introduction

Health, as defined by World Health Organization (WHO), is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Health is influenced by a number of factors that broadly include genetics, environment, lifestyle, socio-economic conditions and access to health services.

Knowing status of health of community or any area is very crucial for policy decision, planning and need-based-demand-driven programme intervention. Adani group have been pioneers in corporate social responsibility and made significant contributions to improve quality of people's life in the entire region they operate in. Gujarat, APSEZL and AEL have started key initiatives in support of sustainable development aiming at bettering the socio-economic and cultural status of local people.

The present study covering 16 villages within 10 km radius of proposed "*Copper Refinery Project*" at Adani Port Special Economic Zone (APSEZ) intends to generate a health index of the catchment area and to establishing benchmark indicators to measure the impact of various community development initiatives by AEL over a period of time.

Objectives

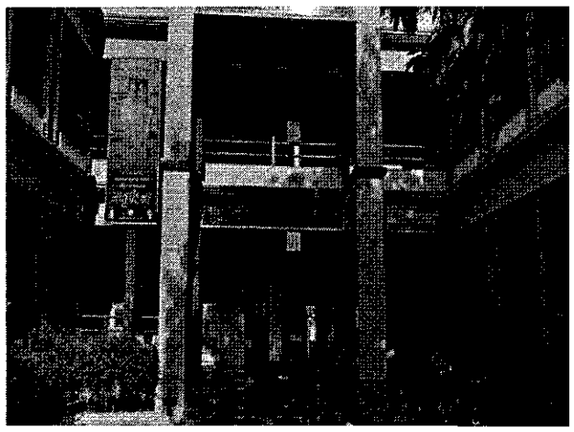
The broad aim of the present study is to develop community health index of area within 10 km radius of proposed copper refinery project. The specific objectives of study are as under:

1. To establish the Community Health Index of 10 Km. radius area using suitable methodology and input parameters (a. Communicable diseases, b. Non-Communicable diseases, c. Status of facilities available, d. Utilization of health services)
2. Compare the data of BASELINE parameters (Communicable and Non-Communicable diseases) of the study area with data of district and the State as a whole.

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3. Mapping of Community Health Resources present in the study area.

Data Collection



PHC Mota Kandagara, Kachchh

In order to establish health index of project areas covering 16 villages (Table 1) catered by six PHCs namely Kandagara Mota, Bhujpur, Jarpara, Nani Tunbadi, Talwanaand Gundiyari and one CHC Mundra where these six PHCs generally refer the patients for specialized health services insub-district hospital (upgraded CHC) of Mandvi and district hospital of Bhuj, Kachchh district were covered.

Table 1: Project Villages

SN.	*Taluka*	Village	Population (Census 2011)	Name of Panchayat
1	**Mundra**	Tunda	12471	Tunda Juth
2		Shiracha	1879	Shiracha
3		Navinal	3100	Navinal
4		Deshalpar	2611	Deshalpar
5		Khakhar Moti	2139	Khakhar Moti
6		Kandagara Mota	4461	Kandagara Mota
7		Nani Bhjpar	1056	Mota Bhujpar Juth
8		Moti Bhujpar	9278	
9		Pratappar	268	
10		Jarpara	7352	Jarpara
11		Borana	377	Nana Kapaya
12		Dhrab	3281	Dhrab
13	**Mandvi**	Nani Khakhar	3412	Nani Khakhar
14		Nana Bhadiya	4318	Nana Bhadiya
15		Mota Bhadiya	3284	Mota Bhadiya
16		Tragadi	1238	Tragadi

From these facilities, data were collected on existing building infrastructure, human resources (medical, para-medical, lab technicians and support staff), pathology laboratory, surgical and examination equipments, labour room and operation theatre, drugs and drugs kits, medicine dispensing, indoor and outdoor health services. Apart from existing facilities, service statistics for last three years were collected.

Type of Data

Mainly secondary data has been collected from a CHC, PHCs and a District Hospital. In addition, secondary data from Department of Health and Family Welfare, Govt. of Gujarat, Census of India 2011, SRS Bulletin, HMIS for 2017-18 and 2018-19 were collected.

Operational Plan

A very experience research team having experience of developing MIS were pooled from the Foundation's core team who were deputed for data collection from health facilities.

These teams were reoriented one day by the medical doctor who broadly covered all technical aspects of medical infrastructure, equipments, operation theatre and drug dispensing. The data collection was carried out during March 12 to 22, 2019.

Data Analysis and Report Preparation



Brain Storming Session at TALEEM with Adani representative

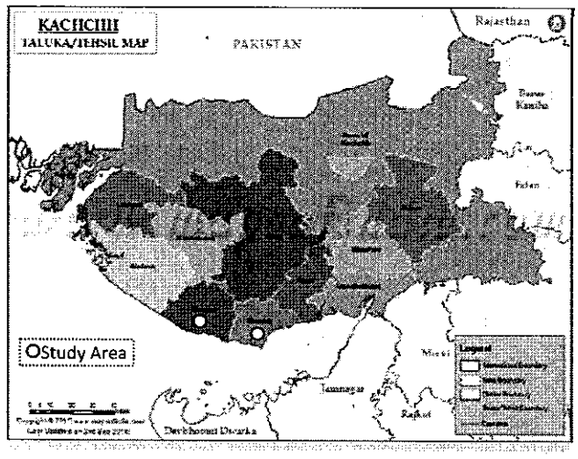
The Sr. faculty members of the Foundation and Statistician Expert involved in the study have prepared detailed analysis and tabulation plan. The community health index has been developed using the statistical method adopted by WHO considering the list of 47 diseases under classification of communicable and non-communicable diseases to compare the health performance of project area with the district and state as a whole. The same statistical technique was more or less adopted by IIM for developing health index of Indian States.

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Chapter 2: Profile of the District and Study *Taluka*(Mandvi and Mundra)

Kachchh is district of Gujarat State in western India covering an area of 45652 sq. km which is 23.3% of the total state geographical areas. It is the largest district in the State of Gujarat and second largest district of India after Leh. It is bounded on the north and north-west by Pakistan, on the north-east by Rajasthan state, on the east by the Banas Kantha and Patan districts of Gujarat, on the south- east by Surendranagar district, on the south by the gulf of Kachchh and Rajkot district and on the south-west by the Arabian sea.

It lies between the parallels of latitude 220.45' to 240 .40' and the meridians of longitude 680.9' to 710 .45.The length from north to south of this territory is about 220.32 km. and from east to west about 376.80 km. The district has the longest coast line of about 406 km. The district has 10 *Talukas* (namely Bhuj, Mandvi, Mundra, Abdasa, Bhachau, Lakhpat, Anjar, Nakhatrana, Rapar and Gandhidham), six Nagar Palika and 949 Revenue villages. Interestingly, there are 19 villages from different sub-districts of Kachchh having population less than 50.



Kachchh district is the 14th most populated district in the State with a total population of 2092371 as per 2011 Census. The district has a population density of 46 inhabitants per sq. kilometer. Its population growth over the decade 2001-2011 was 32.16%. Kachchh has a sex ratio of 908 female for every 1000 males. The distribution of population indicates that Bhuj is the most populous (443269) and Lakhpat is the least populous(62552)*Taluka* of the district. The urban population of

District at a Glance

Area (sq. km)	45652
Population	2092371
Urban Population	34.8%
SC Population	12.37%
ST Population	1.16%
Hindu	76.89%
Muslims	21.14%
Sex Ratio	908
Literacy Rate	70.6%
No. of Taluka	10
Nagar Palika	6
Revenue Villages	949

Source: Census2011

the district accounted for only 34.82 percent of the total population. The district has 76.89% Hindu while Muslims constitute the second largest religious group with 21.14% of the total district population. Similarly, Scheduled Castes (SC) and Scheduled Tribes (ST) constitute 12.37% and 1.16% of the total district population.

The literacy rate of the district as per Census 2011 was 70.6% (with 79.4% for male and 60.9% for female) which is significantly lower than the State average of 78.0%. The rural urban literacy gap is of about 16.0% (64.9% rural and 80.8% urban). The district is ranked 23rd in education in 2011 among all the districts of Gujarat.

The district has a total of 277 SCs, 42 PHCs and 14 CHCs. The number of PHCs providing health services is highest in Bhuj *Taluka* with seven followed by Mundra *Taluka* with sixin number. The highest number of sub-centres (SC) is found to be in Mundra with 52 followed by Bhuj *Taluka* having 44. Anjar *Taluka* has maximum of three CHCs while Bhuj and Mundra *Taluka* have two CHCs in each. The remaining seven *Taluka* has one CHC each.

Taluka	SC	PHC	CHC
1. Lakhpat	27	5	1
2. Rapar	17	2	1
3. Bhachau	19	3	1
4. Anjar	34	5	3
5. Bhuj	44	7	2
6. Nakhtrana	13	4	1
7. Abdasa	34	4	1
8. Mandvi	30	5	1
9. Mundra	52	6	2
10. Gandhidham	7	1	1
Total	**277**	**42**	**14**

Source: District Human Development Report- 2016

Mandvi and Mundra *Talukas* have about 2.3 and 1.5 lakhs populations respectively. Mandvi constitutes 25.2% urban population as against 13.2% for Mundra. SC population constitutes 13.3% of the total population of each of the two *Talukas.* Sex ratio is more skewed in Mundra (868) as compared to Mandvi with 970 female for every 1000 male. Overall, literacy rate is 75.1% for Mandvi as compared to a little over 77.4% in Mundra. Mundra *Taluka* has relatively more number of SC, PHC and CHC as compared to Mandvi.

Mandvi and Mundra *Talukas* at a glance		
Indicators	Mandvi	Mundra
Population	203373	153219
Urban population	25.2%	13.2%
SC population	13.3%	13.2%
ST population	2.0%	1.3%
Sex ratio	970	868
Literacy rate	75.1	77.4
No. of Sub Centres	30	52
No. of PHC	5	6
No. of CHC	1	2

Source: District Human Development Report- 2016

3401

Chapter 3: Existing Government Health Facilities

As mentioned in Chapter 1, one District Hospital (DH) (Bhuj), two Community Health Centres (CHCs) and six Primary Health Centres (PHCs) have been covered in the study. District hospital is located at district headquarters, i.e. Bhuj and is known as G K General Hospital. Two Community Health Centres one at Mundra and other at Mandvi were included in the study to obtain information on vital statistics. At sector level, six PHCs covering 16 villages around the project sites have been covered for collecting data.



CHC, Mundra, Kachchh

Health Care Delivery System in Gujarat

Before getting into detail of health facilities covered in this study, it is worth while taking a peep into the health care Delivery System in Gujarat. The health care delivery in Gujarat is organized in a three tier system;

i) At the primary level, there are sub health centres and primary health centres (PHCs).

ii) At the intermediate level, there are community health centres (CHCs), taluka hospitals and district hospital. About 3-4 PHCs are affiliated to CHCs. It has been planned to develop CHCs as a first referral units (FRU), because they are scattered all over the state and can provide hospital services at the doorstep of the patient. Almost all CHCs are located in taluka headquarters or other important towns of a taluka. There is at least one operational hospital in each district headquarters

iii) The tertiary or referral level facilities are affiliated to medical college and specialized hospitals. Norms for health facilities are ;

Table 3.1: Population covered under Health Facility for specific Areas

Sr. No.	Health Facility	Areas	Population covered
1	PHC	All Areas	30,000
2	PHC	Tribal, Hilly & Inaccessible areas	20,000
3	Sub-Centre	All Areas	5,000
4	Sub Centre	Tribal, Hilly & Inaccessible areas	3,000
5	CHC	All Areas	100,000

In view of very small number of private practitioner providing health care services, Government sub health centres, primary health centres, community health centres and hospitals are very important in the sense that they provide essential basic health services to the rural as well as urban population. In the entire district of Kachchh 361 government health facilities are functioning. Taluka-wise view of number of health facilities is given in Table 3.2.

Table 3.2: Taluka-wise SCs, PHCs and CHCs in Kachchh district

Sr. No.	Taluka	Sub-Health Centre (SCs)	Primary Health Centres (PHCs)	Community Health Centres (CHCs)
1	Abdasa	34	6	1
2	Anjar	34	7	2
3	Bhachau	19	7	3
4	Bhuj	44	11	3
5	Gandhidham	7	2	0
6	Lakhpat	27	4	1
7	Mandvi	30	8	1
8	Mundra	52	7	2
9	Nakhtrana	13	6	2
10	Rapar	17	9	2
Total		**277**	**67**	**17**

Source: https://gujhealth.gujarat.gov.in/images/pdf/1474-list-18.pdf

As per Table 3.2, there are 277 health sub centres SCs), 67 Primary Health Centres (PHCs) and 17 Community Health Centres (CHCs) in Kachchh district of Gujarat.

Functional Status of Health Facilities

As mentioned earlier, one district hospital (DH) at Bhuj, two (02) CHCs (one each at Mandvi-upgraded into SDH and Mundra) and six (06) PHCs (2 in Mandvi and 4 in Mundra) have been covered under this study. Brief description of infrastructure facility, available at the health facilities covered, has been presented hereunder;

Infrastructure

Seven out of nine health facilities covered, i.e. one (01) district hospital (DH), two (02) community health centres (CHCs) and six (06) primary health centre (PHCs) have own building, PHC at Mota Kandagara and Bhujpur villages do not have own building for PHCs. Two PHCs, i.e. PHC at Zarpara and Bhujpur have borewell/tubewell as main source of water while seven other health facilities including district hospital at Bhuj have piped water as main source of water supply. Water supply is available round the clock in all health facilities covered. Operation theatres and labour rooms in each health facility at taluka level (CHC) and at district level (DH) has regular water supply, however, at sector level, two out of six PHCs, one at Mota Kandagara (no OT or labour room as it is running in a sub-centre) and other at Zarpara villages do not have regular water supply in labour room.

Functional toilet facility with running water is available at all nine health facilities while all but one health facilities (PHC at Kandagara) does not have separate toilet facility for male and female. Three health facilities, i.e. district hospital and two CHCs at Mandvi and Mundra do provide food to in-patients; laundry facility is also available at district hospital and CHC at Mandvi. Outsourced laundry facility is also available at CHC Mundra.

Electricity connection is available in all health facilities and its parts the data indicates while standby facility (generator/inverter) is not available in four out of six PHCs (Table 3.3). Generator backup is assured at all time and is connected to labour room/Ice refrigerator

(ILR)/wards of health facilities where standby facility is available. It has been revealed that adequate funds are available for operating generator/standby facility.

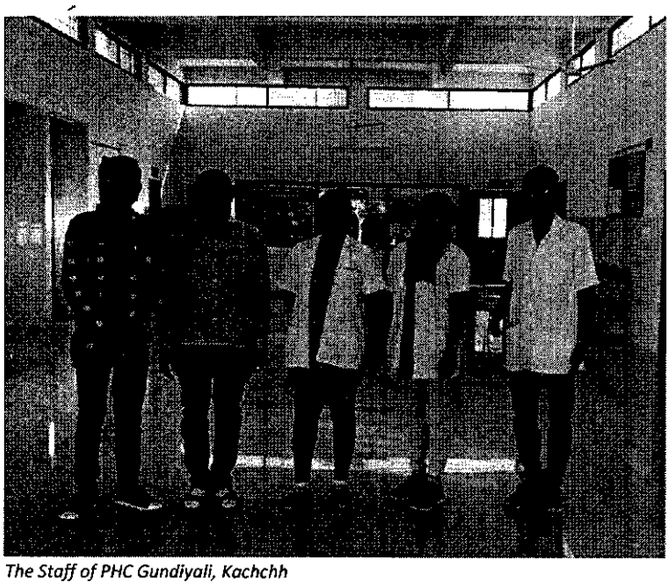
Facilities like Vehicle including Ambulance, Jeep and Car in functional condition, OPD for RTI/STI, name plates/guidelines and counseling is available in all nine health facilities covered at sector, taluka and district level. Barring one PHC at Mota Kandagara village, Eight (08) out of nine (09) health facilities covered have facility available for privacy during examination and separate aseptic labour room. Gynecology /obstetrics OPD facility is available only at CHC and District hospital, not at PHC while telephone facility is available at district hospital, both community health centres and PHCs at Bhujpur and Nani Tumbdi villages.

Staff quarters for RMO and Nurses are available only at Mandvi health facility (CHC/SDH). General medicine ward for male and female separately is available at all health facilities covered. Data also indicates that ANC ward is available in all health facilities covered for obtaining secondary information. Separate registration counters (DH-1, CHCs-2 and PHC-1), complaint/suggestion box, drug storage and drug dispensing (DH-1, CHCs-2 and PHCs-4) and facility for sterilizing instruments (DH-1 and CHCs-2) are available but facility for disposing of bio medical waste is outsourced in all nine health facilities (Table 3.3 – appendix 1).



A view of PHC Gundiyali, Kachchh

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The Staff of PHC Gundiyali, Kachchh

Staff Position

As regards staff position, data indicates status of medical and paramedical staff in position in health facilities. Medical superintendent/PMO is in position in all nine health facilities. Barring district hospital, no other health facility has specialist in Medicine and surgery. Obstetrician/gynaecologist, general duty doctor, staff nurse, dresser, lab technician and ophthalmic assistant are available at Mandvi and Mundra CHCs. More number of staff is available in Mandvi CHC (now upgrades as sub district hospital) than Mundra CHC. At Mandvi CHC/SDH one pediatrician, one Pathologist/Microbiologist one ophthalmologist, one dentist, 17 public health Nurses, two technicians, five pharmacists, one physiotherapist are in position. At PHC level, four PHCs have AYUSH physician, two PHCs namely, Zarpara and Bhujpur do not have AYUSH Physician. All PHCs do have at least one pharmacist, medical officer and laboratory technician (Table 3.4– appendix 1).

Training Received by Staff

Information on training received by the staff during past five years or ever reveals that no medical staff is trained for RTI/STI, SBA or basic emergency obstetric care, non scalpel vasectomy (NSV) and Mini laprotomy at district hospital whereas at least one medical staff has received training for other major areas mentioned in the Table 3.5. At CHC level, Mandvi CHC/SDH has at least one trained medical staff for new born care, RCH foundation skill, F-IMNCI, SBA/basic emergency obstetric care, integrated management of neonatal and childhood illness (IMNCI), HIV/AIDS prevention, care and support and immunization whereas Mundra CHC has at least one medical person having received training on new born care, RCH foundation skill, F-IMNCI, SBA/basic emergency obstetric care, NSSK (Navjat Shishu Suraksha

Karyakram), vector borne diseases, adolescent reproductive sexual health (ARSH), IUD insertion and immunization.



The laboratory of CHC Mundra, Kachchh

Table 3.5 points out at medical/support staff posted at PHCs having received training on various areas. According to table 3.5, medical officer posted at all six PHCs have received training on new born care, Navjat Shishu Suraksha Karyakram (NSSK), Maternal death review (MDR) and immunization. Medical officer of all six PHCs (except PHC at Nani Tumbdi) have received training on RTI/STI, integrated management of neonatal and childhood illness (IMNCI) and SBA or basic emergency obstetric care (except PHC at Zarpara) and directly observed treatment short course (DOTS) (except PHC Bhujpur). Similarly, medical staffs at four out of six PHCs have received training on vector born disease control program (VBDCP) (except PHCs at Bhujpur and Nani Tumbdi) and, adolescent reproductive sexual health (ARSH) (except PHCs at Bhujpur and Gundiyali) (Table 3.5– appendix 1).

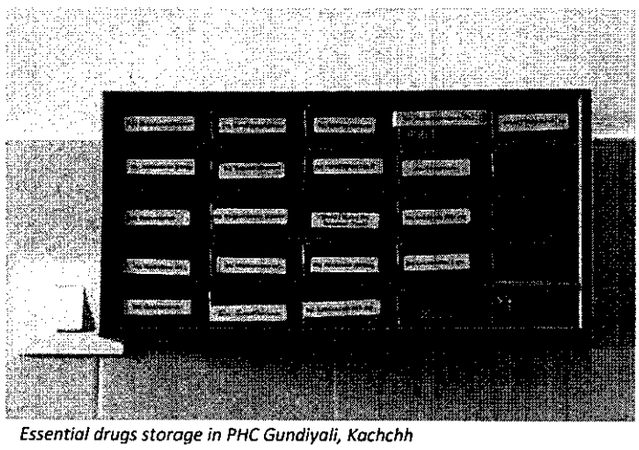
Investigation and Laboratory Services

Among investigation /laboratory services, facilities for urine analysis, pap smear test, sputum test, blood sugar test, RPR for syphilis and pregnancy test are available at district hospital, both CHCs and all six PHCs covered whereas hematology test, blood creation, diagnosis of RTI/STD with wet mounting, grams stain test coomb's test, widal test and X-ray facility is available only at district hospital and both CHCs. Apart from this, some of the investigation facility like stool (PHC Gundiyali), diagnosis of RTI/STDs with wet mounting grams stain (Bhujpur, Nani Tumbdi and Gundiyali PHCs)), ELISA test for HIV (Mota Kandagara & Gundiyali) and VDRL test (Mota Kandagara) is available at few PHCs. However, most of the investigating/laboratory facilities mentioned in the table are available at district hospital Bhuj only and are not supposed to be available at CHCs and PHCs as per standard norms (Table 3.6– appendix 1).

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Other Services

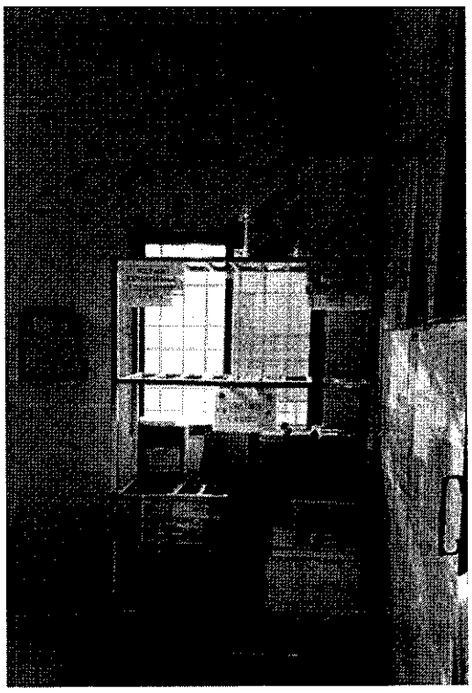
Other services like conducting deliveries (normal and assisted) and new born care, administration of parental oxytopics, antibiotics, administration of magnesium sulphate injection, management of post-partum hemorrhages, management of other delivery complications, management of low birth weight babies and C-section are available 24x7 at district hospital and both CHC at Mandvi and Mundra. In addition, blood storage facility, services like resuscitation, thermal protection, manual vacuum aspiration (MVA), electric vacuum aspiration (EVA) and dilation & curettage are also available at district hospital and both CHCs (Mandi & Mundra). Services for conducting normal deliveries and new born care, administration of parental antibiotics and resuscitation are available at PHC Zarpara and PHC Bhujpur, PHC Talvana and PHC Gundiyali. Besides, resuscitation facility at PHCs (Bhujpur, Talvana and Gundiyali), thermal protection at PHCs (Bhujpur&Gundiyali) and manual and electric vacuum aspiration are available at PHC Zarpara (Table 3.7 -appendix 1).



Essential drugs storage in PHC Gundiyali, Kachchh

Supply of Healthcare Kits

So far as supply of health care kit is concerned, all kits mentioned in Sr. 1 to 9 of Table 3.8 are available at CHC Mundra. This information, however, is not obtained from district hospital (Bhuj) and Sub district hospital (Mandvi). The same is true for PHC Bhujpur barring Kit O and Kit P (donor blood transfusion). In that respect the worst could be seen in PHC Kandagara where there is no supply of any kit mentioned in the Table 3.8. PHC at Nani Tumbdi has supply of only one kit, i.e. Kit I (normal delivery equipment) whereas PHC Talvana has supply of four kits (emergency obstetric care drug kit, RTI/STI laboratory kit, Kit G (IUD insertion kit) and Kit N (equipment for neonatal resection)and PHC at Gundiyali has RTI/STI laboratory kit, Kit G (IUD insertion kit) and Kit N (equipment for neonatal resection), Kit I (normal delivery kit/labour room kit) and Kit N (equipment for neonatal resection)(Table 3.8 -appendix 1).



Cold box and vaccine storage at PHC Zarpara

Stock of Specific Items

Among other supplies, stock of specific items like Nirodh pieces, Oral pill cycles, IUDs, IFA (large), Vitamin A solution and ORS packets are available at all six PHCs and one CHC at Mundra. However, this information has not been obtained from district hospital and sub district hospital at Mandvi (Table 3.9 -appendix 1).

Equipments

Equipments such as Cardiac monitor, Oxygen cylinder, Shadow less lamp pedestal for minor OT, High pressure sterilizer (horizontal /vertical), X-ray machine (functional), ECG machine (functional), Ice Lined Refrigerators and Deep Freezer are available at CHC Mundra. At PHC level, cold chain equipment and deep freezer are available at all six PHCs whereas ice lined refrigerator is available in all but Nani Tumbdi PHCs and shadow less lamp pedestal is reported to be available at only three out ofsix PHCs i.e. Bhujpur, Talvana and Gundiyali (Table 3.10-appendix 1).

Adequacy of Means

Based on the criterion of adequately equipped (if health center is having 60 percent of sanctioned, infrastructure, supply, equipment, etc.) position of the Primary Health Centers, Community Health Centers and District Hospitals have been given in the Table 3.11, 3.12 and 3.13 respectively.

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According to Table 3.11, PHC Mota Kandagara adequately is equipped in medical staff, paramedical staff and supplies but not in infrastructure and equipments. PHC Zarpara is adequately equipped in infrastructure, medical staff, paramedical staff, supply and equipment. PHC Bhujpur is adequately equipped in medical staff, paramedical staff, supply and equipment. PHC Nani Tumbdi, is equipped adequately in infrastructure, medical staff, paramedical staff and supply. In the two PHCs of Mandvi- Talvana and Gundiyali the latter is more adequately equipped than Talvana in terms of paramedical staff and equipment.



A view of G.K. District Hospital, Bhuj, Kachchh

Community Health Centres (Table 3.12) at Mandvi and Mundra too are adequately equipped as per the criterion. Mandvi Community Health Centre is lacking in terms of staff position such as General Surgeon, Radiologist and a Dental Assistant whereas in the Mundra CHC, General Surgeon, Pediatrician, Radiographer and Dental Assistant are not in position.

According to Table 3.14, the District Hospital at Bhuj is adequately equipped so far as infrastructure, medical staff, paramedical staff, supply and equipment are concerned. Barring Dilatation and Curettage (D&C) and Facility of Blood Bank, the

District Hospital is adequately equipped (Tables 3.11, 3.12, 3.13 and 3.14 – Appendix 1).

Infrastructure includes overhead tank pump and facility, electricity in all parts of hospital, availability of generators, telephone functional vehicles, laboratory, operation theatre, and separate aseptic labour room.

1. Includes obstetrician/gynaecologist, paediatrician and anaesthetist.
2. Include staff nurse. ANM, pharmacist, laboratory technician, PHN, health assistant



Waiting Area of Maternity Ward Of PHC Gundiyali, Mandvi, Kachchh

male and female.

3. Includes tual ring, set of standard surgical kits, emergency obstetric care kit, new born care kit, RTI/STI kits and delivery kit I.
4. Includes Boyle's apparatus, shadow less lamp and oxygen cylinder.
5. Calculated from the number of health facilities which facilities have conducted delivery.

Chapter 4: Health Index Measurement

Better health status of the population leads to demographic transition steadying the population growth rate essential for sustainable development. Health index provides relative measures of the health status of a particular area or population.

In the present study efforts were made to develop methodology for measuring the health index for 16 project villages and compared with blocks and district in which these villages fall. In order to do so, secondary data from six PHCs, two CHCs and district hospital were collected. In addition, relevant data from Census (2011), IDSP (2017-180, HMIS (2017-18), and Human Development Report of Kachchh district (2016) were pooled for this purpose.

Health Management Information System (HMIS) is the main source of data for public health indicators covered under National Health Mission (NHM) that combines both National Rural Health Mission (NRHM) launched in 2005 and National Urban Health Mission (NUHM) initiated later in the year 2013. In addition, Government of India also initiated Integrated Diseases Surveillance Programme (IDSP) under National Surveillance Programme for Communicable Diseases (NSPCD) to strengthen diseases surveillance for communicable and non-communicable infectious diseases to detect and respond to outbreak immediately. IDSP data is collated at National Centre for Diseases Control (NCDC) by compiling State/District surveillance data to interpret diseases trend in any specific area of the country. However, there has been several limitations of reporting and compiling diseases related data at PHC, CHC and even at District level.

Table 4.1 indicates that data for most of the infectious diseases are not available at all levels. Even if data is available for some diseases, the numbers are too small. Thirdly, there have been relative inconsistencies in PHC, CHC and DH data. Consequently, HMIS data on relevant public health indicators was used for developing Health Index (HI).

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It must be mentioned that efforts were made to use IIM Ahmedabad methodology for development and estimation of Health Index for the 16 project villages. IIM Ahmedabad collected data on a large number of outcome and input variables and ran the principal component analysis to identify factor loadings/weights of a smaller set of variables and classified the Indian States according to outcome and input factors. Taking lead from there, detailed schedules were developed for collecting secondary data from PHCs, CHCs and the district hospital.

However, a number of difficulties were faced in applying the method:

a. Lack of data at all levels –village, PHC and CHC– for all the outcome and input variables
b. A low case- variable ratio that does not permit us to apply factor analysis
c. While some values are shown in percentages, e.g. percent ANC-4, other values are given in absolute numbers, e.g. malaria in children 0-5 years of age
d. There is also a methodological issue. The project villages are subject to three different effects - intervention effect, programme effects, and other effects such as ongoing development and media effects. Therefore the difference, if any, between baseline and endline indices cannot be routinely attributed to intervention effects only

   In notations, change in health status of the Project villages

   $\delta V = \delta I + \delta P + \delta O$

   δI = change in health status due to intervention

   δP= change in health status due to programme

   δO= change in health status due to other effects

   Therefore, $\delta I = \delta V - \delta P - \delta O$
e. At the grassroots level there is an interaction between input and outcome processes.

Keeping the above facts in mind we first identified all the variables on which information for all aspects of health is available at the village level. Those variables are:

1. % Pregnant Women who received four or more ANCs
2. % Pregnant Women who are not anemic i.e. HB >11 Mg
3. % Total Institutional Births
4. % Live Births (among total pregnancies)

5. % Live Births > 2.5 KG
6. % Mothers received TT
7. % Children who received BCG
8. % Children immunized for measles
9. % Children who received Vit-A
10. % Infant Survived Till the First Birthday

Then seven more variables were identified on which information for both the Blocks were available. They are,

11. % Pregnant Women Examined for Syphilis
12. % Women Getting 1st Post Partum Checkup Between 48 Hours and 14 Days
13. % Newborns Breastfed within 1 Hour of Birth to Total Live Births
14. Sex Ratio at Birth (Female Live Births/ Male Live Births *1000)
15. %Children Fully Immunized (9-11 Months)
16. % Children Immunized for both BCG and Measles
17. % Children (0-5 Yrs) who never had Diarrhea

Except sex ratio, values of all the indicators lie between 0 and 100. Now the values of different indicators were standardized using the formula:

$$SI_i = \frac{SI_{iv} - MinSI_{id}}{MaxSI_{id} - MinSI_{id}}$$

Where SI_i refers to standardized value of the i^{th} indicator, $MinSI_{id}$ refers to minimum value of the SI_i, for any district in Gujarat and Max SI_{id} refers to the maximum value of the SI_i for any district in Gujarat. It may be noted that originally some indicators such as infant deaths in one year moved in a reverse direction. For exhibiting them in the table of health indicators they were replaced by a positive indicator by subtracting their value from 100. For them the following formula was used to arrive at SI_i:

$$SI_i = \frac{Max\ SI_{id} - SI_{iv}}{Max\ SI_{id} - MinSI_{id}}$$

Finally, the Health index was defined as an average value of all the SI_is. Separately, all SI_is lie between 0 and 1. Therefore, the average of them also lies between 0 and 1.

Using the same approach SI_is were computed for the Block level 17 indicators. Finally, the similar exercise was done for the district in which these Blocks and villages fall. Finally, a number of health indices were constructed:

- Village Health Index based on ten variables
- Block Health Index based on ten variables
- Block Health Index based on all 17 variables
- District Health Index based on all 17 variables
- State Health Index based on all 17 variables

The health indices lies between 0 and 1 and for analytical purpose, may be broadly interpreted as the probability that a randomly selected person from the population is healthy. Here, health is defined in the context of Gujarat as the framework of good and bad indicators depends on the minimum and maximum values for different districts of Gujarat. One may use the standards of India as well and compute new indices but health being a state subject and socio-economic and cultural conditions within states being more homogeneous it makes greater sense to use state standards.

To test for the significance of difference in health indicators, interpreted as probabilities, the test for independent samples is applied

$$t_{n1+n2-2} = \frac{p_1 - p_2}{\sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}}$$

Where, n_1 refers to the size of one sample and n_2 to the size of the other sample. For villages and Blocks the respective values of n_1 and n_2 are 16 and 2.

For comparing villages and Blocks with the district, 95% confidence interval is estimated and it is checked whether the district and state Health Indices fall within the confidence interval or not. The confidence interval is given as:

$$p_1 \pm 2 \sqrt{\frac{p_1 q_1}{n_1}}$$

We believe that change of any other more sophisticated formulae would not change the inference considerably.

Findings

Tables 4.2 and 4.3 exhibit the estimates of Health Index. Table 4.2 is based on 10 indicators for which all data were available for all the 16 villages. Table 4.3 is based on 17 variables for which data were available only for Blocks, district and the State.

Table 4.2 shows that the Project villages are better than the Blocks in the following aspects:

1. ANC- 4
2. Live Births

On the other hand the Project villages are not as good as the Blocks in terms of:

1. Anemia among pregnant women
2. BCG among children

The table also shows that the Project villages are better than the district in terms of:

1. ANC – 4
2. Live Births
3. Infant Survival

But the villages are not as good as the district in terms of anemia, %TT injection and BCG.

Table 4.2 shows that the estimate of the village Health Index is 0.81. The estimate of Block Health Index is 0.75.

It is found that the difference between the village Health Index and the Block Health Index is not statistically significant (t= .19). The 95% confidence interval of the village Health Index is .7 – .91 which contains the value of the district, but not the State and, therefore, it may be said that the differences between villages, Blocks and district are not statistically significant. Yet, the 16 project villages are significantly better than the state.

Table 4.3 shows that on the basis of 17 indicators of health, the two Blocks seem to be slightly backward Blocks (.62) of the district (.65) but they are at the same level of health as the Gujarat state (HI=.62).However, the difference between Blocks and the district is not statistically

significant (t = -.15). The 95 percent Confidence Interval of the Health Index of the two Blocks is - .10 – 1.26 and the value of the Health Index of the district lies within this interval.



Medical Officer at PHC Mota Kandagara, Kachchh

Table 4.3 also exhibits that when 17 rather than 10 indicators are used there is deterioration in the Health Index at all levels – Block, district and state. This is because of the relatively lower values of sex ratio at birth, full immunization, breastfeeding and diarrhoea at all the levels. This implies that the project should particularly focus on gender sensitization and full immunization amongst children. Since the health indicators for them are lower, greater investment in these aspects of health may yield better results and will be cost effective.

Limitations

There are several limitations of the study:

1. In developing the health index, input and outcome variables are not separated because the outcome variables such as IMR, <5 MR cannot be estimated at the village level
2. In cases such as diarrhea in children 0-5 years of age the size of exposed population is not available and therefore in constructing the index total population of the village, Block, district or state was used for computing indicator ratios.
3. Due to errors in data and otherwise due to specific rule of standardization, if a SI showed a value of more than 1 it was replaced by 1.

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Table 4.1 Absolute number of cases reported at different PHC, CHC and DH for Communicable and Non-Communicable diseases – 2017-18 (as per WHO indicators)

Diseases List	Kandagara Mota	Jarpara	Bhujpur	Nani Tunbadi	Talwana	Gundiy ari	CHC-Mundra	DH-Bhuj
Communicable Diseases								
Acute diarrhoeal diseases	173	54	321	209	159	408	1640	543
Malaria	1012	1313	0	0	955	828	7594	0
Acute respiratory infection	434	145	262	230	2190	964	1462	3293
Japanese encephalitis	0	0	0	0	0	0	0	0
Viral hepatitis	0	0	0	0	0	0	0	72
Acute encephalitis syndrome	0	0	0	0	0	0	78	0
Dengue	0	0	0	0	3	0	0	0
Cholera	0	0	0	0	0	0	0	0
Typhoid	0	0	0	0	1	2	94	0
Tetanus neonatal	0	0	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0	0	12
Whooping cough	0	0	0	0	0	0	0	0
Measles	0	0	0	0	0	0	0	1
Rabies	0	0	0	0	180	32	0	0
Polio	0	0	0	0	0	0	0	0
Pneumonia	0	0	0	0	1	0	0	177
Meningococcal meningitis	0	0	0	0	0	0	0	0
Syphilis	0	0	0	0	0	0	0	0
Gonococcal infection	0	0	0	0	0	0	0	0
Pulmonary Tuberculosis	12	68	34	18	17	24	0	0
Leprosy	0	0	0	0	1	0	0	0
Kala azar	0	0	0	0		0	0	0
Swine flu	0	0	0	0	3	0	0	0
Chikungunya fever	0	0	0	0	1	0	0	0
Acute flaccid paralysis (AFP)	0	0	0	0		0	0	0
Gonococcal infection	0	0	0	0	0	0	0	0
Non Communicable Diseases								
Coronary heart disease	0	0	0	0	4	4	0	807
Ischemic heart diseases	0	0	0	0	3	12	0	0
Burden of ischemic heart diseases	0	0	0	0	0	0	0	0
Burden of stroke	0	0	0	0	23	0	0	0
Diabetes	0	0	0	0	250	32	0	636
Hypertension	0	0	0	0	300	26	0	0
Incidences of blindness	0	0	0	0	0	0	0	0
Cancer	0	0	0	0	0	3	0	222

The zero data against some of the diseases represents that no cases of this diseases were reported at PHC and CHC, however it does not mean that these diseases were not present in that area. Hence zero data diseases has not been considered for calculation of the health index in the report

Table 4.2 : Health Index (Based on 10 Indicators)

Indicators	Village		Block		District		State	
	16 Project Villages	Index	Mundra & Mandvi	Index	Kachchh	Index	Gujarat	Index
POPULATION	48376		178296		2092371		60439692	
% Pregnant Women who received four or more ANCs	84.6	0.8	63.6	0.3	73.0	0.5	72.8	0.5
% Pregnant Women who are not anemic i.e. HB >11 Mg	22.6	0.7	33.9	1.0	50.2	1.0	30.6	0.9
% Total Institutional Births	87.4	0.8	90.9	0.8	91.8	0.8	84.9	0.7
% Live Births (among total pregnancies)	98.8	1.0	98.6	0.2	99.0	0.8	98.9	0.9
% Live births > 2.5 KG	96.2	1.0	93.7	1.0	93.8	1.0	87.7	0.3
% Mother Received TT	88.3	0.5	88.3	0.5	100.0	1.0	96.0	0.8
% Children who Received BCG	84.4	0.4	95.0	0.8	97.1	0.9	100.0	1.0
% Children Immunized for Measles	99.7	1.0	100.0	1.0	100.0	1.0	91.9	0.8
% Children who received Vitamin-A	99.7	1.0	100.0	1.0	100.0	1.0	100.0	1.0
% Infant Survived till the First Birthday	98.9	0.9	98.3	0.9	98.9	0.1	98.2	0.1
Total		**8.1**	-	**7.5**	-	**8.1**	-	**7.0**
Mean		**0.81**	-	**0.75**	-	**0.81**	-	**0.70**

Table 4.3 : Health Index (Based on 17 Indicators)

Indicators	Block		District		State	
	Mundra & Mandvi	Index	Kachchh	Index	Gujarat	Index
POPULATION	178296		2092371		60439692	
% Pregnant Women who received four or more ANCs	63.6	0.3	73.0	0.5	72.8	0.5
% Pregnant Women who are not anemic i.e. HB >11 Mg	33.9	1.0	50.2	1.0	30.6	0.9
% Total Institutional Births	90.9	0.8	91.8	0.8	84.9	0.7
% Live Births (among total pregnancies)	98.6	0.2	99.0	0.8	98.9	0.9
% Live births > 2.5 KG	93.7	1.0	93.8	1.0	87.7	0.3
% Mother Received TT	88.3	0.5	100.0	1.0	96.0	0.8
% Children who Received BCG	95.0	0.8	97.1	0.9	100.0	1.0
% Children Immunized for Measles	100.0	1.0	100.0	1.0	91.9	0.8
% Children who received Vitamin-A	100.0	1.0	100.0	1.0	100.0	1.0
% Infant Survived till the First Birthday	98.3	0.9	98.9	0.1	98.2	0.1
% pregnant women examined for Syphilis	19.3	0.3	7.3	0.1	12.0	0.2
% Women getting 1st Post Partum Checkup between 48 hours and 14 days	41.5	0.1	51.4	0.3	74.2	0.6
% Newborns breast fed within 1 hour of birth to Total Live Births	99.1	1.0	82.9	0.6	86.1	0.6
Sex Ratio at birth (Female Live Births/ Male Live Births *1000)	917	0.7	942	0.8	910	0.6
% Children fully immunized (9-11 months)	81.70	0.2	95.0	0.4	93	0.4
% Children Immunized for both BCG & Measles	72.5	0.1	82.4	0.1	88.7	0.3
% Children (0-5 yrs) never had Diarrhoea	99.3	0.7	99.3	0.7	99.5	0.8
Total		**10.6**		**11.1**		**10.5**
Mean		**0.62**		**0.65**		**0.62**

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Chapter 5: Conclusion and Recommendations

The present study broadly attempted to examine the adequacy of government health services and determining the health index of 16 project villages in comparison of *Taluka*(Block) and District as a whole. For this purpose, IDSP and HMIS data of six PHCs, two CHCs and District Hospital were examined and facility survey was conducted.

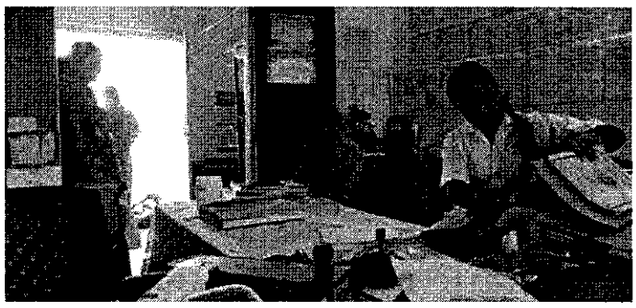
The analysis of facility survey data indicated that more or less all six PHCs are adequately equipped to provide primary healthcare services to their respective catchment areas. While both the CHCs are not adequately equipped as per the norms particularly, in areas of medical and para-medical staff affecting the delivery of specialized medical services to PHCs referral patients. However, District Hospital at Bhuj seems to be adequately equipped in terms of infrastructure, medical and para-medical staff in position, supply and equipments compensating the demand of specialized medical services of both rural and urban areas of the district.



A broader view of PHC Gundiyali, Kachchh

Due to limitations of IDSP data on communicable and non-communicable infectious diseases, HMIS data on relevant public health indicators was used for developing health indices. Further, due to non-availability of village level public health data at PHCs, health index for 16 project villages falling under six PHCs of Mundra and Mandvi CHCs was measured on 10 available health indicators. The analysis demonstrated that project villages are better than the block average in terms of ANC coverage and live birth but lag behind anaemia among pregnant women and BCG vaccination coverage.

It was also found that project villages are better than the district in ANC coverage, live birth and infants' survival but the project villages are not as good as the district in terms of anaemia, %TT and BCG. It is evident from Table 4.1 that the Health Index of project villages are 0.81 as compared to block level of 0.75. Moreover, the differences between project villages, block and district are not statistically significantly though better than the state.



Doctor examining patient in PHC Mota Kandagara, Mundra, Kachchh

Further, considering all 17 health indicators available for Block, district and state rather than 10 indicators, the health index at block, district and state levels deteriorated because of the relatively lower values of sex ratio at birth, full immunization, breastfeeding and diarrhoea at all the levels. This implies that the project should particularly focus on gender sensitization and full immunization coverage amongst children. Since the health indicators for them are lower, CRS investment in coordination with government existing Health facilities which are by and large adequately equipped may yield better results and will be cost effective too.

Based on the present exercise, it is greatly felt that there is a need for collecting primary data at village level on all major health indicators at the household level in all intervention villages to have more sound estimates. For instance, If we have primary data on deaths by age we can calculate life expectancy at the village/Block level for comparison between the start of the intervention and its completion even without data on age distribution. Life expectancy is a good summary measure of health and changes in age-distribution of deaths will affect the changes in the disease burden, due to communicable and non-communicable diseases and other causes and overall improvement in life expectancy. It is further suggested that a few qualitative interviews with stakeholders and administrators will also help in identifying the priorities areas and the approaches to delivery which is area-specific and as per the needs of the people.

Alternatively, if it is not possible to collect primary data at village level, the baseline value of 0.81 may be taken as the value of Health Indicator of the Project villages and using the same methodology a similar value may be obtained for project evaluation in the endline study. This comparison will show the effect of project intervention net of other factors which may change the health conditions in the villages.

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Appendix 1

Table 3.3: Infrastructure Available at Covered Health Facilities

Sr. No.	Infrastructure facility	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Own Building	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
2.0	Main source of Water	Piped	Piped	Piped	Piped	Borewell/ Tubewell	Borewell/ Tubewell	Piped	Piped	Piped
2.1	Running water supply available for 24 hours at facility (DH/CHC/PHC)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.1	Regular water supply available in OT?	Yes	Yes	Yes	-	-	-	-	-	-
2.3	Regular water supply available in Labour room	Yes	Yes	Yes	-	-	Yes	Yes	Yes	Yes
3.0	Proper drainage and sanitation system for waste water, surface water, sub soil water and sewerage exists in the facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.0	Functional toilet facility with running water available	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.1	Separate toilet facility available for males and females	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
5.0	Is in-house laundry facility available at facility DH/CHC/PHC)	Yes	Yes	No		-	-	-	-	-
5.1	If in-house laundry not available, is it outsourced?	No	No	Yes		-	-	-	-	-
6.0	Facility of providing food for inpatients available	Yes	Yes	Yes		-	-	-	-	-
7.0	Electricity connection available	Complete	Complete	Yes	Complete	Complete	Complete	Complete	Complete	Complete
7.1	Standby facility of generator/inverter available in working condition	Yes	Yes	Yes	No	No	Yes	No	Yes	No
7.2	Capacity of the generator in KW	1000			-	-	-	-	-	-

7.3	Generator supply is connected to Labour room/Ice line refrigerator (ILR)/wards	Yes	Yes	Yes	-	-	Yes	-	Yes	-
7.4	Generator backup is assured at all time	Yes	Yes	Yes	-	-	Yes	-	Yes	-
7.5	Adequate fund available for operating Generator	Yes	Yes	Yes	-	-	Yes	-	Yes	-
8.0	Operation Theatre	Yes	Yes	Yes		-	-	-		-
9.0	Separate aseptic Labour room available	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
10.0	Telephone facility available/Intercom	Yes	Yes	Yes	No	No	Yes	Yes	No	No
11.0	Vehicle on road (Ambulance, Jeep, and Car functional)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.0	OPD facility for RTI/STI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.1	Gynecology/obstetric OPD facility	Yes	Yes	Yes	No	No	No	No	No	No
12.2	Nameplates guidelines	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12.3	Privacy during examination	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
13.0	Facilities for counseling available	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14.0	Linkage with district blood bank	Yes	Yes	Yes	-	-	-	-		-
14.1	Regular blood supply available	Yes	Yes	Yes	-	-	-	-		-
15.0	Quarters for obstetrician/gynecologists	No	No		No	No	No	No	No	No
15.1	Quarters for RMO	No	Yes		No	No	No	No	No	No
15.2	Quarters for Nurse	No	Yes		Yes	No	No	No	No	No
16.0	Security (at least 1 person available round the clock)	Yes	Yes	No	No	No	No	Yes	No	No
16.1	Critical care Area available at DH/SDH	Yes	Yes	Yes	-	-	-	-	-	-
16.2	Integrated Counseling and Testing Center (ICTC) there in DH/SDH	Yes	Yes	Yes	-	-	-	-	-	-

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17.0	Wards and Number of beds	DH		Mandvi (SDH)		Mundra		Mundra PHC 1 (Mota Kandagara)		Mundra PHC 2 (Zarpara)		Mundra PHC 3 (Bhujpur)		Mundra PHC 4 (Nani Tumbdi)		Mandvi PHC 5 (Talvana)		Mandvi PHC 6 (Gundiyali)	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
17.1	General Medicine ward	90	60			yes	yes	-	-	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
17.2	General Surgery ward	90	60					-	-	-	-								
17.3	Pediatric ward	90					yes	-	-	-	-								
17.4	Intensive Medicare ward	8						-	-	-	-								
17.5	Post Operation ward	8						-	-	-	-								
17.6	Labour Room		6				yes	-	No	-	No	-	yes	-	yes		yes		yes
17.7	ANC ward				07		yes	-	yes	-	yes	-	yes		yes		yes		yes
17.8	PNC ward		2		21		yes	-	-	-	No	-	yes		yes		yes		yes
17.9	Post Partum ward		2				yes	-	-		-		-						
17.10	High Dependency ward							-	-		-								
17.11	Burn ward	12					Yes	-	-										
18.0	Prominent display boards regarding service availability in Local Language display at District Hospital?	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
18.1	Separate registration counters	Yes		Yes		Yes		No		Yes		No		No		No		No	
18.2	Complaint box/ Suggestion box	Yes		Yes		Yes		No		No		No		No		Yes		Yes	
18.3	Pharmacy of drug storage and drug dispensing	Yes		Yes		Yes		No		Yes		No		Yes		Yes		Yes	
19.0	Facility for sterilizing instruments available/ Whether CSSD (Central Sterile and Supply Department) is there at DH/SDH?	Yes		Yes		Yes		-		-		-		-		-		-	
19.1	Where instruments & items are sterilized?	7		7		7		7		7		7		7		7		6	
20.0	Facilities available for disposing of bio medical waste (*Incinerator, Auto Claving/ Microwaving, Shredder, Needle And Syringe Destroyer, Other Reasons)*	7		7		7		7		7		7		7		7		6	
20.1	If not in-house, are Biomedical disposal services out sourced	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
20.2	Color coded waste bags available for segregated waste	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	

20.3	Mode of infectious /biomedical waste and non infectious waste disposal*	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI	In	NI
		7	7	7	7	7	7	7	7	7	8	7	7	7		7	6&7	6	6

***Answer Codes for Q.20 (In for Infectious, NI for Non-infectious)**

1. Bury in deep burial pit	2. Bury in pit	3. Throw in common public disposal pit	4. Throw outside hospital compound
5. Throw inside hospital compound	6. Use incinerator	7. Out sourced	8. Other

Table 3.4: Staff Position in Health Facility (DH/CHC/PHC)

Sr. No.	Medical and Paramedical Staff	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Medical Superintendent/ PMO	1	1	1	1	1	1	1	1	1
2.0	Specialist (Medicine)	4	-	0	-	-	-	-	-	-
3.0	Specialist (Surgery)	5	0	0	-	-	-	-	-	-
4.0	Obstetrician / Gynecologist	7	1	1	-	-	-	-	-	-
5.0	Pediatrician	5	1	0	-	-	-	-	-	-
6.0	Anesthetist	5	0	1	-	-	-	-	-	-
7.0	Pathologist/ Microbiologist	9	1	-	-	-	-	-	-	-
8.0	Radiologist	5	0	-	-	-	-	-	-	-
9.0	Dermatologist/ Venerologist	2	-	-	-	-	-	-	-	-
10.0	Ophthalmologist	3	1	-	-	-	-	-	-	-
11.0	Dentist	2	1	0	-	-	-	-	-	-
12.0	E.N.T. Specialist	3	-	-	-	-	-	-	-	-
13.0	General Duty Doctor	-	3	1	No	1	1	-	1	1
14.0	AYUSH Physician	1	-	-	1	No	No	1	1	1
15.0	other MOs OR SPECIALISTS _____ (Specify) (list out all other categories of MOs and specialists in the facility)				No	No	No	No	No	No
16.0	Public Health Nurse	0	17	0	4	9	7	4	1	-
17.0	Nurses Working In Obstetric-Gynae Department	8	-	-	-	-	-	-	-	-
18.0	Auxiliary Nurse Midwife(ANM)	-	-	-	4	9	7	4	1	4

19.0	Staff Nurse (Excluding Those Already Covered)	8	2	7	-	0	0	0	0	0
20.0	Technician	17	2	-	-	-	-	-	-	-
21.0	Radiographer	7		0	-	-	-	-	-	-
22.0	Pharmacist	6	5	-	1	1	1	1	1	1
23.0	Physiotherapist	2	1	-	-	-	-	-	-	
24.0	Medical Record Officer	2	0	2	1	1	1	2	1	1
25.0	Compounder	0	0	1	-	-	-	-	-	-
26.0	Dresser	0	1	1	-	-	-	-	-	-
27.0	Public Health Programme Manager	0	0	0	-	-	-	-	-	-
28.0	Lab. Technician	-	2	1	1	1	1	1	1	1
29.0	Ophthalmic Assistant	2	1	1	-	-	-	-	-	-
30.0	Dental Hygienist	0	0	-	-	-	-	-	-	-
31.0	Any Other Staff_____ **(Specify)** (List Out All Other Paramedical Categories In The Facility)	-	-	-	No	No	LHV, Class IV employee and Male health assistant	Class IV employee	Class IV employee	ASHA Worker

Note: (-) indicates not in position as per standard primary health centre (PHC) norms. (-) at some places does indicate information not available

Table 3.5: Training Received by the Staff (DH/CHC/PHC) (Past 5 years or Ever)

Sr. No.	Medical and Paramedical Staff	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	RTI/STI	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
1.1	New-born care	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.2	Medical Termination of pregnancy (MTP)	Yes	No	No	No	No	No	Yes	No	No
1.3	RCH Foundation Skill Training	Yes	Yes	Yes	-	-	-	-	-	-
1.4	F-IMNCI (Facility Based IMNCI) training	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
1.5	NSSK (Navjat Shishu Suraksha Karyakram) Training	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes

1.6	Blood grouping and cross matching training	Yes	No	No	No	No	No	-	-	-
1.7	Integrated Management of Neonatal and Childhood Illnesses (IMNCI) training	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
1.8	SBA or Basic Emergency Obstetric Care training	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
1.9	Electro Cardiogram (ECG) training	Yes	No	No	-	-	-	-	-	
1.10	Dental Hygiene		No		-	-	-	-	-	
1.11	Mother Child tracking system	Yes	No	No	No	No	No	No	Yes	No
1.12	MDR (Maternal Death Review) Orientation	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.13	Non Scalpel Vasectomy (NSV) training	No	No	No	No	No	No	Yes	No	No
1.14	Vector Born Disease Control Programme (VBDCP) training	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
1.15	Directly Observed Treatment- Short Course (DOTS) training	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
1.16	Immunization training	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.17	Adolescent Reproductive Sexual Health (ARSH) Training	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No
1.18	Minilaprotomy training	No	No	No	No	No	No	Yes	No	No
1.19	IUD insertion training	Yes	No	Yes	Yes	No	No	Yes	No	No
1.20	HIV/AIDS Prevention, Care and Support training	Yes	Yes		-	-	-	-		
1.21	Emergency Obstetric Care(including C-Section) training	Yes	Yes	Yes	No	No	No	No	No	No
1.22	Health Management Information System (**HMIS**) Training	Yes	Yes	No	No	No	No	No	Yes	No
1.23	Any Other Training (Specify)	-	-	-	MR, MI, Polio, Swineflu	NQAS	-	-	Kayakalp, NVBCP, MR, Bridge	No

Table 3.6: Investigation and Laboratory Services

Sr. No.	Investigative/Laboratory Services	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	**CLINICAL PATHOLOGY**									
	(a). Hematology	Yes	Yes	Yes	-	-	-	-	-	-
	(b). Urine analysis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(c). Stool analysis	Yes	No	No	-	-	-	-	-	Yes
1.1	**PATHOLOGY**									
	(a). Pap smear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(b). Sputum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(c). Histopathology	Yes	Yes		-	-	-	-	-	-
1.2	**MICROBIOLOGY**									
	(a). Diagnosis of RTIs/ STDs with wet mounting, grams stain, etc.	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
	(b). RPR for Syphilis	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.3	**BIOCHEMISTRY**									
	(a). Blood sugar	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(b). Blood urea	Yes	Yes		-	-	-	-	-	-
	(c). Blood creation	Yes	Yes	Yes	-	-	-	-	-	-
1.4	**SEROLOGY**									
	(a). Pregnancy test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(b).Coomb's test	Yes	Yes	Yes	-	-	-	-	-	-
	(c). Widal test	Yes	Yes	Yes	-	-	-	-	-	Yes
	(d). Elisa for HIV test	Yes	Yes	Yes	Yes	No	No	No	-	Yes
	(e). R A factor test	Yes	Yes		-	-			-	-
	(f).VDRL test	No	Yes	Yes	Yes	No	No	No	-	-
1.5	**INVESTIGATION**									
	(a). ECG	Yes	Yes	-	-	-	-	-	-	-
	(b).STRESS TEST (TMT)	Yes	No	-	-	-		-	-	-
	(c).2D- ECHO	Yes	No	-	-	-	-	-	-	-
1.6	**RADIOLOGY**									
	(a). X – RAY	Yes	Yes	Yes	-	-	-	-	-	-
	(b). ULTRA SOUND	Yes	No	Yes	-	-	-	-	-	-
1.7	**BLOOD BANK**									
	Fully Operational Blood Bank	Yes	No	No	-	-	-	-	-	-
1.8	**PHYSIOTHERAPY UNIT**									
	Fully Functional Physiotherapy Unit	Yes	Yes	-	-	-	-	-	-	-

Table 3.7: Availability of Services

Sr. No.	Supply of Kits	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Deliveries are conducted (1. 24x7, 2. day time only or 3. no)	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
2.0	Services related to 'delivery and ' new born care' are provided in this facility (rec.1,2 or 3)	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
	(a) Normal Delivery	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
	(b) Assisted delivery(forceps delivery/vacuum)	24x7	24x7	24x7	No	No	No	No	No	No
	(c) Administration of parental oxytocics	24x7	24x7	24x7	No	Day time only	24x7	No	No	No
	(d) Administration of parental antibiotics	24x7	24x7	24x7	No	Day time only	24x7	No	24x7	24x7
	(e) Administration of Magnesium sulphateinjection	24x7	24x7	24x7	No	Day time only	24x7	No	No	No
	(f) Management of post-partumhemorrhages	24x7	24x7	24x7	No	No	24x7	No	No	No
	(g) Management of other deliverycomplications	24x7	24x7	24x7	No	No	24x7	No	No	No
	(h) Caesarian section	24x7	24x7	24x7	-	-	-	No	-	-
3.0	Is there a blood bank available in thisfacility? if yes, it is functional 24 X 7	No	No	No	No	No	No	No	No	No
4.0	Blood storage facility available inthis facility?	Yes	Yes	Yes	No	No	No	No	No	No
5.0	Are low weight birth babies managedat the facility	24x7	24x7	24x7	No	Yes	Yes	No	Yes	Yes
6.0	is new born care facility available atfacility	24x7	24x7	24x7	Yes	Yes	Yes	Yes	Yes	Yes
7.0	Resuscitation	Yes	Yes	24x7	No	Day time only	24x7	No	24x7	24x7
8.0	Thermal protection (warmer/ table lamp)	Yes	Yes	24x7	No	No	24x7	No	24x7	24x7
9.0	Manual Vacuum Aspiration	Yes	Yes	24x7	No	Yes	No	No	No	No

	(MVA)									
10.0	Electric Vacuum Aspiration (EVS)	Yes	Yes	24x7	No	Yes	No	No	No	No
11.0	Dilatation & Curettage (D & C)	Yes	Yes	24x7	-	-	-	-	-	-

Table 3.8: Supply of Healthcare of Kit

Sr. No.	Supply of Kits	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi (SDH)	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Standard surgical kit (all six sets)	Yes	Yes	Yes	No	No	Yes	No	No	No
2.0	Emergency obstetric care drug kit	-	-	Yes	No	Yes	Yes	No	Yes	No
3.0	RTI/STI laboratory kit	-	-	Yes	No	Yes	Yes	No	Yes	Yes
4.0	Kit G (IUD insertion kit)	-	-	Yes	No	No	Yes	No	Yes	Yes
5.0	Kit for new born care equipment	-	-	Yes	No	No	Yes	No	No	Yes
6.0	Kit I (normal delivery kit/labour room kit)	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
7.0	Kit N (equipment for neonatal resection)	-	-	Yes	No	Yes	Yes	No	Yes	Yes
8.0	Kit O (side laboratory test and blood transfusion)	-	-	Yes	No	No	No	No	No	No
9.0	Kit P (donor blood transfusion)	-	-	Yes	No	No	No	No	No	No

Table 3.9: Stock of Specific Items of Health Care

Sr. No.	Supply of Kits	Taluka Level (CHC)	(PHC)					
		Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.0	Nirodh pieces	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.0	Oral pill cycles	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.0	IUDs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.0	IFA (large)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5.0	Vitamin A solution	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6.0	ORS packets	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.10: Heal Care Establishment with Specific Equipments

Sr. No.	Supply of Kits	Taluka Level (CHC)	(PHC)					
		Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1.1	Shadow less lamp pedestal for minor OT	Yes	No	No	Yes	No	Yes	Yes
1.2	Cold chain equipment (functional)	No	Yes	Yes	Yes	Yes	Yes	Yes
1.3	Ice Lined Refrigerators	Yes	Yes	Yes	Yes	No	Yes	Yes
1.4	Deep Freezer	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3.11: Adequacy of Infrastructure, Staff, Supply and Equipment at PHCs

(As per PHC Guideline)*	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
Medical Officer (1)	1	1	1	1	1	1
Pharmacist (1)	1	1	1	1	1	1
Staff Nurse (1)	4	9	7	4	1	4
Data Entry Operator (1)	1	1	1	2	1	1
Laboratory Technician (1)	1	1	1	1	1	1
Class IV (4)	2	2	2	2	1	2
Own Building	No	Yes	No	Yes	Yes	Yes
Main source of Water	Yes	Yes	Yes	Yes	Yes	Yes
Proper drainage system	Yes	Yes	Yes	Yes	Yes	Yes
Toilet	Yes	Yes	Yes	Yes	Yes	Yes
Electricity connection available	Yes	Yes	Yes	Yes	Yes	Yes
OPD facility	Yes	Yes	Yes	Yes	Yes	Yes
Labour Room	No	No	Yes	Yes	Yes	Yes
Normal Delivery Kit	No	Yes	Yes	Yes	No	Yes
Equipment for assisted vacuum delivery.	No	No	No	No	No	No
Equipment for assisted forceps delivery	No	No	No	No	No	No
Standard Surgical Set (for minor procedures like episiotomies stitching).	No	No	Yes	No	No	No
Equipment for Manual Vacuum Aspiration	No	Yes	No	No	No	No
Equipment for New Born Care and Neonatal Resuscitation	No	Yes	Yes	No	Yes	Yes
IUCD insertion kit	No	No	Yes	No	Yes	Yes
Cold chain equipment (functional)	Yes	Yes	Yes	Yes	Yes	Yes
Ice Lined Refrigerators	Yes	Yes	Yes	No	Yes	Yes

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Deep freezer	Yes	Yes	Yes	Yes	Yes	Yes
Oral pill cycles	Yes	Yes	Yes	Yes	Yes	Yes
IUDs	Yes	Yes	Yes	Yes	Yes	Yes
IFA (large)	Yes	Yes	Yes	Yes	Yes	Yes
Vitamin A solution	Yes	Yes	Yes	Yes	Yes	Yes
ORS packets	Yes	Yes	Yes	Yes	Yes	Yes
Cases Referred to Higher Centres	0	0	0	0	7	8

**Source: Indian Public Health Standards (IPHS): Guidelines for Primary Health Centres, 2012*

Table 3.12: Adequacy of Infrastructure, Staff, Supply and Equipment at CHCs

As per CHC Guidelines*	Mandvi (SDH)	Mundra
Block Medical Officer/Medical Superintendent (1)	1	1
General Surgeon (1)	0	0
Obstetrician & Gynecologist (1)	1	1
Pediatrician (1)	1	0
Anesthetist (1)	-	1
General Duty Medical Officer (2)	3	1
Staff Nurse (1)	19	7
Lab. Technician (2)	2	1
Radiographer (1)	0	0
Dental Assistant (1)	0	0
Statistical Assistant/ Data Entry Operator (2)	1	2
Own Building	Yes	Yes
Main source of Water	Yes	Yes
Proper drainage system	Yes	Yes
Toilet	Yes	Yes
Electricity connection available	Yes	Yes
OPD facility	Yes	Yes
Labour Room	Yes	Yes
Nameplates guidelines	Yes	Yes
Regular blood supply available	Yes	Yes
Critical care Area	Yes	Yes
Security (at least 1 person available round the clock)	Yes	No
Integrated Counseling and Testing Center (ICTC) there in DH/SDH	Yes	Yes
Facility for sterilizing instruments available/ Whether CSSD (Central Sterile and	Yes	Yes

SupplyDepartment) is there at DH/SDH?		
Color coded waste bags available for segregated waste	Yes	Yes
Standard surgical kit (all six sets)	Yes	Yes
Emergency obstetric care drug kit	-	Yes
RTI/STI laboratory kit	-	Yes
Kit G (IUD insertion kit)	-	Yes
Kit for new born care equipment	-	Yes
Kit I (normal delivery kit/labour room kit)	Yes	Yes
Kit N (equipment for neonatal resection)	-	Yes
Kit O (side laboratory test and blood transfusion)	-	Yes
Kit P (donor blood transfusion)	-	Yes
Nirodh pieces	-	Yes
Oral pill cycles	-	Yes
IUDs	-	Yes
IFA (large)	-	Yes
Vitamin A solution	-	Yes
ORS packets	-	Yes

**Source: Indian Public Health Standards (IPHS): Guidelines for Community Health Centres, 2012*

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Table 3.13: Adequacy of Infrastructure, Staff, Supply and Equipment at District Hospital

(As Per DH Guidelines)*	DH
Medical Superintendent/ PMO	1
Specialist (Medicine) (5)	4
Specialist (Surgery) (4)	5
Obstetrician / Gynecologist (6)	7
Pediatrician (5)	5
Anesthetist (4)	5
Pathologist/ Microbiologist (4)	9
Radiologist (2)	5
Dermatologist/ Venerologist (1)	2
Ophthalmologist (2)	3
Dentist (3)	2
E.N.T. Specialist (2)	3
AYUSH Physician (2)	1
Staff Nurse (min. 45 for a standard of a hospital having 100 beds)	8
Radiographer (9)	7
Pharmacist (12)	6
Physiotherapist (3)	2
Medical Record Officer (1)	2
Lab. Technician (18)	17
Ophthalmic Assistant (2)	2
Own Building	Yes
Main source of Water	Yes
Proper drainage system	Yes
Toilet	Yes
Electricity connection available	Yes
OPD facility	Yes
Labour Room	Yes
Nameplates guidelines	Yes
Regular blood supply available	Yes
Critical care Area	Yes
Security (at least 1 person available round the clock)	Yes
Integrated Counseling and Testing Center(ICTC) there in DH/SDH	Yes
Facility for sterilizing instruments available/ Whether CSSD (Central Sterile and SupplyDepartment) is there at DH/SDH?	Yes
Color coded waste bags available for segregated waste	Yes
Standard surgical kit (all six sets)	Yes
Kit I (normal delivery kit/labour room kit)	Yes
Deliveries are conducted	Yes
Services related to 'delivery and ' new born care' are provided in this facility	Yes

(a) Normal Delivery	Yes
(b) Assisted delivery(forceps delivery/vacuum)	Yes
(c) Administration of parental oxytocics	Yes
(d) Administration of parental antibiotics	Yes
(e) Administration of Magnesium Sulphateinjection	Yes
(f) Management of post-partumhemorrhages	Yes
(g) Management of other deliverycomplications	Yes
(h) Caesarian section	Yes
Is there a blood bank available in thisFacility? If yes, it is functional 24 X 7	No
Blood storage facility available inthis facility?	Yes
Are low weight birth babies managedat the facility	Yes
Is new born care facility available atfacility	Yes
Resuscitation	Yes
Thermal protection(warmer/ table lamp)	Yes
Manual Vacuum Aspiration(MVA)	Yes
Electric Vacuum Aspiration(EVS)	Yes
Dilatation & Curettage(D & C)	No

**Source: Indian Public Health Standards (IPHS): Guidelines for District Hospitals, 2012*

Table 3.14: Facilities

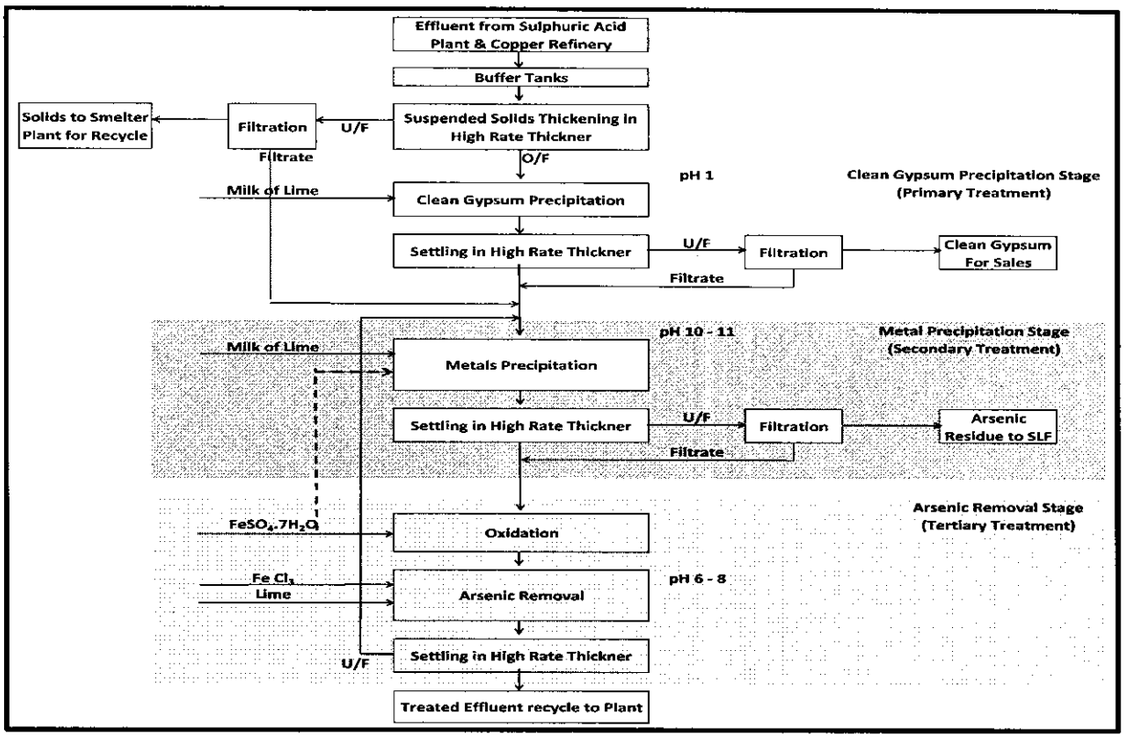
Sr. No.	Particulars	District Level	Taluka Level (CHC)		Sector Level (PHC)					
		DH	Mandvi	Mundra	Mundra PHC 1 (Mota Kandagara)	Mundra PHC 2 (Zarpara)	Mundra PHC 3 (Bhujpur)	Mundra PHC 4 (Nani Tumbdi)	Mandvi PHC 5 (Talvana)	Mandvi PHC 6 (Gundiyali)
1	Infrastructure	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
2	Medical Staff[1]	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes
3	Paramedical Staff[2]	Yes	Yes	Yes	No	No	No	No	Yes	Yes
4	Supply[3]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Equipment[4]	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
6	Referred delivery cases attended during last three months[5]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

EAC OBSERVATION:

Details regarding disposal of arsenic bearing sludge has not been submitted.

REPLY:

Effluents from the gas cleaning plant of Sulphuric Acid and Copper Refinery will be treated in a state of art Effluent Treatment Plant (ETP) facility with tertiary treatment to remove arsenic as arsenic bearing sludge and segregation of clean chemical gypsum. The process flow is shown as below.



The Arsenic bearing sludge generated in ETP will be sent to Secured Land Fill (SLF), which will be constructed as per CPCB Guideline. Greenbelt of 15 m width will be developed all around the storage area. For construction of secured land fill (SLF) refer **Annexure-11(b)**.

Disposal Procedure:

Arsenic bearing sludge will be collected at the outlet of the filter press in the truck and will be transported to SLF for safe disposal. Waste shall be discharged by tipping at the working area of the SLF. Once the waste has been discharged it shall be spread in layers and compacted with the help of Roller in a well-defined manner to ensure that the completed slopes are at the designated gradients. Water sprinkling will be carried out through water tankers within SLF area for dust suppression.

Leachate collected through the leachate collection system will be sent to ETP through pipeline for treatment purpose and the treated effluent will be recycled for the plant operations.

EAC OBSERVATION NO.-13

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Characteristics of the Arsenic Bearing Sludge:

Parameter	UOM	Value on Dry Basis (Wt/Wt)
Iron	%	45 - 54
Arsenic	%	10 – 12
Copper	mg/l	1300 – 2100
Bismuth	mg/l	65 -185
Cadmium	mg/l	<15
Chromium	mg/l	<15
Cobalt	mg/l	<20
Nickel	mg/l	<15
Lead	mg/l	20 – 50
Antimony	mg/l	<20
Selenium	mg/l	20 – 40
Zinc	mg/l	1100 – 2500
CaO	%	14 – 18
Sulphates as SO_3	%	20 – 25
Silica	%	<0.5%
Moisture	%	35

Dust from the Landfill:

Dust from landfill operations is mainly a problem during periods of dry weather. Fugitive dust control will be addressed by:

a. Limiting vehicle speed;
b. Spraying roads with water; and
c. Spraying site and powder type waste with water;
d. Green Belt around the Landfill.

Road Maintenance:

To avoid the mud/ dust is not carried off site by vehicles adequate wheel cleaning facilities will be provided. The water after cleaning will be recycled back in the ETP operation.

Landfill Safety Aspects:

Employees training shall include site safety, first aid and the handling of dangerous materials where appropriate. Emergency plans shall be laid down. Landfill sites shall be regarded as potentially hazardous locations and the operator shall have a written safety plan for the site and Safety hazards present at landfill sites. All employees and visitors to

the site shall be made aware of the potential hazards and the safety procedures to be implemented including fire safety.

Record Keeping:

Record keeping procedures as well as waste acceptance procedures to be followed at the landfill site shall be formulated.

Records shall be kept as per the consent conditions. In addition a site Manual shall be kept at the site office giving all site investigation, design and construction details.

Landfill Closure:

When landfill reaches the final height, it will be closed as per CPCB Guidelines. HDPE liner with 1.5 mm thickness will be used for landfill cover. It is compacted with smooth steel drum rollers and provided a suitable gradient (3 to 5%) to encourage surface water to run-off from the cover and thus minimise infiltration. The side slopes of the intermediate cover are compacted by the crawler tracked dozer moving up and down the slope. An access road is provided on the landfill cover to enable easy approach for routine inspection of the landfill cover. Long-term vegetative stabilisation will be undertaken to return the land to its original and natural vegetative landform.

Landfill Layout Display Board:

A site layout will be displayed at the entrance of the SLF entry in Local as well as Hindi and English language. Layout will typically will include:

a. Access roads;
b. Equipment shelters;
c. Temporary waste storage and/or disposal sites for special wastes:
d. Demarcation of the landfill areas and areas for stockpiling cover maternal and liner material;
e. Location of surface water drainage facilities,
f. Location of landfill leachate management facilities;
g. Location of gas management facilities (optional);
h. Location of monitoring wells/environmental monitoring facilities,
i. Fencing and green belt along the peripheral boundary and
j. Emergency exit.

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EAC OBSERVATION NO.-14

EAC OBSERVATION:

Mercury in ambient air has not been monitored.

REPLY:

Mercury (Hg) in ambient air was monitored during January and February 2019 at eight locations within the 10 km radius of study area.

For the mercury sampling IS: 5182-Part-23 has been followed. The collected sample has been extracted by microwave extraction (Method IO-3.1) method. The extract has been analysed by the ICP MS having least count of 5.0 ng/m^3.

The Hg content in the ambient air found to be <5.0 ng/m^3.

Details of Mercury in ambient air sampling locations and analysis is provided in **Annexure-14.**

ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR

1.0 INTRODUCTION

During the EAC meeting, it was desired by the EAC to monitor the concentration of mercury in ambient air quality within the study area. Hence, mercury concentration in ambient air was monitored during 28th January, 2019 till 2nd February, 2019 at eight locations within the 10 km radius study area. The sampling methodology and concentrations are given below:

The details of sampling locations are given in **Table-1** and shown in **Figure-1.**

TABLE-1
DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS

Station Code	Location	Distance from Centre of Project Site (km)	Direction w.r.t. Centre of Project Site
AAQ1	Project Site	-	-
AAQ2	Navinal	1.7	ENE
AAQ3	Bhujpar Mota	6.2	NE
AAQ4	Jarpara	6.8	ENE
AAQ5	Wandh	1.8	SW
AAQ6	Kandagara	4.4	NW
AAQ7	Siracha	1.7	NNW
AAQ8	Moti Khakhar	5.9	NNW

2.0 METHODOLOGY OF SAMPLING

Sampling Procedure

For the mercury sampling, IS: 5182-Part-23 has been followed. The Respirable Dust Sampler (RDS) has been used and 24-hour sample was collected by using whatman filter paper (8 inch x 10 inch). Flow rate of 1.0-1.5 m^3/min has been maintained. During the monitoring period, hourly reading of flow rate has been recorded to capture the flow fluctuations. After the required time of sampling, the flow meter reading was recorded and the filter paper from the sampler and put in a envelope for further analysis.

Sample Storage

After collecting samples, The filter papers have been transported the laboratory, taking care to minimize contamination and loss of the sample. These samples have been stored in a protective environment up to 30°C until analysis. Even though, the sample holding can be up to 180 days, the samples have been analyzed within 10 days' time after collection.

Extraction of Samples

The collected sample has been extracted by microwave extraction (Method IO-3.1) method. The extract has been injected into the ICP MS.

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ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR

Microwave Extraction

The filter paper was cut 1"x 8" strip or half the filter from the 8"x10" filter sample and placed on its edge in a labeled centrifuge tube using vinyl gloves or plastic forceps. Using the plastic forceps, crush the filter strip down into the lower portion of the centrifuge tube to ensure acid volume will cover entire filter. Add 10.0 ml of the extraction solution to each of the centrifuge tubes (3% conc. HNO_3 and 8% conc. HCl). Place the centrifuge tubes in a 3Teflon vessel containing 31 ml of deionized water. Place the vessel caps with the pressure release valves on the vessels hand-tight and tighten using the capping station to a constant torque of 12 ft-lb. Place the vessels in the microwave carousel. Connect each sample vessel to the overflow vessel using the Teflon connecting tubes. Place the carousel containing the 12 vessels on to the turntable of the microwave unit. Irradiate the sample vessels at 486 W (power output) for 23 min.

Allow the pressure to dissipate, then remove the carousel containing the vessels and cool in tap water for 10 min. Using the caping station uncap the microwave vessels, remove the labeled centrifuge tube containing samples. Add 10 ml of deionized water to each centrifuge tube. Cap the centrifuge tube tightly and mix the contents thoroughly for 2-3 minutes to complete extraction. The final extraction volume is 20 ml based upon the above procedure. Filter the extracted fluid with Whatman No. 41 and make up the final volume to 100 ml, the filtered sample is now ready for analysis.

Metal Concentration

$C\ ng/m^3$ $(Ms - Mb) \times Vs \times Fa \times 1000/V \times Ft$

Where,

C = Concentration, ng/m^3

Ms = Metal concentration µg/ ml
Mb = Blank concentration µg/ ml
Vs = Total volume of extraction in Ml
Fa = Total area of exposed filter in cm^2
V = Volume of air sampled in m^3
Ft = Area of filter taken for digestion in cm^2

ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR

3.0 DATA ANALYSIS

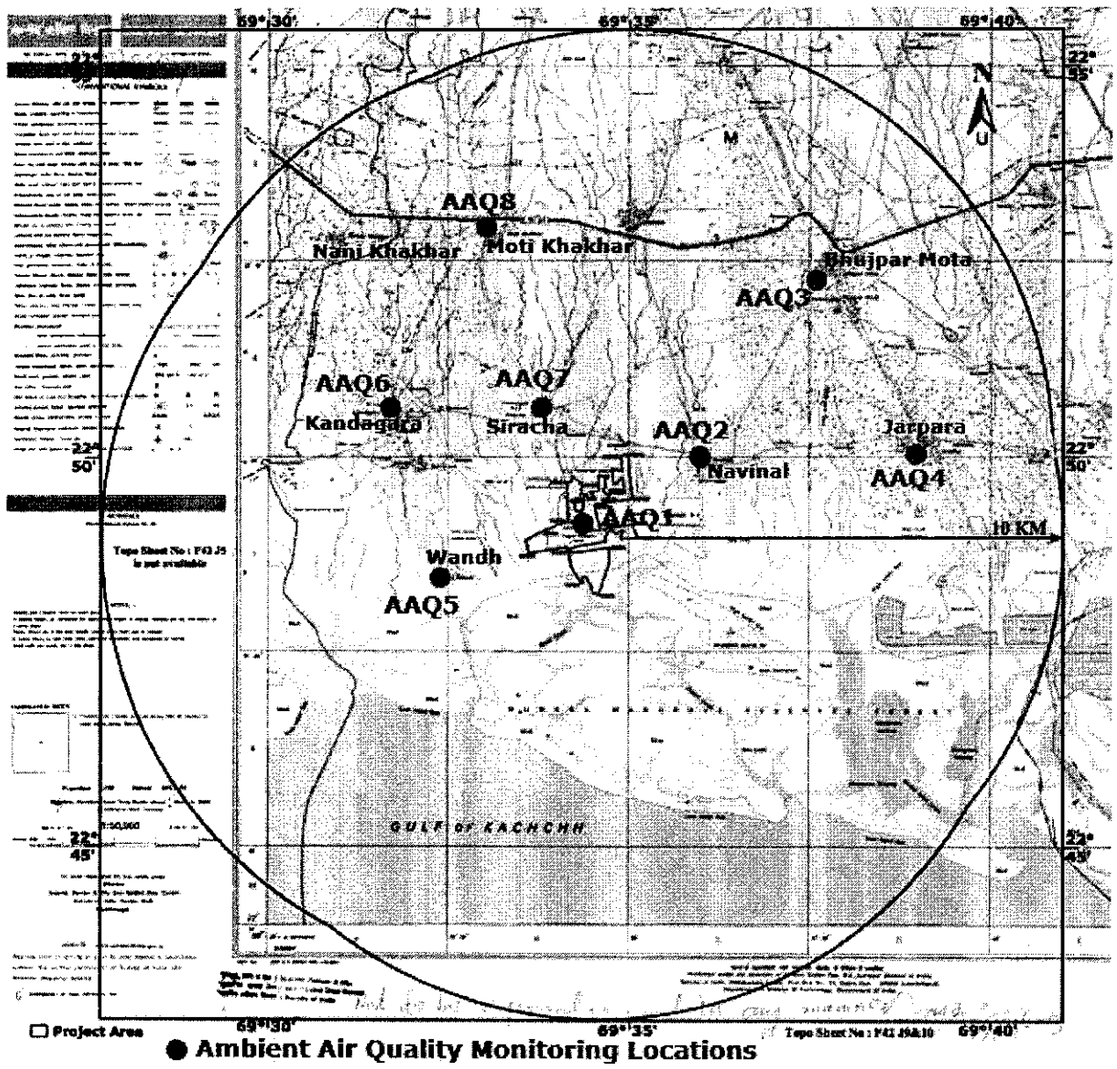
Mercury analysis results in the ambient air are given in **Table-2**

TABLE-2
MERCURY ANALYSIS REPORT

Sr. No	Date	Station Code	Locations	Mercury as Hg (ng/m^3)
1	28-Jan-2019	AAQ-1	Project Site	<5.0
2	28-Jan-2019	AAQ-5	Wandh	<5.0
3	28-Jan-2019	AAQ-6	Kandagara	<5.0
4	28-Jan-2019	AAQ-7	Siracha	<5.0
5	29-Jan-2019	AAQ-1	Plant area	<5.0
6	29-Jan-2019	AAQ-5	Wandh	<5.0
7	29-Jan-2019	AAQ-6	Kandagara	<5.0
8	29-Jan-2019	AAQ-7	Siracha	<5.0
9	01-Feb-2019	AAQ-2	Navinal	<5.0
10	01-Feb-2019	AAQ-4	Japara	<5.0
11	01-Feb-2019	AAQ-3	Bhujpar Mota	<5.0
12	01-Feb-2019	AAQ-8	Moti Khakhar	<5.0
13	02-Feb-2019	AAQ-2	Navinal	<5.0
14	02-Feb-2019	AAQ-4	Japara	<5.0
15	02-Feb-2019	AAQ-3	Bhujpar Mota	<5.0
16	02-Feb-2019	AAQ-8	Moti Khakhar	<5.0

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ANNEXURE-14
MERCURY ANALYSIS IN AMBIENT AIR



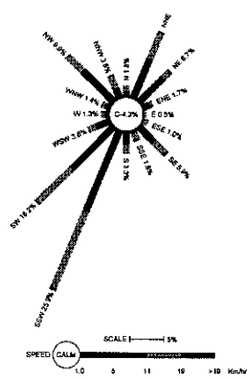


FIGURE-1
AIR QUALITY SAMPLING LOCATIONS

EAC OBSERVATION:

Conservation plan prepared for the Schedule-I species is not meeting the requirement of the conservation of the species that are identified. Therefore, the plan shall be revised considering the requirements of the conservation of the species identified and shall be approved by the competent authority concerned.

REPLY:

Wildlife & mangrove conservation plan for proposed project has been prepared in consultation with Divisional Forest Office, Kutch District East. The study was conducted during month February-March 2019. During the primary field survey study total 8 faunal species belong to Schedule-I of Wildlife Protection Act 1972 were found in the study area. These species include 2 species of reptiles, 5 species of birds and one mammal.

The impacts during construction phase could be short term, temporary in nature and will be confined to the close boundary of the project site. General ecological impacts anticipated from the construction and operation phases of the copper refinery plant and mitigation measures are presented in the report as **Annexure-5**.

Budget provision of Rs. 193.5 Lakhs for conservation for Schedule-1 species as per field scientific study has been proposed.

The financial allocation for wildlife conservation activities including Mangroves protection measures is about Rs. 443.5 lakhs.

A detailed report (**Annexure-5**) is submitted to Divisional Forest Officer (Kutch- East) and it is forwarded by Divisional Forest Officer (DFO) to Chief Conservative of Forest (CCF). CCF has forwarded Conservation Plan to Chief Wildlife Warden (CWLW) of the state for the approval process.

SPECIES OF HIGHER CONSERVATION SIGNIFICANCE PRESENT IN THE STUDY AREA

Type of Species	Name of Species		IWPA-1972 Status	IUCN Status
	Common Name	Scientific Name		
Plants	Gugal	*Commiphora wightii*		CR
	Mangroves	*Avicennia marina*	Important	LC
Reptiles	Flap shell Turtle	*Lissemus punctatea*	Schedule-I	LC
	Indian monitor lizard	*Varanus bengalensis*	Schedule-I	LC
Bird	Black shoulder kite	*Elanus caeruleus*	Schedule-I	LC
	Eurasian Spoonbill	*Platalea leucorodia*	Schedule-I	LC
	Indian Peafowl	*Pavo cristatus*	Schedule-I	LC
	Marsh Harrier	*Circus aeruginosus*	Schedule-I	LC
	Shikra	*Accipiter badius*	Schedule-I	LC
Mammal	Chinkara	*Gazella bennettii*	Schedule-I	LC

EAC OBSERVATION NO.-15

3145



SAMPLING LOCATIONS FOR FLORA AND FAUNA STUDY IN THE BUFFER AREA



SAMPLING LOCATIONS FOR FLORA AND FAUNA STUDY IN THE CORE AREA

EAC OBSERVATION:

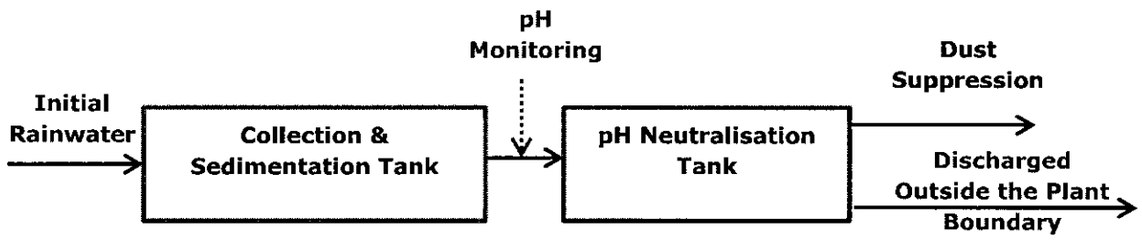
Collection of runoff water from the raw material storage area, slag and gypsum storage yard and its treatment has not been submitted.

REPLY:

Treatment of Initial Rainwater

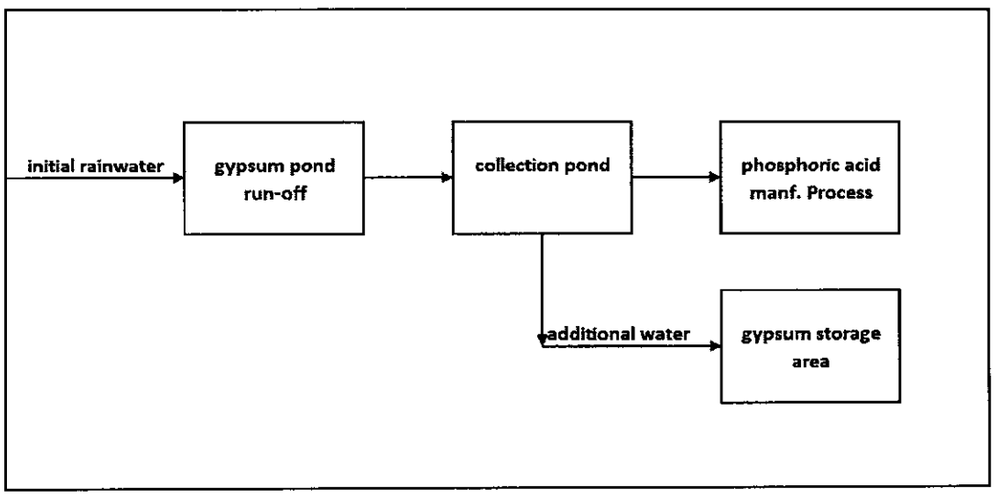
Part A: (raw material storage area & slag)

The rainwater runoff from raw material storage area & slag will be collected in a storm water collection pond for sedimentation of suspended solid materials. Provision for pH monitoring and provision for neutralisation will be made as required. The preliminary flow diagram is as shown below. The water after sedimentation and neutralisation will be utilised within the plant for dust suppression in raw material storage areas and copper slag granulation. The balance water will be discharged outside the plant boundary after conforming to the discharge standards. The bottom sludge of the sedimentation tank will be recycled back to smelter.



Part B: Treatment of Initial Rainwater (Gypsum Storage)

Collecting amount of initial rainwater: The initial rainwater in gypsum storage area will be collected through the garland drains to the dedicated collection pond of 4,000 m^3. This water will be reused in the phosphoric acid manufacturing process and for dust suppression in the Gypsum Storage Area.



EAC OBSERVATION NO.-17

- Considering only 80% of the run-off as available volume after evaporation, spillage and other losses, 2,21,433 m^3 (0.221 MCM) of rain water will be available from Smelter, Production Plant, Storage and Landfill areas for use in the production process, green belt/plantation, toilets etc.
- Considering only 80% of the run-off as available volume after evaporation, spillage and first flush wastage, 5,566 m^3 (0.006 MCM) of rain water is available from the roof top areas for harvesting and use.
- Considering 25% of the roads and paved area 50% of the green belt area free from contamination, 84,877 m^3 (0.085 MCM) of run-off from the rainfall collected in these areas is available for harvesting after 20% of this run-off accounting for evaporation, spillage and other losses.
- The amount of run-off available from the above areas if managed with at least 70% efficiency will be 63,310 m^3 (0.063 MCM), which would meet 69.96% of proposed green belt water requirement.

  A detailed report on hydrogeology and rainwater harvesting has been conducted and is available as **Annexure-18**

EAC OBSERVATION NO.-17

EAC OBSERVATION:

Study on installation of rain water harvesting structure based on annual rain fall pattern and details regarding amount of water to be conserved has not made available.

REPLY:

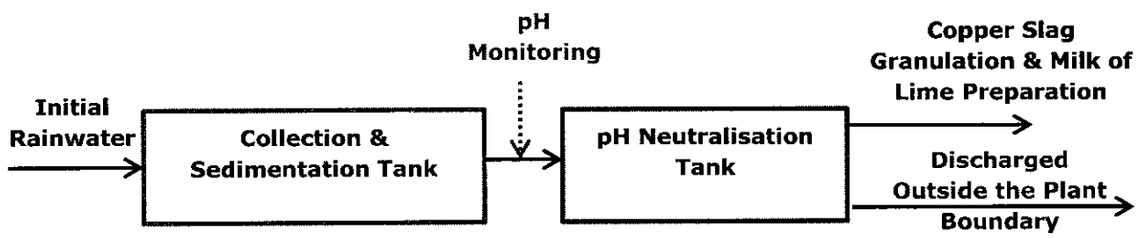
a. Rain Water Harvesting for the Administrative Building Premises:

The annual volume of rain water available from the project site is to be 5566 m^3/year after runoff and evaporation losses. Two nos. of 4,000 m^3 capacity each for rain water collection are proposed for the project.

The initial rainwater collecting tank shall be installed in the areas to collect the all roofs runoffs from the administrative buildings. The run offs will be pass through the sand soak pits and reused for domestic sewage requirements (Flushing purpose).

b. Rain Water Harvesting for the Production Plant Premises:

The initial rainwater collecting tank shall be installed in the areas to collect the all rooftops runoff. The same will be connected to a common collection tank; where the runoff from the other areas such as raw material storage, Smelter Plant area is collected in a storm water collection pond. Here, the provision for pH neutralisation will be provided. The water after sedimentation and neutralisation will be utilised within the plant for copper slag granulation and milk of lime preparation. The balance water will be discharged outside the plant boundary after conforming to the discharge standards.



ANNUAL & MONSOON RUN-OFF FROM PROJECT SITE

Sr. No.	Land Use	Area (ha)	Run-off Coefficient	Annual Rainfall (m)	Annual Run-off (m^3)	Monsoon Rainfall (m)	Monsoon Run-off (m^3)
1	Buildings/sheds	2.30	0.7	0.432	6957	0.425	6833
2	Plant & utilities	56.76	0.7	0.432	171817	0.425	168738
3	Roads & paved area	59.13	0.9	0.432	230132	0.425	226007
4	Green belt	89.84	0.25	0.432	97126	0.425	95385
5	Storage of Solid Waste (Copper Slag, Phospho-gypsum & SLF)	48.55	0.5	0.432	104975	0.425	103094
Total		**256.58**	**0.61**	**0.432**	**611007**	**0.425**	**600057**

- The annual volume of rain water available from the project site spread in 256.58 ha (634 acres) is estimated at 6,11,007 m^3 (0.61 MCM) and during SW and NE monsoon periods is 6,00,057 m^3 (0.60 MCM).

EAC OBSERVATION NO. -18

TDS of Moti Khakhar, Desalpar and Siracha (2660.7 mg/l to 3322.3 mg/l), Total Hardness of Siracha (659.9 mg/l), Chlorides of Siracha (1321.6 mg/l), Sulphates of Moti Khakhar (486.5 mg/l), Manganese of Siracha (0.36 mg/l) and Iron of Jarpara (0.31 mg/l) samples show higher values than permissible limits. In the present study, water type of all ground water samples is Sodium Chloride indicating brackish/saline origin.

The present stage of ground water development in the study area is estimated as 102.37% and can be categorized as "Over-exploited". However no ground water extraction is envisaged for the Project.

The Secured Land Fill will have impervious layers of clay liner and HDPE liner. This will ensure that the ground water will not be impacted by the storage of the ETP cake. In case of any rupture/breakage or failure of the SLF bottom liner, any contaminant reaching sub-surface strata and water table will move towards Gulf of Kachchh following the ground water flow direction in the project area.

Danesri Nadi, a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. There are no other drainage courses in the project site. Danesri Nadi along the project boundary will not be disturbed and maintained with necessary bank stabilization will be done with compaction/stone pitching and raising the bund up to 2.0m. The Danesri Nadi conservation plan will include a 50 m corridor from HFL along the stream course for green belt development and another 50 m along the green belt where any storage is coming (Total of 100 m from HFL along the stream course near the storage areas) as presented in plant layout hereunder. No effluent will be discharged into this stream from the plant. Storm water drains carrying excess storm water from the plant area will be provided sand filters to arrest any suspended particles and quality will be monitored periodically to ensure contaminant free storm water only reaches Danesri Nadi.

Impact on Hydrogeology

- Impact on water quality during construction and operation of proposed project will be anticipated due to following activities:
  - Sewage generated from the domestic facilities;
  - Wastewater generated from different plant operations;
  - Waste and oil spillage from the workshop;
  - Solid waste and hazardous waste disposal etc;
  - Runoff water from raw materials, products & fuel storage areas; and
  - During disaster (like failure of transportation of materials & fuel and overflow of hazardous chemicals & fuels from storage areas etc.).

- Anticipated surface water bodies environment will be affected by the proposed project as follows:
  - Disturbing natural water courses;
  - Change in drainage pattern of the area, quantity and quality;
  - Due to withdrawal of water or discharge of wastewater; and
  - Contaminated leachate from disposal/dumping of solid waste etc.

EAC OBSERVATION NO. -18

EAC OBSERVATION:

Impact on hydro geology regime of the project site has not submitted.

REPLY:

Detailed Hydrogeology studies were conducted in 10 km radius areas of the proposed copper Greenfield copper refinery project. No ground water is proposed to abstract for the project usage. The plant will be designed and operated on Zero Liquid Discharge (ZLD) system. No effluent will be discharged outside of the plant premises. Hence, there will not be any impact envisaged on ground water regime. Additionally, a ground water level monitoring system shall be established within the plant premises for monitoring of ground water quality.

The total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/ Quaternary sediments with surface lithological boundaries running almost parallel to coast line (E-W). Proposed project site, Adani Power & other industrial set-ups in APSEZ area are located on older coastal plain. Resistivity of different lithological units in the study area range from <1 Ωm to >300 Ωm. ERT1 and 2 are located in project site lying on older tidal flat and marsh deposit with resistivity ranging from <1.0 Ωm to 5.0 m. The resistivity at these locations decreases to <1.0 Ωm with depth indicating saline nature.

The average ground water recharge by rainfall infiltration and increment in ground water storage is 78.15 MCM. However, the huge difference in recharge by rainfall infiltration and increment in ground water storage indicates that the ground water draft is much more than ground water recharge.

The annual volume of rain water available from the project site spread in 256.57 ha (634 acres) is estimated at 6,43,658 m^3 (0.64 MCM) and during SW and NE monsoon periods is 6,32,123 m^3 (0.63 MCM). Considering only 80% of the run-off as available volume after evaporation, spillage and first flush wastage, 5,566 m^3 (0.006 MCM) of rain water is available from the roof top areas for harvesting and use.

Ground water in the study area is developed through shallow dug wells and tube wells for domestic, irrigation and industrial purpose. Dug wells are mainly seen along and in the stream courses and near water bodies/check dams. With the increase of tube wells in the area and lowering of water table, most of the dug wells are abandoned. The depth to water level in dug wells during field visit (2nd week of February 2019) ranges from 7.85 m to 16.12 m bgl whereas the depth to water level in tube wells ranges from 2.00 m bgl in Adani Power's piezometers near project site to 44.38 m bgl in an agricultural well near Gelada. The average water levels in dug wells during field visit, pre and post monsoon are 12.42 m, 12.13 m and 6.23 m bgl respectively with a water level fluctuation of 7.15 m.

General ground water flow direction in major part of the study area is towards Gulf of Kachchh with depressions of deeper levels below mean sea level between Bhadia Mota and Bhadia Nana, around Navinal and east of Bhujpar Mota. Reduced water levels <0 around Bhadia Mota, Bhadia Nana, Tragadi, CGPL and Wandh in the west and to the east of Bhujpar Mota in the northeast indicate that ground water movement is towards inland encouraging sea water intrusion.

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- Water level contours indicate that the water levels in and around Tragadi, Bhadia Nana, CGPL, Wandh, Navinal and Jarpara are below mean sea level and these areas are prone to saline water intrusion.

Conclusion & Recommendations

a) Measures for Rain Water Management & Treatment within the Proposed Project:

- Rain water from Concentrate Storage, Smelter Area, Slag Storage and Gypsum Storage will be collected in separate tanks installed in the areas of feed stock storage and conveying, smelting system and gypsum storage.
- Rain water from Production Plant premises will be collected in a separate tank installed in the plant premises to collect rain water from all roofs.
- The water collected in these tanks will be treated in initial rain water treatment station and then goes to the advanced treatment section of the production effluent treatment plant for treatment before it is reused for production and thereby reducing the fresh water consumption.
- Additional water if any will be used for spraying purpose in the Gypsum Storage area.

b) Mitigation Measures for Ground Water & Surface Water Contamination:

- Though ground water abstraction is not envisaged for the present project, the project proposes to implement drinking water supply to the nearby villages, afforestation, water spreading channels, check dams and bandharas, which would help in limiting the ground water grouabstraction, enhance ground water recharge and thereby reduce salinity in the area as a corporate responsibility.
- The Secured Land Fill (SLF) will have impervious layers of clay liner and HDPE liner. This will ensure that the ground water will not be impacted by the storage of the ETP cake.
- Danesri Nadi, a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. There are no other drainage courses in the project site.
- The Danesri Nadi conservation plan will include a 50 m corridor from HFL along the stream course for green belt development and another 50 m along the green belt where any storage is coming (Total of 100 m from HFL along the stream course near the storage areas) as presented in plant layout.
- No effluent will be discharged into this stream from the plant. Storm water drains carrying excess storm water from the plant area will be provided sand filters and quality will be monitored.

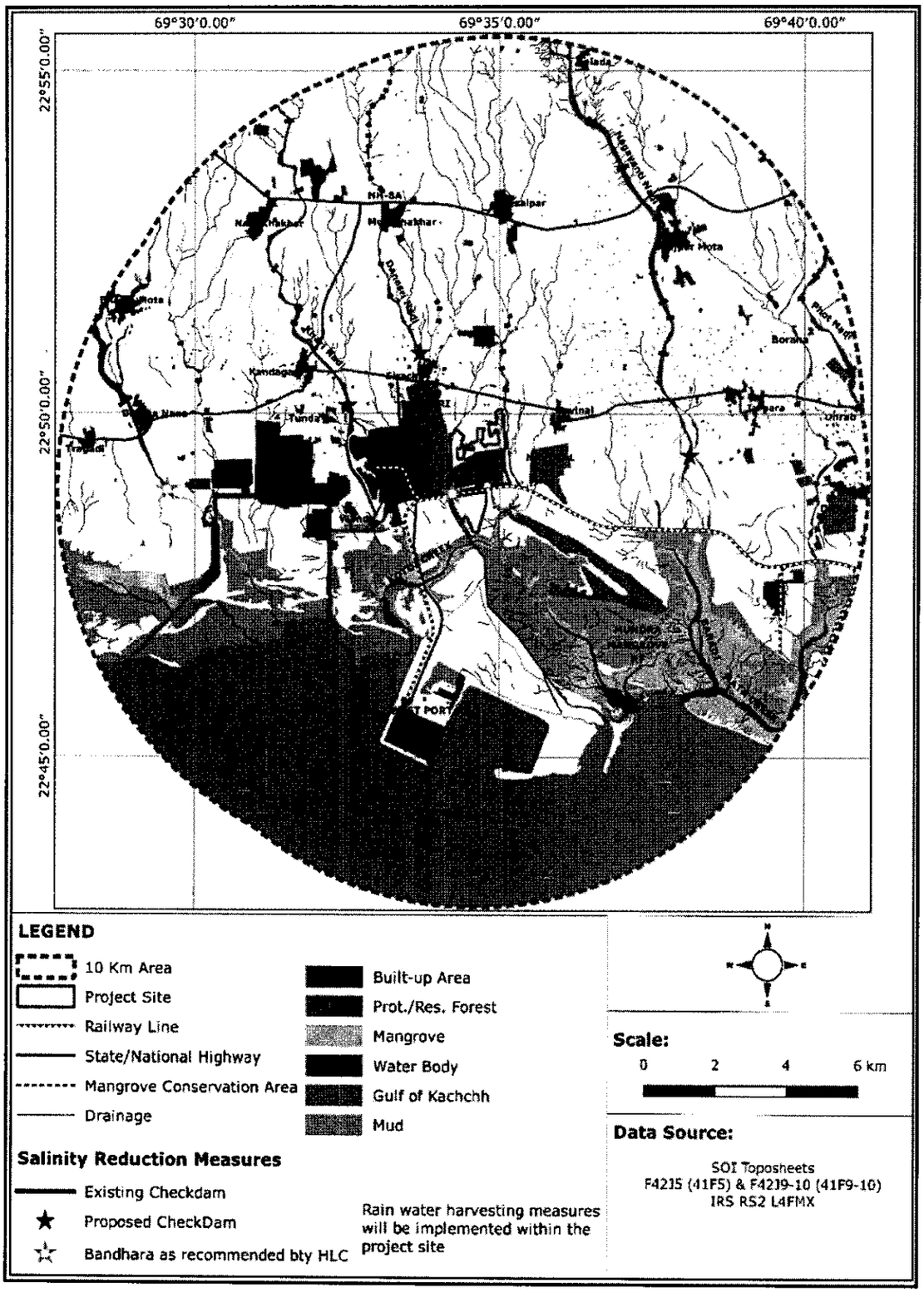
Measures for reduction of salinity ingress in the study area:

- To control surface and subsurface salinity ingression along the coastal stretches
- To recharge and enhance the quality of underground aquifer of the coastal belt

- To promote agricultural activities by providing surface water facilities to the farmers in and around the constructed civil structures
- To achieve an overall improvement in socio-economic conditions of the village community in the vicinity of the constructed civil structures.
- Though, ground water abstraction is not proposed for the present project, based on the measures recommended by HLC-I & II and implemented under Salinity Ingress Prevention Scheme of Govt. of Gujarat, the following measures are proposed to be implemented in the vicinity of the project site as a corporate responsibility:
- A fund of Rs. 1600 Lakhs has been allocated for **Drinking water supply** to nearby villages **Siracha, Jarpara, Desalpar and Moti Khakhar**, which will limit the ground water abstraction through tube wells.
- A fund of Rs. 120 Lakhs has been allocated for carrying out afforestation activities with suitable species in village panchayat lands, waste lands, open lands in SEZ area, areas of degraded vegetation in public lands of owners motivated towards the community benefit, which will slowdown the surface run-off and enhance recharge.
- Water spreading channels along Mundra-Mandvi road on the upstream side, which will enhance recharge.
- Check dams across the stream course of Khari Nadi, Danesri Nadi and Nagavanti Nadi – dam constructed across a drainage course to reduce water flow velocity and thereby enhancing recharge.
- Bandharas near river/stream mouths of stream near Bhadia Nana, Danesri Nadi and Nagavanti Nadi as recommended by HLC in coordination with Salinity Ingress Prevention Scheme - bandharas are structures constructed near the mouths of rivers to top tidal/backwater ingress into the land by sealing the mouths of the rivers.

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LOCATIONS OF WATER HARVESTING AND SALINITY REDUCTION MEASURES

GEOLOGY & HYDRO-GEOLOGY IN 10 KM RADIUS AREA OF PROPOSED GREENFIELD COPPER REFINERY PROJECT AT ADANI PORT SPECIAL ECONOMIC ZONE LAND IN VILLAGES SIRACHA AND NAVINAL, TALUKA MUNDRA, DISTRICT KUTCH, GUJARAT

FINAL REPORT

adani

M/s. Adani Enterprises Limited (AEL)
Siracha and Navinal Villages, Taluka Mundra,
District Kutch, Gujarat

Prepared by :

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(QCI/NABL Accredited and ISO 17025 Certified Laboratory, Recognized by MoEF, New Delhi)

September 2019

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1.0 INTRODUCTION

1.1. Background

Adani Group is one of India's leading global integrated infrastructure players holding a company of M/s Adani Enterprises Limited (AEL). It was ranked among the top 50 Asian companies by Forbes Asia in 2009. Adani Enterprises is quoted on the Indian Stock Exchange, together with its four group companies – Adani Ports SEZ Limited, Adani Green Energy Limited, Adani Gas Limited and Adani Power Limited. M/s Adani Enterprises Limited is listed on the Bombay Stock Exchange (BSE) and National Stock Exchange of India (NSE).

Adani Enterprises Limited is one of the fastest growing diversified conglomerates with business interests across – Integrated Coal Management and mining, solar cells and module manufacturing, agri-storage infrastructure and services as well as edible oils and food products. This business mix – business-to-business and business-to-consumer – is directed at enhancing access to basic services (electricity through timely coal availability), creating a less polluted world, delivering quality food grain and providing healthy cooking media.

1.2 Project

M/s Adani Enterprises Limited (AEL) intends to set up a Greenfield Copper Refinery project at Adani Port Special Economic Zone (APSEZ) land in villages Siracha and Navinal, taluka Mundra, district Kutch, Gujarat. The project includes facilities like copper smelter, sulphuric acid plant, copper refinery, continuous cast copper wire rod plant, precious metal recovery plant, phosphoric acid plant, aluminium fluoride plant, effluent treatment plant, utilities storage of water and fuel etc. with state of art environment friendly technology.

M/s Vimta Labs Limited, Hyderabad has assigned Multi-Tech Services, Hyderabad carrying out geological and hydrogeological studies in 10 km radius area of proposed Copper Refinery project indicating the impact of the project on the water regime along with rain water harvesting and artificial recharge strategies.

1.3 Location, Extent and Communication

The proposed project will be located in Siracha and Navinal villages at APSEZ, Mundra taluka, Kutch district, Gujarat. AEL proposes to set up a Greenfield Copper Refinery project of 10 LTPA (1.0 MTPA) capacity in 256.57 ha (634 acres) of area.

The proposed project site lies between latitudes 22°48'15.65"N to 22°50'03.86"N and longitudes 69°33'38.12"E to 69°35'10.76"E. The area is covered by Survey of India toposheet no. F42J9-10 (41F9-10) on the scale of 1:50000.

Geographically, the study area lies between 22°42'49.30"N to 22°55'29.74"N latitudes and 69°27'45.00"E to 69°41'02.95"E longitudes and is covered by Survey of India toposheet nos. F42J9-10 (41F9-10) and F42J5 (41F5) on the scale of 1:50000. The study area encompasses the geographical area of Mundra and Mandvi taluks, Kutch district, Gujarat.

The proposed project site is well connected by the existing National/State highways, cargo rail link which is about 2.0 km away from the project site. The nearest airport is Mundra airport owned by Mundra International Airport Pvt. Ltd., a subsidiary of Adani Group located at 20 km in SE direction of the project site and another is at Bhuj, located at a distance of 65 km from the project site. The nearest railway station is Adipur/Gandhidham, which is about 80 km from project site and nearest town is Mundra which is about 20 km from the project site. The national highway NH-8A is passing at about 15.0 km away from the site. State highway SH-6 is about 3.0 km north of proposed site. The site is well connected with Ahmedabad city located at about 460 km.

Location of the proposed project site is shown in **Figure-1** and the study area is presented in **Figure-2**.

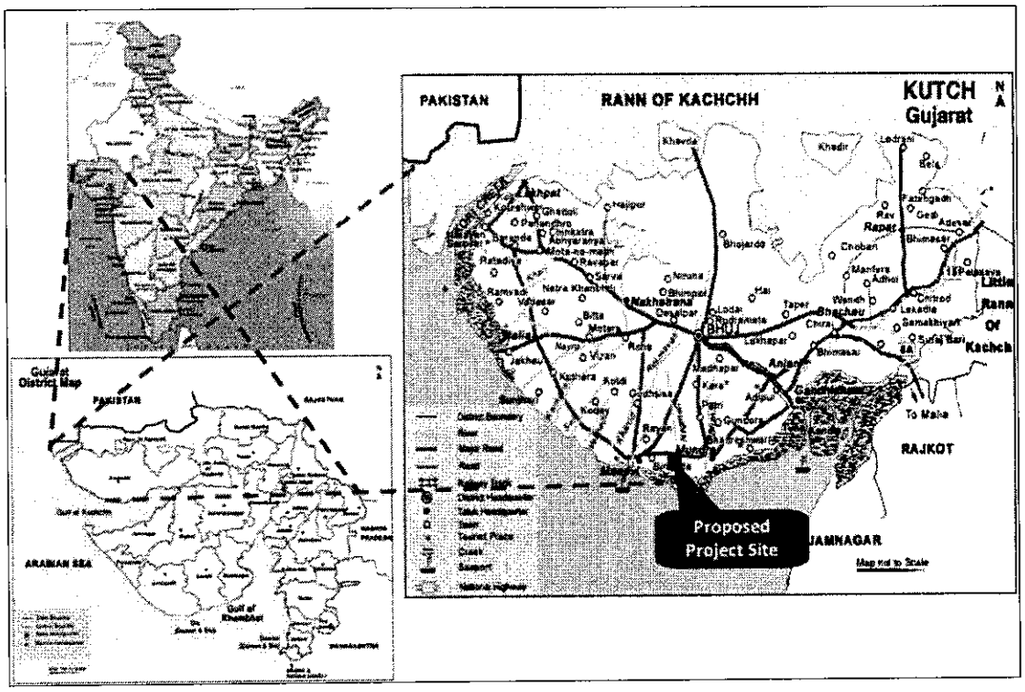


Figure-1. Location Map of Proposed Copper Refinery



22°48'56.62"N, 69°35'08.94"E



22°48'41.07"N, 69°34'14.03"E

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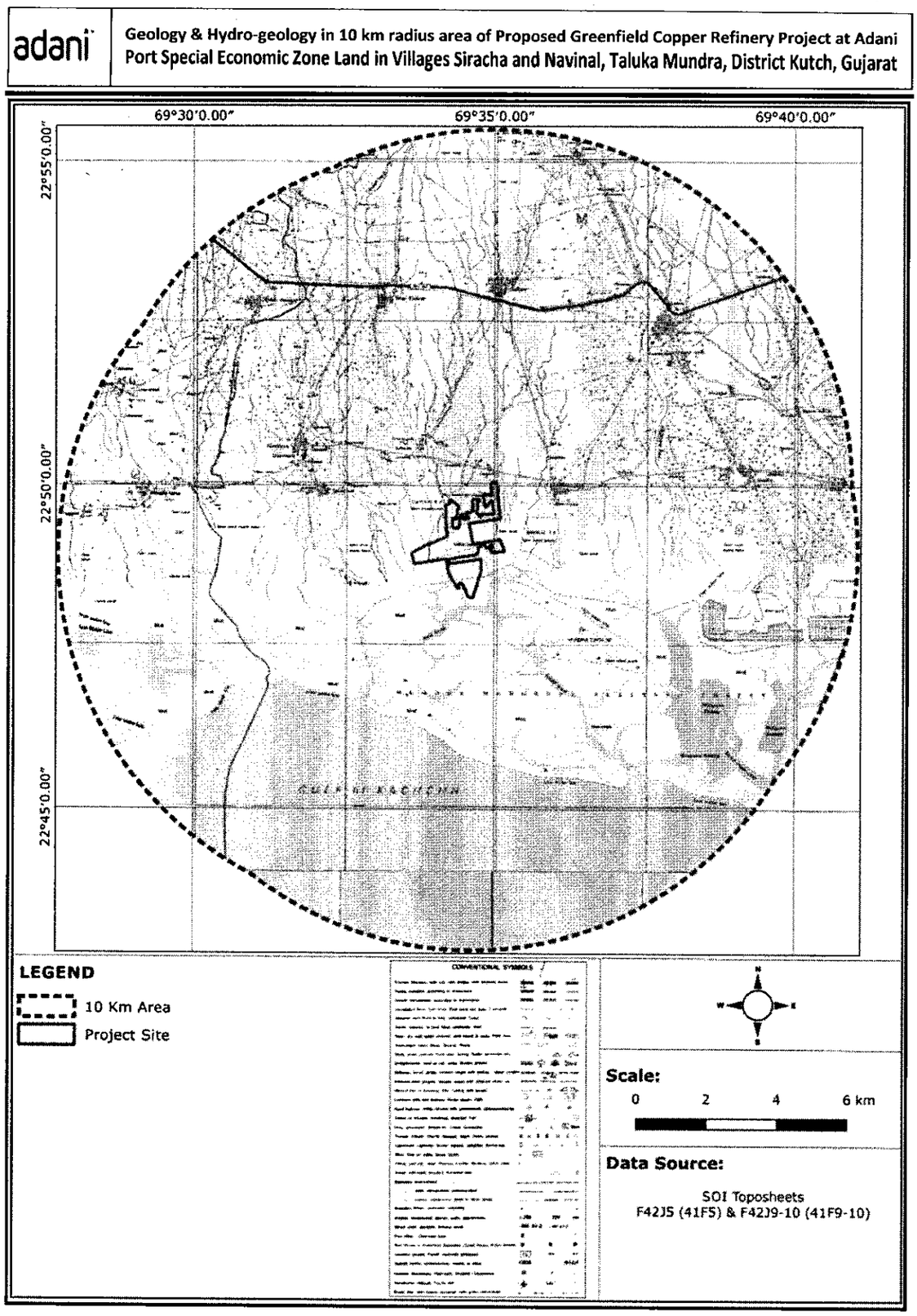


Figure-2. Study Area – 10 km Radius Area of the Project

1.4 Water Source and Requirement

The total water requirement for the project (phase-I & phase-II) is about 35,496 KLD (35.5 MLD). 32,267 KLD (32.27 MLD) would be sourced from desalination plant of APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). Balance will be met from treated/blowdown recycled water for greenbelt/cover, lime slurry preparation and reverse osmosis plant and multi effect evaporator. The water allocation letter is enclosed as **Annexure-I**.

An integrated water system is proposed. The effluent from the process units is treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEE) for further recovery and solids generated will be sent to Secured Land Fill (SLF).

Water demand is made up of the following:

- Water for product purpose like sulphuric acid and phosphoric acid;
- Make-up losses for copper slag granulation preparation;
- Make-up losses in the cooling towers and heat exchangers/circuits;
- Steam losses from the steam and power systems; and
- Steam consumed directly in the process etc.

The details of usage of water and water balance are presented in **Table-1** and **Figure-3**.

Table-1. Water Requirement for Copper Refinery Plant

Sr.No.	Purpose	Raw (Fresh) Water m^3/day	Treated/ Recycled Water m^3/day	Total m^3/day
1	Phosphoric Acid Plant	31838	2106	**33944**
2	Sulphuric Acid Plant			
3	Copper Smelter Plant + Scrap Melting Furnace			
4	Copper Refinery & PMR			
5	CCR Plant			
6	Domestic	429	0	**429**
7	Greenbelt/Green Cover	0	313	**313**
8	Lime Slurry Preparation	0	810	**810**
Grand Total		**32267**	**3229**	**35496**

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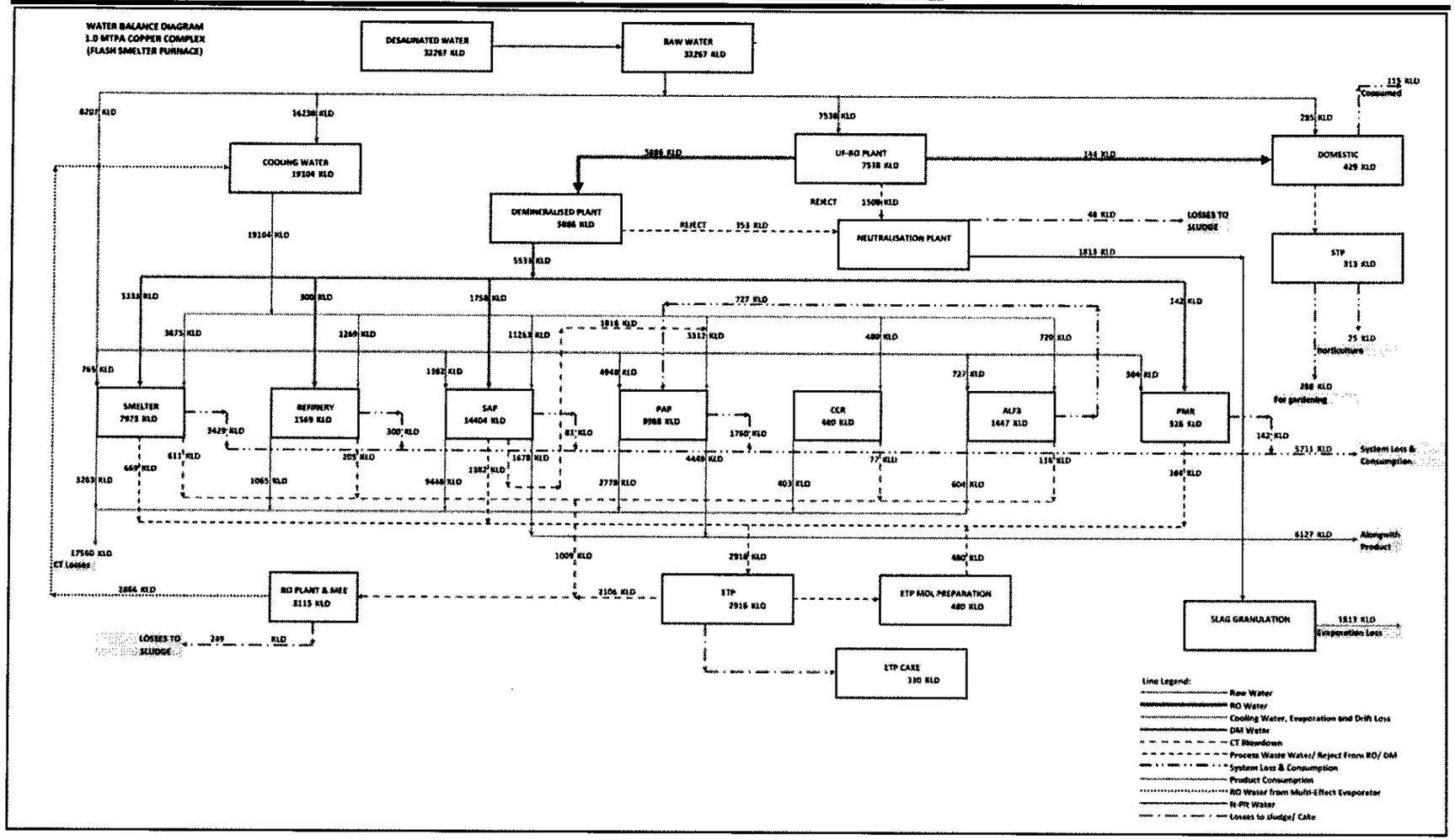


Figure-3. Water Balance – 1 MTPA Copper Plant

2.0 HYDROLOGY

2.1 Climate

The study area falls in South Kachchh and North Kathiawar Peninsular, which is hot arid Ecological Sub Region (L12Et2) with deep, loamy saline and alkali soils, low Available Water Capacity (AWC) and a Length of Growing Period (LPG) of 60-90 days.

Regional Climate around Bhuj

The climate in Bhuj area is called a desert climate. During the year, there is virtually no rainfall in Bhuj area. The average annual temperature is 26.3°C. The rainfall here averages 358 mm. Bhuj has a borderline hot desert climate just short of hot semi-arid climate. Although annual rainfall "averages" around 330 mm on 14.3 average rainy days, the variability is among the highest in the world with coefficient of variation of around 60%. Recorded annual rainfall has been as low as 21.9 mm in 1899 – yet in 1926 a total of 1,177.1 mm fell and in the incomplete year of 1959 rainfall exceeded 1,160 mm of which 730.6 mm fell during Bhuj's wettest-ever month of July 1959. The heaviest rainfall recorded in 24 hours was 467.9 mm on 15.07.1959.

Apart from the cool mornings of the "winter" season from December to February, temperatures are very warm to sweltering throughout the year, which further reduces the effectiveness of the erratic monsoonal rainfall. During the "hot" season from mid-March to mid-June, temperatures of 40°C are frequent, whilst during the monsoon season they exceed 34°C with high humidity except during rainy spells accompanied by cooler temperatures but oppressive humidity.

Climate around Mundra and Mandvi

The climate around Mundra and Mandvi area is called a desert climate. During the year, there is virtually no rainfall in this area. The average annual rainfall based on IMD data is 432.4 mm on 15 average rainy days. About 94.71% of the rainfall is received during South West monsoon (June-September). The highest average monthly rainfall, 206.92 mm occurs in July contributing 47.85% of the total rainfall.

A review of annual rainfall at Mundra and Mandvi for 124 years between 1879 and 2013 indicate that the average annual rainfall in the area during this period is 415.45 mm. The lowest rainfall recorded at Mundra and Mandvi are 30.80 mm and 2.20 mm respectively during 1987 whereas the highest rainfall recorded at Mundra and Mandvi are 1079.60 mm during 1961 and 1193.04 during 1926 respectively. The rainfall pattern in the area during this period shows a standard deviation of 222.01 mm with coefficient of variation of 54.21%.

The annual mean temperature is 26.2°C and monthly mean temperatures range between 10.1°C during January to 38.7°C during May. Summer temperature ranges from 18.3°C in March to 38.7°C in May. December and January are coolest months with temperature ranging from 10.1°C to 26.1°C.

Being arid climatic conditions, air is generally dry except during the monsoon season. However, the relative humidity in the coastal parts of the area is high throughout the year exceeding 60% on the average. During monsoon months, the relative humidity exceeds 80% in the coastal region and over 65% in the interiors of the area. The rest of the year the air is dry with relative humidity to the order of 25% or less. March and April months are the driest months.

The prevailing wind direction in the study area is south-westerly during summer and monsoon seasons and north-easterly during winter season. The mean wind speed ranges from 5.9 to 13 kmph during winter months and 26 to 36.9 kmph during monsoon months. During the months of April-May, the mean wind speed is around 17.5 to 23.8 kmph.

Meteorological data of Mundra and Mandvi from IMD, Bhuj is presented in **Table-2** and graphical representation is made in **Figure-4a&4b**.

Table-2. Meteorological Data of Mundra and Mandvi - IMD, Bhuj

Month	Temperature (°C) (Max-Min)		Humidity (%) (Max-Min)		Mean Total Rainfall (mm)		Wind Speed (km/hr)	
	Mundra	Mandvi	Mundra	Mandvi	Mundra	Mandvi	Mundra	Mandvi
January	26.1-10.1	25.6-14.2	48–24	65-59	1.88	2.8	7.9	13
February	29.1-12.9	26.3-14.8	52–17	69-71	3.06	2.3	8.1	16.4
March	34.0-18.3	29.8-18.6	59–26	80-77	0.99	1.3	8.5	20.3
April	37.6-22.7	32.3-22.3	57– 22	79-77	0.06	0.4	11.2	23.8
May	38.7-25.6	32.7-26.2	66–33	84-83	0.71	2	17.6	30.1
June	36.7-27.4	33.0-28.4	72–50	88-85	66.67	39.3	21	32.8
July	33.0-26.3	31.1-26.9	77–64	87-86	214.13	199.7	26	36.3
August	31.7-25.3	30.3-26.1	80–62	89-85	95.31	108.4	17	33.1
September	33.2-24.1	30.5-25.4	77–54	87-82	41.61	53.8	13	26.5
October	35.6-21.5	31.9-22.8	64–26	77-70	9.68	7.2	8.6	16.9
November	32.3-15.6	30.5-19.2	55–27	61-62	9.16	1	7	13.8
December	28.0-11.2	26.9-15.6	56–25	64-63	1.72	1.7	5.9	14.3
Range/ Total/Average	**33.0-20.1**	**30.1-21.7**	**63 –36**	**77-75**	**444.98**	**419.90**	**12.65**	**23.11**

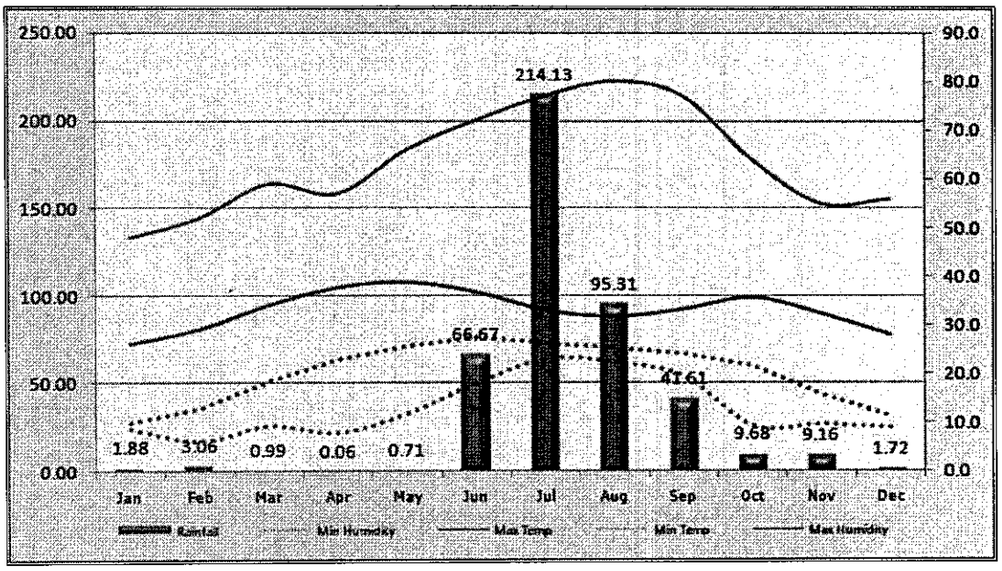


Figure-4a. Climate Graph – Mundra

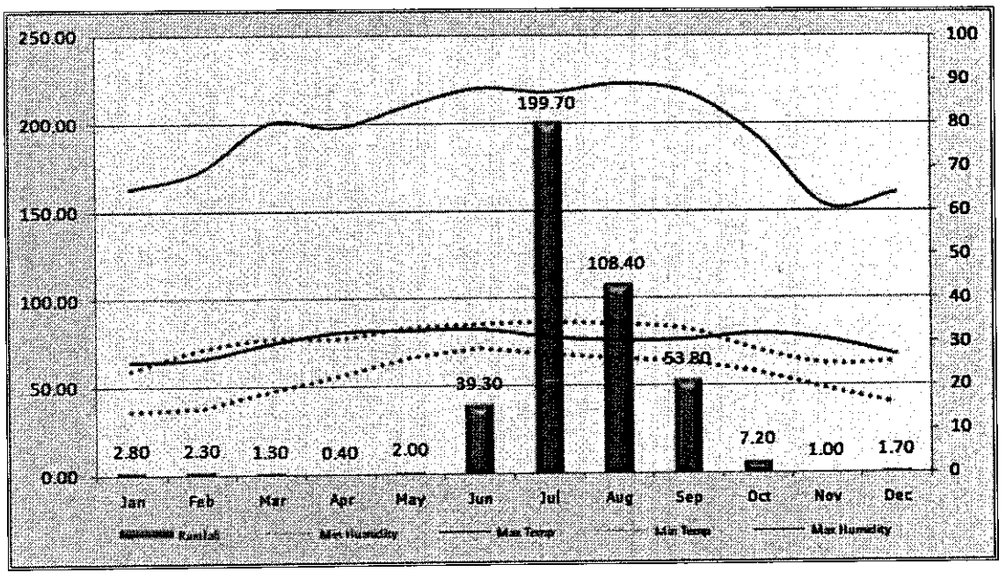


Figure-4b. Climate Graph – Mandvi

2.2 Physiography and Drainage

2.2.1 Physiography

Physiographically, Kachchh district can be divided into:

a) Central high land and the upland in the Rann area;
b) Central plain in the southern part;
c) Little and Great Rann areas; and
d) Banni plains.

The study area forms part of central plain with fringes of ridges in the northern part around Gelada. The study area is fairly flat with growth of prosopis juliflora. The highest elevation and lowest topographic elevations of the area are around 65.00 m (in the northern part west of Gelada) and 0.00 m above mean sea level (amsl) along coast line. The general slope in the study area is towards south towards Gulf of Kachchh. Elevation in the project site ranges from 3.0 m amsl in the south 9.0 m amsl in the north with general slope towards south into Gulf of Kachchh.

Danderi RF NW of project site, Siracha RF in the western part of project site, Navinal RF towards east of project site, Dhrab RF in the east (south of Dhrab) and Mundra Mangrove RF along Baradi Mata Creek are the forest covers in the study area.

2.2.2 Drainage

According to River Basin Atlas of India, Ministry of Water Resources, the study area forms part of B20RAN14, 15 & 16 watersheds in Rann Sub-basin of West Flowing Rivers of Kutch and Saurashtra including Luni Basin.

The drainage of the study area is largely governed by the combination of lithology and tectonics however, the influence of sea level fluctuations during Quarternary period is also obvious. Khari nadi (1.9 km, W), Danesri Nadi (in the western part), Naganandini (4.7 km, E) and Phot nadi (8.7 km, ENE) are the streams in the study area flowing southwards into Arabian Sea, the Gulf of Kachchh. The drainage network in the study area is generally dendritic to sub-parallel and controlled by these streams. These streams are seasonal and rarely seen in flowing condition only during peak rainfall events. The study area is having a drainage density of 1.27 km/sq km. There are a few small to medium ponds/tanks spread over the entire study area and a number of check dams were constructed on stream courses.

Kotdi creek towards south of project site and Boradi Mata creek towards southeast of project site are the major creeks in the study area. Arabian Sea, the Gulf of Kachchh is in the southern part occupying 18% of the study area. Physiography and drainage network in the study area is presented in **Figure-5**.

Danesri Nadi, a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. Stream flow only for a few hours after peak rainfall events is reported in this stream at Siracha, 1.5 km NW of project site. Danesri Nadi merges into Kotdi creek area after railway crossing near project site and after this point, it has more of tidal/backwater influence than run-off from rainfall. Since no flow data is available for Danesri Nadi, a tentative estimate of run-off from Danesri Nadi catchment and discharge at railway line near project site is done based on the catchment characteristics.

The run-off values calculated for different land uses in the catchment area are presented in **Table-3**. The annual volume of surface run-off available from the catchment area is

estimated at 5.33 MCM while the volume of water available during southwest monsoon period is 5.05 MCM.

Table-3. Annual and Monsoon Run-off from Danesri Nadi Catchment

Sr.No.	Land Use	Area (sq.km)	Run-off Coefficient	Annual Rainfall (m)	Annual Run-off (MCM)	Monsoon Rainfall (m)	Monsoon Run-off (MCM)
1	Residential Land	0.68	0.50	0.432	0.15	0.410	0.14
2	Industrial Land	0.45	0.70	0.432	0.14	0.410	0.13
3	Barren Land	0.15	0.70	0.432	0.05	0.410	0.04
4	Forest Land	0.76	0.20	0.432	0.07	0.410	0.06
5	Scrub Land	5.33	0.25	0.432	0.58	0.410	0.55
6	Cultivated Land	29.99	0.30	0.432	3.89	0.410	3.68
7	Water Body	1.20	0.90	0.432	0.47	0.410	0.44
Total/average		**38.57**	**0.51**	**0.432**	**5.33**	**0.410**	**5.05**

Danesri Nadi discharge at railway crossing near project site is estimated using Rational Formula considering maximum one day rainfall of 129 mm for Mundra area. In the absence of short duration rainfall data, India Meteorological Department (IMD) empirical reduction formula has been used for estimation of 1-hour rainfall (44.72 mm/hr). Danesri Nadi peak discharge at railway crossing near project site is estimated at 256.83 cumecs which will occur only for few hours after peak rain events of magnitude mentioned above.

Rational Formula as applicable for catchments <50 sq km: Qp = 1/36(KPcA)

where Qp = Discharge in Cumecs
K = Run-off Coefficient
Pc = Critical rainfall intensity in cm/hr
A = Catchment area in ha

Qp = 1/36(0.536 x 44.72 x 3875)
= 256.83 cumecs


Danesri Nadi near Siracha


Danesri Nadi after Railway Crossing

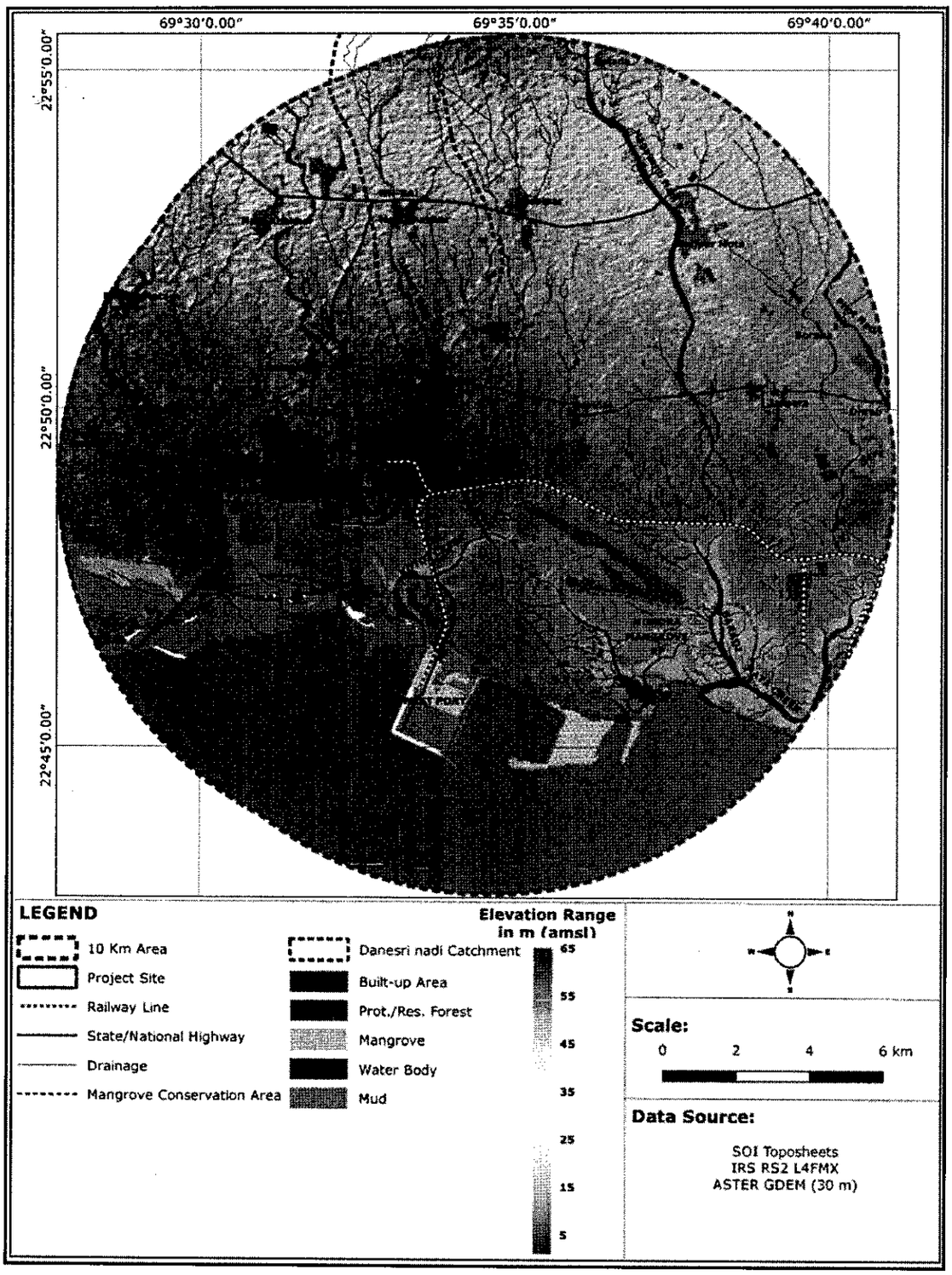


Figure-5. Physiography and Drainage Map of the Study Area

3.0 GEOLOGY

3.1 Geomorphology

Geomorphological features on earth surface craft by various geomorphic processes such as erosional, depositional, tectonic etc. Geomorphological characteristics of the region facilitate important hydrologic processes like surface run-off and infiltration. Geomorphology map of the study area has been prepared based on Geomorphology Theme (2005-06), Bhuvan, National Remote Sensing Center (NRSC) with landforms classified at Level-2 and is presented in **Figure-6**.

Geomorphologically, the study area can be divided into:

- Denudational origin
  - Pediment-Pediplain complex
- Fluvial origin
  - Younger Alluvial plain
- Coastal origin
  - Older Coastal plain
  - Younger Coastal plain
- Anthropogenic origin
  - Anthropogenic terrain
- Water bodies

The geomorphological boundaries in the study area run W-E following the coast line trend.

Pediment occurs as gently sloping rocky surface covered intermittently with weathered debris, residual gravel, wind-blown and sheet wash sand/silt deposits of variable thickness (Twidale, 1978b). Pediplain is an extensive plain formed by the coalescence of pediments. Pediment-Pediplain complex occurrence in the study area is mainly in the form of pediplain covering central to northern part.

Alluvial Plain is a largely flat landform created by the deposition of sediment over a long period of time by one or more rivers coming from highland regions, from which alluvial soil forms. Alluvial plains of the study area are compositionally sand dominant and occur along Danesri and Nagavanti nadis in the northern part.

Coastal Plain is flat, low-lying land adjacent to a sea coast. Older coastal plain extends E-W from Bhadia Nana and Jarpara between pediplain and younger coastal plain. Younger coastal plain extends E-W between younger coastal plain and Gulf of Kachchh. Proposed project site, Adani Power & other industrial set-ups in APSEZ area are located on older coastal plain.

Anthropogenic Terrain is a landform created due to human intervention. Reclaimed lands for industrial set-ups in younger coastal plain of the study area are shown as anthropogenic terrain.

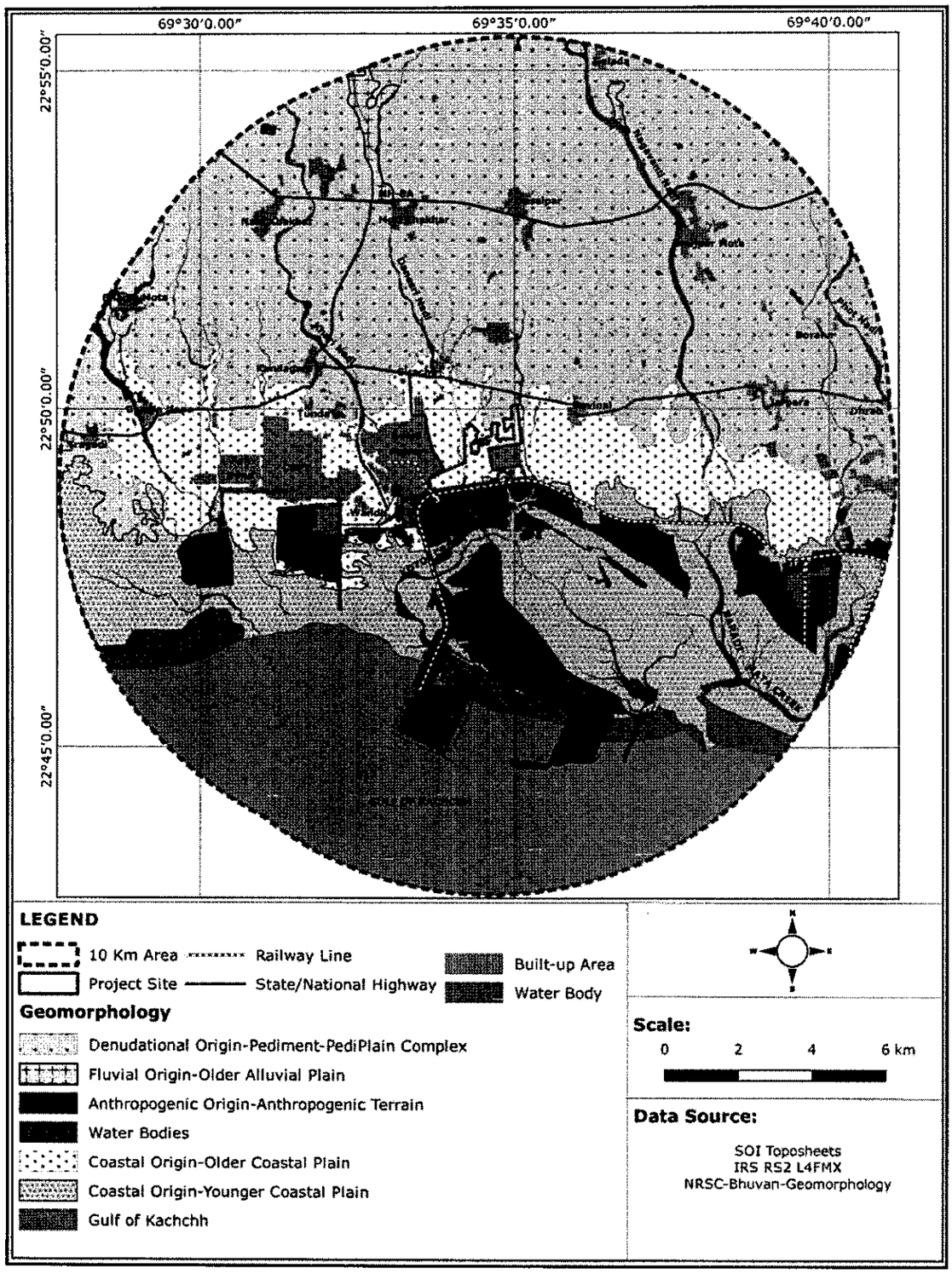


Figure-6. Geomorphology of the Study Area

Note: The older tidal flat deposits are currently inactive or no tidal activity at present in the older tidal flat deposits. Part of this area around Tragadi, Siracha, Navinal, Dhrab and Jarpara has been converted into agriculture and/plantations.

3.2 Regional Geology

The Katchchch district comprises litho-units of the Mesozoic sediments, the Deccan Volcanics, the Palaeogene and Neogene sediments of Tertiary age and the Quarternary sediments.

The Mesozoic sediments, represented by the Pachchham, the Chari, the Katrol and the Bhuj Formations, comprise mainly conglomerate, sandstone, shale, siltstone, clay, limestone, marl, etc. Various vertebrate, including dinosaurian remains (near Ler and Anjar) and footprints (near Fategarh) and invertebrate fauna and flora of Gondwana affinity are present in these sediments.

Alkaline intrusive, basaltic flows, basaltic/doleritic and olivine gabbro intrusive and andesitic trachyte represent the Deccan Volcanics. The basaltic flows, are also associated with inter-trappean horizons containing dinosaurian remains.

The Deccan Volcanics are unconformably overlain by the lateritic horizons of the Matanomadh Formation and the sedimentary rocks belonging to the Kakdinadi, the Fulra, the Maniyara Fort, the Khari Nadi, the Gaj and the Sandhan Formations. These sediments are fossilliferous and include limestone, shale, siltstone, marl, sandstone, conglomerate, etc.

The Pleistocene sediments include coarse clastics of the Kothara Formation and predominantly calcareous rocks of the Miliolite Formation.

The youngest sediments belong to the Holocene period and are represented by the Rann Clay and Mahuva Formations (marine), Rann Formation (fluvio-marine), Katrol and Varahi Formations (fluvial) and Jantral Formation (Aeolian).

The regional stratigraphic succession based on Geological Survey of India (GSI) publication, 2000 is given in **Table-4**.

Table-4. Regional Stratigraphic Succession

Lithology	Formation	Group/Series	Age
Younger tidal flat and marsh deposits	Mahuva Formation (ME)		Holocene
Older tidal flat and marsh deposits	Rann Clay Formation (ME)		
Rann clay and mud deposits	Rann Formation (FME)		
Younger flood plain, channel-fill and deltaic deposits	Varahi Formation (FE)		
Older flood plain and channel-fill deposits	Katpur Formation (FE)		
Un-stabilized sand sheet and sand dune deposits	Jantral Formation (AE)		

Lithology	Formation	Group/Series	Age
Miliolite limestone, shell limestone, calcareous sandstone, pebbly limestone and conglomerate	Miliolite Formation	Porbander Group	Lower Pleistocene
Pebbly sandstone, conglomerate gravel and sand	Kothara Formation		Lower Pleistocene
Micaceous sandstone, mottled clay, siltstone, conglomerate and calcareous clay and marl	Sandhan Formation		Pliocene
Shale interbedded with fossilliferous marl	Gaj Formation		Lower to Middle Miocene
Variegated siltstone and gypseous claystone	Khari Nadi Formation		Upper Oligocene to Lower Miocene
Calcareous and gypseous claystone/siltstone, clay, coral limestone and sandstone	Maniyara Fort Formation		Middle to Upper Oligocene
Foraminiferal limestone, glauconitic shale and clay	Fulra Formation		Middle Eocene
Gypseous, lignite-bearing shale, fossilliferous nodular limestone and clay, ferruginous shale and clay with intercalated marl	Kakdi Nadi Formation		Lower Eocene
Laterite, sandstone, conglomerate and bentonitic and kaolinitic clay	Matanomadh Formation		Palaeocene
Andesitic trachyte	Extrusive	Deccan Volcanics	Upper Cretaceous to Eocene
Olivine gabbro	Intrusive		
a. Basalt and dolerite dyke, b. Plug and sill			
Basalt flows with inter-trappean sediments	Extrusive		
a. Alkali gabbro, b. Alkali basalt			
Gluconitic and burrowed sandstone, siltstone, shale, limestone, marl, conglomerate, ironstone and clay with marine and plant fossil	Bhuj Formation		Cretaceous
Shale, fossilliferous sandstone, marl and conglomerate	Katrol Formation		Upper Jurassic to Lower Cretaceous
Gypseous shale, siltstone and conglomerate with phosphatic nodule, colitic limestone	Chari Formation		Middle to Upper Jurassic
Gypseous shale, siltstone, limestone, sandstone and conglomerate	Pachchham Formation		Middle Jurassic

(Source: GSI Publication, 2000)

3.3 Geology of the Study Area

Of the total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/Quarternary sediments with surface lithological boundaries running almost parallel to coast line (E-W).

Holocene sediments of the study area comprises of younger and older tidal flat and marsh deposits of Mhuva and Rann Clay Formations respectively from sea towards inland and younger flood plain, channel-fill and deltaic deposits from tidal flats towards inland. The tidal flat and marsh deposits occupy 41.31% of the study area covering170.88 sq km. Flood plains belonging to Varahi Formation extend from central to northern part of the study area covering 161.48 sq km (39.03%). Coastal region also has aeolian sands deposited under strong wind action from gulf occupying a small area 5.65 sq km (1.37%).

Recent flood plain sediments are deposited by rivers flowing southerly and ultimately meet to Gulf of Kachchh in south. Alluvium sediments composed of sand, gravel, beach sand, dunal sand and tidal mud. The thickness of alluvium is observed to be 2.0 m in the north to 18.0 m. The recent sediments are well exposed in cliff sections of Danesri, Nagavanti and Phot nadis. Alluvium is highly porous in nature and is a good aquifer of coastal region.

Geology of the study area based on GSI publication, 2000 is presented in **Figure-7**.

3.4 Sub-Surface Lithology and Resistivities in the Study Area

3.4.1 Sub-Surface Lithology

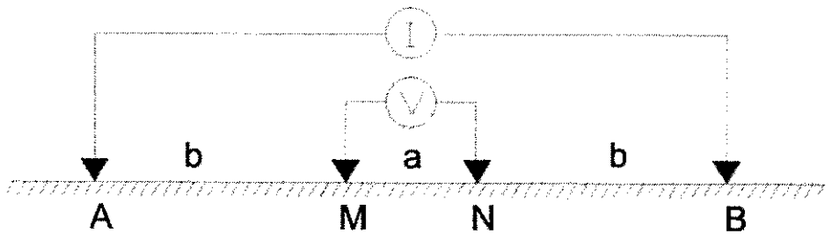
Sub-surface lithological information collected from the local tube well driller for two tube well locations in Bhujpur and Siracha is presented in the form of lithologs in **Figure-8**. Top soil at these locations is reported to be around 2.00 m followed by alluvium extending up to 15.00 m. At Bhujpur, alluvium is underlain by compact sandstone and disintegrated sandstone occurring as alternate layers up to 182.00 m with lateritic gravel between 61.00 m and 76.00 m. Disintegrated/fractured sandstone from 122.00 m to the bottom of the well is water yielding acting as aquifer. At Siracha, alluvium is followed by calcareous kankar up to a depth of 30.00 m. Below this, compact sandstone and disintegrated sandstone occur as alternate layers up to 122.00 m. Disintegrated/fractured sandstone from 107.00 m to the bottom of the well is water yielding and acting as aquifer.

3.4.2 Sub-Surface Resistivities

Application of geophysical methods will help us to identify the nature and thickness of sub-surface formation by studying the variation of their physical properties through the measurements made at the surface. Several surface geophysical methods are deployed to reach the purpose. All these methods rely upon the principle that each lithological assemblage has independent physical properties and identification of these properties helps to recognize the formation. One such property easily detectable is its electrical character for the passage of known strength of current. These testing methods are applied for arriving information on sub-surface lithological data and vertical layering of water structure in the surveyed area.

In geo-electrical methods, the centre of the configuration (O) is kept at fixed location and measurements are made by successively increasing electrode spacing. In this, current is sent into the ground through a pair of electrodes called current electrodes and resulting potential difference across the ground is measures with the help of another pair of electrodes called potential electrodes. The ratio between the potential difference (ΔV) and current (I) gives the resistance (R), which depends on the electrode arrangement and on the resistivity of the sub-surface formations. The apparent resistivity values obtained with increasing values of electrode separations are used to estimate the thickness and resistivity of the sub-surface formations. The plot between apparent resistivity values obtained with increasing values of electrode separations and corresponding current electrodes separation from the centre is used for analysis of thickness and true resistivity of the sub-surface formations.

There are two popular surface electrical methods in geophysical investigations namely Schlumberger and Werner configurations. The Schlumberger method of Electrical Resistivity Test (ERT) was used in the present study with the help of a DC resistivity meter - DDR-3 of IGIS, Hyderabad. In Schlumberger configuration, all the four electrodes (A, B, M and N) are kept in a line. The outer electrode spacing (b) is kept large, compared to the inner electrode spacing (a), usually more than 5 times. Field resistance values will be obtained at every change of electrode spacing for calculating apparent resistivity values. The disposition of electrodes for Schlumberger configuration is shown in below picture and the apparent resistivity ρ_a for a specified configuration is computed with below mentioned formula.



Schlumberger Configuration

Apparent Resistivity $\rho_a = \pi kR$

where, 'k' is the constant = $\pi/a(AB/2^2-MN/2^2)$
'AB' is current electrode spacing and
'MN' is potential electrode spacing
$R = \Delta V/I$

For obtaining the thickness and true resistivity of sub-surface lithological units within the study area, Electrical Resistivity Tests (ERTs) were conducted at 15 different locations following Schlumberger configuration with a maximum AB/2 separation of 100.5 m. The DC resistivity meter model DDR-3 of IGIS, Hyderabad make is used in the present geophysical investigations. Locations for conducting ERTs were selected considering topography & space to run electrodes up to 100 m on either side, site conditions including surface moisture etc.



Out of these, 2 ERT locations were within the project site and rest are spread in the study area. These locations are designated as ERT1 to ERT15 and shown in **Figure-7**.

At ERT1, 2, 5, 6, 7, 10, 12, 13, 14 and 15, field data could not be captured for the complete AB/2 separation of 100.5 m even after several attempts and the data capture at these locations ranged from 21.0 m to 59.0 m. The following reasons may be attributed for not capturing data beyond mentioned AB/2 separation at these locations:

- The layers present below respective depths having very low resistivity values <1Ωm
- The layers are highly altered or highly brackish or saline

The resistivity data obtained is interpreted in terms of physical parameters viz., resistivity and thickness of the formations. In the present study, Inverse Slope method of interpretation is used to interpret the data acquired from the field. Resistivity and thickness of each layer at 15 locations are presented in **Table-5**.

Resistivities of different lighological units in the study area range from <1 Ωm to >300 Ωm. ERT1 and 2 are located in project site lying on older tidal flat and marsh deposit with resistivities ranging from <1.0 Ωm to 5.0 m. The resistivity at these locations decreases to <1.0 Ωm with depth indicating saline nature. The other sub-surface lithological units in the study area represent alluvium of fluvial origin, laterite as capping and extending as lens into sandstone and sandstone with resistivities ranging between 5.0 Ωm to >300 Ωm. At ERT5, 6, 7, 10, 12, 13, 14 and 15 also, resistivity below 21.0 m to 59.0 m is very low <1.0 Ωm indicating formation salinity.

Table-5. Resistivity and Thickness Details from Electrical Resistivity Tests (ERTs)

Sr. No	ERT No.	Resistivity Ωm	Depth m		Thickness m
			From	To	
1	ERT1	5	0	12	12
		2	12	21	9
		<1	21	Below	-
2	ERT2	2	0	48	48
		<1	48	Below	-
3	ERT3	15	0	2	2
		55	2	27	25
		20	27	48	21
		7	48	100	52
4	ERT4	15	0	1	1
		60	1	27	26
		80	27	60	33
		25	60	100	40
5	ERT5	20	0	10	10
		71	10	15	5
		31	15	21	6
		14	21	38	17
		<1	38	Below	-
6	ERT6	20	0	1	1
		65	1	24	23
		<1	24	Below	-
7	ERT7	15	0	1	1
		14	1	24	23
		56	24	48	24
		<1	48	Below	-
8	ERT8	15	0	21	21
		44	21	50	29
		14	50	100	50
9	ERT9	15	0	5	5
		64	5	27	22
		51	27	59	32
		17	59	100	41
10	ERT10	15	0	5	5
		38	5	15	10
		65	15	27	12
		<1	27	Below	-
11	ERT11	20	0	2	2
		18	2	48	46
		10	48	100	52
12	ERT12	20	0	1	1
		27	1	9	8
		50	9	21	12
		>300	21	38	17
		<1	38	Below	-

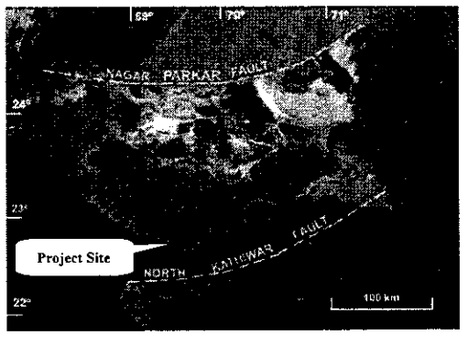
Sr. No	ERT No.	Resistivity Ωm	Depth m		Thickness m
			From	To	
13	ERT13	20	0	1	1
		60	1	27	26
		>300	27	38	11
		11	38	48	10
		<1	48	Below	-
14	ERT14	15	0	21	21
		<1	21	Below	-
15	ERT15	20	0	12	12
		34	12	48	36
		10	48	59	11
		<1	59	Below	-

A review of soil analysis results indicates that the soils in the proposed project site are of clay loam type with slow permeability, high water holding capacity, 1.1 g/cc of bulk density and saline in nature. The project proponent is advised to take up detailed geo-technical investigations to further gaining an engineering decision on foundation and construction of buildings.

3.5 Tectonic Setup and Lineaments/Faults

The Kachchh district lies 3-400 km from the plate boundary between the Indian Plate and the Eurasian Plate, but the current tectonics is still governed by the effects of the continuing continental collision along this boundary. During the break-up of Gondwana in the Jurassic, this area was affected by rifting with a roughly west-east trend. During the collision with Eurasia the area has undergone shortening, involving both reactivation of the original rift faults and development of new low-angle thrust faults. The related folding has formed a series of ranges, particularly in central Kachchh.

Kachchh geological province, Gujarat is often referred to as "Kachchh Basin", "Kachchh Rift Basin" or "Kachchh Aulacogen", in tune with the usage by workers involved in the exploration of oil in the terrain. The Kachchh basin is bounded between the Nagar Parkar Fault (NPF) in the north and North Kathiawar Fault towards south.



(Source: Current Science, Vol 112, No.5, 10 Mar 2017)

The study area form part of Kachchh Basin and does not show any major tectonic evidences except few geomorphic lineaments parallel to drainage courses and a minor fault of structural origin in the SE (**Figure-7**). The nearest major fault is North Kathiawar Fault (NPF) towards south.

hazards and the physical, social and economic vulnerability of its people, asses and economy at taluka level. The estimated mean taluka Peak Ground Acceleration (PGA in g) zonation with event magnitude for a 100 year return period is presented in **Figure-9**. This zonation would typically be used for the design of critical buildings that need to have a mean design service life of 100 years.

The cities of Ahmedabad, Baruch, Rajkot and Bhavnagar fall into the severe intensity zone, while Bhuj and Jamnagar fall in the very severe intensity zone over this time frame. The project site is located in unclassified zone covering Little and Great Rann of Kachchh including Mundra coastal area, but close to very severe intensity zone.

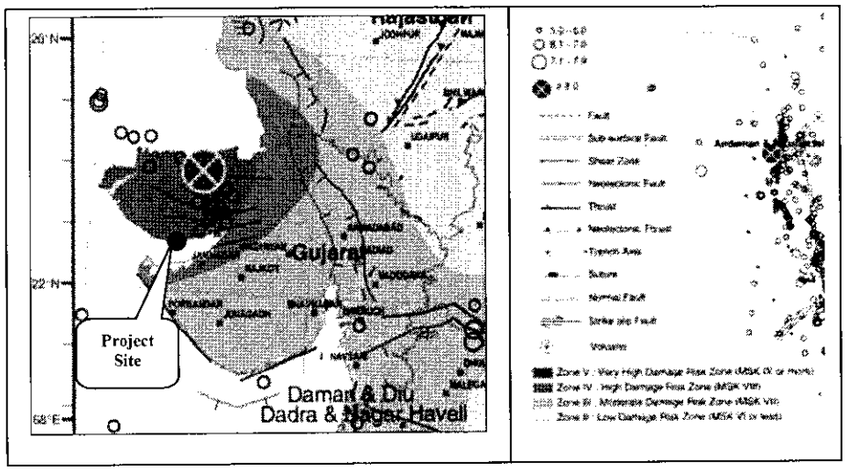
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3.6 Earthquakes

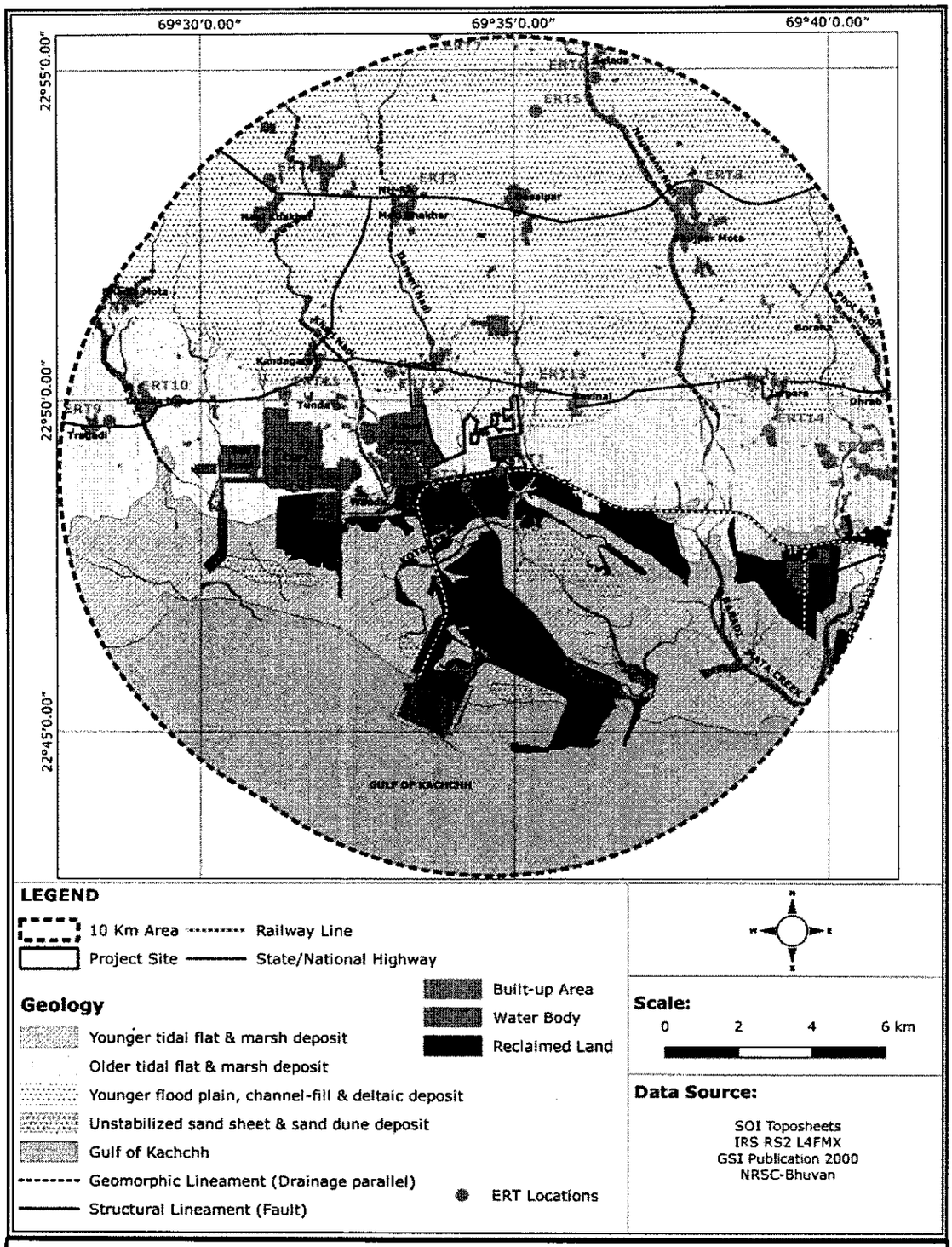
The Indian subcontinent has a history of devastating earthquakes. The major reason for the high frequency and intensity of the earthquakes is that the Indian plate is driving into Asia at a rate of approximately 47 mm/year. Geographical statistics of India show that almost 54% of the land is vulnerable to earthquakes. The latest version seismic zoning map of India given in the earthquake resistant design code of India (IS 193 (Part 2) 2002) assigns four levels seismicity for India in terms of zone factors. In other words, the earthquake zoning map of India divides India into 4 seismic zones (Zone 2, 3, 4 and 5) unlike its previous version, which consisted of five or six zones for the country. According to the present zoning map, Zone 5 expects the highest-level seismicity whereas Zone 2 is associated with the lowest level of seismicity. The MSK (Medvedev-Sponheuer-Karnik) intensity broadly associated with the various seismic zones is VI (or less), VII, VIII and IX (and above) for Zone 2, 3, 4 and 5 respectively, corresponding to Maximum Considered Earthquake (MCE). Each zone indicates the effects of an earthquake at a particular place based on the observations of the affected areas and can also be described using a descriptive scale like Modified Mecalli Intensity Scale or the Medvedev-Sponheuer-KarnikSclae.

Earthquake risk is very high in Gujarat and the state has suffered major earthquakes in 1819, 1845, 1847, 1848, 1864, 1903, 1938, 1956 and 2001 (9 times in past 200 years). The 2001 Kachchh earthquake also known as Bhuj earthquake was the third largest and second most destructive earthquake in India over the last two centuries. The epicentre was about 9 km south-southwest of the village Chobari in Bachau taluka of Kachchh district. The intraplate earthquake reached 7.7 on the moment magnitude scale.

As per Earthquake Hazard Map of India, Building Material and Technology Promotion Council (BMTPC) prepared based on digitized data of SOI, GOI; Seismic Zones of India Map IS:1893-2002, BIS, GOI; Seismotectonic Atlas of India and its Environs, GSI, GOI, the study area falls in Very High Damage Risk Zone – Zone V (MSK IX or more).



In order to provide a guiding framework to undertake mitigation investments and activities, Gujarat State Disaster Management Authority (GSDMA) initiated a study for preparation of a Composite Hazard Risk & Vulnerability Atlas for the state covering six natural and man-made



Note: The older tidal flat deposits are currently inactive or no tidal activity at present in the older tidal flat deposits. Part of this area around Tragadi, Siracha, Navinal, Dhrab and Jarpara has been converted into agriculture and/plantations.

Figure-7. Geology of the Study Area

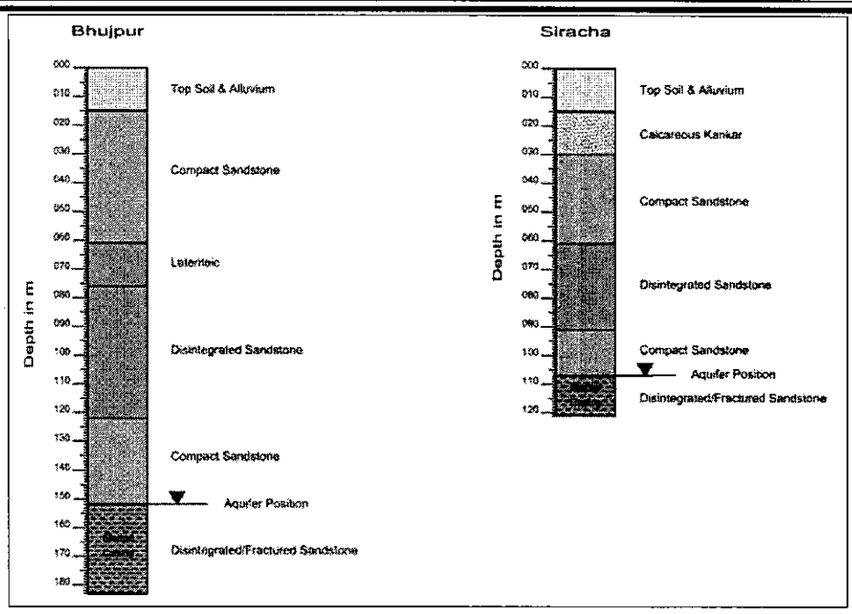


Figure-8. Tube Well Sections at Bhujpur and Siracha

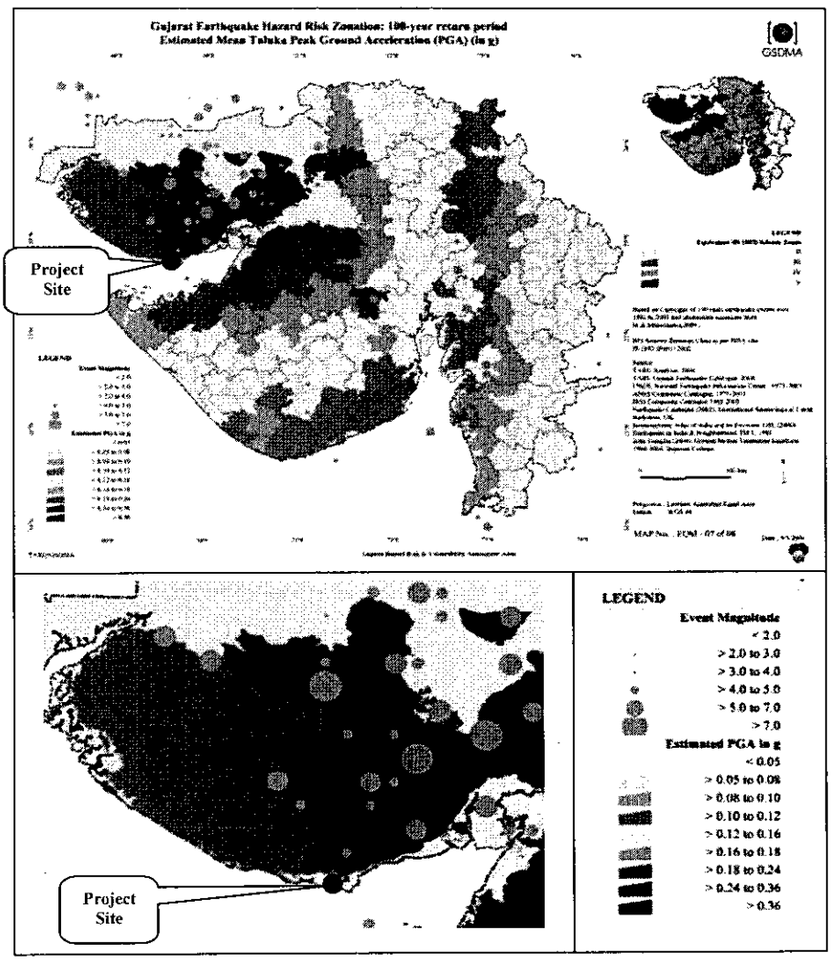


Figure-9. Gujarat Earthquake Zonation: 100 Year Return Period

4.0 HYDROGEOLOGY

Hydrogeology is the area of geology that deals with the distribution and movement of ground water in the soil and rocks of earth's crust commonly in aquifers. The hydrogeological studies have been carried out in the area to understand the local geology, geo-morphological features, drainage network, aquifer characteristics and yield of water. Accordingly, various components controlling the hydrogeological regime of the study area have been studied. Hydrogeological investigations were carried out in the area between 06.02.2019 and 08.02.2019. Hydrogeology of the study area is presented in **Figure-10**.

4.1 Nature of Occurrence of Ground Water

Ground water systems are a result of the complex combination of different lithological and structural types within an area that together constitute an aquifer within which ground water accumulates and moves. Rather than describing individual lithologies and their tendencies to form aquifers or otherwise, it is useful to describe the ground water as **one continuous across** various lithological types (Kulkarni and Deolankar, 1995).

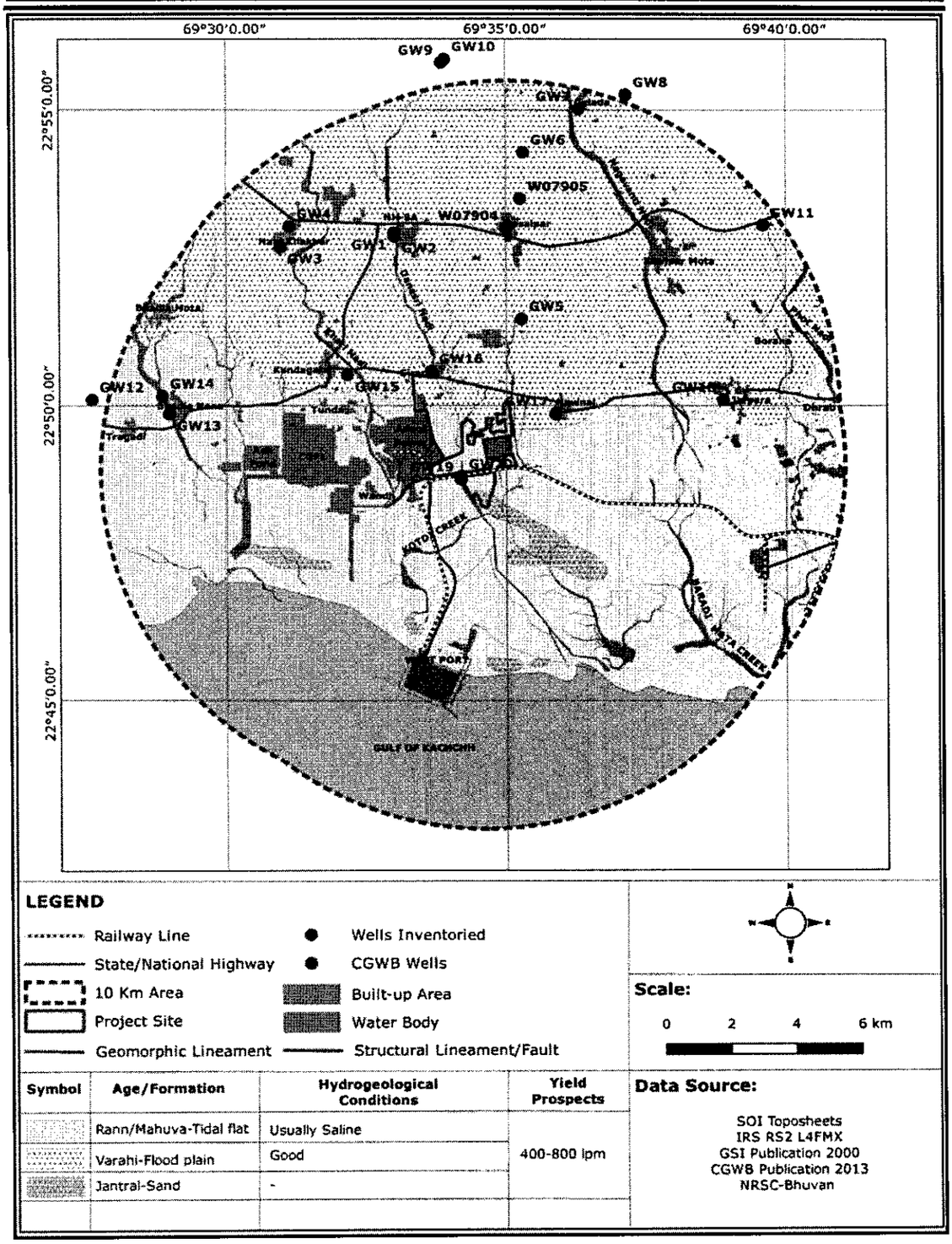
Of the total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/Quarternary sediments with surface lithological boundaries running almost parallel to coast line (E-W).

Holocene sediments of the study area comprises of younger and older tidal flat and marsh deposits of Mhuva and Rann Clay Formations respectively from sea towards inland and younger flood plain, channel-fill and deltaic deposits from tidal flats towards inland.

The thickness of alluvium is observed to be 2.0 m in the north to 18.0 m and tidal flat and marsh deposits are more than 20 m in thickness. The alluvium is underlain by sandstone of Sandhan Formation and laterite at places. Sandstone forms productive aquifer at places. The alluvium yields small quantities of brackish water to shallow wells.

4.2 Wells, Water Levels and Yields

Ground water in the study area is developed through shallow dug wells and tube wells for domestic, irrigation and industrial purpose. Dug wells are mainly seen along and in the stream courses and near water bodies/check dams. With the increase of tube wells in the area and lowering of water table, most of the dug wells are abandoned. Only a few dug wells near water bodies/check dams have water during the field visit. Depth of dug wells inventoried range from 7.58 m to 16.90 m below ground level (bgl) and of tube wells range from 54.86 m to 137.16 m bgl. Depth of tube wells in the study area range from 30.00 m to 180.00 m bgl with a diameter of 12". 46% of the dug wells inventoried are dry during the field visit. Of the total dug wells inventoried only two wells are being used for domestic purpose and rest of the wells are not being used. Tube wells are used for both domestic in the villages and for agriculture in the fields installing 3.5 HP to 20 HP submersible pumps.



Symbol	Age/Formation	Hydrogeological Conditions	Yield Prospects
	Rann/Mahuva-Tidal flat	Usually Saline	400-800 lpm
	Varahi-Flood plain	Good	
	Jantral-Sand	-	

Figure-10. Hydrogeology of the Study Area

Note: The older tidal flat deposits are currently inactive or no tidal activity at present in the older tidal flat deposits. Major portion of this is turned to be waste land mainly with prosopis/thorny shrub and existing industrial set-ups in Adani SEZ are located in this area. Part of this area around Tragadi, Siracha, Navinal, Dhrab and Jarpara has been converted into agriculture land/plantations.

Water levels during field visit are recorded measuring depth to standing water and post monsoon water levels are recorded up to the moisture indication in the dug wells. Pre monsoon water levels are recorded through interaction with well owner or local person available at the site. The depth to water level in dug wells during field visit (2nd week of February 2019) ranges from 7.85 m to 16.12 m bgl whereas the depth to water level in tube wells ranges from 2.00 m bgl in Adani piezometers near project site to 44.38 m bgl in an agricultural well near Gelada. Of the total dug wells inventoried, all wells except three in Depa and Navinal are reported to go dry during summer. Pre monsoon water levels in the three wells range from 10.00 m to 14.20 m bgl. The depth to water level in dug wells during post monsoon ranges from 3.25 m bgl in Depa to 9.80 m bgl in NaniKhakhar. The average water levels in dug wells during field visit, pre and post monsoon are 12.42 m, 12.13 m and 6.23 m bgl respectively with a water level fluctuation of 7.15 m. Well inventory data is furnished in **Table-6**.

Two to 10 tube wells for domestic use and village water supply and 50 to 300 tube wells for agriculture purpose are reported to be drilled in each village depending on village size and about 30% of these were reported as low or no yielding. Yields from tube wells in the study area range from <75 m^3/day (<1 lps) to around 2000 m^3/day (around 20 lps).

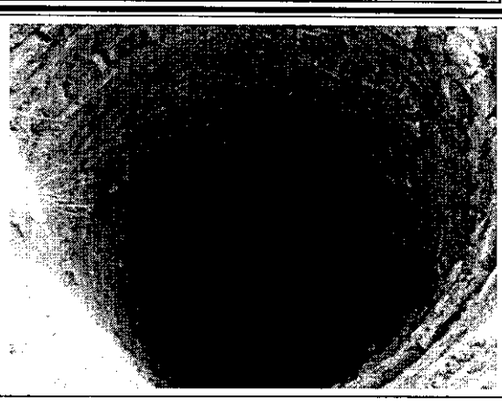
There were two dug wells in Deshalpur under CGWB water level monitoring network (Well Code: W07904 & W07905) and these wells were monitored till 2001. Pre and post monsoon average water levels in these wells between 1996 and 2001 are17.13 m and 0.52 m respectively. Water level monitoring data of these wells is presented hereunder:

SITE_NAME	SITE_TYPE	WLCODE	YEAR_OBS	MONSOON	POMRB	POMKH	PREMON
Deshalpur m.-1	Dug Well	W07905	2001	-	11.52	-	-
Deshalpur m.-1	Dug Well	W07905	2000	-	-	9.85	10.98
Deshalpur m.-1	Dug Well	W07905	1999	17.13	-	-	17.13
Deshalpur m.-1	Dug Well	W07905	1998	6.09	8.32	-	17.13
Deshalpur m.-1	Dug Well	W07905	1997	17.13	-	17.13	17.13
Deshalpur m.-1	Dug Well	W07905	1996	-	17.13	-	17.13
Deshalpur m.-2	Dug Well	W07904	2000	9.57	-	-	-
Deshalpur m.-2	Dug Well	W07904	1999	11.65	8.42	-	10.91
Deshalpur m.-2	Dug Well	W07904	1998	14.69	14.69	0.52	14.69
Deshalpur m.-2	Dug Well	W07904	1997	-	-	0.7	-
Deshalpur m.-2	Dug Well	W07904	1996	8.99	14.69	9.85	10.1
				12.18	12.46	7.61	14.40

WLCODE: Well Code **YEAR_OBS:** Year of Observation **POMRB:** Post-Monsoon Rabi
POMKH: Post-Monsoon Kharif **PREMON:** Pre-Monsoon

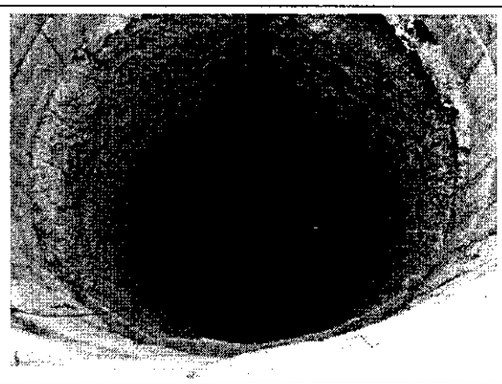
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Dry Well in Stream Course, Nana Bhadiya





Well with Water near a Check dam, Depa



Tube well for Agriculture, Gelada



Village Water Supply Well, Nana Bhadiya

4.3 Movement of Ground Water

Ground water movement mainly takes place through the fractures and joints of the crystalline rocks and the ground water is transmitted through voids and interstitial openings in sedimentary rocks and unconsolidated formations. In other words, movement of ground water is controlled by the hydraulic conductivity of the aquifer and hydraulic gradient.

Based on the water level data during field visit, ground water level contour map has been prepared for February 2019 considering water levels reduced to mean sea level and presented in **Figure-11**. The reduced water levels in the study area range from 41.00 m

above mean sea level (amsl) in the north to -22.00 m below mean sea level (bmsl) between Bhadia Mota and Bhadia Nana in the west. General ground water flow direction in major part of the study area is towards Gulf of Kachchh with depressions of deeper levels below mean sea level between Bhadia Mota and Bhadia Nana, around Navinal and east of Bhujpar Mota. These ground water depressions indicate either ground water pumping in these areas is heavy and/or piezometric head of the aquifer is not reaching the general water table.

Reduced water levels <0 around Bhadia Mota, Bhadia Nana, Tragadi, CGPL and Wandh in the west and to the east of Bhujpar Mota in the northeast indicate that ground water movement is towards inland encouraging sea water intrusion. The hydraulic gradient in the study area ranges from 3.33 m/km towards project site from upstream to 6.26 m/km in the northeast.

Table-6. Details of Well Inventory in Study Area

Sr.No.	Well No	Village	Lat	Long	Well Type	Purpose	Total Depth (m)	Dia (m)	Lining (Dug Well) (m)	Static Water Level (m)			Fluctuation (m)	Aquifer
										Feb-19	Pre Monsoon (May)	Post-Monsoon		
1	GW1	Moti Khakhar	22°52'55.20"N	69°33'0.00"E	Dug well	Domestic	15.40	3.95	8.40	Dry	Dry	8.40	-	Alluvium - fluvial
2	GW2	Moti Khakhar	22°52'51.60"N	69°33'0.00"E	Dug well	Domestic	12.20	2.00	12.20	Dry	Dry	5.40	-	Alluvium - fluvial
3	GW3	NaniKhakhar	22°52'40.80"N	69°30'57.60"E	Dug well	Domestic	16.90	2.80	12.00	Dry	Dry	9.80	-	Alluvium - fluvial
4	GW4	NaniKhakhar	22°53'01.60"N	69°31'07.40"E	Dug well	Domestic	14.10	1.80	14.10	Dry	Dry	6.50	-	Alluvium - fluvial
5	GW5	Maheshwari Nagar	22°51'27.76"N	69°35'16.40"E	Dug well	Domestic	13.20	3.20	13.20	Dry	Dry	6.90	-	Alluvium - fluvial
6	GW6	Deshalpar	22°54'17.07"N	69°35'18.44"E	Tube well	Domestic	54.86	0.30	-	35.25	-	-	-	Sandstone
7	GW7	Gelada	22°55'1.20"N	69°36'18.00"E	Dug well	Domestic	16.85	2x2	7.22	16.12	Dry	7.22	-	Alluvium - fluvial
8	GW8	Gelada	22°55'15.60"N	69°37'8.40"E	Tube well	Agriculture	118.87	0.30	-	44.38	-	-	-	Sandstone
9	GW9	Depa	22°55'48.00"N	69°33'50.40"E	Dug well	Domestic	11.15	3.00	7.60	7.85	10.00	3.25	6.75	Alluvium - fluvial
10	GW10	Depa	22°55'51.60"N	69°33'54.00"E	Dug well	Domestic	12.85	6.00	4.20	11.70	12.20	4.20	8.00	Alluvium - fluvial
11	GW11	Bhujapar Mota	22°53'02.90"N	69°39'35.40"E	Tube well	Domestic	137.16	0.30	-	41.00	-	-	-	Sandstone
12	GW12	Tragadi Gham	22°50'6.00"N	69°27'36.00"E	Dug well	Domestic	13.82	1.85	12.82	13.75	Dry	7.13	-	Alluvium - marine
13	GW13	Nana Badhiya	22°49'51.60"N	69°28'58.80"E	Dug well	Domestic	11.35	2.50	6.68	10.90	Dry	5.49	-	Alluvium - marine
14	GW14	Nana Badhiya	22°50'9.60"N	69°28'51.60"E	Tube well	Domestic	106.68	0.30	-	34.00	-	-	-	Sandstone
15	GW15	Khandagara	22°50'31.20"N	69°32'9.60"E	Tube well	Domestic	-	-	-	-	-	-	-	Sandstone
16	GW16	Siracha	22°50'34.80"N	69°33'39.60"E	Dug well	Domestic	12.50	2.50	10.20	Dry	Dry	4.50	-	Alluvium - fluvial
17	GW17	Navinal	22°49'51.60"N	69°35'52.80"E	Dug well	Domestic	16.60	7.00	16.60	14.20	14.20	7.50	6.70	Alluvium - fluvial
18	GW18	Jarpara	22°50'6.00"N	69°38'52.80"E	Dug well	Not in use	7.58	3.00	7.58	Dry	Dry	4.65	-	Alluvium - fluvial
19	GW19	Adani Piezometer	22°48'45.08"N	69°34'11.01"E	Tube well	Adani Piezometer	30.00	0.15	-	2.00	2.80	1.80	-	Alluvium - marine
20	GW20	Adani Piezometer	22°48'48.15"N	69°34'11.12"E	Tube well	Adani Piezometer	30.00	0.15	-	2.20	3.00	2.10	-	Alluvium - marine
						Average	34.32	2.28	10.22	18.25	12.13	6.23	7.15	
						Dug well	13.42	3.30	10.22	12.42	12.13	6.23	7.15	
						Tube well	79.60	0.25	-	26.47	-	-	-	

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Geology & Hydro-geology in 10 km radius area of Proposed Greenfield Copper Refinery Project at Adani Port Special Economic Zone Land in Villages Siracha and Navinal, Taluka Mundra, District Kutch, Gujarat

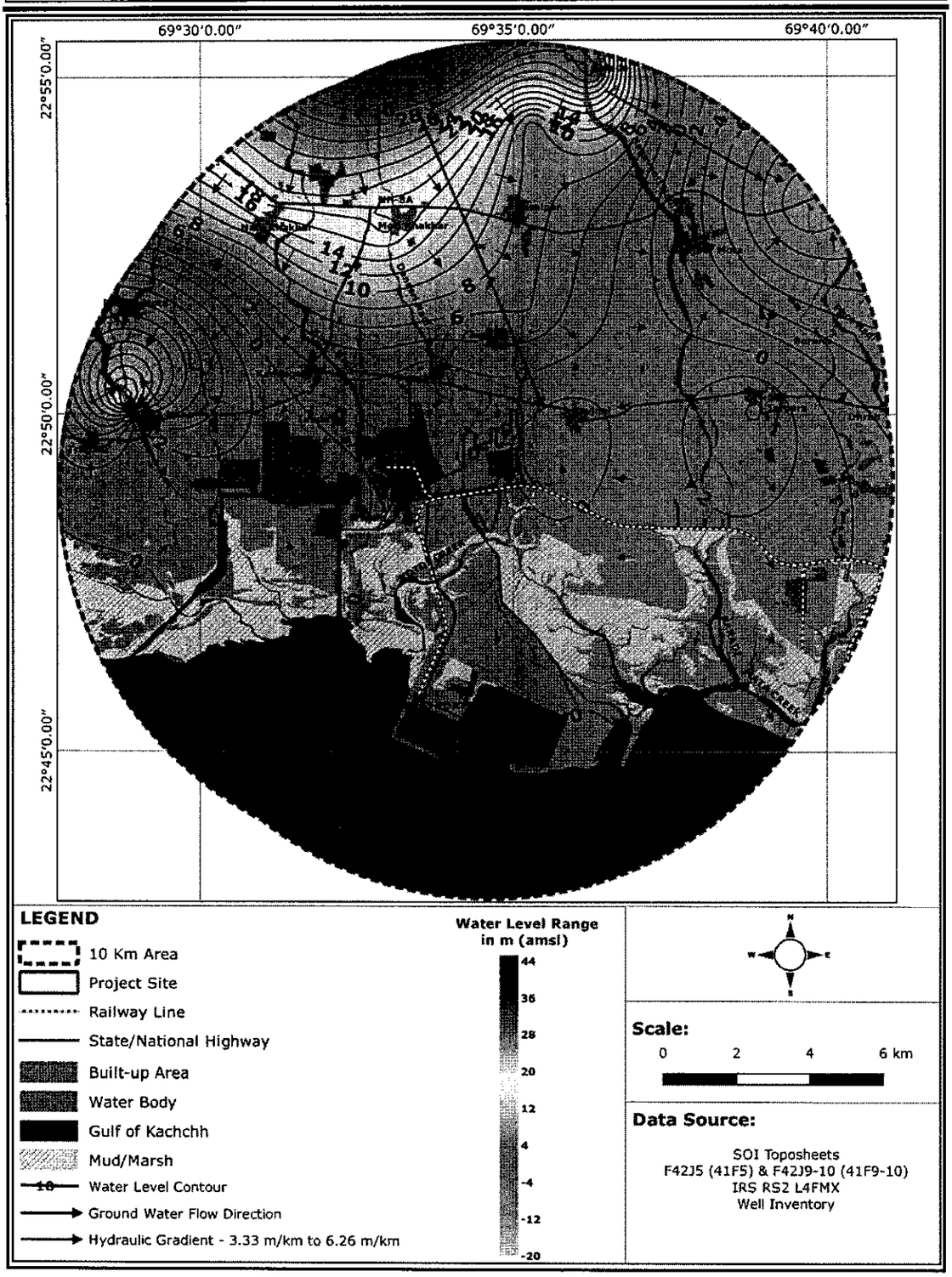


Figure-11. Water Level Contours – February 2019

4.4 Aquifer Characteristics

Ground water is stored in the open spaces and fractures within geologic material such as soil, sand and rock that occur beneath the land surface. Aquifers are the geologic layers that are filled with water and that can transmit enough water to supply a well under normal hydraulic gradients.

Pumping tests are conducted to determine the performance characteristics of a well and to determine the hydraulic properties of the aquifer such as permeability/hydraulic conductivity, transmissivity and storage coefficient. Permeability is the ease with which water can flow in a soil mass or a rock. These properties determine how easily water moves through the aquifer, how much water is stored, and how efficiently it produces water. During an aquifer test, the hydraulic head in the aquifer declines as the time of pumping increases. Analysis of hydraulic head decline, or drawdown, allows for the estimation of aquifer hydraulic properties. There are many pumping test solution methods but most commonly used for different aquifers and conditions have some general assumptions: a) aquifer extends radially and infinitely, b) single pumping well, c) fully penetrating well (except for Neuman method).

A medium duration test was conducted on a bore well in Navinal on 07.02.2019 and corresponding drawdown measurements were done on the pumping well. The bore well is 91.44 m deep with a discharge of 4.2 lps. The pump test was conducted for 300 minutes till steady state condition was achieved. After stopping the pump, recovery was continued for 100 minutes. In the absence of observation well, interpretation of single well tests with Cooper-Jacob straight line method remains more reasonable than most alternatives. The aquifer parameters were determined using Cooper-Jacob straight line method for pumping and Theis Recovery method for recovery data.

Pumping and recovery data are presented in **Table-7** and **Table-8** respectively and flows are shown in **Figure-12**. The results of pumping and recovery analysis are presented in **Table-9**. The average transmissivity is found as 54.75 m^2/day while storage coefficient is 8.93E-03 and hydraulic conductivity is found as 5.475 m/day. Aquifer characteristics in the region as summarized from different studies are presented in **Table-10**.

Table-7. Pumping Test Data

Project: Adani Copper Smelter		Well Type: Bore Well	
Location: Navinal		Well Dia: 0.3048 m	
Date: 07.02.2019		Well Depth: 91.44 m	
Time of Test Start: 06.15 AM		Static Water Level: 31.65 m	
Lat: 22°50'22.24"N		Long: 69°34'50.29"E	
Time Since Pump Started T in Min	**WI Below MP in M**	**Draw Down S in M**	**Discharge (Q) in Lps**
1	39.06	1.43	4.20
2	39.93	2.30	"
3	40.53	2.90	"
4	40.83	3.20	"
5	41.13	3.50	"
6	41.37	3.74	"
7	41.53	3.90	"
8	41.73	4.10	"
9	41.87	4.24	"
10	41.99	4.36	"
15	42.33	4.70	"
20	42.59	4.96	"
25	42.73	5.10	"
30	42.83	5.20	"
40	42.98	5.35	"
50	43.10	5.47	"
60	43.19	5.56	"
80	43.32	5.69	"
100	43.41	5.78	"
120	43.48	5.85	"
140	43.59	5.96	"
160	43.68	6.05	"
180	43.74	6.11	"
200	43.78	6.15	"
220	43.83	6.20	"
240	43.87	6.24	"
270	43.92	6.29	"
300	43.98	6.35	"

Table-8. Recovery Test Data

Time Since Pump Started T In Min	Time Since Pump Stopped T' In Min	T/T'	WI Below MP In M	Residual Drawdown (S)
301	1	301.00	42.71	5.08
302	2	151.00	42.59	4.96
303	3	101.00	42.47	4.84
304	4	76.00	42.36	4.73
305	5	61.00	42.29	4.66
306	6	51.00	42.20	4.57
307	7	43.86	42.11	4.48
308	8	38.50	42.05	4.42
309	9	34.33	41.99	4.36
310	10	31.00	41.93	4.30
315	15	21.00	41.71	4.08
320	20	16.00	41.55	3.92
325	25	13.00	41.46	3.83
330	30	11.00	41.34	3.71
340	40	8.50	41.21	3.58
350	50	7.00	41.09	3.46
360	60	6.00	41.02	3.39
380	80	4.75	40.88	3.25
400	100	4.00	40.78	3.15

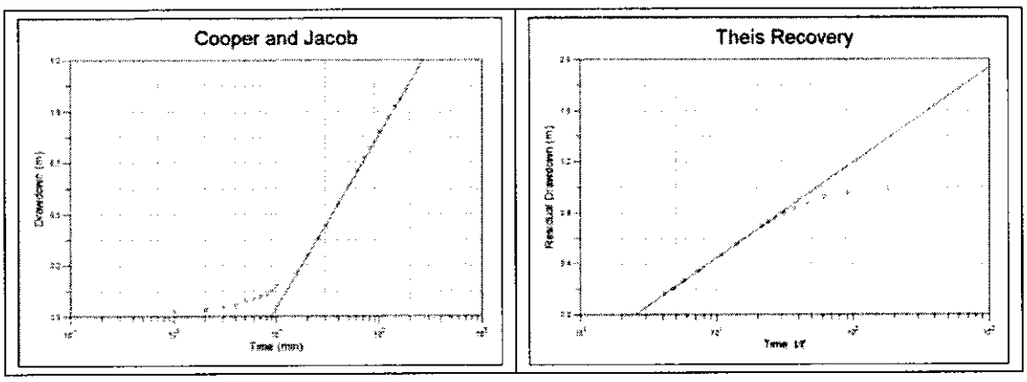


Figure-12. Pumping & Recovery Data Analysis

Table -9. Pumping and Recovery Analysis Results

Sr.No.	Aquifer Parameter	Pumping Test	Recovery	Average
1	Transmissivity (T) - m^2/day	57.16	52.34	54.75
2	Hydraulic Conductivity (K) - m/day	5.716	5.234	5.475
3	Storage Coefficient (S)	8.93E-03	-	8.93E-03

Table-10. Summary of Aquifer Characteristics in and around Study Area

Parameters	Alluvium	Sandstone	Laterite
Type	Unconfined	Semi confined	Unconfined
Characteristic	Sandy, mixture of clay, iron concretion	Red, Buff coloured, coarse grain, Marine	Sorted in Iron concretion and variegated clays
Important Locality	Coastal track in southern side of Deshalpar to Hatadi village	South to Ramaniya to Karagogha village	About 2.5 km. wide belt between Bocha and Ramaniya village
SWL Fluctuation Range-M	2 to 10	(-) 6 to +20	3 to 8
Hydraulic Conductivity K	19.7 m/day	20.3 m/day	155 m/day
Transmissivity –T	82.9 m2/day	55.3 m2/day	535 m2/day
Discharge –Q	900-1100 lpm	800-1000 lpm	275-300 lpm

(Source: GWRDC, 1987, 2002 and Raju, 2003)

5.0 GROUND WATER RESOURCES

5.1 Ground Water Recharge

Ground water recharge or deep drainage or deep percolation is a hydraulic process where water moves downward from surface water to ground water. Recharge is the primary method through which water enters an aquifer. This process usually occurs in the vadose zone below plant roots and is often expressed as a flux to the water table surface. Recharge occurs both naturally through the water cycle (rainfall) and through anthropogenic processes (artificial ground water recharge), where rain water and or reclaimed water is routed to the sub-surface. Most of the rainfall flows downstream as run-off and the amount of rainfall reaching ground water naturally after meeting evaporation and evapo-transpiration losses is very limited. The anthropogenic processes of ground water recharge in the study area include return flow from irrigation, check dams etc.

Of the total study area of 413.68 sq km, 75.67 sq km (18.29%) of the southern part is covered by Arabian Sea, the Gulf of Kachchh. Remaining study area is entirely occupied by Holocene/Quarternary sediments with surface lithological boundaries running almost parallel to coast line (E-W).

Holocene sediments of the study area comprise of younger and older tidal flat and marsh deposits of Mhuva and Rann Clay Formations respectively from sea towards inland and younger flood plain, channel-fill and deltaic deposits from tidal flats towards inland.

Since most of the ground water abstraction is in alluvial deposits, only 161.48 sq km of flood plain area has been considered to estimate the ground water recharge. Recharge in the study area has been worked out by rainfall infiltration and increment in ground water storage methods as per the guidelines of Ground Water Estimation Committee (GEC), 1997 and details are presented in **Table-11** and **12**respectively. Recharge by rainfall infiltration is estimated considering average rainfall of IMD, Mundra and Mandvi and rainfall infiltration factors of geological units in the study area. The average ground water fluctuation in dug wells between pre and post monsoon in the study area has been considered to estimate recharge by increment in ground water storage.

Table-11. Recharge by Rainfall Infiltration

Sr.No.	Recharge Unit	Area (sq.km)	Rainfall Infiltration	Annual Rainfall (m)	Recharge (MCM)
1	Younger flood plain, channel-fill & deltaic deposit	161.48	0.10	0.43	6.98
2	Recharge from return flow (irrigated + aquaculture)	40.59	0.25	0.43	4.39
3	Water Body	11.57	0.20	0.43	1.00
Total Ground water recharge					12.37

Table-12. Recharge by Increment in Ground Water Storage

Sr.No.	Recharge Unit	Area (sq.km)	Specific yield	Increment in groundwater storage (fluctuation) (m)	Recharge (MCM)
1	Younger flood plain, channel-fill & deltaic deposit	161.48	0.120	7.15	138.55
2	Recharge from return flow	40.59	0.250	0.43	4.39
3	Water Body	11.57	0.200	0.43	1.00
Total Ground water recharge					**143.94**

The average ground water recharge by rainfall infiltration and increment in ground water storage is 78.15 MCM. However, the huge difference in recharge by rainfall infiltration and increment in ground water storage indicate that the ground water draft is much more than ground water recharge.

5.2 Ground Water Discharge

The ground water discharge in the study area is mainly for domestic and irrigation purposes. The annual ground water draft has been estimated as per GEC 97 guidelines and is given in **Table-13**.

Wheat, bajra, millets and **pulses** are the major food crops, while **cotton, castor** and **groundnut** are the major commercial crops grown in the area. Mango, **papaya, Date Palm**, Sapota, Lemon and **Pomegranate** are the important horticultural crops. While wheat and cotton are most water intensive crops, water requirement for other crops and plantations is less. As the area receives very low rainfall, no canal irrigation facilities (Narmada Canal running across north central part of study area is under construction), deep water levels resulting in dry open wells, the local agriculture is dependent on only tube wells for irrigating the crops and plantations.

The total ground water draft for different purposes in the study area is 11.40 MCM.

Table-13. Annual Ground Water Draft/Discharge

Sr.No.	Purpose	Usage in Days	Requirement/Usage m^3/day	No. of Units	Ground water draft (MCM)
1	Domestic human population and livestock	365	0.075	60525	1.66
2	Irrigation	120	40 (per ha)	2030	9.74
4	Existing Industries	365	0	0	0.00
Total groundwater draft					**11.40**

5.3 Ground Water Balance

Ground water balance in respect of the study area has been estimated as per GEC 97 guidelines and is indicated in **Table-14**. Ground water balance flow diagram is placed as **Figure-13**. As per GEC 97 norms, areas where ground water resources assessment shows stage of ground water development at 70% or lower and there is no significant long term decline of pre or post monsoon ground water levels are categorized as "Safe" areas with potential for development; more than 70%, but less than 90% and either pre or post monsoon ground water level shows a significant long term decline are categorized as "Semi Critical" areas with cautious ground water development; more than 90% but less than 100% are categorized as "Critical"; more than 100% are categorized as "Over-exploited".

The study area forms part of Mundra and Mandvi blocks of Kachchh district. The average stage of ground water development in these blocks as per CGWB assessment is 82.26% and categorized as "Semi-critical" (Mundra at 63.28% as "Safe" and Mandvi at 101.23% as "Over-exploited").

The following factors of the study area make it difficult to arrive at a reasonable water balance:

- The study area has a complex geological setup with 59% of the under Gulf of Kachchh and tidal flat and marsh deposits;
- Very low rainfall, meagre natural recharge and higher ground water draft
- The study area covers 10 km radius area from the project site and not defined as a hydrological unit (watershed or catchment);
- Non availability of exact information on ground water draft through tube wells or number of tube wells; etc.,

However, an attempt has been made to arrive at a water balance for the study area based on available information. The present stage of ground water development in the study area is estimated as 102.37% and can be categorized as "Over-exploited".

Table-14. Ground Water Balance

Sr.No.	Particulars	Quantity (MCM)
I	Gross groundwater recharge	12.37
ii	Natural discharge to drain and other losses – 10% of (i)	1.24
Iii	Net groundwater availability (i-ii)	11.13
iv	Annual groundwater draft for all uses	11.40
v	**Groundwater balance (iii-iv)**	**-0.26**
vi	Water requirement for the proposed project	0.00
Vii	Balance of groundwater left for development	-0.26
[illegible]	[illegible]	102.37
iX	Present stage of groundwater development in Mundra & Mandvi blocks as per CGWB District Profiles	82.26% (Semi-critical)
X	Stage of ground water development in the study area	102.37

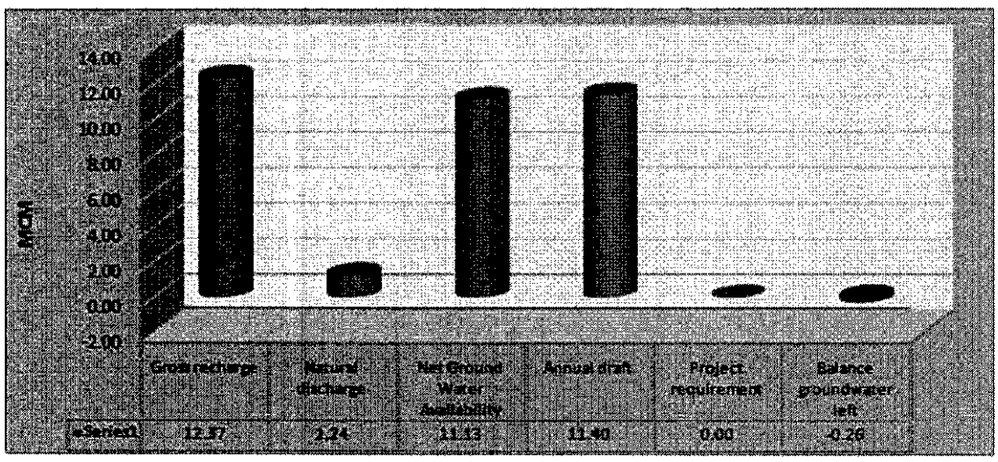


Figure-13. Ground water Balance in Study Area

6.0 WATER QUALITY

For any water body to function adequately in satisfying the desired use, it must have corresponding degree of purity. Drinking water should be of highest purity. As the magnitude of demand for water is fast approaching the availability supply, the concept of management of the quality of water is becoming as important as its quantity. Each water use has specific quality need. IS 2296:1992 specifies surface water quality standards based on the following designated best uses:

A. Drinking water source without conventional treatment but after disinfection
B. Outdoor bathing (organized)
C. Drinking water source after conventional treatment and disinfection
D. Propagation of wild life and fisheries
E. Irrigation, industrial cooling, controlled waste disposal

Drinking water is water intended for human consumption for drinking and cooking purposes from any source. It includes water (treated or untreated) supplied by any means for human consumption. IS 10500:2012, Indian Standard was formulated with the objective of assessing the quality of water resources, and specified the acceptable and the permissible limits in the absence of alternate source. It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under "acceptable" render the water not suitable. Such value may, however, be tolerated in the absence of an alternate source.

Since all surface water bodies and streams courses in the study area are dry during field visit, surface water quality of samples analysed during previous monitoring period are discussed to present the surface water quality in the study area. Ground water sampling and analysis of physical, chemical & heavy metals have been undertaken during field investigation period (February, 2019). 8 ground water samples were collected from tube wells at different locations in the study area. These samples were collected as grab samples and were analysed for 37 water quality parameters. The location details of ground water samples collected and results of the samples analysed at VIMTA Labs Ltd., are presented in **Table-15, 16** and **17** respectively and locations are shown in **Figure-14**.

6.1 Surface Water

The analysis results indicate that pH is found to be 7.2 to 8.0, which is well within the specified standard 6.5-8.5. The TDS is observed to be 41,645 to 43,572 mg/l. Dissolved oxygen is observed to be 5.6 to 5.9 mg/l. The chlorides and sulphates are found to be 16,078.9 to 20,915.5 mg/l and 2,139.1 to 2,734.0 mg/l respectively. Bacteriological studies reveal the 5 MPN/100ML. The surface water is observed to be saline in nature.

6.2 Ground Water

The analysis of ground water samples indicate that these are mild alkaline with pH values ranging between 7.53 and 8.49 and found to be within drinking water standard (IS: 10500-2012).

TDS of Navinal, Bhujpar Mota, Jarpara, Kandagara and Nana Badia (955.60 mg/l to 1973.91 mg/l), Total Hardness of all samples except Jarpara (248.6 mg/l to 573.6 mg/l), Total Alkalinity of all samples, Calcium of Navinal, Moti Khakhar, Desalpar, Jarpara and Siracha (97.2 mg/l to 132.6 mg/l), Magnesium of all samples except Nana Badia (46.5 mg/l to 79.8 mg/l). Total Boron of Navinal, Desalpar and Siracha (0.52 mg/l to 0.62 mg/l), Chlorides of all samples except Nana Badia (472.6 mg/l to 996.8 mg/l), Sulphates of all samples except Moti Khakhar and Nana Badia (261.2 mg/l to 366.8 mg/l), Fluorides of Moti Khakhar, Desalpar and Siracha (1.1 mg/l to 1.2 mg/l), Copper of Bhujpar Mota and Jarpara (0.06 mg/l) and Manganese of all samples except Bhujpar Mota and Jarpara (0.12 mg/l to 0.16 mg/l) samples shows slightly higher values than acceptable limits but are within permissible limits.

TDS of Moti Khakhar, Desalpar and Siracha (2660.7 mg/l to 3322.3 mg/l), Total Hardness of Siracha (659.9 mg/l), Chlorides of Siracha (1321.6 mg/l), Sulphates of Moti Khakhar (486.5 mg/l), Manganese of Siracha (0.36 mg/l) and Iron of Jarpara (0.31 mg/l) samples show higher values than permissible limits.

Cyanide, Cadmium, Arsenic, Lead, Chromium and Mercury, parameters concerning toxic substance and the all other parameters are well within acceptable limits.

Table-15. Water Sampling Locations

Sample Code	Location	Distance from Project Site (km)	Direction
Surface Water Samples			
SWS1	Kotdi Creek	4.5	SSW
SWS2	Baradi Mata Creek	0.4	ESE
SWS3	Sea water Intake	5.0	S
SWS4	Near Wandh	2.0	SW
Ground Water Samples			
GWS1	Navinal	1.37	ENE
GWS2	Bhujpar Mota	6.88	NE
GWS3	Moti Khakhar	6.07	NNW
GWS4	Desalpur	5.75	N
GWS5	Jarpara	6.56	ENE
GWS6	Siracha	1.83	NW
GWS7	Kandagara	3.79	WNW
GWS8	Nana Badia	8.18	WNW

Table-16. Surface Water Quality

Sr. No.	Parameters	UOM	SW1	SW2	SW3	SW4
1	pH	-	8	7.2	8	7.5
2	Temperature	°C	26.2	25.9	25.7	25.6
3	Conductivity	µs/cm	57900	52785	59800	58421
4	Salinity	gm/kg	29.6	29	37.7	32.3
5	Density	Kg/m^3	1018	1018	1024	1021
6	Dissolved oxygen	mg/l	5.6	5.8	5.7	5.9
7	Biochemical Oxygen Demand (BOD)	mg/l	<3*	<3*	<3*	<3*
8	Total Dissolved Solids	mg/l	42784	41645	43056	43572
9	Total Hardness	mg/l	6800	6962	7243	7637
10	Oil and Grease	mg/l	<1.0*	<1.0*	<1.0*	<1.0*
11	Sodium	mg/l	9640	9684	10120	10633
12	Potassium	mg/l	354	332	492	383
13	Nitrates	mg/l	2.1	3.5	1.4	2.7
14	Nitrites	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
15	Chlorides	mg/l	16421	16078	20915	17926
16	Sulphates	mg/l	2582	2543	2139.1	2734
17	Ammonia	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
18	Phosphates	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
19	Silicates	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
20	Reactive Silica	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
21	Total Phosphorous	mg/l	<0.1*	<0.1*	<0.1*	<0.1*
22	Total Nitrogen	mg/l	<0.2*	<0.2*	<0.2*	<0.2*
23	Lead as Pb	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
24	Cadmium as Cd	mg/l	<0.001*	<0.001*	<0.001*	<0.001*
25	Zinc as Zn	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
26	Copper as Cu	mg/l	<0.01*	<0.01*	<0.01*	<0.01*
27	Coli forms	MPN/100 ml	Absent	Absent	Absent	Absent
28	Faecal Coli forms	Per 100 ml	<2*	<2*	<2*	<2*

Table-17. Ground Water Quality

Sr.No.	Parameters	Units	IS:10500 Limits	GWS1	GWS2	GWS3	GWS4	GWS5	GWS6	GWS7	GWS8
1	pH	-	6.5-8.5 (NR)	7.96	8.09	7.81	7.63	8.49	7.53	8.19	8.27
2	Colour	Hazen	5 (15)	2	3	2	2	4	2	2	3
3	Taste	Ag	Ag	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Odour	Ag	Ag	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Conductivity	µS/cm	$	3150	2910	4960	4320	3190	5390	2500	1439
6	Turbidity	NTU	1(5)	1	<1	<1	<1	<1	1	<1	<1
7	Total Dissoved Solids	mg/l	500 (2000)	1973.91	1821.10	3082.22	2660.70	1966.68	3322.30	1606.40	955.60
8	Total Hardness as $CaCo_3$	mg/l	200 (600)	495.5	362.9	573.6	530.6	507.5	659.9	373.6	248.6
9	Total Alkalinity as CaCO3	mg/l	200 (600)	372.2	342.5	512.6	402.8	366.6	456.8	322.6	286.2
10	Calcium as Ca	mg/l	75 (200)	99.6	68.6	109.9	102.6	97.2	132.6	72.4	58.6
11	Magnesium as Mg	mg/l	30 (100)	59.9	46.5	72.6	66.6	64.3	79.8	46.8	24.8
12	Residual Free Chlorine	mg/l	0.2 (1)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
13	Total Boron as B	mg/l	0.5(1)	0.56	0.42	0.38	0.62	0.46	0.52	0.38	0.21
14	Chlorides as Cl	mg/l	250 (1000)	623.0	559.0	996.8	946.2	642.5	1321.6	472.6	189.6
15	Sulphates as SO_4	mg/l	200 (400)	302.60	282.60	486.50	366.50	274.20	366.80	261.20	162.50
16	Fluorides as F	mg/l	1.0 (1.5)	0.9	0.8	1.2	1.1	0.8	1.1	1	0.7
17	Nitrates as NO_3	mg/l	45 (NR)	5.6	6.2	10.4	8.5	8.1	12.2	9.8	5.2
18	Sodium as Na	mg/l	$	475.6	486.5	853.6	725.8	481.2	914.6	387.6	201.2
19	Potassium as K	mg/l	$	34.5	28.4	38.6	40.6	31.8	36.8	32.4	26.8
20	Phenolic Compounds as C6H5OH	mg/l	0.001 (0.002)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
21	Cyanides as CN	mg/l	0.05 (NR)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
22	Anionic Detergents as MBAS	mg/l	0.2 (1.0)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
23	Mineral Oil	mg/l	0.5(NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
24	Cadmium as Cd	mg/l	0.003(NR)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Sr.No.	Parameters	Units	IS:10500 Limits	GWS1	GWS2	GWS3	GWS4	GWS5	GWS6	GWS7	GWS8
25	Total Arsenic as As	mg/l	0.01 (0.05)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Copper as Cu	mg/l	0.05 (1.5)	0.04	0.06	0.05	0.02	0.06	0.05	0.04	0.03
27	Lead as Pb	mg/l	0.01 (NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
28	Manganese as Mn	mg/l	0.1 (0.3)	0.12	0.08	0.16	0.12	0.1	0.36	0.16	0.14
29	Iron as Fe	mg/l	0.3 (NR)	0.12	0.16	0.21	0.23	0.31	0.26	0.14	0.08
30	Total Chromium as Cr^{6+}	mg/l	0.05 (NR)	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
31	Selenium as Se	mg/l	0.01 (NR)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Zinc as Zn	mg/l	5 (15)	0.08	0.12	0.06	0.09	0.08	0.07	0.06	0.11
33	Aluminium as Al	mg/l	0.03 (0.2)	0.22	1.21	1.36	2.46	2.16	2.11	1.62	1.02
34	Mercury as Hg	mg/l	0.001 (NR)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
35	Pesticides	mg/l	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	E-Coli	(MPN/100ml)	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
37	Total Coliform	(MPN/100ml)	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

†: Limits in parenthesis are permissible limits in absence of alternate source

$: Limits not specified

NR: No relaxation specified

UO: Un-Objectionable

Ag: Agreeable

NTU: Nephelometric Turbidity Unit

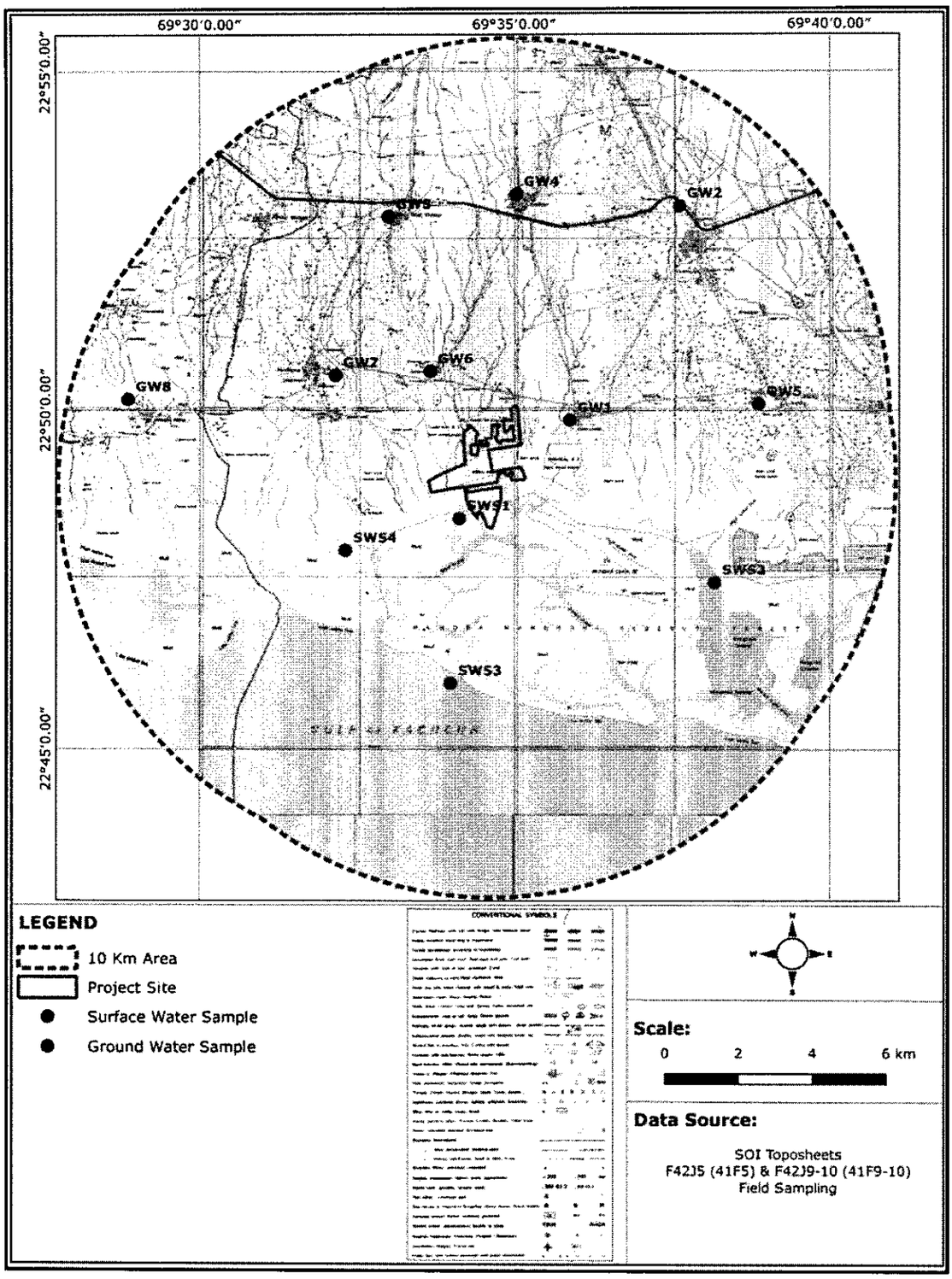


Figure-14. Locations of Water Samples

6.2.1 Ion Distribution and Water Types

Since the chemistry of water directly hints the quality of water for various purposes, its monitoring and assessment gained substantial importance in the century. Water type/hydro-chemical facies evaluation is extremely useful in providing a preliminary idea about the complex hydro-chemical processes in the sub-surface. Determination of hydro-chemical facies was extensively used in the chemical assessment of ground water and surface water of several decades. This method is able to provide sufficient information on the chemical quality of water, particularly the origin.

The first attempt in this direction was made by Hill (1940) and which is modified by Piper (1944), Duroy (1948) further improved the piper plot. Piper diagrams are made in such a way that the milli-equivalent percentages of the major cations and anions are plotted in separate triangle. These plotted points in the triangular fields are projected further into the central diamond field, which provides the overall character of the water. In general, the sample points in Piper diagram can be classified into 6 major fields. They are 1. Calcium Magnesium Chloride, 2. Calcium Bicarbonate, 3. Sodium Chloride, 4. Calcium Sodium Bicarbonate, 5. Calcium Chloride and 6. Sodium Bicarbonate types. Details of Ion distribution and water type classification based on major anion and cation variation are presented in **Table-18** and Piper diagram with Ion distribution of ground water samples is presented in **Figure-15**.

In the present study, water type of all ground water samples is Sodium Chloride indicating brackish/saline origin.

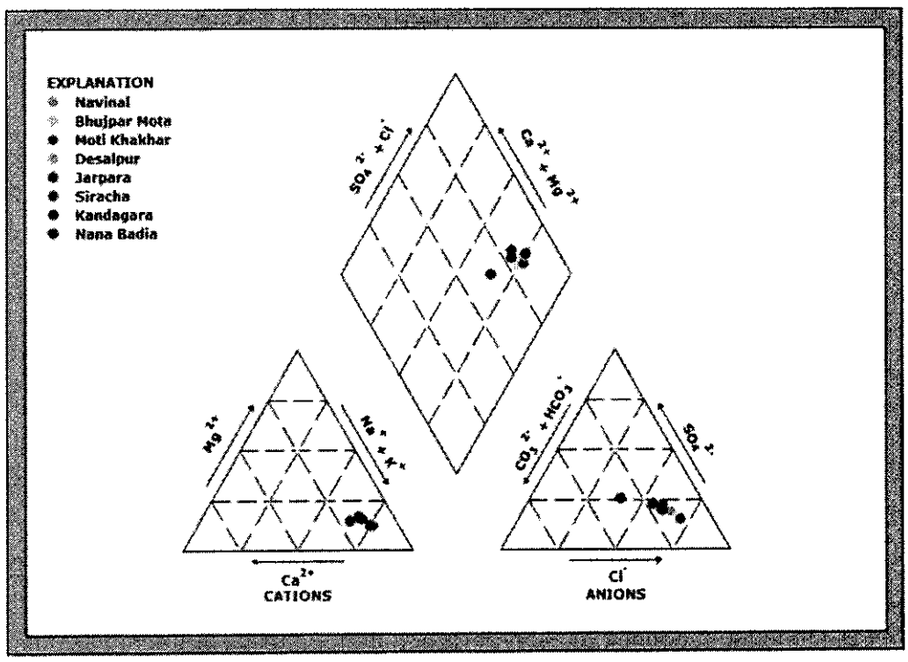


Figure-15. Piper Trilinear Diagram – Ground Water

Table-18. Ion Distribution in Ground Water

Sample Code	Unit	Na^+	K^+	Ca^{2+}	Mg^{2+}	$HCO_3^- + CO_3^-$	SO_4^{2-}	Cl^-	NO3	Water Type
GWS1	mg/l	475.60	34.50	99.62	59.89	372.20	302.60	623.00	5.60	Sodium Chloride
	meq/l	20.68	0.88	4.98	4.93	6.10	6.30	17.60	0.09	
	%	65.70	2.81	15.83	15.66	20.27	20.95	58.48	0.30	
GWS2	mg/l	486.50	28.40	68.60	46.50	342.50	282.60	559.00	6.20	Sodium Chloride
	meq/l	21.15	0.73	3.43	3.83	5.61	5.89	15.79	0.10	
	%	72.59	2.50	11.77	13.13	20.50	21.49	57.65	0.37	
GWS3	mg/l	853.60	38.60	109.90	72.62	512.60	486.50	996.80	10.40	Sodium Chloride
	meq/l	37.11	0.99	5.50	5.98	8.40	10.14	28.16	0.17	
	%	74.86	2.00	11.08	12.06	17.93	21.63	60.08	0.36	
GWS4	mg/l	725.80	40.60	102.60	66.60	402.80	366.50	946.20	8.50	Sodium Chloride
	meq/l	31.56	1.04	5.13	5.48	6.60	7.64	26.73	0.14	
	%	73.03	2.41	11.87	12.69	16.06	18.58	65.03	0.33	
GWS5	mg/l	481.20	31.80	97.20	64.28	366.60	274.20	642.50	8.10	Sodium Chloride
	meq/l	20.92	0.82	4.86	5.29	6.01	5.71	18.15	0.13	
	%	65.61	2.56	15.24	16.59	20.03	19.04	60.49	0.44	
GWS6	mg/l	914.60	36.80	132.60	79.80	456.80	366.80	1321.60	12.20	Sodium Chloride
	meq/l	39.77	0.94	6.63	6.57	7.49	7.64	37.33	0.20	
	%	73.77	1.75	12.30	12.18	14.22	14.51	70.89	0.37	
GWS7	mg/l	387.60	32.40	72.40	46.80	322.60	261.20	472.60	9.80	Sodium Chloride
	meq/l	16.85	0.83	3.62	3.85	5.29	5.44	13.35	0.16	
	%	66.99	3.30	14.39	15.31	21.82	22.45	55.08	0.65	
GWS8	mg/l	201.20	26.80	58.60	24.80	286.20	162.50	189.60	5.20	Sodium Chloride
	meq/l	8.75	0.69	2.93	2.04	4.69	3.39	5.36	0.08	
	%	60.72	4.77	20.34	14.17	34.71	25.05	39.62	0.62	

6.2.2 Ground Water Salinity

Salinity by definition is the presence of soluble salts in soils or water. Salinity processes are natural processes closely linked with landscape and soil formation processes; however, human activities can accelerate salinity processes, thereby further aggravating the land and water degradation of the affected region. Salinity in water is usually defined by the Total Dissolved Solids content (TDS, mg/l or g/l) or the Chloride content (Cl, mg/l) although the Chloride ion comprises only a fraction of the total dissolved salts in water. The classification of ground water based on TDS suggests four categories as given below:

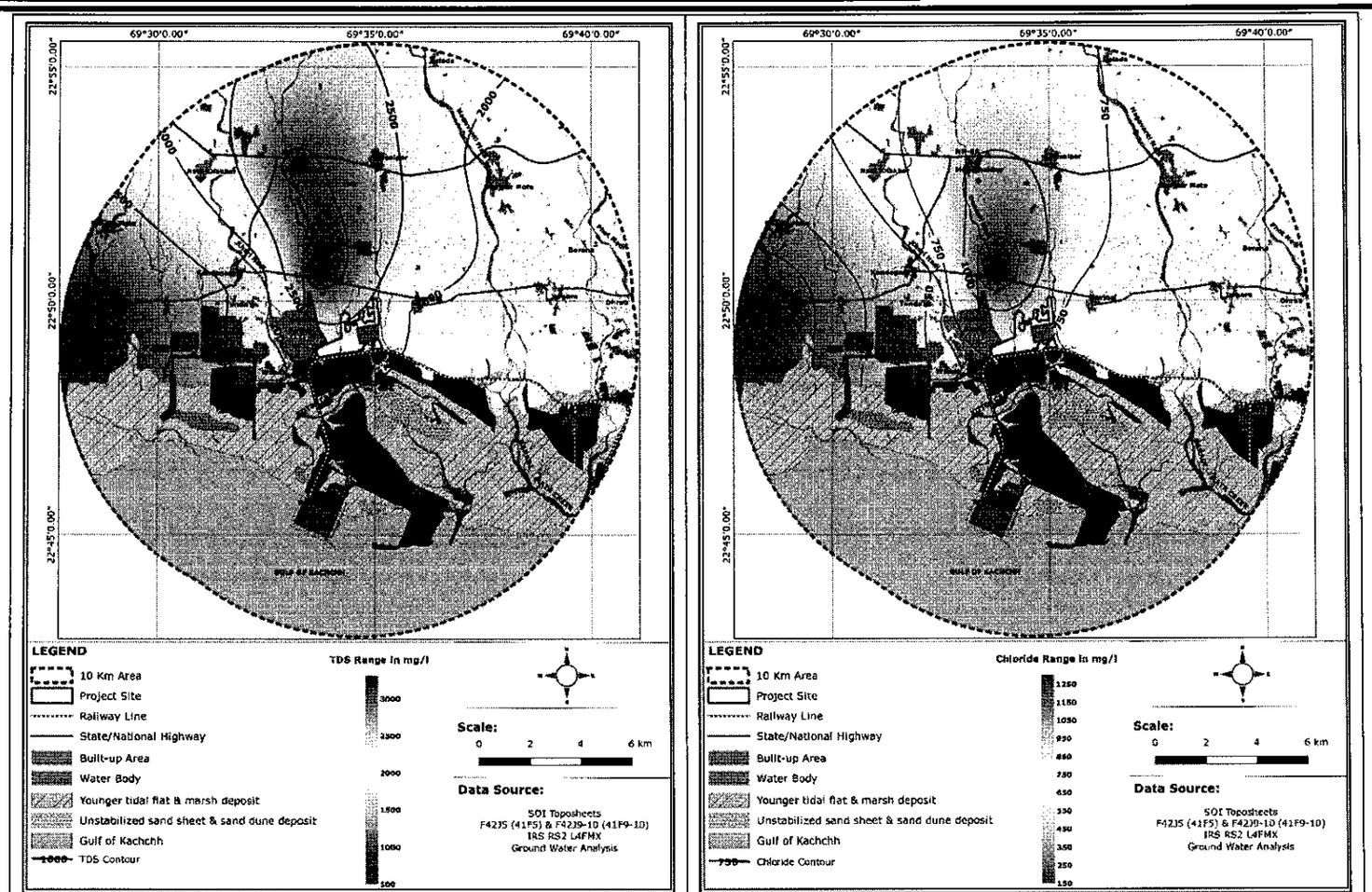
Water Type	TDS Range (mg/l)
Fresh water	0 - 1000
Brackish	1000 - 10,000
Saline	10,000 - 1,00,000
Brine	>1,00,000

Along the coastal tracts of Gujarat, salinity of ground water broadly varies with geological formations and their disposition with reference to the coast. It is influenced by factors like sea water ingress, inherent salinity of the formations deposited under marine conditions and the structural features. Also, several creeks under tidal influence allow the sea water to invade and deteriorate the ground water quality in the phreatic aquifers. Thus, the soil and ground water salinity is a combined effect of a) inherent formation water salinity, b) sea water encroachment due to ground water overdraft, c) tidal water incursion through creeks/estuaries, d) saline water percolation in low lying marshy lands inundated by sea water, e) irrigation with saline water, and f) salt laden winds/sea sprays. In addition, in such fresh saline aquifers, where fresh water is underlain by saline water at deeper depths, the overdraft of ground water causes salt water upcoming of the underlying saline water.

Water level contours presented in **Figure-11** indicate that the water levels in and around Tragadi, Bhadia Nana, CGPL, Wandh, Navinal and Jarpara are below mean sea level and these areas are prone to saline water intrusion. To understand the salinity levels in terms of water quality, distribution of TDS and Chloride in ground water in the inland area of study area up to younger tidal flat deposit is presented in **Figure-16**.

A review of maps showing TDS and Chloride distribution in ground water in the inland area reveal that the TDS and Chloride distribution in the inland area show similar pattern and the ground water in entire area except around Tragadi and Bhadia Nana is moderately brackish with TDS more than 1000 mg/l. TDS and Chloride values of more than 3000 mg/l and 1000 mg/l respectively around Siracha and Moti Khakhar does not show any continuity from coast line and appears to be native to the deeper aquifers/formations.

3508



TDS in mg/l | Chloride in mg/l

Figure-16. TDS and Chloride Distribution in Ground Water in Study Area

3207

7.0 IMPACT OF PROPOSED PROJECT ON WATER REGIME AND MITIGATION MEASURES

The construction, commissioning and expansion of any type of developmental projects have significant influence on the existing physical, biological and social components of environment.

The impact of proposed Copper Refinery on water regime may be in different ways and on surface or ground water or both. Water environment may be affected by the proposed project in terms of disturbing natural water courses or change in drainage pattern of the area, quantity and quality – due to drawl of water, discharge of polluted/waste water, by contaminated leachate from disposal/dumping of solid waste etc.

7.1 Natural Drainage and Water Bodies

Danesri Nadi, a seasonal stream passes through western part of the project site. Danesri Nadi originates from north of study area (3.80 km from study area) and has a catchment area of 3.75 sq km from railway line near project site. There are no other drainage courses in the project site.

7.1.1 Danesri Nadi Conservation Plan

Danesri Nadi along the project boundary will not be disturbed and maintained with necessary bank stabilization will be done with compaction/stone pitching and raising the bund up to 2.0m. The Danesri Nadi conservation plan will include a 50 m corridor from HFL along the stream course for green belt development and another 50 m along the green belt where any storage is coming (total of 100 m from HFL along the stream course near the storage areas) as presented in plant layout hereunder. No effluent will be discharged into this stream from the plant. Storm water drains carrying excess storm water from the plant area will be provided sand filters to arrest any suspended particles and quality will be monitored periodically to ensure contaminant free storm water only reaches Danesri Nadi. Danesri Nadi conservation plan is presented in **Figure-17**.

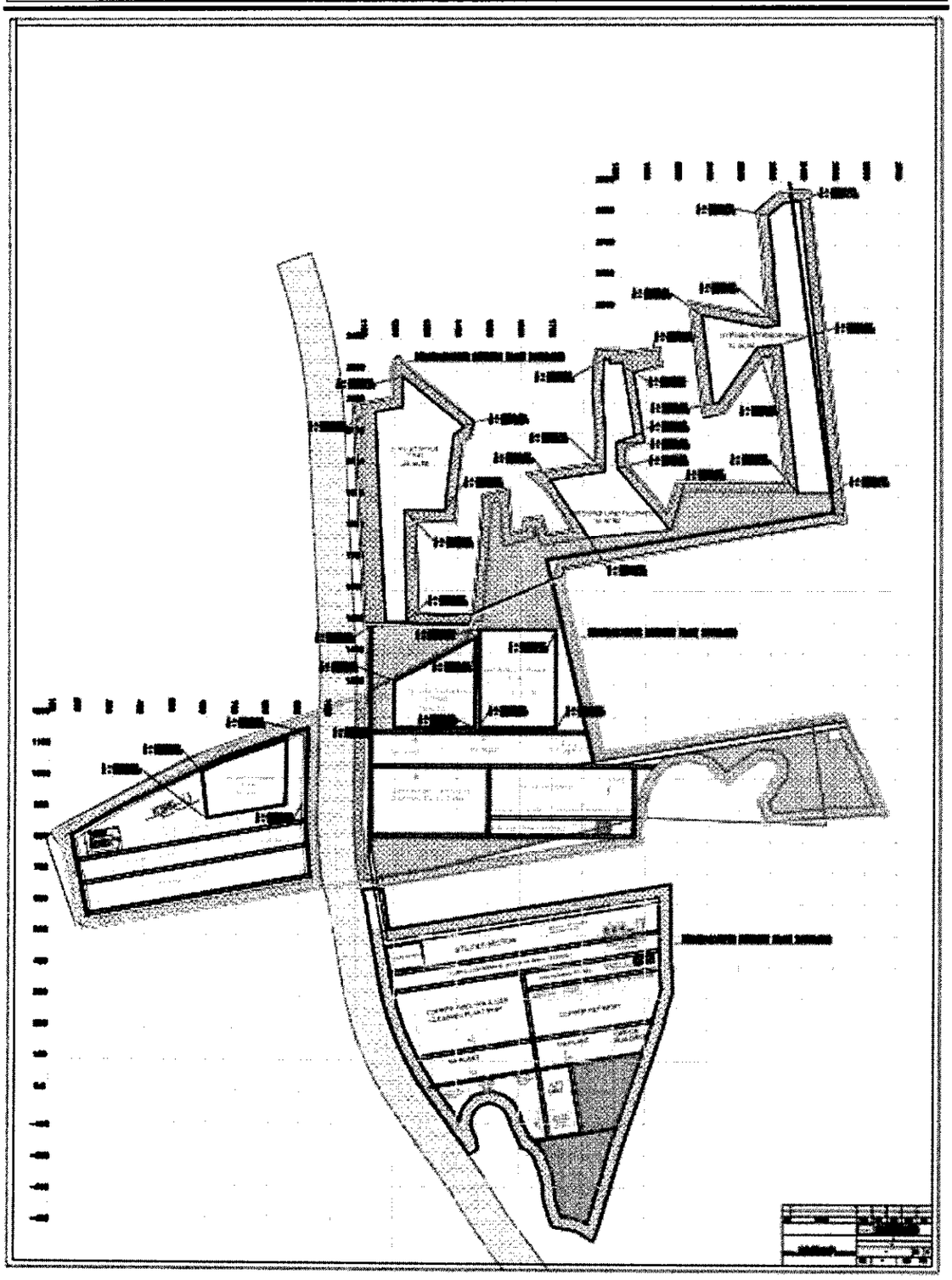


Figure-17. Danesri Nadi Conservation Plan

7.2 Drawing Surface/Ground Water

The total water requirement for the project (phase-I & phase-II) is about 35,496 KLD (35.5 MLD). 32,267 KLD (32.27 MLD) would be sourced from desalination plant of APSEZ Limited and supply through M/s. Mundra Utility Private Limited (MUPL). Balance will be met from treated/blowdown recycled water for greenbelt/cover, lime slurry preparation and reverse osmosis plant and multi effect evaporator. The water allocation letter is enclosed as **Annexure-I**. The details of usage of water and water balance for Flash Smelter Furnace (FSF) and TSL Furnace technologies are presented in **Table-1** and **Figure-3** &**3b**.

No ground water is proposed to abstract for the proposed project.

7.2.1 Water Availability

Use of sea water is in favour of saving fresh water resources, easing tensions in industrial water, availability in abundant quantity, scope of economy, environment etc.

7.3 Water Quality

A review of water quality during field visit and analysis results during February 2019 indicates that surface and ground water quality in the study area in general is poor.

TDS of Moti Khakhar, Desalpar and Siracha (2660.7 mg/l to 3322.3 mg/l), Total Hardness of Siracha (659.9 mg/l), Chlorides of Siracha (1321.6 mg/l), Sulphates of Moti Khakhar (486.5 mg/l), Manganese of Siracha (0.36 mg/l) and Iron of Jarpara (0.31 mg/l) samples show higher values than permissible limits.

Impact on water quality during construction and operation of any industry may be due to sewage generated from the domestic facilities, waste water generated from different plant operations, waste and oil spillage from the workshop, ash or other waste disposal etc. It is important to ensure that the water discharged from the project meet the relevant disposal norms and water used in the project meets the relevant national standards.

7.3.1 Waste Water

An integrated water system is proposed, where the effluent from the process units will be treated and reused to reduce water demand. It is also proposed to install a secondary Reverse Osmosis (RO) plant to further treat water from the effluent plant facility for effective use. Rejects from the reverse osmosis plant will be sent to Multi Effect Evaporator (MEE) for further recovery and solids generated will be sent to Secured Land Fill (SLF). This water would be utilized to meet the DM water and plant/utility requirement of proposed project. The water system is highly integrated and is designed for Zero Liquid Discharge (ZLD).

313 m^3/day (in both FSF and TSL Furnace technologies) of sewage generated from service water will be treated in STP and used for greenbelt, gardening and horticulture.

8.0 WATER RESOURCE MANAGEMENT PLAN

8.1 Ground Water Development

Since the entire water requirement would be sourced from desalination plant of APSEZ Ltd and supply through M/s Mundra Utility Private Limited (MUPL), no ground water development is envisaged for the proposed project.

8.2 Rain Water Management

Considering the ground water scenario in and around the project site (<2.0 m during post monsoon) and ground water flow direction in major part of the project site towards Gulf of Kachchh, the water conservation and artificial recharge system in proposed project may be more on water harvesting and reuse to reduce the dependency on external water and less on artificial recharge.

8.2.1 Rain Water Potential

To understand the quantum of water available from the project area for rain water harvesting, reuse and ground water recharge, a tentative run-off estimation based on different land uses in the area is worked out and presented in **Table-19**. The annual volume of rain water available from the project site spread in 256.58 ha (634 acres) is estimated at 6,11,007 m^3 (0.61 MCM) and during SW and NE monsoon periods is 6,00,057 m^3 (0.60 MCM).

Rain water from the contamination potential areas like plant operations, storage areas, landfill shall be diverted to effluent treatment facilities for treatment and reuse and from contamination free areas like administration and other buildings, open areas and green belt shall be directed to rain water harvesting and use for non-domestic usage and recharge.

Table-19. Annual & Monsoon Run-Off from Project Site

Sr.No.	Land Use	Area (ha)	Run-off Coefficient	Annual Rainfall (m)	Annual Run-off (m^3)	Monsoon Rainfall (m)	Monsoon Run-off (m^3)
1	Buildings/sheds	2.30	0.7	0.432	6957.44	0.425	6832.75
2	Plant & utilities	56.76	0.7	0.432	171817.06	0.425	168737.83
3	Roads & paved area	59.13	0.9	0.432	230131.59	0.425	226007.28
4	Green belt	89.84	0.25	0.432	97126.02	0.425	95385.37
5	Storage of Waste (slag yard, gypsum & Secured Landfill - Undeveloped land/clay loam)	48.55	0.5	0.432	104974.81	0.425	103093.50
Total/average		**256.58**	**0.61**	**0.432**	**611006.93**	**0.425**	**600056.73**

8.2.2 Rain Water Management in Smelter, Production Plant, Storage and Landfill Areas

Rain water from Concentrate Storage, Smelter Area and Slag Storage will be collected in separate tank installed in the areas of feed stock storage and conveying, smelting system which will potentially pollute the collected rain water. 4000 m^3 of rain water is expected to

2916 m^3/day in the case of FSF technology and 5028 m^3/day in the case of TSL Furnace technology of waste water generated from different plant operations will be treated in 5 ETPs and reused within the plant for process, cooling and other purposes.

7.3.2 Solid Waste

The main solid wastes envisaged from the proposed project are:

- ❖ Copper slag from copper smelter plant;
- ❖ Phosphogypsum from phosphoric acid plant;
- ❖ Hazardous cake produced from effluent treatment plant; and
- ❖ Scrubber cake from fugitive gas handling scrubbers.

Hazardous cake, ETP waste sludge, scrubber cake, spent catalyst and spent resins (from DM, RO and refinery) will be stabilized and stored in secured land fill of 13.35 ha as per guidelines of MoEF & CC/CPCB/GPCB. Further, an area of 18.2 ha and 20.63 ha are identified for the intermediate/emergency storage of copper slag and phosphogypsum. Provision would be made to reclaim the disposed copper slag and phosphogypsum from gypsum pond at a later stage for various utilization ventures.

The ETP cake, because of its hazardous nature, will be stored in a Secured Land Fill (SLF)). The SFL will be constructed as per CPCB guidelines. The SLF will have impervious layers of clay liner and HDPE liner. This will ensure that the ground water will not be impacted by the storage of the ETP cake. In case of any rupture/breakage or failure of the SLF bottom liner, any contaminant reaching sub-surface strata and water table will move towards Gulf of Kachchh following the ground water flow direction in the project area. The SLF facility will be provided with monitoring piezometric bore wells around it and the samples will be collected periodically to have a check on the sub-soil water quality.

Spillage of hazardous material such as waste oil, used paints, colour material, used batteries from store, workshop etc., may reach surface and ground water causing deterioration of water quality. These hazardous wastes shall be disposed-off as per Hazardous Waste Amendment Rules and it shall be sent to an authorized dealer.

collect from these areas. The water collected in these tanks will be treated in initial rain water treatment station and then goes to the advanced treatment section of the production effluent treatment plant for treatment before it is reused for production. The process flow of collection and treatment is presented in **Figure-18.**

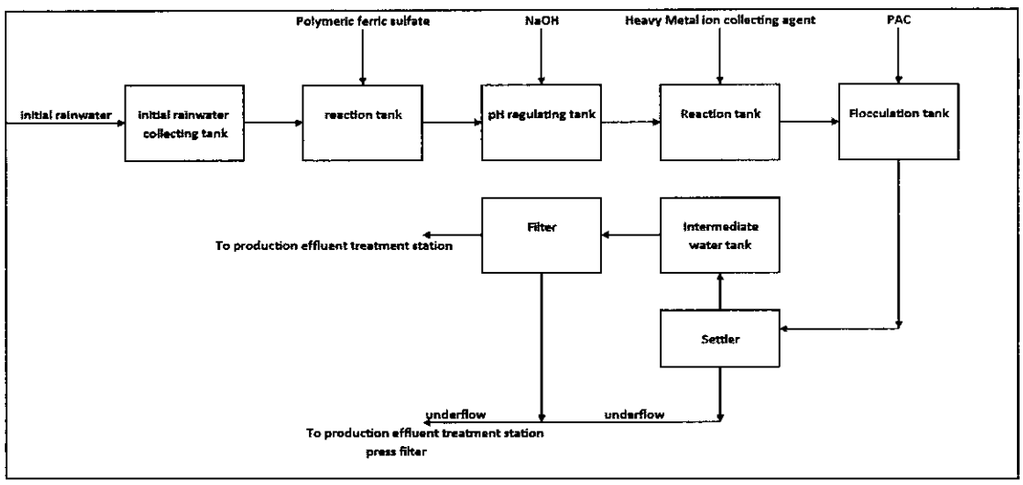


Figure-18. Process Flow of Treatment of Rain Water from Concentrate Storage, Smelter & Slag Storage

Rain water from the Gypsum Storage will be collected in a separate tank installed in Gypsum Storage area and about 4000 m^3 of rain water is expected to be collected from this area. The rain water collected in this tank will reused in the phosphoric acid manufacturing process and thereby reducing the fresh water consumption to that extent. Additional water if any will be used for spraying purpose in the Gypsum Storage area.

Rain water from Production Plant premises will be collected in a separate tank installed in the plant premises to collect rain water from all roofs. The collected rain water will be treated in initial rain water treatment station and then goes to the advanced treatment section of the production effluent treatment plant for treatment before it is reused for production. The process flow of collection and treatment is presented in **Figure-18.**

Rain Water from Secured Landfill (SLF) is required to minimize:

- ❖ Leachate generation by preventing ponding and the infiltration of water into the fill;
- ❖ Transport of contaminants from the landfill; and
- ❖ Erosion of the liner, solid waste or cover material.

The surface water drainage system performs the function of collecting and transporting run-off from the landfill and surrounding area to drains at the periphery of the landfill. Drainage channels should be located so that surface water run-off from the surrounding area is intercepted and diverted before it reaches the waste. Perimeter surface water control systems are usually designed to accommodate both off site run-off and onsite run-off.

Surface water run-off arising within the landfill area may be classified as that from cells under construction, operational areas and restored areas. Surface water can be controlled using drainage blankets, ditches, french drains and garland drains. It is necessary to provide a settlement pond to remove solids from surface water running off restored areas. The surface water from these areas may be used for plantation, toilets etc., provided they meet the receiving water standards.

Water from cells under construction may need to be pumped to the drainage channels or retention pond. Surface water from the restored areas should be transported via drainage layers incorporated in the capping system to the perimeter drainage channels. Surface water in active cells should be directed into the leachate collection system.

Surface water run-off from paved areas and site access roads shall be directed to storm water retention ponds or if necessary, to leachate storage facilities. Provision should be made for surface water from parking/fuelling/repair/maintenance/paved areas to pass through petrol/oil interceptors.

Considering only 80% of the run-off as available volume after evaporation, spillage and other losses, **2,21,433 m^3 (0.221 MCM)** of rain water will be available from **Smelter, Production Plant, Storage and Landfill** areas for use in the production process, green belt/plantation, toilets etc.

8.2.3 Rain Water Harvesting

Of the total project site, rain water from plant area, and secured landfill areas will be treated and used for plant and other purposes as described under 7.3. Admin building, canteen, SAP office building and engineering stores (shown as building area in **Table-19**) are found to be feasible for roof top water harvesting and use. An amount of 6,832 m^3 (0.007 MCM) of rain water will be available from these roof areas. Considering only 80% of the run-off as available volume after evaporation, spillage and first flush wastage, 5,566 m^3 (0.006 MCM) of rain water is available from the roof top areas for harvesting and use. A typical roof top rain water harvesting model is presented in **Figure-19**.

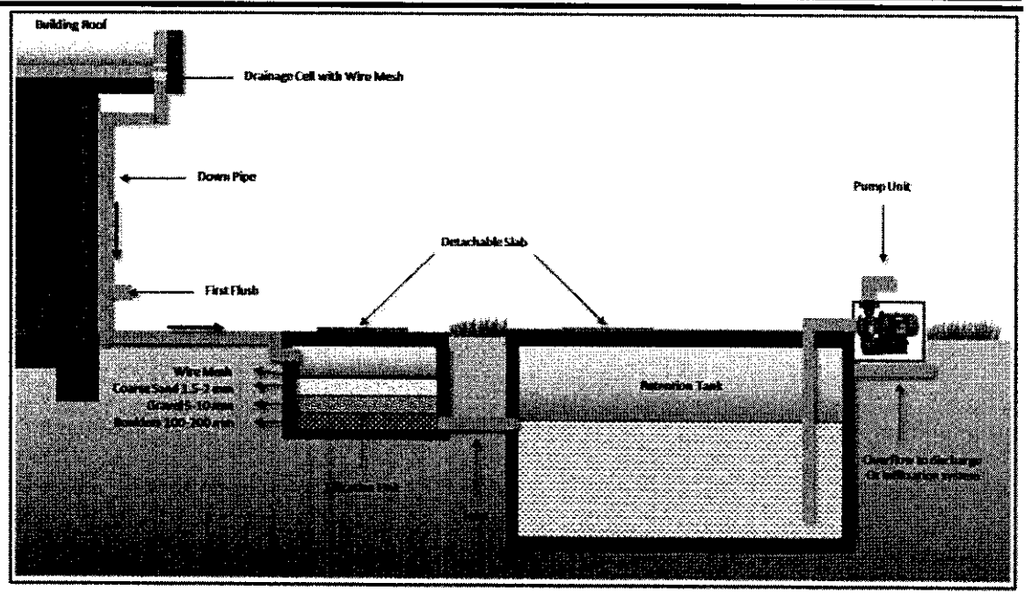


Figure-19. Typical Roof Top Rain Water Harvesting Model

To hold 80% of rainfall from these buildings during wettest months of July and August (308.1 mm) and use for the project during non-monsoon period, the volume of storage structure(s) shall be 4096 m^3. This storage may be spread in 3 locations with pit sizes of 32 m x 32 m x 4 m. For simultaneous use, the volume of storage structure may be reduced to 50%.

Considering 25% of the roads and paved area 50% of the green belt area free from contamination, 84,877 m^3 (0.085 MCM) of run-off from the rainfall collected in these areas is available for harvesting after 20% of this run-off accounting for evaporation, spillage and other losses.

The amount of run-off available from the above areas if managed with at least 70% efficiency will be **63,310 m^3 (0.063 MCM),** which would meet 69.96% of proposed green belt water requirement.

8.2.4 Measures towards Salinity Reduction in the Study Area

To address the severe problem of water and land salinity in the coastal regions of Gujarat, that posed a major threat to agriculture, animal husbandry, rural economy and urban development of the coastal stretches, the State Government appointed two High Level Committees (HLC-I and HLC-II) in 1970s and 1980s. The committees opined that the problem of poor recharge, extensive withdrawal of ground water, intrusion of tidal waters through creeks/estuaries and the increase in salinity has to be considered in its totality. No single solution will be applicable to the entire affected area or will be sufficient in isolation. Various measures involving engineering, agriculture, forestry, social and legal aspects have to from a part of an integrated approach to reduce the water and land salinity problem and improve conditions in the salinity affected areas. The Committee recommended several salinity prevention techniques, outline in **Table-20**, including construction of a large number of structures to achieve the following objectives:

1. To control surface and subsurface salinity ingression along the coastal stretches
2. To recharge and enhance the quality of underground aquifer of the coastal belt
3. To promote agricultural activities by providing surface water facilities to the farmers in and around the constructed civil structures
4. To achieve an overall improvement in socio-economic conditions of the village community in the vicinity of the constructed civil structures

Table-20. Salinity Prevention Techniques Recommended by HLC-I and HLC-II in Gujarat

Salinity Control Techniques	Recharge Techniques
• Tidal regulators • Bandharas • Fresh water barrier • Extraction barrier • Static barrier	• Check dams • Recharge tanks • Recharge wells • Spreading channels • afforestation
Management Techniques	**Land Reclamation**
• Change in cropping pattern • Regulation of ground water extraction	• Coastal land reclamation

It is a well-known fact that no recharge or salinity control scheme will give its full long-term advantage, unless supported by proper management strategies such as control over the pumping and use of ground water, conjunctive use of ground water and surface water and cultivation of less water intensive crops that are also salt tolerant.

A review of measures implemented under Salinity Ingress Prevention Scheme, Government of Gujarat indicate that:

- ❖ Ground water recharge techniques such as check dams, recharge tanks, spreading channels and recharge wells as well as afforestation measures were found to be feasible in augmenting the ground water recharge.
- ❖ Tidal regulators and bandharas were found to be effective in preventing upstream movement of tidal water through river channels.

Though, ground water abstraction is not proposed for the present project, based on the measures recommended by HLC-I & II and implemented under Salinity Ingress Prevention Scheme, the following measures are proposed to implement in the vicinity of the project site as a corporate responsibility:

- ❖ A fund of Rs. 1600 Lakhs has been allocated for **Drinking water supply** to nearby villages **Siracha, Jarpara, Desalpar and Moti Khakhar**, which will limit the ground water abstraction through tube wells.
- ❖ A fund of Rs. 120 Lakhs has been allocated for carrying out afforestation activities with suitable species in village panchayat lands, waste lands, open lands in SEZ area, areas of

degraded vegetation in public lands of owners motivated towards the community benefit, which will slowdown the surface run-off and enhance recharge.

- **Drinking water supply** to nearby villages Siracha, Navinal, Jarpara, Wandh and Kandagara, which will limit the ground water abstraction through tube wells
- **Afforestation** with suitable species in Government lands, waste lands, open lands in SEZ area, areas of degraded vegetation in nearby forests and public lands of owners motivated towards the community benefit, which will slow down the surface run-off and enhance recharge
- **Water spreading channels** along Mundra-Mandvi road on the upstream side, which will enhance recharge
- **Check dams** across the stream course of Khari Nadi, Danesri Nadi and Nagavanti Nadi – dam constructed across a drainage course to reduce water flow velocity and thereby enhancing recharge
- **Bandharas** near river/stream mouths of stream near Bhadia Nana, Danesri Nadi and Nagavanti Nadi as recommended by HLC in coordination with Salinity Ingress Prevention Scheme - bandharas are structures constructed near the mouths of rivers to top tidal/backwater ingress into the land by sealing the mouths of the rivers. Locations of bandharas are shown in the below **Figure-20**.

Locations of water harvesting and salinity reduction measures are shown in **Figure-21**.

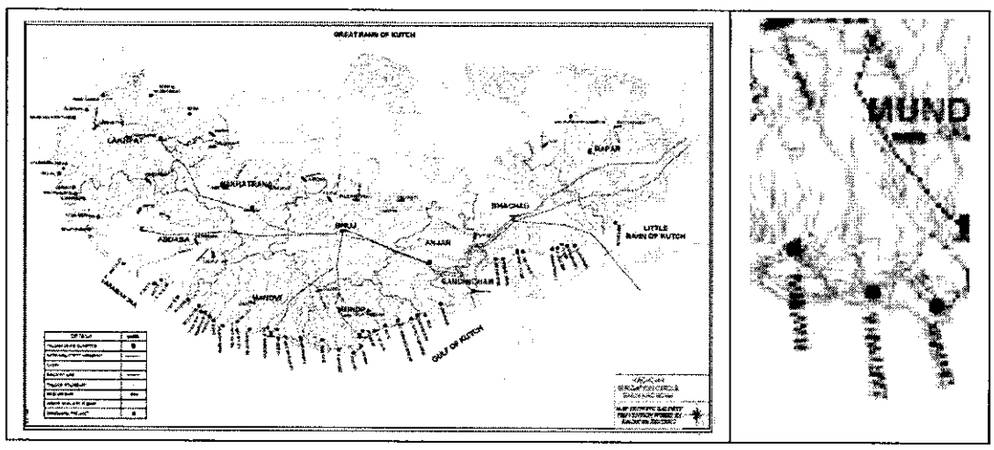


Figure-20. Salinity Prevention Works in the Region of Kutchch as Recommended by HLC

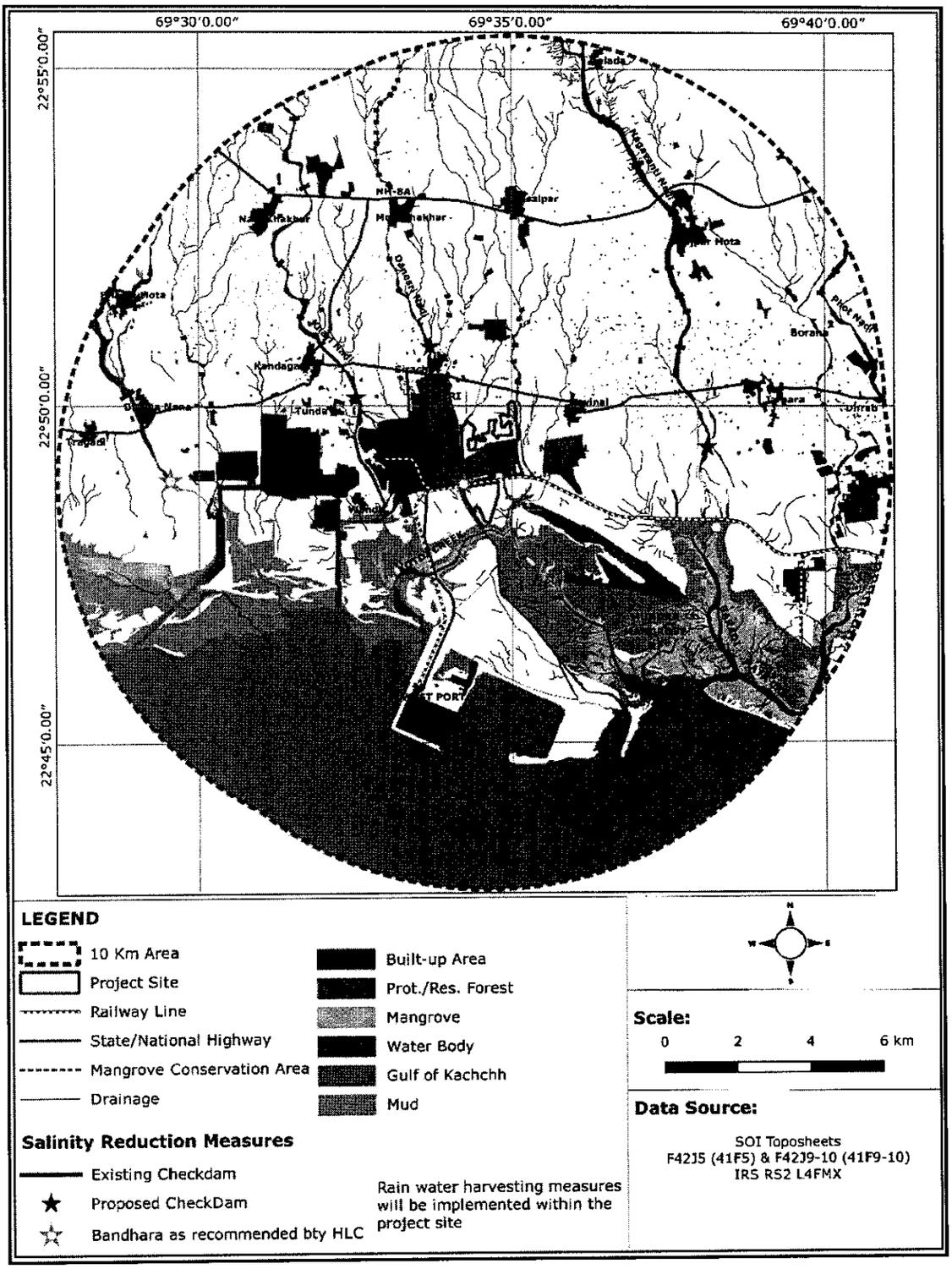


Figure-21. Locations of Water Harvesting and Salinity Reduction Measures