

**BEFORE THE NATIONAL GREEN TRIBUNAL**

**Principal Bench, New Delhi**

**(Through Video Conferencing)**

**O.A No. 64/2016 (WZ)**

**In the matter of:**

**Akhil Bhartiya Mangela Samaj Parishad & Ors. .... Applicant(s)**

**Versus**

**Maharashtra Pollution Control Board & Ors. .... Respondent(s)**

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**Bharat Kumar Sharma**

Regional Director,  
Central Pollution Control Board,  
Regional Directorate, Pune

Date: 13.05.2021

Place: Pune

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,**  
**PRINCIPAL BENCH AT NEW DELHI**

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**IN THE MATTER OF:**

Akhil Bhartiya Mangela Samaj Parishad  
...Applicant

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Maharashtra Pollution Control Board & Ors.

...Respondents

**Joint Reply of the Committee (constituted by the Hon'ble National Green Tribunal, Principal Bench) to the objections filed by Tarapur Industrial Manufacturers Association and Tarapur Environment Protection Society**

The Hon'ble Tribunal passed the directions vide order dated 26/9/2019 read with order dated 22/10/2019 in the said matter and the relevant orders are reproduced as below:

“ ...

*7. In Original Application No. 95/2018 in the matter of “Aryavart Foundation v. M/s Vapi Green Enviro Ltd. & Ors.” in a similar situation prevailing in the Vapi Industrial Cluster, the Tribunal had passed certain directions. Considering the identical nature of the issues involved, we pass the following directions as in that case:*

- (i) *We direct constitution of following Committee to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units:*
- a) Representative of CPCB.*
  - b) Representative of IIM, Ahmadabad.*
  - c) Nominee of IIT, Ahmadabad.*
  - d) Scientist nominated by NEERI.*
  - e) Representative of MPCB.*
- (ii) *The Committee may give its report within three months. The Committee will be entitled to take any factual or technical inputs in the manner found necessary. CPCB will be the nodal agency for the purpose. The Committee may also suggest steps for restoration of the environment.*
- (iii) *The Committee may give hearing to the CETP operator and the units identified as polluting by the MPCB for which list will be furnished by the MPCB to the Committee indicating the period and nature of default within one month.*
- (iv) *The MPCB may inform the defaulting units for compliance of this order.*
- (v) *The MPCB may also consider exercise of its statutory powers of prosecution which power is coupled with duty.*
- (vi) *Having regard to the entirety of the fact situation in the present case, we direct that, except for the green and white categories of industries, other category of defaulting industries connected to the CETP, shall deposit with the CPCB the following amounts towards interim compensation within one month:*
- a) Large Industries – Rs. 1 Crore each.*
  - b) Medium Industries – Rs. 50 Lakhs each.*
  - c) Small Industries – Rs. 25 Lakhs each.*
- (vii) *The CETP on its part shall deposit a sum of Rs. 10 Crores with the CPCB towards interim compensation within one month.*

...”

The Committee constituted by the Hon'ble National Green Tribunal, Principal Bench as per the aforesaid orders dated: 26-09-2019 read with order 22-10-2019 in the matter of OA No. 64/2016 (WZ) titled Akhil Bharatiya Mangela Samaj & Ors. Vs Maharashtra Pollution Control Board & Ors (hereinafter called as the Committee) submitted its report vide email dated 19/6/2020 to the Hon'ble NGT in compliance with aforesaid orders of the Hon'ble Tribunal.

Vide order dated 17-9-2020, the Hon'ble NGT ordered that *“We find that the reports of the Expert Committee have taken into consideration all relevant data after visit to the site and have considered the view point of the CETP operator and the Association of the industries. We do not find any reason to reject the report and the conclusions and recommendations therein. Application of ‘Precautionary Principle’ which is part of ‘Sustainable Development’ requires anticipatory action and scientific certainty before taking such remedial action is necessary, once an Expert Committee has found that there is continuous violation of environmental norms causing harm to the environment and health. Credentials of the Committee members and their expertise on the subject is beyond question. We do not find any merit in the objections of the contesting CETP and industries which will stand rejected and the report of the Committee is thus, accepted.”* (Vide para 10 of the said order dated 17-9-2020)

Tarapur Industrial Manufacturers Association (hereinafter referred as TIMA) preferred a statutory appeal [Civil Appeal no. 3756 of 2020 titled Tarapur Industrial Manufacturers Association (TIMA) Vs. Akhil Bhartiya Mangela Samaj Parishad & Others.] before the Hon'ble Supreme Court. The Hon'ble Supreme Court, vide order dated 14.12.2020, in the said matter passed order that *“The Monitoring Committee may file reply to objections, if it deems proper and necessary, within such time as stipulated by the National Green Tribunal.”*

It is submitted that the Committee, who submitted its report to the Hon'ble NGT, prefers to submit its reply to objections dated 29-12-2020 filed by TIMA and objections dated 29-12-2020 filed by Tarapur Environment Protection Society (hereinafter referred as TEPS) to the Hon'ble NGT in compliance of the aforesaid order of the Hon'ble Supreme Court. Subsequently, TEPS also filed objections dated 01-4-2021 to the report of the Committee (on Action Plan prepared by the Committee for remedial measures and restoration of contaminated water bodies in and around MIDC Tarapur and their compliance status submitted to the Hon'ble Tribunal on 11/1/2021 in compliance with order dated 17/9/2020 of the Hon'ble Tribunal). Parawise reply of the Committee to the said objections filed

by TIMA and TEPS are given in the subsequent paragraphs below as Part- I, II and III respectively.

### **Part- I**

#### **Para-wise reply to PART – A of the objections dated 29-12-2021 filed by TIMA**

##### **Para (A) 1 (a) to (f)**

1. That with regard to various errors, as pointed out by M/s TIMA under Paras (a) to (f), about identification of polluting units and number of days of violation, the Committee submits that relevant directions of the Hon'ble NGT vide order dated: 26-09-2019 read with order 22-10-2019 are as below;

“... ”

*7. (iii) The Committee may give hearing to the CETP operator and the units identified as polluting by the MPCB for which list will be furnished by the MPCB to the Committee indicating the period and nature of default within one month.*

*(iv) The MPCB may inform the defaulting units for compliance of this order ... ”*

The entire process of identification of polluting units and period of violations were considered by the Committee in compliance of the aforesaid orders of the Hon'ble NGT by seeking list of polluting units from MPCB (who initially forwarded list of 221 polluting units) and giving opportunity of hearing to each of such units wherein nature and period of violations, etc. were presented to them. During the hearing, the Committee observed some discrepancies in the polluting units identification and their period of violations and, therefore, communicated to MPCB such observations along with necessary recommendations adopting rational approach. MPCB was requested by the Committee to re-examine the industrial units on the basis the said observations/recommendations and provide revised list of polluting units along with nature and period of defaults to the Committee.

2. The MPCB re-examined about the polluting units in view of the aforesaid observations & recommendations of the Committee and accordingly provided a revised list of 103 polluting units including only those units for which due records are available for establishing the violations identified. The said 103 polluting units consisted of 83 among the said 221 units and another 20 units on the basis of the observations and recommendations of the Committee for the purpose of imposing environmental damage cost/damage restoration cost. After the hearing, notices were also served by MPCB to these 103 (83+20) giving them another opportunity of submitting additional details/records against the said violations, if any.
3. The Committee has, therefore, arrived to the polluting units identification, their nature & period of violation and other details of 103 polluting units (including CETP) based on opportunity of hearing given to each of 221+20 units by the Committee; rationalizing the criteria for identification of polluting units and their nature & period of violation; giving another opportunity by way of serving notices to each of the said 103 units for submitting additional details/records against the said violations, if any, to MPCB, examination of records available at MPCB, and compiled details thereof forwarded by MPCB.
4. Details of the aforesaid identification of polluting units and their nature & period of violation, hearing given, observations & recommendations made by the Committee, etc. are given under Chapter 5 at page 59 - 64 of the report submitted by the Committee and a copy of the said report is given at Annexure – 1.

**Para (B) (1) to (3) (a) to (h)**

**Reply to objections on application of Market Exchange Rate (MER) and Purchasing Power Parity (PPP) to estimate environmental damage cost**

1. The submissions made by M/s TIMA about the application of Market Exchange Rate (MER) and Purchasing Power Parity (PPP) to estimate environmental damage cost has been noted by the Committee. The Committee examined the various methods used for environmental damages cost assessment and it is safe to say that each of the methods have their own merits and limitations [1,2]. The peer-reviewed literature

<https://www.sciencedirect.com/science/article/pii/S0959652620345650#appsec1>) describes the approaches used for environmental damages cost assessment in detail and a copy of the same is given in Appendix-A.

2. The guiding principle to be deployed for the choice of the appropriate transfer-cost multiplier (PPP or others) depends on the basis of assessment of commensurate value of damages in the target location vis-a-vis a source location where the estimate was originally conducted [3,4]. Given above, the Committee re-examined and worked out the estimates based on the available data and limitations therein. As an additional measure, the Committee also made an attempt to find direct costs [Cost of Treatment (CoT)\* ] which would have incurred (other than what has been incurred by M/s TEPS) in treatment of effluent by the CETP operator – M/s TEPS in achieving the prescribed CETP outlet effluent norms during the reported period under reference viz. 2011-12 to 2019-20. The estimates using varied techniques are shown below:

- Using MER (As submitted in the original report filed by the Committee) = Rs. 85.042 Crores
- Using PPP = Rs. 27.04 Crores
- Using CoT\* = Rs. 88.6 Crores

3. It is to be noted here that damage cost is a function of environmental pollution, its magnitude and intensity and affect generated thereof. With a view to provide avenues of improvement of environmental infrastructure in Tarapur region, funds can/may be used out of these estimates given above.

Some References:

1. Hon'ble NGT decision on VOC case of Mahul area of Mumbai: [https://www.livelaw.in/pdf\\_upload/pdf\\_upload-380054.pdf](https://www.livelaw.in/pdf_upload/pdf_upload-380054.pdf)
2. PwC, valuing corporate environmental impacts PwC methodology document. <https://www.pwc.co.uk/sustainability-climate-change/assets/pdf/pwc-environmental-valuation-methodologies.pdf>

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\* CoT has been arrived by the Committee taking into account of actual cost data from 09 CETPs in Maharashtra and Gujarat and inlet effluent in such CETPs are also chemical/Pharma/Textile/etc. to that of CETP Tarapur. Details of the same are given in Appendix-B.

3. Hernández-Sancho, F., Molinos-Senante, M., & Sala-Garrido, R. (2010). Economic valuation of environmental benefits from wastewater treatment processes: An empirical approach for Spain, *Science of The Total Environment*, Volume 408, Issue 4, 953-957.
4. A Study on the Economic Valuation of Environmental Externalities from Landfill Disposal and Incineration of Waste; European Commission, DG Environment.  
[https://ec.europa.eu/environment/pdf/waste/studies/econ\\_eva\\_landfill\\_annex.pdf](https://ec.europa.eu/environment/pdf/waste/studies/econ_eva_landfill_annex.pdf)

**Reply to TIMA's objection regarding no notified wetland in and around Tarapur MIDC and baseless damage cost thereof**

4. The submissions made by TIMA that there is no notified wetland in and around Tarapur MIDC or anywhere near marine discharge of treated effluent and damage to wetland and damage cost thereof are baseless and needs to be outrightly rejected. It is submitted that the area of wetland and other features in the region, shown using remote sensing in the Table 6.2 of the Committee's report, has been showcased merely to understand features of polluted water recipient bodies and their sensitiveness.
5. It is further submitted that the receptors (of illegal discharges of non-complying effluent from the CETP and industries) in the region are also among environmentally most critical areas (viz. Mangroves and Intertidal Zone) and other ecologically sensitive areas (viz. Creeks) prevailing in the region which are also classifications of wetlands.
6. It is submitted that the presence of such coastal wetlands (Mangroves, Creeks, etc.) may not have been notified under the Wetlands (Conservation and Management) Rules, 2017, since the said Rules do not apply to the wetlands falling in areas covered under the Indian Forest Act, 1927, the Wild Life (Protection) Act, 1972, the Forest (Conservation) Act, 1980, the State Forest Acts, and the Coastal Regulation Zone Notification, 2011 as amended from time to time<sup>2</sup>.

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<sup>2</sup> Rule 4 of the Wetlands (Conservation and Management) Rules, 2017]

7. However, presence of wetlands such as Mangroves, Sand/Beach and Creeks in the region have been shown under Coastal Zone Management Plan (CZMP) of Palghar notified under the Coastal Regulation Zone Notification, 2011, under the Environment (Protection) Act, 1986, read with draft CZMP of Palghar published under Coastal Regulation Zone Notification, 2019. Therefore, wetlands are present in the region which are also among environmentally most critical receptors of illegal discharges of non-complying effluent from the CETP and industries.

### **Reply to TIMA's objection w.r.t. multiple objections to data inadequacy**

8. That the objections with respect to the alleged data inadequacy in the Committee's report are denied as being baseless. It is submitted that Tarapur MIDC had been identified as critically polluted industrial clusters/ areas (among the list of 88 polluted industrial clusters/ areas in India) in December 2009 by CPCB<sup>3</sup>. Among 100 polluted industrial areas/clusters monitored during 2018, Tarapur Industrial Areas was listed with the highest CEPI score of 93.69 in the country and also that it was having the highest Water EPI of 89 in the country.
9. It is obvious that illegal discharges/overflow of non-complying effluent from the CETP since long time, as reported in the Committee's report (refer Chapter 3 of the Committee's report), may have impact on the environment. However, in order to ascertain the impact, if any, the Committee did field sampling & analysis of surface water (drains passing through MIDC Tarapur and receiving water bodies Creeks and Sea water) and ground water in and in and around the MIDC area.
10. Based on sampling & analysis results of monitoring of 09 drains passing through MIDC Tarapur along with sediments at few locations; water and sediment samples from 03 locations of the two creeks in which the above drains confluence and 01 location of each of the two streams before confluence of the said drains; sea water and sand near to Navapur CETP outfall, Nandgaon beach and the other at Edvan beach about 85 kms from the said Navapur CETP outfall, and; ground water samples from 06 different bore-wells in and around MIDC area; carried out by the Committee during November-December 2019, the Committee has arrived

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<sup>3</sup> <https://cpcb.nic.in/displaypdf.php?id=Q1BBL05ld0l0ZW1fMTUyX0ZpbmFslUJvb2tfMi5wZGY=>

at affirmative contamination of - groundwater in and around Tarapur MIDC area; water in drains in and around Tarapur MIDC area due to industrial discharge of untreated effluent/solvent/chemicals into the drains, and; impact on Creeks and Seashores around Tarapur MIDC thereto (paras 8.2.1, 8.2.1.1 to 8.2.1.4 at page 91-92 under Chapter 8 read with para 4.2 to 4.5 at page 44-57 under Chapter 8 of the Committee's report may be referred in this regard).

11. Therefore, contamination due to illegal discharges of non-complying effluent from the CETP and industries and affirmative contamination/impact thereof on water bodies have been established, as above.
12. Further, the vast extent of discoloration of the sea near the effluent discharge outfall of the Tarapur ETPs is even visible from space, as clearly seen in the satellite images in Figures 2.3, 3.2, 4.2 on pages 10, 14, and 41 of the expert Committee report, which are also supportive corroboration of contamination/impact due to illegal discharges of non-complying effluent from the CETP and industries.
13. As the Committee has clearly stated, the spatial span and true magnitudes of damages over the affected geographical area needs to be determined through a comprehensive study. This recommendation should not be interpreted as no evidence of damages, instead the Committee is recommending a course of action to uncover the full extent of damages based on overwhelming evidence of contamination in the areas where samples were tested. This recommendation adheres to the principles of due diligence and precaution in dealing with matters of irreversible and grave environmental damages.

**Reply to TIMA's objection w.r.t. total discharge being taken both as discharge into the sea and into the creeks (error by duplication) and overlapping of BOD & COD while assessing damage cost**

14. With regard to averment made by TIMA about duplication of 25 MLD (approx.) as discharge into sea and creek while calculating environment damage cost, it is submitted that the said discharge of 25 MLD (approx.) have impacts on both the recipient bodies i.e. sea and wetlands which are

also linked to each other. Further, the reference paper for damage cost assessment gives individual costing for impact related to various receiving bodies as well as based on individual parameters which include COD and BOD as well.

15. It is also submitted that the effect of accumulation of pollutant in these bodies could not be accounted by the Committee due to lack of scientific information, which otherwise may have resulted into higher damage cost and therefore the Committee has refrained from including the same.
16. The conclusions under para 8.2.1.1 also outlines that industries are discharging untreated effluent/solvent/chemicals to the drains in and around Tarapur MIDC area which are contaminated with elevated levels of various pollutants, odour and colour. Environmental damage cost of such discharges through drains resulting into wetlands/sea too could not be accounted by the Committee due to lack of scientific information.
17. The Committee could take into account of environmental damage cost only w.r.t. BOD, COD and Suspended Solids whereas various other pollutants such as Ammonical Nitrogen, Phenols, metals, etc. too have been discharged beyond permissible limits and environmental damage cost due to the same could not be accounted due to lack of scientific information.
18. The Committee has, therefore, stated in its report under para 6.2 of Chapter 6 (page 77 of the Committee's report) about its calculated environmental damage cost that *the same is conservative as it only considers scope of damages due to effluent discharge beyond the standards on surface water wetlands. The impact on sea water pollution and wetlands is also very conservative due to lack of better information on other pollutants including nitrates/nitrogen and phosphates.*

**Para (B) (3) (i) (i)**

**Reply to TIMA's objection w.r.t. concept of super fund for the pollution which has not even been established or quantified**

1. That regarding averment made by TIMA about proposal of the concept of super fund for the pollution which has not even been established or quantified, it is submitted that the CETP Tarapur has been found violating effluent discharge standards as well as CETP inlet design/inlet standards

during the reported period of 28/4/2011 to 30/11/2019, as concluded at page 83 of the Committee under the Chapter 8 read with Chapter 3. The report also outlines that the CETP is not adequate to treat the effluent currently being received. Besides, it also operated at beyond its hydraulic load capacity of 25 MLD and resulting into the overflow from the CETP during such duration and such overflow effluent is being discharged into to drains leading to other water bodies (creeks, sea and ground water). Details of exceedance of parameters in inlet and outlet effluent of CETP and hydraulic load exceedance during the said reported period have also been presented in the report.

2. As submitted above under para (1) to (3) (a) - (h) above, it is obvious that illegal discharges of non-complying effluent from the CETP since long time, as above, may have impact on the environment. However, in order to ascertain the impact, if any, the Committee did field sampling & analysis of various surface water bodies (drains passing through MIDC Tarapur and receiving water bodies Creeks and Sea water) and ground water in and around the MIDC area. Based on analysis results of monitoring of the said water bodies, the Committee has arrived at affirmative contamination of - groundwater and drains in and around Tarapur MIDC area due to industrial discharge of untreated effluent/solvent/chemicals, and; impact on Creeks and Seashores around Tarapur MIDC thereto (paras 8.2.1, 8.2.1.1 to 8.2.1.4 at page 91-92 under Chapter 8 read with para 4.2 to 4.5 at page 44-57 under Chapter 8 of the Committee's report may be referred in this regard).
3. Therefore, contamination due to illegal discharges of non-complying effluent from the CETP and industries and affirmative contamination/impact thereof on water bodies have been established, as above. Once established, quantification of pollution including delineation of the contaminated areas and areas needing remediation; detailed site investigation & characterization; risk assessment studies & identification of remediation goals/objectives and preparation of remediation plans thereof; selection of remediation criteria; outlining remediation options and preparation of detailed technical document with specifications for the selected remediation option; are subsequent steps in scientifically management of contaminated sites. As part of restoration measures, the Committee has recommended Phase-I work which includes the said

activities by preparing Detailed Project Report (DPR) followed by execution of the selected remediation plan as Phase-II work. Preparation of the said DPR and remediation thereto have been recommended by the Committee in line with “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India (para 8.2.2; page 92-93 of Chapter-8 of the Committee report may be referred in this regard).

**Para (B) (3) (i) (ii)**

**Reply to TIMA’s objection w.r.t. ground water not severely polluted as per MPCB Report of 2019**

1. That regarding averment made by TIMA that the MPCB Report of 2019 not explicitly mentioning that the ground water is severely polluted and requires restitution, etc., it is submitted that scope of the said MPCB Report of 2019 (available at webpage as given in the footnote numbered as 3 at page 59 of M/s TIMA’s objections under the reference) was related to sampling & analysis of Stack, Ambient Air Quality, Surface Water, Waste Water, and Ground Water Quality Critically Polluted areas (CPAs) related to Comprehensive Environmental Pollution Index (CEPI) score of Tarapur MIDC whereas scope of work of the Committee and the Committee’s report thereof are primarily to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units. The Committee’s sampling and field analysis are more elaborate as compared to the said MPCB Report of 2019 w.r.t. coverage of water bodies and nos. of samples thereof. The Committee carried out sampling & analysis of 09 drains passing through MIDC Tarapur along with sediments at few locations; water and sediment samples from 03 locations of the two creeks in which the said drains confluence and 01 location of each of the two streams before confluence of the said drains, and; sea water and sand near to Navapur CETP outfall, Nandgaon beach and the other at Edvan beach about 85 kms from the said Navapur CETP outfall, and; ground water samples from 06 different bore-wells in and around MIDC area. Whereas MPCB Report of 2019 reports no sampling & analysis of surface water quality.

2. It is also submitted that, as submitted above in the reply to para (1) to (3) (a) - (h) above, Tarapur had been identified as critically polluted industrial clusters/ areas (among the list of 88 polluted industrial clusters/ areas in India) in December 2009<sup>4</sup> by CPCB. Among 100 polluted industrial areas/clusters<sup>5</sup> monitored during 2018, Tarapur Industrial Areas was listed with the highest CEPI score of 93.69 in the country and also that it was having the highest Water EPI of 89 in the country.
3. The Committee having representatives from MPCB also, however, considered its own field sampling/monitoring of various surface waters and ground water carried out during November-December 2019 and analysis of the same carried out in Central Lab of MPCB, and are more elaborate and conclusive about contamination/impact on water bodies which require further detailed studies/DPR preparation, as Phase-I activities as stated above, and remediation thereof as Phase-II activities, as applicable, as part of required remediation measures activities also in line with "Guidance document for assessment and remediation of contaminated sites in India" prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India.

**Para (B) (3) (i) (iii) to (viii)**

**Reply to TIMA's objection w.r.t. concept of "Super Fund" is alien**

1. That regarding averments made by TIMA that concept of "Super Fund" is alien to the Indian environmental regulation statutory regime and seems to have been adopted from the Comprehensive Environmental Response and Liability Act (CERCLA) enacted by the United States Congress, the Committee, in addition to comments submitted under para (i) of Para (3) (i) above, submits that the terminology of "Super Fund" has been used by the Committee merely to allocate certain amount of fund to meet the future studies to carry out as the aforesaid Phase-I activities comprising of delineation of the contaminated areas and areas needing remediation;

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<sup>4</sup> <https://cpcb.nic.in/displaypdf.php?id=Q1BBL05ld0l0Zw1fMTUyX0ZpbmFsLUJvb2tfMi5wZGY=>

<sup>5</sup> Please refer the Table given under Para 11; page 7-10; of the order dated July 10, 2019 of the Hon'ble National Green Tribunal, Principal Bench, in the matter of Original Application No. 1038/2018 titled News item published in "The Asian Age" Authored by Sanjay Kaw Titled "CPCB to rank industrial units on pollution levels"

[https://greentribunal.gov.in/gen\\_pdf\\_test.php?filepath=L25ndF9kb2N1bWVudHMvRWZpbGluZ19kb2N1bWVudHMvbmd0ZG9jL2NhcnVkb2MvMDcwMTEwMjAwMTMwMjAxOC8wNC8wMS8yNS8wNF8yNV8wMDFfMTU2Njg2Mzk2NC5wZGY=](https://greentribunal.gov.in/gen_pdf_test.php?filepath=L25ndF9kb2N1bWVudHMvRWZpbGluZ19kb2N1bWVudHMvbmd0ZG9jL2NhcnVkb2MvMDcwMTEwMjAwMTMwMjAxOC8wNC8wMS8yNS8wNF8yNV8wMDFfMTU2Njg2Mzk2NC5wZGY=)

detailed site investigation & characterization; risk assessment studies & identification of remediation goals/objectives and preparation of remediation plans thereof; selection of remediation criteria; outlining remediation options and preparation of detailed technical document with specifications for the selected remediation option, and preparation of DPR on the same as given ; followed by execution of the remediation plan as per the said DPR as Phase-II activities. Methodologies on the same are also indicated in Annexure-VI of the Committee's report which has been recommended to be implemented by MPCB.

2. Without prejudice to regulation of “Super Fund” in United States or other countries or its merits/demerits or its applicability in the country, the Committee has just used the term “Super Fund” so as to meet the aforesaid future expenses in remediating the contaminated sites in and around the Tarapur due to industrial activities and money to the said Super Fund would be deposited based on precautionary principal and polluter pay principal and the aforesaid 103 identified polluting units are the identified polluters who have been identified with systematic and rational approach in compliance with order dated 26-09-2019 of the Hon’ble NGT by the Committee.

3. It is also submitted that:

- (i) in the absence of delineation of the contaminated areas and areas needing remediation (which require detailed hydrology, geology, etc. studies and detailed sampling & analysis) and remediation technique required thereof, which will be outlined in the DPR as recommended under Phase-I activities followed by field remediation work as recommended under Phase-II activities in the Committee’s report, and;
- (ii) considering that ground water and drains in and around the Tarapur MIDC have been found contaminated;

the Committee has suggested initial amount for the Super Fund as 75 Crores INR to meet the cost to be incurred in the aforesaid activities of Phase-I and Phase-II in remediation. However, the Committee has also suggested (please refer para 8.2.2.2; page 94 and of Chapter 8 and page 77 of chapter 6 of the Committee’s report) that depending upon the selected remediation options, the cost of remediation may increase or decrease to

that of Rs. 75 Crores. In such case, the amount may be collected or refunded to each of the said 103 polluting units, as the case may be, in the same proportion as the damage recovery cost has been recommended to be paid using the equation (4) as given at page 82-83 under Chapter 7 of the Committee report.

4. The Committee, therefore, submits that the proposed 'Super Fund' of INR 75 Crs. is indeed a novel concept for the Indian environmental statutory regime and yet in spirit fully upholds the precautionary principle and the polluter pays principles that are the cornerstones of the Indian environmental jurisprudence<sup>6</sup>.
5. Further the expert Committee has taken cognizance of the fact that long procedural delays and direction in remedial/restoration of the environment, especially in critically polluted areas where the carrying capacity of the natural environment is severely tested, exacerbates the degradation of the local ecology. Worse in such cases, the underlying non-linearities of the complex ecosystem may even push the local biosphere beyond a point of no return.
6. The concept of 'Super Fund' is proposed in all earnest to endow the regulatory bodies and local governments with sufficient financial resources to expeditiously engage in restoration and remediation action and prevent irreversible damages to the environment.
7. It is submitted that the Committee was directed by the Hon'ble NGT to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units. The Committee complied with the said directions by performing various activities diligently including field sampling/monitoring and scientific & technical analysis of the various information/data/analysis results which have been presented along with conclusions and recommendations in its report submitted to the Hon'ble NGT.
8. It is denied that the Committee erred in imposing Rs. 75 crores under the heading 'Super Fund' upon TIMA members and TEPS, the Committee

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<sup>6</sup> Epstein, Richard A. "The Principles of Environmental Protection: The Case of Superfund." *Cato J.* 2 (1982): 9.

disagrees such error in recommending creation of Super Fund of Rs. 75 crores and recommends such Super Fund considering immediate remedial measures required for remediation of environmental pollution. The comments submitted by the Committee under para (i) to (iii) of the para 3(i) above may be referred in this regard.

**Para (B) (3) (j)**

**Reply to TIMA's objection w.r.t. consideration of fiscal discounting**

1. That averments made by M/s TIMA about fiscal discounting referring self-cleansing ability of water bodies, sewage and human waste attributed by five different villages surrounding the MIDC area, etc., it is submitted that analysis results of all the samples collected from the monitored drains passing through the MIDC Tarapur, the two creeks in which the said drains confluence and 01 location of each of the two streams before confluence of the said drains, and; sea water and sand near to Navapur CETP outfall, Nandgaon beach and the other at Edvan beach about 85 kms from the said Navapur CETP outfall, and; ground water samples from 06 different borewells in and around MIDC area; attribute to presence of one or more parameters such as odour, colour, pH, TDS, COD, TSS, Fluorides, Phenols, Total Ammonical Nitrogen, Metals (Lead, Copper, Iron and Manganese), etc. which are signatures of industrial discharges sourced from industrial activities of Tarapur MIDC (please refer analysis results given at Table 4.5 to 4.11, paras 42. To 4.5 at pages 42-58 under Chapter 4 of the Committee's report). Presence of such parameters and elevated concentration of parameters in water bodies to that of as recommended in the "Guidance document for assessment and remediation of contaminated sites in India" prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India, indicate contamination/impact on such water bodies resulting into environmental damage which has obviously occurred after exceeding the self-cleansing ability of the water bodies.
2. It is further submitted that the discounting can be defined as the technique used to compare costs and benefits that occur at different points in time. Its main motive is to express in present values the flow of costs and benefits that arise across the full lifetime of a scenario or project. Discounting can be used whenever long-term impacts need to be assessed, and when discount rates can be identified to reflect the opportunity cost of being able

to make use of benefits now or defer costs until later. Moreover, immediate impacts of a policy or other intervention are often considered to be valued more highly than the same impacts at some future date and hence it is designed to adjust the value of future impacts to present values, in order to allow cost and benefits to be aggregated and compared in a consistent form<sup>7</sup>.

3. The objection regarding fiscal discounting states that the Committee ought to have considered some extent of fiscal discounting in costs based on the following grounds that sea and creek can be considered as public undepletable externality and it has a system of self-cleansing process of a period of time. However self-cleansing property requires time and repeated effluent discharges aggravates the pollution and hence the objection statement “Pollutants like BOD, COD, TSS have the capacity to disintegrate over a period of time so much so that they do not remain harmful” is irrelevant and in ignorance assumes the notion of the sea and natural water bodies as infinite sinks capable of assimilating pollutants for an indefinite period of time. However the environmental damage cost assessment done by the expert Committee is based on the background of present scenario damages (Assessment period) caused due to the pollution and hence the concept of fiscal discounting is not applicable.

#### **Para B (4)**

#### **Reply to on objection w.r.t. erroneous liability arising due erroneous parameters/formula adopted for apportionment of liability**

1. That averments made about formula adopted by the Committee in assessing the individual unit’s liability, formulating principles in apportionment of individual unit’s liability, etc. resulting into erroneous liability, it is submitted that, as mentioned under Chapter 7 of the Committee’s report, the methodology recommended in “Report of the CPCB In-house Committee on Methodology for Assessing Environmental Compensation and Action Plan to Utilize the Fund” has been used by the Committee with addition of some additional features to meet objective of distributing the cost of 160.042 Crore INR among the 103 polluting units. The said methodology adopted is also part of Environmental compensation

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<sup>7</sup> [http://www.integrated-assessment.eu/eu/index3b1b.html?q=guidebook/discounting\\_0](http://www.integrated-assessment.eu/eu/index3b1b.html?q=guidebook/discounting_0)

regime fixed for industrial units which has been accepted by the Hon'ble Tribunal and has also been directed to be acted upon as an interim measure vide order dated 28.08.2019 of the Hon'ble Principal Bench of the Tribunal in the matter of Original Application No. 593/2017 titled Paryavaran Suraksha Samiti & Anr. Versus Union of India & Ors. The adopted methodology takes into account the pollution index depending on pollution hazard, scale of operation, load factor based on the population located around the industrial unit and the number of days for which violation took place for respective polluting unit.

2. The derived Damage Recovery cost for a polluting unit (in lakh INR) = DRC factor x 160.042 Crore x 100, as derived at page 82 under para 7.1 of Chapter 7 of the Committee's report, gives distributed accountability of each of the identified 103 polluting units in recovering the estimated environmental damage cost and restoration cost of 160.042 Crore INR in terms of their respective pollution index depending on pollution hazard, scale of operation, load factor based on the population located around the industrial unit, number of days for which violation took place and also considering deterrence for repeat/habitual violators.
3. As mentioned in the report of the Committee (Page 59 - 64 of the report), it is submitted that in compliance of aforesaid order of the Hon'ble Tribunal, MPCB submitted list of 221 polluting units who were individually heard by the Committee during Nov-30, Dec-03, 2019 during which MPCB presented nature and period of violations, etc. to each of the units' representative. The representative of the respective unit was also given opportunity to submit records against such violations presented by MPCB.

The Committee, however, observed during the hearing that:

- (a) In cases where violations were informed about samples collected from their storm water drain, outlet of ETP having zero liquid discharge facility, etc., the unit denied citing the following arguments:
  - (i) Samples collected from their storm water drain are not being discharged but channelized to collection tank of their ETP;

- (ii) Seepage/rainwater run-off from others premises actually enters into their premises due to undulating land terrain and find place in their storm water drain;
  - (iii) Effluent collection sump is at higher elevation than that of unit's ETP treated storage tank and as a result effluent from the collection sump enters into their ETP treated storage tank;
  - (iv) In cases of units having zero liquid discharge facility, outlet of ETP (prior to RO/MEE) exceeding the prescribed discharge limits may not be considered as violations since there is no discharge line and the outlet of ETP is further subjected to RO/MEEs, and;
  - (v) Communication informing the exceedance of prescribed norms in samples collected by Joint Vigilance Survey (JVS) or show-cause notice/interim direction have not been received by the units in some of the cases.
- (b) The SSI units represented that though in their Consent to Operate issued under the Water (Prevention & Control of Pollution) Act, 1974, MPCB has prescribed discharge effluent standard stringent to the design/standard of the CETP but incidences, where effluent from their unit have found within the inlet design/standard of the CETP should not be considered as violation for imposing environmental compensation/damage.

In order to rationalize the criteria for identification of polluting units and their nature & period of violation under given varied scenarios, the Committee made the following recommendations to MPCB after detailed discussions:

- (1) In view of (a) above and other similar cases, MPCB may furnish the list of only those polluting units for the purpose of environmental compensation/restoration cost for which due records are available for the violations noticed by MPCB.
- (2) Incidences of SSI units, where they have discharged into CETP exceeding their prescribed norms but within design/prescribed inlet standards of CETP, may not be included in the list of polluting units for the purpose of environmental compensation/restoration cost recovery. For if SSI units are required to meet its outlet effluent standard to that of outlet effluent discharge standard of CETP then

there remains no role of CETP which has primarily been facilitated for smaller units. However, MPCB may examine the matter and take appropriate decision in exempting such exceedance cases in case of SSI units.

(3) The violations which are not directly related to effluent discharge in to CETP or not causing damage to soil/ surface water/ground water, may not be taken in the list of polluting units for the purpose of environmental compensation in this matter under reference. However, MPCB may take appropriate actions for such defaults.

(4) Limiting period of violations

Taking reference from section 15(3) of the National Green Tribunal Act, 2010, and to limit a period since when default is to be considered for assessing environmental damage cost and cost of restoration, the period of default has been taken into account since five years prior to the day Original Application No. 64/2016 (WZ) was made before the Hon'ble Tribunal (i.e. 28/4/2016) and till the date of order of the Hon'ble Tribunal (i.e.26/09/2019) viz. 28/4/2011 to 26/9/2019.

(5) Number of days (N) of violations:

(i) In cases where closure direction has been issued, the period of default (N in days) may be taken as date of inspection till the effective date of closure of the unit.

(ii) For other cases including where conditional restart order or show-cause notice/proposed direction/interim direction issued under the Water (Prevention & Control of Pollution) Act, 1974/ Environment(Protection) Act, 1986, have been issued, the period of default may be taken as number of days(N) for which violation took place. It may be the period between the day of violation observed/ due date of compliance of directions and the day as on which the compliance was verified by MPCB.

4. MPCB was requested by the Committee to re-examine considering the above and provide revised list of polluting units along with nature and period of defaults to the Committee.

5. MPCB re-examined and identified 83 of the said 221 units as polluting units and another 20 units considering observations and recommendations

of the Committee for the purpose of imposing environmental damage cost/damage restoration cost. MPCB informed that the following recommendations of the Committee were considered by MPCB in arriving 103 units as the polluting units:

- (i) Inclusion of only those units for which due records are available for establishing the violations;
  - (ii) Exempting SSI units (having effluent discharge less than 25 KLD) who were found discharging effluent to CETP meeting CETP inlet consent norms of COD-3500 mg/l and BOD 1500 mg/l;
  - (iii) Non-inclusion of violations which are not directly related to effluent discharge in to CETP or not causing damage to soil/ surface water/ground water;
  - (iv) Considering the period of default of five years since the date of making Original Application No. 64/2016 (WZ) i.e. 28/4/2011 to 26/9/2019 taking reference from section 15(3) of the National Green Tribunal Act, 2010, with regard to consideration of default for assessing environmental compensation and cost of restoration;
6. It was also informed that period of violations for the aforesaid 103 identified polluting units for the purpose of imposing environmental damage cost/damage restoration cost were also revised as per recommendations of the Committee that in cases where closure direction have been issued, the period of default (N in days) has been taken as date of inspection till the effective date of closure of the unit. For other cases including where conditional restart issued under W (P&CP) Act, 1974/ EP Act, 1986, the period of default has been taken as no of days (N) for which violation took place. Such N has been taken as the period between the day of violation observed/ due date of compliance of directions and the day as on which the compliance was verified. The period between effective closure of the unit till the date of restart order issued by MPCB has not been considered as violation period.
7. The aforesaid additional 20 units were also given opportunity of hearing by the Committee on 27/1/2020 and the 103 polluting units were also served with notices by MPCB giving them another opportunity of submitting additional details/records against the said violations, if any.

8. The identified units have thus been given due consideration and the Committee rationalized the criteria for identification of polluting units and their nature & period of violation with best possible logic under given varied scenarios for distributing accountability of CETP and polluting industrial units towards cost of restoration of the environment.

**Reply to on closure directions without show-cause notices, samples not collected in accordance with provisions, delayed or non- sharing of analysis results etc.**

9. That with regard to averments at this stage that units have been issued closure directions without show-cause notices, samples were not collected in accordance with section 21 of the Water (Prevention and Control of Pollution) Act, 1974, delayed or non- sharing of analysis results of Joint Vigilance Samples (JVS) by MPCB, etc., it is submitted that such issues would have been raised to MPCB by the concerned units immediately after of issuance of directions including closure directions by MPCB or during revocation process of such directions. Not raising such issues immediately after of issuance of directions including closure directions by MPCB or during revocation process of such directions or not seeking remedies as available under the law imply that issuance of such directions were undisputed and acceptable to the unit.

**Reply to increased period of violation due to delay in verification by MPCB**

10. That with regard to averments that after issuance of conditional restart orders, most of the units quickly complied with the conditions with intimation to MPCB and delay in verification of such compliance by MPCB has resulted into increased no. of days (N) for which violation took place for which units not to be held liable, it is submitted that benefits have also been given to all the units by calculating the said no. of days (N) w.e.f. date of inspection where violations were observed by MPCB whereas such violations may have continued for days much before when was observed by MPCB.

**Reply to errors in date of inspection, date of compliance, name of the units, closure not attributing to water pollution, scale of unit and category of unit in some of units in Committee's report**

11. That averments about error in date of inspection, date of compliance, name of the units, closure not attributing to water pollution, scale of unit and category of unit in some of units as given at Annexure-V of the Committee's report, it is submitted that the Table 1 to Table 103 have been prepared by the Committee based on information provided by MPCB who provided the details as per the aforesaid recommendations of the Committee/hearing/ post-hearing serving of notices for submission of additional details/records against the violations and as per available records.
  
12. However, in case the Hon'ble NGT feels appropriate, MPCB may re-examine such cases for errors, if any, and make necessary corrections as per aforesaid recommendations of the Committee in the respective Tables only in terms of – (i) date of inspection; (ii) date of compliance; (iii) name/address of the units, and; (iv) scale of unit and category of unit (during the violation period). The re-examined and corrected Tables may be forwarded to the Committee as in case of any correction even in a one unit, the DRC factor will also get changed for all other 102 units also, as given in equation 3 and 4, as given at page 82 under para 7.1 of Chapter 7 of the Committee's report, and thereby the Damage Recovery cost for each of the 103 units. Such changes shall, therefore, also be made applicable to all units and revised Damage Recovery cost be worked out for all the 103 units accordingly (applying equation 1, 2, 3 and 4 as given under para 7.1 of Chapter 7 of the Committee's report) when such error corrections found applicable in one or more units. The Committee may submit its revised Table 1 to Table 103 with revised Damage Recovery cost based on re-examined and corrected Tables as provided by MPCB.

**Para B 5 (a) to (d)**

1. That averments about inaction on part of Maharashtra Industrial Development Corporation (MIDC) and consequential apportionment of liability, it is submitted that the damage to the environment has occurred due to discharge of effluent occurring as outlet from the CETP and operator of the CETP viz. M/s Tarapur Environment Protection Society (TEPS), who applied and were granted Consent to Operate (CTO) under the Water (Prevention and Control of Pollution) Act, 1974, failed to meet the prescribed CETP outlet effluent standards (in terms of both i.e. quality and

quantity exceedance of CETP outlet effluent) as the CETP hardly complied with the CETP outlet standards prescribed under the CTO during the entire reported period of 28/4/2011 to 30/11/2019 (please refer page 84-85 under Chapter 8 read with page 20-24 under Chapter 3 of the Committee's report). The exceedance to 25 MLD hydraulic load has also resulted into over flow from the CETP and discharges into drains/environment.

2. The CETP also continuously not met with the prescribed permissible inlet effluent standards (in terms of i.e. quality and quantity exceedance of CETP outlet effluent) prescribed under the CTO during the entire reported period of 28/4/2011 to 30/11/2019 (please refer page 84-85 under Chapter 8 read with page 20-24 under Chapter 3 of the Committee's report).
3. Section 24 and 25 of the Water (Prevention and Control of Pollution) Act, 1974, and amendments thereof, are reproduced for ready reference:

*“24. PROHIBITION ON USE OF STREAM OR WELL FOR DISPOSAL OF POLLUTING MATTER, ETC.*

*(1) Subject to the provisions of this section, -*

*(a) no person shall knowingly cause or permit any poisonous, noxious or polluting matter determined in accordance with such standards as may be laid down by the State Board to enter (whether directly or indirectly) into any stream or well or sewer or on land; or*

*(b) no person shall knowingly cause or permit to enter into any stream any other matter which may tend, either directly or in combination with similar matters, to impede the proper flow of the water of the stream in a manner leading or likely to lead to a substantial aggravation of pollution due to other causes or of its consequences.*

...

*25. RESTRICTIONS ON NEW OUTLETS AND NEW DISCHARGES.*

*(1) Subject to the provisions of this section, no person shall, without the previous consent of the State Board,--*

*(a) establish or take any steps to establish any industry, operation or process, or any treatment and disposal system or an extension or*

*addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land (such discharge being hereafter in this section referred to as discharge of sewage); or*

*(b) bring into use any new or altered outlets for the discharge of sewage; or*

*(c) begin to make any new discharge of sewage;*

*...”*

4. M/s TEPS, as operator of the CETP and who applied and were granted CTO with the conditions to operate the CETP meeting the prescribed permissible effluent quality and effluent of not more than 25 MLD, has, therefore, continued to receive and discharge non-compliant effluent into/from its premises in violation of the CTO conditions which contributed to damage of the environment.
5. Contributors to such more than 25 MLD effluent resulting into overflow from the CETP premises and exceeding the prescribed CETP inlet effluent norms are member units of the CETP. Had such member units complied with their respective outlet effluent discharge standards in terms of quality and quantity as prescribed under their respective CTO, the desired effluent inlet standards to CETP would not have violated and also overflow of effluent from CETP premises or during conveying of effluent (since non-compliant effluent may lead to deposition of sludge or frequent breakdown) would not have occurred which contributed damage to the environment.
6. It is, therefore, submitted that CETP and the polluting industries are violators of provisions of CTO granted under the Water (Prevention and Control of Pollution) Act, 1974, who all together contributed damage to the environment and are jointly liable for the same instead of MIDC. Thus consequential apportionment of liability on MIDC may not be applicable.

**Para (B) 5 (e) to (h)**

1. The contents of the paras under reply in so far as they are a matter of record need no reply. However, anything beyond the record is denied as being

false. It is submitted that the Objector is attempting to shy away from their responsibility by blaming the government Authorities who have been repeatedly sending notices and taking actions against the Industry but to no avail.

**Para (B) 5 (i)**

1. That averments made by M/s TIMA about imposition of proportionate environment compensation upon the MIDC may not be applicable in view of submissions made by the Committee under Para 5 (a) to (d) above.

**Para (B) 6 (a)**

1. That averments made by M/s TIMA about applicability of Polluter Pays Principle and Precautionary principle and compensation may not be imposed thereof as imposition of damages on account of sea water and wetlands is without any factual or legal support, and; creation of Super Fund be rejected; the comments of the Committee as submitted under various paras above may be referred.

**Para (B) 6 (b)**

1. That averment made about forfeiture of bank guarantees by the regulators in past from the member industries, it is submitted that the Committee was directed by the Hon'ble NGT to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units. The Committee complied with the said directions and report in this regard has been report submitted to the Hon'ble NGT. Adjustments of such bank guarantees forfeited amount has not been made in the individual accountability of CETP and polluting industrial units as the same may have been forfeited towards other commitment/liabilities.

**Para (B) 6 (c)**

That averments made by M/s TIMA relates to the Right of Information Act 2005 and MPCB and this Committee has no comments to offer.

## Part- II

### Para-wise comments to the objections dated 29-12-2020 filed by TEPS

#### **Para A (i) to (iii)**

1. That averment made about not following mandate of the Hon'ble Tribunal and exceeding its authority in terms of non-conclusive environmental damage reporting, actual restoration cost not done and recommended Super Fund has no legal backing, comments of the Committee as given against Para (i) under Para (3) (i) of Part (B) of TIMA's objections, as above under Part-I, may be referred.

#### **Para A (iv) and (vi)**

2. That about averment made that entire methodology of identifying the polluting units is erroneous, comments of the Committee as given under heading "Comments on objection w.r.t erroneous liability arising due erroneous parameter / formula adopted for apportionment of liability" against the Para (iv) of the TIMA's objections, as above under Part-I, may be referred.

#### **Para – A (v)**

3. That averment made by TEPS about holding TEPS CETP as polluting unit is unsustainable as it is not manufacturing or releasing any effluent, comments of the Committee as given against Para 5 (a) to (d) of TIMA's objections, as above under Part-I, may be referred.

#### **Para – A (vii)**

4. That averment made that report of the Committee is required to be reconsidered and judicially scrutinized, the Committee submits that it has made observations and recommendations based on available scientific data and has made every effort to fulfill the tasks assigned in accordance with orders dated: 26-09-2019 read with order dated: 22-10-2019 of the Hon'ble Tribunal.

**Para – B**

5. That averment made about polluter pay principal is not applicable to TEPS, comments of the Committee as given against Para 5 (a) to (d) of TIMA's objections, as above under Part-I, may be referred.

**Para - C**

6. That averment made about wrong categorization of TEPS as Large Scale Industry/ Rate Category, it is submitted that the said categorization has been taken into account as per the categories stipulated in the Consent to Operate granted to TEPS under the Water (Prevention & Control of Pollution) Act, 1974.

**Para – D**

7. That averment made about observations of the Committee that there was no Consent to Operate for a period between 2017-19, it is submitted that the said observations have been made as per records made available to the Committee.

**Para – E, F and G**

8. That averment made about not touching root cause of the excess effluent load and consequent failure to apportion the liability amongst MIDC/MPCB, comments of the Committee as given against Para 5 (a) to (d) of TIMA's objections, as above under Part-I, may be referred.
9. That averment made about non-consideration of role of the proposed new 50 MLD CETP, it is submitted that the assessed environmental damage and damage cost recovery & restoration of damaged environment thereto have no linkage with the proposed new 50 MLD CETP. In case the 25 MLD CETP or the proposed new 50 MLD CETP is operated effectively complying CETP inlet and outlet effluent prescribed norms, the same would control further damages to the environment instead of restoring the environment already damaged.

**Para – H (i) to (ii)**

10. That averment made about erroneous inclusion of damages for alleged excess loading pollutant into the sea and wetland, comments of the

Committee as given under heading “Comments on no notified wetland in and around Tarapur MIDC and baseless damage cost thereof” against the Paras (1) to (3) (a) to (h) of Part-B of TIMA’s objections, as well as comments of the Committee as given under Para (i) of Para 3 (i) of Part – B of TIMA’s objections, as above under Part-I, may be referred.

**Para – H (iii)**

11. That averment made about total discharge has been taken both as discharge into sea and into the creeks and error by duplication thereto and overlapping of BOD and COD costs while assessing damage cost, comments of the Committee on the same as given under Paras (1) to (3) (a) to (h) of Part-B of TIMA’s objections, as above under Part-I, may be referred.

**Para – H (iv) to (v) (3)**

12. That averment made about Super Fund is alien to the Indian environmental statutory regime and referring MPCB’s report of 2019 about status of ground water, comments of the Committee on the same as given under Paras (1) to (3) (a) to (h) of Part-B of TIMA’s objections, as above under Part-I, may be referred.

**Para – H (v) (4) to (viii)**

13. That averments made under these Paras relate to the National Green Tribunal Act, 2010, and this Committee has no comments to offer. However, it is submitted that the Committee was directed by the Hon’ble NGT to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units. The Committee complied with the said directions by performing various activities diligently including field sampling/monitoring and scientific & technical analysis of the various information/data/analysis results which have been presented along with conclusions and recommendations in its report submitted to the Hon’ble NGT.

**Para – H (vi)**

14. That averment made about consideration of fiscal discounting referring self-cleansing ability of water bodies, sewage attribution by villages, etc.,

comments of the Committee on the same as given against Para 3 (j) of Part (B) of the TIMA's objections, as above under Part-I, may be referred.

**Para – H (vii)**

15. That averment made about lack of baseline data, the comments of the Committee as given under heading "Comments on objection w.r.t. multiple objections to data inadequacy" under Paras (1) to (3) (a) to (h) of Part-B of TIMA's objections, as above under Part-I, may be referred.

**Para – H (viii) and (ix)**

16. That averment made about erroneous adoption of Hernandez-Sancho et al. paper and non-consideration of Purchase Power Parity, the comments of the Committee as given under heading "Comments on objections on application of Market Exchange Rate (MER) and Purchase Power Parity (PPP) to estimate environmental damage cost" under Paras (1) to (3) (a) to (h) of Part-B of TIMA's objections, as above under Part-I, may be referred.

**Part- III**

**Parawise reply to objections dated 01/04/2021 filed by TEPS to the report of the Committee (on Action Plan prepared by the Committee for remedial measures and restoration of contaminated water bodies in and around MIDC Tarapur and their compliance status submitted to the Hon'ble Tribunal on 11/1/2021 in compliance with order dated 17/9/2020 of the Hon'ble Tribunal)**

**Para 1:**

1. The contents of the para under reply in so far as they are a matter of record need no reply. However anything beyond the record is denied as being false.

**Para 2:**

2. That averment made about filing status report dated 11/01/2021 filed by the Committee, it is submitted that the said report of the Committee filed on 11/01/2021 is on Action Plan prepared by the Committee for remedial measures and restoration of contaminated water bodies in and around MIDC Tarapur and their compliance status. The same has been prepared and filed by the Committee in compliance with order dated 17/09/2020 of

the Hon'ble National Green Tribunal in the matter of Original Application No. 64/2016 (WZ); Akhil Bhartiya Mangela Samaj & Ors. Versus Maharashtra Pollution Control Board & Ors.

**Para 3:**

3. That averment made by TIMA that Committee failed to prepare and finalize remediation action plan, it is submitted that the Committee, which included District Magistrate Palghar also, prepared a detailed action plan for remedial measures and restoration of contaminated water bodies in and around MIDC Tarapur outlining various actions points, responsible agencies and time frame for the same. The said action plans include:
  - (i) Action plan for controlling the further impact on environment due to partial/untreated effluent discharge and restoration/remediation of contaminated water bodies in and around MIDC Tarapur, as prepared by Committee, is given in column no. 2 and 3 of the table given at Annexure-II of the said report of the Committee filed on 11/01/2021. The same has been prepared in line with the recommendations made in the Committee's report accepted by the Hon'ble NGT and directed to be acted upon vide the aforesaid order dated 17.09.2020 of the Hon'ble NGT.
  - (ii) Action plan on the prohibition of the use of contaminated ground water in affected areas and remedying the inhabitants' health, including providing healthcare to the affected individuals in and around Tarapur MIDC have also been prepared and given at Annexure-III and Annexure- IV respectively of the said report of the Committee filed on 11/01/2021.
4. The above action plans and their compliance status have been prepared in consultation with MPCB, MIDC, Zila Parishad Palghar, Central Ground Water Authority and CETP operator – TEPS and submitted to the Hon'ble NGT by the Committee.

A copy of the said report of the Committee filed on 11/01/2021 is given at **Annexure-2** for ready reference.

**Para 4:**

5. That averment of about no analysis or efforts on part of the Committee has been made to observe, identify and address the causes of excess load /

excess effluent to CETP, it is submitted that the Committee has addressed the same in detail as given at Annexure – II of the aforesaid Committee report dated 11/1/2021 read with their brief status, recommendations and conclusions as given under paras 3, 4 and 5 (page 2-9) respectively of the said report of the Committee filed on 11/01/2021.

6. With regard to averment about their grounds at Para A (iv) and (vi) and E in their objections dated 29/12/2021, comments of the Committee as given against such paras, as above under Part-II, above may be referred.

#### **Para 5**

7. That averment made about citing show-cause notice issued by MIDC to one ZLD unit discharging effluent despite being zero discharge unit, it is submitted that such incidences of non-compliances are to be dealt in accordance with provisions of the Acts / Rules. The Committee has suggested relevant detailed measures in this regard as given in Annexure II of the aforesaid report of the Committee filed on 11/01/2021 along with recommendations and conclusions, as stated above.
8. With regard to averment about exemption of all ZLDs and SSI units from liability as elaborated under Ground (B) of the objection dated 29/12/2020 filed by TEPS, comments of the Committee as given against such paras, as above under Part-II, may be referred.

#### **Para 6**

9. That averment made about various recommendations of the Committee for closure of 25 MLD CETP is contrary to steps taken by them as outlined in Para 3.1 (a) to (g) of the said report of the Committee filed on 11/01/2021, it is submitted that such steps taken by CETP were required to be taken far earlier. However, such limited steps taken still did not address controlling discharge of illegal/substandard effluent into the environment and other measures were yet to be completed as have been suggested in Annexure-II of the said report of the Committee filed on 11/01/2021. The Committee has, therefore, made recommendations for control of further impact on environment due to partial / untreated effluent under Para 4.1 (Page 6-7) of the said report and the same is reproduced as below;

“ ...

#### **4. Recommendations**

##### **4.1 Control of further impact on environment due to partial/untreated effluent discharge**

*Although various works/remedial measures have been undertaken, as stated at para 3.1 above, w.r.t. the 25 MLD (old CETP) which is continuously non-compliant since the reported period from 2011 (as mentioned in the Committee's report submitted to the Hon'ble NGT) but - (i) continued non-compliance of inlet and outlet effluent of CETP even after the aforesaid order dated 17/9/2020 of the Hon'ble NGT till its volunteer closure for up-gradation/retrofitting on 26/11/2020 (ii) not able to identify/list out units contributing to the higher hydraulic load and/or higher concentrated effluent to the CETP despite surveillance by separate teams of CETP and MPCB during such period, and; (iii) continued effluent discharge to CETP and discharge of effluent from CETP through sumps (though small in quantity of about 01-02 MLD) even during the said volunteer shut-down of CETP; reveal that there may be lack of system/arrangement to identify units who contribute higher concentrated effluent or higher hydraulic load to the CETP occasionally or continuously.*

*It is recommended that:*

*(i) resumption of the 25 MLD CETP expected from 30/12/2020 may not be allowed by MPCB unless – (a) CETP operator or MIDC (who conveys effluent from units to CETP) individually or collectively takes the responsibility that they have mechanism in place to identify and report non-compliant units in the event of every occasion of higher hydraulic load/effluent quality being received at the CETP, and (b) the CETP demonstrates compliance to the prescribed outlet norms.*

*(ii) ...”*

#### **Paras 7 and 8**

10. That averment made about failure by MIDC / MPCB and discharge of illegal / substandard effluent thereof, it is submitted that comments of the

Committee as given against paras Para B 5 (a) to (d) of the objections dated 29/12/2021 filed by TIMA, as above under Part-I, may be referred.

### **Para 9**

11. That averment made about commissioning of discharge pipeline (7.1 kms deep into the sea), it is submitted that the same is required to be enforced as per conditions stipulated under the consent to operate issued by MPCB.
12. With regard to issue of non-consideration of 50 MLD CETP, as raised under Para F of the objections dated 29/12/2021 filed by TIMA, comments of the Committee, as given against the said para, as above under Part-II, may be referred.

### **Para 10**

13. That averment made that the status report suffers from the set of lacunas (legal and factual errors) as pointed out vide their objections dated 29/12/2020, it is submitted that comments of the Committee against the said objections dated 29/12/2020, as given under Part-II above, may be referred.

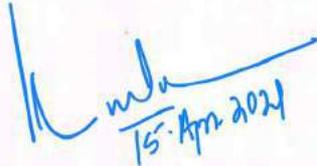
### **Para 11**

14. That averment made that they have been acting in a bonafide manner in the matter to take all possible steps to implement its own remedial measures, it is submitted that the same may not hold true as reported by the Committee in its aforesaid report (on Extent of damage in & around MIDC Tarapur, restoration measures, environmental damage cost & cost of restoration, and individual accountability of CETP and polluting units) submitted to the Hon'ble NGT on 19/06/2020 and subsequent report filed on 11/01/2021.
15. With regard to averment that the stated project cost of Rs. 150 crores spent by TEPS w.r.t 50 MLD CETP, it is submitted that a CETP operator is liable to operate its CETP attaining and complying with conditions stipulated under the consent to operate by installing & operating appropriate system and incurring cost thereto. Further, such 50 MLD CETP, if operated complying with the norms, may not restore the impacts already caused due to discharge of illegal / substandard effluent but may only control further damage to the environment already caused.

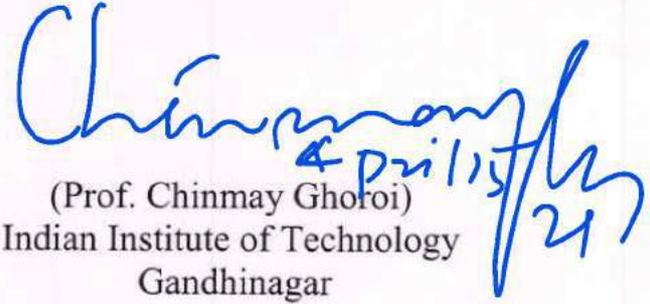
**Para 12**

16. That averment made about consideration of Committee's report filed on 11/01/2021, be only considered along with hearing of grounds of objections dated 29/12/2020 filed by TEPS, it is submitted that the Committee has no further comments to offer in consideration of the above submissions of the Committee.

In view of the above facts and circumstance, it is humbly submitted that the Hon'ble Tribunal may pass any order as may deem fit and proper in the interest of justice. However, this Committee shall abide by any order or directions, if any, passed by the Hon'ble Tribunal.



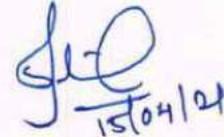
(Prof. Anish Sugathan)  
Indian Institute of Management  
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(Er. Hemant Bherwani)  
Scientist  
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(D. B. Patil)  
Regional Officer  
Maharashtra Pollution Control Board



(Bharat K Sharma)  
Regional Director  
Regional Directorate, Pune  
Central Pollution Control Board

Dated: 15/04/2021

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,  
Principal Bench, New Delhi  
Original Application No. 64/2016 (WZ)**

**In The Matter of: -****Akhil Bhartiya Mangela Samaj & Ors.****Applicants****Vs.****Maharashtra Pollution  
Control Board & Ors.****Respondents****Index**

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**(BHARAT K SHARMA)**  
Regional Director  
Central Pollution Control Board,  
Regional Directorate, Pune

Date: 18.06.2020  
Place: Delhi

**REPORT OF THE COMMITTEE**  
**ON**  
**EXTENT OF DAMAGE IN & AROUND MIDC**  
**TARAPUR;**  
**RESTORATION MEASURES;**  
**ENVIRONMENTAL DAMAGE COST & COST OF**  
**RESTORATION, AND;**  
**INDIVIDUAL ACCOUNTABILITY OF CETP AND**  
**POLLUTING UNITS**

(in the matter of Original Application No. 64/2016 (WZ);  
Akhil Bhartiya Mangela Samaj & Ors. Versus Maharashtra  
Pollution Control Board & Ors.)

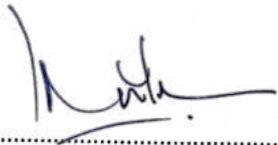


**FOR SUBMISSION TO**  
**HON'BLE NATIONAL GREEN TRIBUNAL**  
**PRINCIPAL BENCH, NEW DELHI**

**MARCH 2020**

**REPORT OF THE COMMITTEE  
ON  
EXTENT OF DAMAGE IN & AROUND MIDC TARAPUR;  
RESTORATION MEASURES;  
ENVIRONMENTAL DAMAGE COST & COST OF RESTORATION, AND;  
INDIVIDUAL ACCOUNTABILITY OF CETP AND POLLUTING UNITS**

We, the members of the Committee constituted by the Hon'ble National Green Tribunal, Principal Bench, New Delhi, by its order dated 26.09.2019 read with order dated 22.10.2019 do hereby submit the Report of this Committee. We are all greatly honoured by the confidence placed in us by the Hon'ble National Green Tribunal and have made every effort to fulfil the task assigned to us.



.....  
**Prof Anish Sugathan**



.....  
**Prof Chinmay Ghoroi**



.....  
**Hemant Bherwani**



.....  
**D B Patil**



.....  
**Bharat K Sharma**

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# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND:

Akhil Bhartiya Mangela Samaj, in its application vide Original Application No. 64/2016 (WZ); Akhil Bhartiya Mangela Samaj & Ors. Versus Maharashtra Pollution Control Board & Ors. before the Hon'ble National Green Tribunal, Western Zone Bench, Pune; expressed grievances that there is severe environmental and ecological degradation of the water bodies situated in the vicinity of the Tarapur MIDC caused by the discharge of effluent in MIDC and the release of unauthorised volume of effluent in excess of the permitted limit by the Maharashtra Pollution Control Board (MPCB) in the Arabian Sea at Navapur as well as in the water bodies in the vicinity of Tarapur MIDC from the Common Effluent Treatment Plant. This has impacted the livelihood of the fisher folk and the health of the people who are habiting in this area and caused degradation of the aquatic ecology.

The Tarapur Environment Protection Society Common Effluent Treatment Plant (TEPS- CETP), located in the Tarapur MIDC and was commissioned as a primary treatment plant with a capacity of 20 MLD in 2006 which was subsequently enhanced to 25 MLD in 2009. A 59 kilometre effluent carrying pipeline runs throughout the industrial area to convey the industrial effluent of its member industries of Tarapur MIDC to the CETP. The outlet from CETP is discharged into a shallow depth of Arabian Sea at Navapur which is about 5.66 Km away from the CETP.

It is stated by the applicant that the Tarapur MIDC has a long history of being one of the most polluted industrial areas in the country ever since it began functioning in 1972, showing flagrant violations of prescribed norms for industries. TEPS CETP does not meet standards and there have been frequent leakages from the CETP which have been recorded in several reports, resulting in high pollution levels in the water bodies that lie in its vicinity.

The Hon'ble Tribunal passed the directions, vide order dated 26/9/2019 read with order dated 22/10/2019, and the same are reproduced as below:

“ ...

7. In Original Application No. 95/2018 in the matter of “Aryavart Foundation v. M/s Vapi Green Enviro Ltd. & Ors.” in a similar situation prevailing in the Vapi Industrial Cluster, the Tribunal had passed certain directions. Considering the identical nature of the issues involved, we pass the following directions as in that case:

- (i) We direct constitution of following Committee to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units:
  - a) Representative of CPCB.
  - b) Representative of IIM, Ahmadabad.
  - c) Nominee of IIT, Ahmadabad.
  - d) Scientist nominated by NEERI.
  - e) Representative of MPCB.
- (ii) The Committee may give its report within three months. The Committee will be entitled to take any factual or technical inputs in the manner found necessary. CPCB will be the nodal agency for the purpose. The Committee may also suggest steps for restoration of the environment.
- (iii) The Committee may give hearing to the CETP operator and the units identified as polluting by the MPCB for which list will be furnished by the MPCB to the Committee indicating the period and nature of default within one month.
- (iv) The MPCB may inform the defaulting units for compliance of this order.
- (v) The MPCB may also consider exercise of its statutory powers of prosecution which power is coupled with duty.
- (vi) Having regard to the entirety of the fact situation in the present case, we direct that, except for the green and white categories of industries, other category of defaulting industries connected to the CETP, shall deposit with the CPCB the following amounts towards interim compensation within one month:
  - a) Large Industries – Rs. 1 Crore each.
  - b) Medium Industries – Rs. 50 Lakhs each.
  - c) Small Industries – Rs. 25 Lakhs each.

*(vii) The CETP on its part shall deposit a sum of Rs. 10 Crores with the CPCB towards interim compensation within one month.*

*(viii) The amount may be utilized by the CPCB for restoration of the environment.*

*(ix) The CPCB shall undertake jointly with MPCB extensive surveillance and monitoring of the CETP at regular intervals of three months and submit its report to this Tribunal.*

*(x) Copy of the order may be sent to CPCB by email and all reports in pursuance of the above directions be sent to this Tribunal at judicial-ngt@gov.in*

*8. In order to ensure uniformity in the proceedings, it is felt appropriate that the matter should be heard in Court No. 1 where similar cases including Original Application No. 95/2018: Aryavart Foundation v. M/s Vapi Green Enviro Ltd. & Ors. is under consideration.*

*9. We accordingly direct that this case be listed in Court No. 1 on 07.01.2020.”*

This report of the Committee constituted vide the aforesaid orders, outlines various tasks assigned to the Committee viz. extent of damage in and around Tarapur MIDC; environmental damage cost and cost of restoration, and; individual accountability of CETP and polluting industrial units in meeting the said costs after giving hearing to the polluting units identified by MPCB. The report also suggests steps for restoration of the environment as directed by the Hon’ble Tribunal.

## **1.2 THE COMMITTEE:**

In accordance to order of Hon’ble NGT, the committee constituted with the following members:

| <b>Sl. No.</b> | <b>Member of the Committee</b>   |
|----------------|--|
| 1              | Prof. Anish Sugathan<br>Indian Institute of Management<br>Vastrapur, Ahmedabad   |
| 2              | Prof. Chinmay Ghoroi<br>Indian Institute of Technology, Gandhinagar<br>Palaj, Gandhinagar  |
| 3              | Er. Hemant Bherwani<br>Scientist, Director's Research Cell<br>National Environmental Engineering Research Institute (NEERI)<br>Nehru Marg, Vasant Nagar, Nagpur                            |
| 4              | Shri D. B. Patil,<br>Regional Officer<br>Maharashtra Pollution Control Board,<br>Plot No P-30, 5th floor Office Complex Building<br>Mulund Checknaka, Thane, Maharashtra                   |
| 5              | Bharat K Sharma,<br>Regional Director<br>Regional Directorate<br>Central Pollution Control Board<br>Row House No. 1, Sanjivani Nisarg<br>Balewadi, Pune<br><br><i>.....Member Convener</i> |

### **1.3 TASKS ASSIGNED TO THE COMMITTEE:**

The Committee was assigned the following tasks as per the aforesaid orders of the Hon'ble NGT:

- (i) Assessment of extent of damage;
- (ii) Restoration measures;
- (iii) environmental damage cost and cost of restoration;
- (iv) Individual accountability of CETP and polluting industrial units to meet the aforesaid costs after giving hearing to the polluting units identified by MPCB;
- (v) Steps for restoration of the environment.

## **1.4 APPROACH.**

The approach adopted by the committee in accomplishing the aforesaid tasks is as below:

- (a) Visit to the CETP and in and around MIDC Tarapur area.
- (b) Data/information collection from CETP operator, MIDC and MPCB.
- (c) Assimilation of information on water bodies in and around MIDC, Tarapur.
- (d) Sampling of effluents from various components of CETP Tarapur.
- (e) Sampling & Analysis of sediments and water samples at various drains, creek and sea shore in and around MIDC Tarapur.
- (f) Sampling & Analysis of ground water at various locations in and around MIDC, Tarapur.
- (g) Hearing to the polluting units as per list provided by MPCB for the purpose of estimating their individual accountability.
- (h) Analysis of various data/information and discussions through meetings/video conferences.
- (i) Report preparation.

## CHAPTER 2

### MIDC TARAPUR AND WATER BODIES

#### 2.1 BACKGROUND

MIDC Tarapur is an industrial estate set up by Maharashtra Industrial Development Corporation, Government of Maharashtra, in the year 1972. Tarapur is geographically located at 17°42'N 75°28'E 17.7°N 75.47°E and at an elevation of average 10 m above the MSL. The nearest highway is NH-8 connecting Mumbai to Ahmedabad. Tarapur MIDC is approximately 130 km from Mumbai and 17 km off the national highway NH-8. It is one of the largest chemical industrial estate in the State of Maharashtra. It is spread into 1028 hectares and accommodates chemical (Pharmaceuticals, Dye & Dye Intermediate, specialty chemicals), textile, steel, engineering, etc. industries. The location of MIDC Tarapur is shown in following Figure-1:

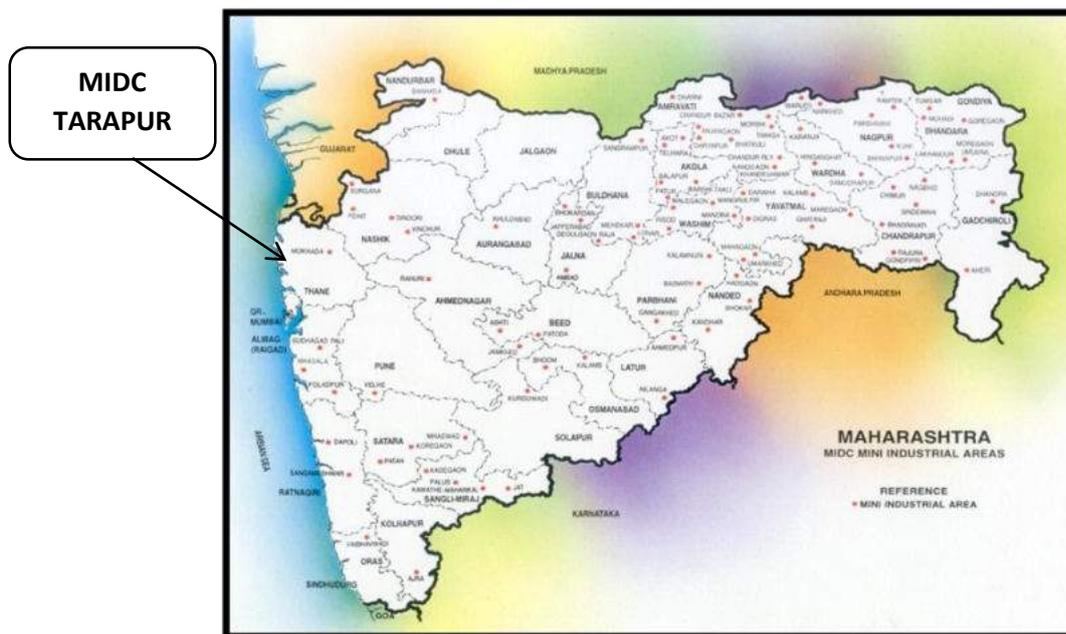


Figure-2.1 : Location map of MIDC Tarapur Industrial Area (Not to the scale)

#### 2.2 INDUSTRY STATISTICS OF MIDC TARAPUR

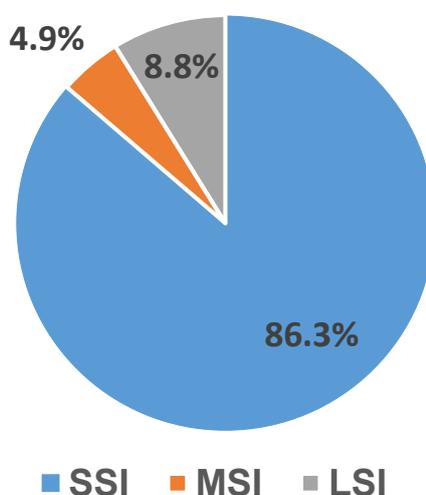
There are 512 (42%) red category industries, 90 (7.5%) orange category industries and 614 (50.5 %) are green category industries in MIDC Tarapur. The category and scale wise breakup of industries are depicted in the Table 2.1.

**Table 2.1: Category and scale wise breakup of industries in MIDC Tarapur**

| <b>Scale→<br/>Category↓</b> | <b>Large Scale</b> | <b>Medium Scale</b> | <b>Small Scale</b> | <b>Total</b> |
|-----------------------------|--------------------|---------------------|--------------------|--------------|
| Red                         | 69                 | 20                  | 423                | <b>512</b>   |
| Orange                      | 6                  | 13                  | 71                 | <b>90</b>    |
| Green                       | 32                 | 26                  | 556                | <b>614</b>   |
| <b>Total</b>                | <b>107</b>         | <b>59</b>           | <b>1050</b>        | <b>1216</b>  |

Major types of industrial units are bulk drugs manufacturing units, specialty chemical manufacturing units, steel plants and textile plants. Scale wise distribution of industries as Small Scale Industries (SSI), Medium Scale Industries (MSI) and Large Scale Industries (LSI) and sector wise distribution of industries are given in Figure 2.2 and Table 2.2 respectively.

**Fig. 2.2: Scale wise distribution of industries in MIDC Tarapur**



**Table 2.2: Sector Wise distribution of Industries in MIDC Tarapur**

| <b>Sl. No.</b> | <b>Industry Sector</b>    | <b>Number</b> |
|----------------|---------------------------|---------------|
| 1.             | Textile Processors        | 40            |
| 2.             | Steel Processors          | 2             |
| 3.             | Chemical                  | 298           |
| 4.             | Dyes & Dyes Intermediates | 25            |
| 5.             | Pharmaceuticals           | 120           |
| 6.             | Pesticides                | 4             |
| 7.             | Others                    | 727           |
|                | <b>Total</b>              | <b>1216</b>   |

### **2.3 WASTEWATER MANAGEMENT**

MIDC provides water to entire industrial area and residential area inside MIDC as well as to adjoining villages. The source of water is Surya River approx. 12 km from MIDC Tarapur. Water supply to industries in the MIDC Tarpaur is about 38 MLD by MIDC.

There is a Common Effluent Treatment Plant (CETP) of 25 MLD capacity for industries in Tarapur MIDC and another 50 MLD capacity CETP is under commissioning stage. It has effluent collection drainage network of about 59 km and the outlet of CETP is released to coastal waters of Arabian Sea at a location with shallow depth. The submarine outfall of the CETP outlet is at shallow location which is 500 meters from High Tide Line.

Responsibility for the collection and disposal of treated effluent rest with MIDC whereas responsibility for treatment is with Tarapur Environment Protection Society i.e. CETP.

Leakages from drainage network of CETP, overflow from CETP, illegal discharges have been noticed. Indiscriminate discharge of partially treated wastewater or untreated/illegal effluent discharge into creeks, coastal sea may have an impact on surface water bodies, soil, sediment and groundwater in and around MIDC Tarapur. MIDC Tarapur, Tal Palghar Dist. Palghar, was declared by CPCB in 2009 among 88 critically polluting stretches in India.

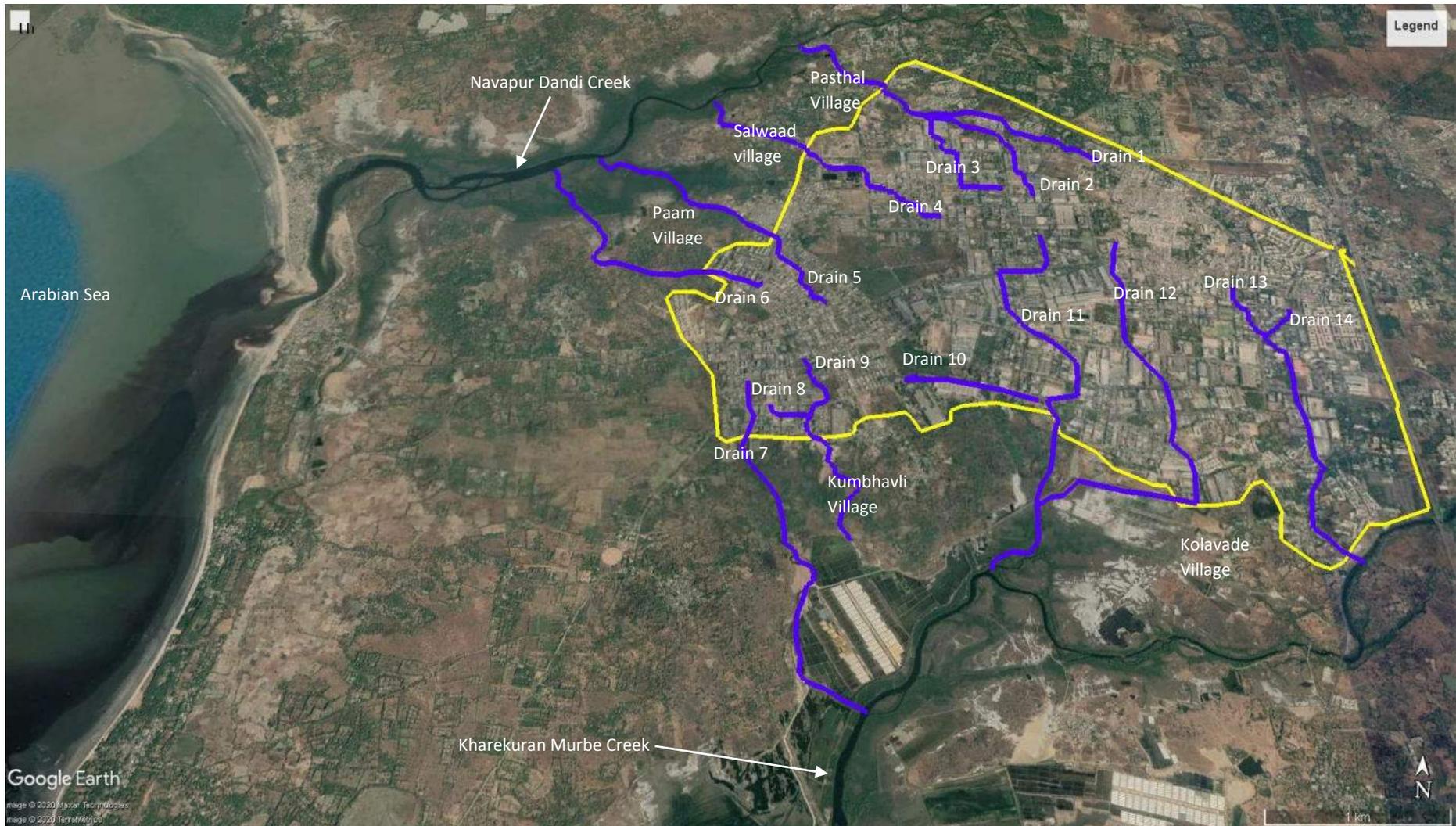
## 2.4 WATER BODIES IN AND AROUND MIDC, TARAPUR

MIDC Tarapur is surrounded by Navapur Dandi Creek in north and Kharekuran Murbe Creek in south direction. Their confluence points into the Arabian Sea are separated by about 6.5 Km.

Various natural and storm drains are also flowing through the MIDC area which meets the aforesaid Navapur Dandi Creek in north and Kharekuran Murbe Creek in south due to natural topography of MIDC, Tarapur. There are 14 natural drains flowing through the MIDC. List of all the said drains, their direction of flow and place of convergence to Creeks is given in Table 2.3. Google earth map showing water bodies (drains, creeks and sea) in and around MIDC, Tarapur is given in Fig: 2.3.

**Table 2.3: List of drains flowing through MIDC, Tarapur**

| Drain Name | Drain Origin location   | Name of the village through which drain meet Creeks | Direction towards which Drain flow from the MIDC | Creek to which drain meet |
|------------|---|---|--|---------------------------|
| Drain 1    | Starting from Plot No. RB-38  | Pasthal Village                                     | North West                                       | Navapur-Dandi Creek       |
| Drain 2    | Starting from Plot No. C-4/2/2  |   |  |                           |
| Drain 3    | Starting from Plot No. E-24/2   |   |  |                           |
| Drain 4    | Starting from Plot No. E-13   | Salwad Village                                      | Paam Village                                     |                           |
| Drain 5    | Starting from Plot No. T-3  |   |  |                           |
| Drain 6    | Starting from Plot No. T-52   |   |  |                           |
| Drain 7    | Starting from Plot No. N-48   | Kumbhavli Village                                   | South  | Kharekuran Murbe Creek    |
| Drain 8    | Starting from Plot No. N-27   |   |  |                           |
| Drain 9    | Starting from Plot No. M-7<br>(Meets with Drain No. 8 near Plot No. N-26) |   |  |                           |
| Drain 10   | Starting from Plot No. OS-13  | Kolavade Village                                    |  |                           |
| Drain 11   | Starting from Plot No. C-2  |   |  |                           |
| Drain 12   | Starting from Plot No. C-7  |   |  |                           |
| Drain 13   | Starting from Plot No. J-72/2   |   |  |                           |
| Drain 14   | Starting from Plot No. J-138  |   |  |                           |



**Fig 2.3: Water Bodies in and around MIDC, Tarapur** (Blue colour represents various drains)

## **CHAPTER 3**

### **CETP AND ITS PERFORMANCE**

#### **3.1 BACKGROUND**

The Common Effluent Treatment Plant (CETP) in Tarapur MIDC has been set up by Tarapur Industries Manufacturers' Association (TIMA). Initially, it started with 2 MLD capacity in 1994 being the first CETP in Maharashtra serving particularly for the small-scale industries.

TIMA formed a separate society in the year 2004 named as "Tarapur Environment Protection Society (TEPS)" for looking after the matters relating to wastewater treatment in Tarapur Industrial Area. TEPS took over implementation of the CETP project of 25 MLD capacity which was completed in November, 2009, in phase wise manner.

The 25 MLD CETP is a single-stage activated sludge process. The wastewater treatment consists of primary treatment, secondary biological treatment and tertiary treatment process based on the activated sludge process. The outlet of CETP is released to coastal waters of Arabian Sea at a location with shallow depth.

#### **3.2 MEMBER INDUSTRIES TO CETP**

The main criteria for any member is that the approaching industry must have their own or sublet plot in MIDC industrial area and possesses Consent to Establish or Operate issued by MPCB or acknowledged application for CTE or CTO. The CETP has 1161 industries as its members.

#### **3.3 DRAINAGE NETWORK FOR CETP**

The Tarapur MIDC areas have been divided into sixteen (16) Zones namely A, B, C, D, E, F, G, H, J, K, L, M, N, S, T and W.

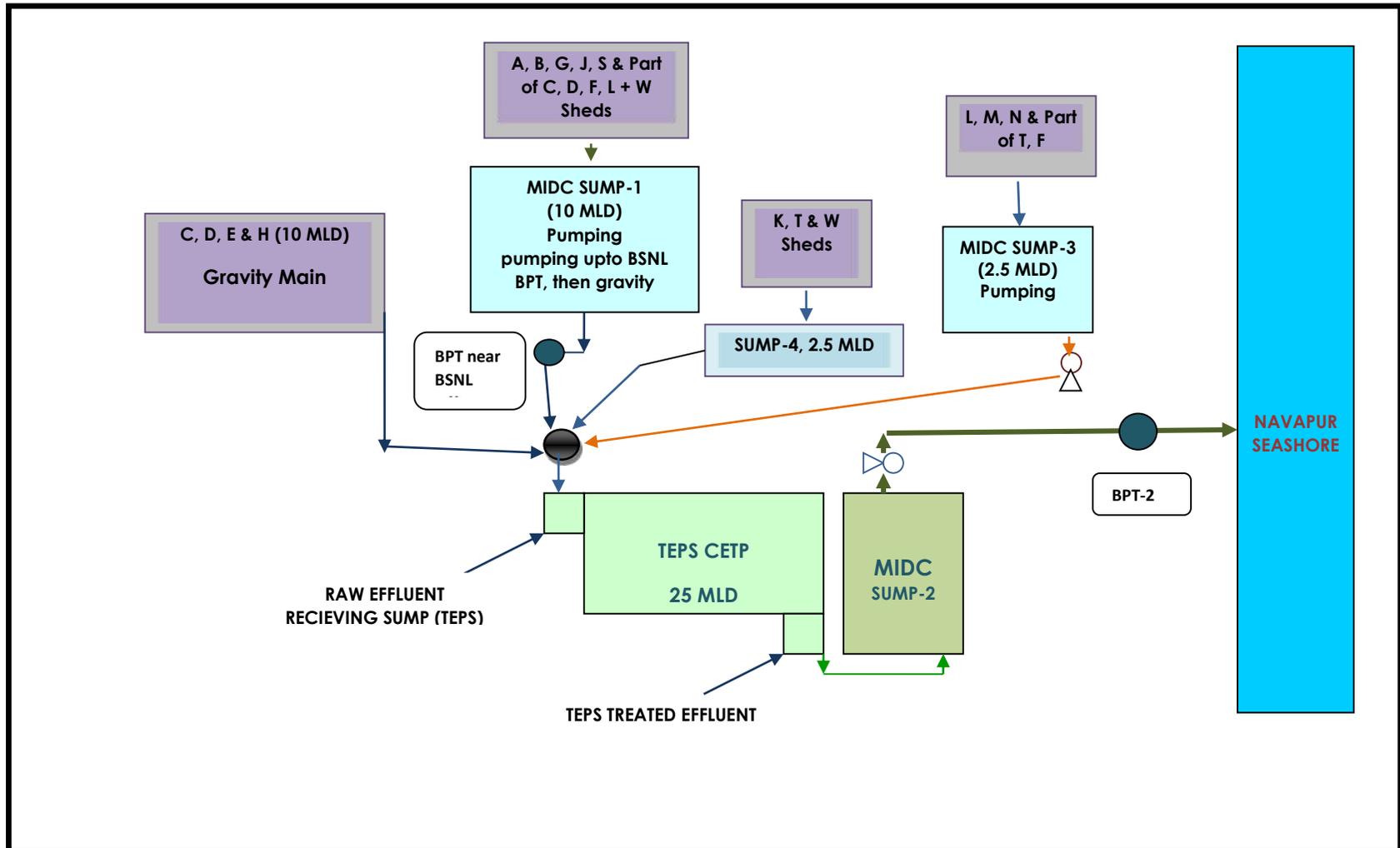
The effluent from industries in these zones are channelized by gravity to sumps namely Sump 1, Sump 3, Sump 4 and Gravity Main. From these, effluent are pumped to CETP except Gravity Main from where effluent is conveyed to the

CETP by gravity. The total drainage collection network is of 59.00 Km which are underground. Most of the drainage network has been converted with HDPE lines.

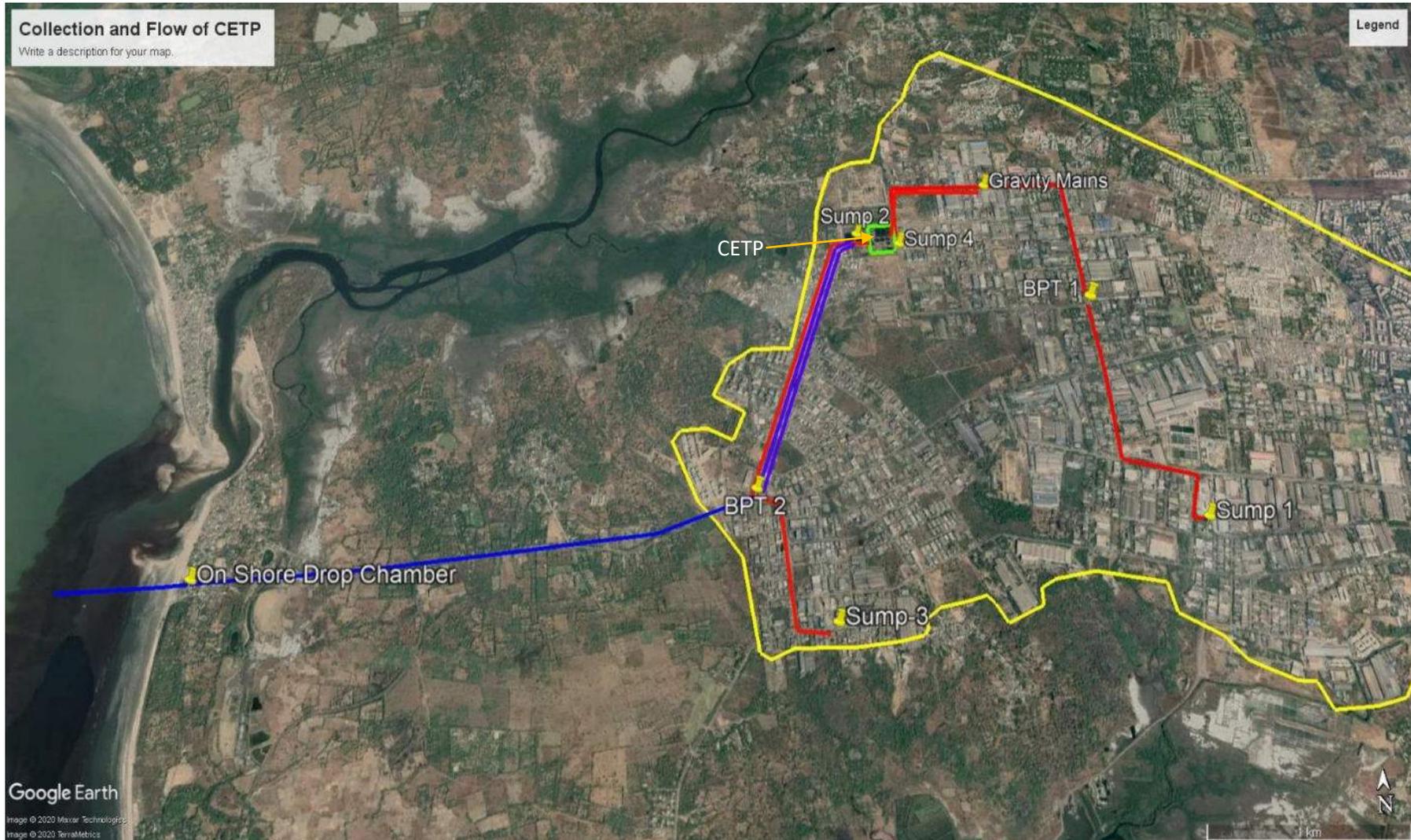
The treated effluent from CETP is conveyed to Sump-2 from where it is pumped for 1.8 km to Break Pressure Tank-2 (BPT-2). The effluent from BPT-2 is conveyed to the On-shore drop chamber which is at 3.36 Km through two pipelines i.e. Line-1 and Line-2. and is finally released to coastal waters of Arabian Sea at a location with shallow depth. The submarine outfall of the CETP outlet is at shallow location which is 500 meters from the On-shore drop chamber. Work of converting the existing Pre-stressed Concrete (PSC) with HDPE lines is in progress.

Schematic diagram showing zone wise collection, sumps, CETP and discharge into Navapur seashore is shown in Fig 3.1. Locations of sumps, CETP and discharge into seashore have also been shown in google earth map in Fig 3.2.

**Fig 3.1: Schematic diagram showing zone wise collection, sumps, CETP and discharge into Navapur Sea Shore**



**Fig. 3.2: Google earth map showing locations of sumps, CETP and discharge into Navapur Beach (Not to the scale)**



Infrastructures available for collection and pumping at various Sumps/Gravity Main and corresponding Zones being catered are given in Table 3.1.

**Table 3.1: Infrastructures available for collection and pumping at various sumps and corresponding Zones**

| Sr. No. | NAME of SUMP | PURPOSE   | ZONE PROVIDING EFFLUENT TO SUMP BY GRAVITY   | INFRASTRUCTURE FOR COLLECTION & DISPOSAL  |
|---------|--------------|---|--|---|
| 1       | SUMP-1       | Used for the pumping to BPT-1 then discharge of effluent to CETP by gravity having number of Textile and Engineering industries   | A, B, G, J, S & Part of C, D, F, L + W Sheds | <ul style="list-style-type: none"> <li>Collection Tank = 02 Nos</li> <li>Capacity -1,500 Cum &amp; 3,000 Cum</li> <li>Installed Pumps -02 Nos (75 HP each), Submersible</li> <li>Individual Pumping Capacity = 500 Cum/Hr.</li> </ul> |
| 2       | SUMP-3       | Used for the collection of effluent generated from L, M, N & T zone having numbers of chemical industries.                        | L, M, N & Part of T, F                       | <ul style="list-style-type: none"> <li>Collection Tank = 01 No</li> <li>Capacity -1,500 Cum</li> <li>Installed Pumps -02 Nos (50 HP each), Coupled Vertical Pumps</li> <li>Individual Pumping Capacity = 200 Cum/Hr.</li> </ul>       |
| 3       | SUMP-4       | Used for the collection of effluent from K, T & Part W zone by gravity then pumping to CETP having numbers of chemical industries | K, T & W Sheds                               | <ul style="list-style-type: none"> <li>Collection Tank = 01 No</li> <li>Capacity -500 Cum</li> <li>Installed Pumps -02 Nos (20 HP each), Coupled Submersible Pumps</li> <li>Individual Pumping Capacity = 200 Cum/Hr.</li> </ul>      |
| 4       | GRAVITY MAIN | Used for the transferring effluent from Zone C, D, E, & H   | C, D, E & H                                  | <ul style="list-style-type: none"> <li>No Machinery installed</li> </ul>  |
| 5       | SUMP-2       | Used for collection of treated effluent for pumping to BPT-2 then discharge of effluent to Sea by gravity                         | TREATED EFFLUENT FROM CETP                   | <ul style="list-style-type: none"> <li>Collection Tank = 01 No</li> <li>Capacity -10,000 Cum</li> <li>Installed Pumps - 04 Nos (100 HP each), Coupled Vertical Pumps</li> <li>Individual Pumping Capacity = 450 Cum/Hr</li> </ul>     |

### 3.4 DESIGN/CONSENT NORMS OF CETP, TARAPUR

CETP inlet and outlet design parameters, as informed by M/s TEPS, and prescribed standards under the Consent to Operate vide dated Consent No. MPC/WPAE/EIC/TN-0261-05/Thane-107 dated 22/03/2005 and vide Consent No. BO/JD(WPC)/UANN0-0000062174/R/HOD/1911001395 dated 29/11/2019, granted by MPCB under Water (Prevention & Control of Pollution) Act, 1974 are given in Table 3.2:

**Table-3.2 : CETP Design Parameters and prescribed limits as per Consent**

| S. No. | Parameters   | Inlet Limit                |                             | Outlet Limit               |                             |
|--------|--------------|----------------------------|-----------------------------|----------------------------|-----------------------------|
|        |              | As per Design <sup>§</sup> | As per Consent <sup>#</sup> | As per Design <sup>§</sup> | As per Consent <sup>#</sup> |
| 1.     | pH           | 5.5-7                      | 6.0-9.0                     | 5.5-7                      | 6.0-9.0                     |
| 2.     | TSS          | 300-400                    | <i>Refer Note below</i>     | 100                        | 100                         |
| 3.     | BOD          | 1500                       |                             | 100                        | 30*                         |
| 4.     | COD          | 3500                       |                             | 250                        | 250                         |
| 5.     | Oil & Grease | 50                         | 20                          | 10                         | 10                          |

Note:

- Parameters are expressed in mg/l except pH.
- CETP Inlet norms for SSI industries (discharge up to 25 m<sup>3</sup>/day) i.e. Industries' Outlet norms- BOD: 1500 mg/l, COD: 3500 mg/l. The SSI (more than 25 m<sup>3</sup>/day), MSI and LSI units, are required to discharge effluent to CETP within stipulated standards in their individual consent (i.e. COD: 250mg/l; BOD 100 mg/l and other parameters & limits specified therein).

\*The limit of BOD = 30 mg/l has been stipulated as per direction of MPCB dated 02.04.2016 and incorporated in Consent to Operate dated 13.04.2016 issued to CETP. Prior to that, the Limit was stipulated as 100 mg/l.

# Besides the above 05 parameters, the Consent to Operate also specify other parameters and their limits

§ As informed by M/s TEPS-CETP

Copy of Consent to Operate dated 29/11/2019 issued to the CETP by MPCB is given at **Annexure – I**.

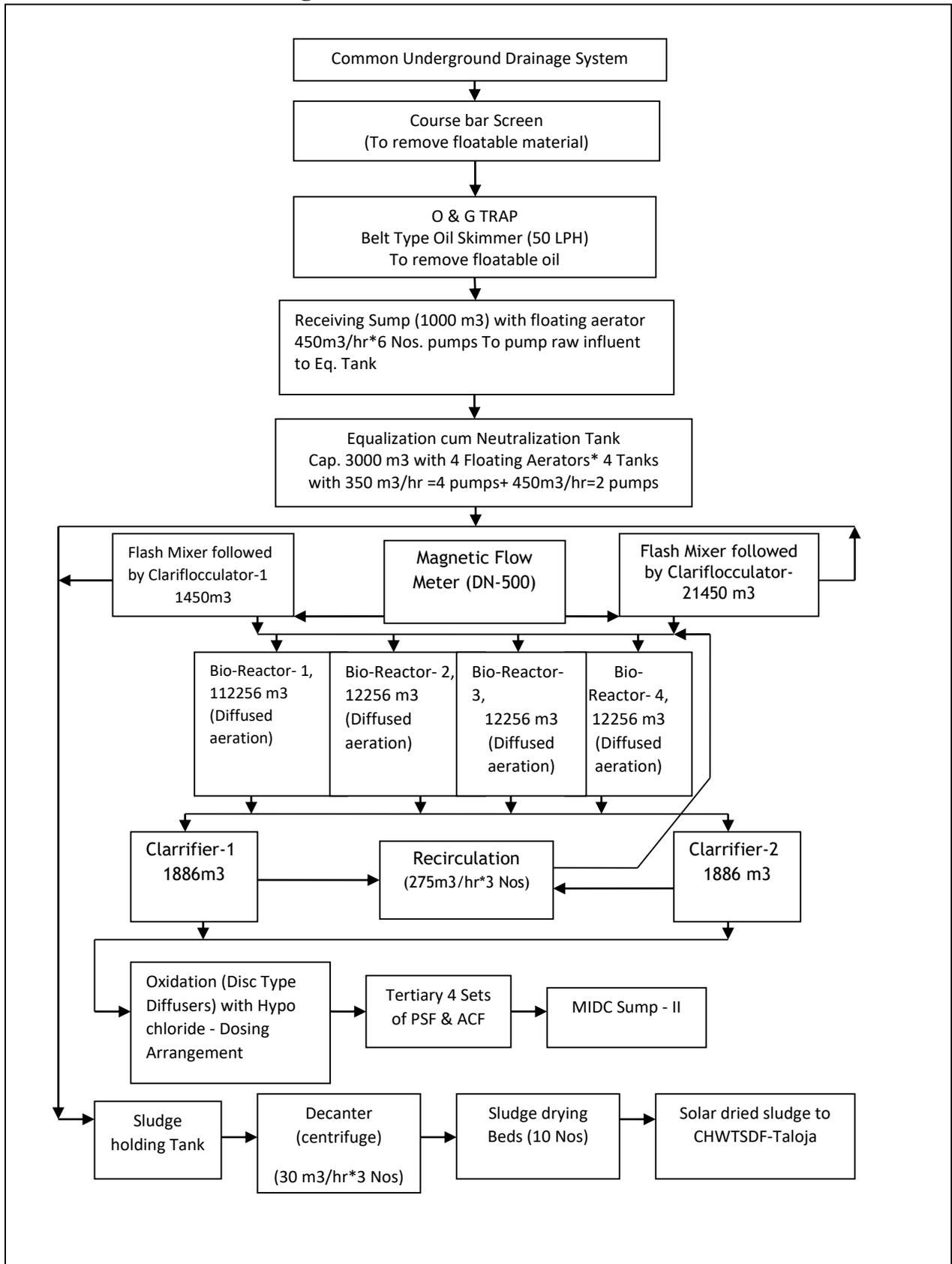
### 3.5 PRESENT TREATMENT SCHEME OF CETP

The treatment methodology comprises of primary, secondary and tertiary treatment. CETP receives effluent for treatment from MIDC.

- Pre-primary & Primary treatment System:  
Course bar Screen, oil and grease trap, receiving sump with floating aerators, equalization cum Neutralization tank, Flash Mixture followed by Clariflocculator (2 Nos.)
- Secondary treatment System:  
Activated Sludge process (4 Nos. of aeration tanks), Clarifiers (2 Nos.), oxidation with hypo chloride dosing arrangement.
- Tertiary treatment system:  
Pressure sand filter and Activated carbon filter (4 sets)

CETP Flow Diagram showing various units operations/processes is given at **Figure-3.3**. Few photographs of CETP are given in **Annexure-II**.

### Flow Diagram/Schematic of CETP (25MLD)



**Figure-3.3 : Flow Diagram/Schematic of CETP (25 MLD) Tarapur**

### 3.6 DISPOSAL OF TREATED EFFLUENT

The treated effluent from CETP is conveyed to Sump-2 from where it is released to coastal waters of Arabian Sea at a location with shallow depth. The submarine outfall of the CETP outlet is at shallow location which is 500 meters from the On-shore drop chamber. The pipeline from Sump-2 to the said On-shore drop chamber is 5.16 km.

### 3.7 SLUDGE MANAGEMENT

CETP has 03 decanter centrifuges each having capacity of 30 cum/hour. There are 10 nos. solar drying pits having RCC surface and leachate collection arrangement.

The sludge generated from the treatment process is collected in a sludge holding tank. The sludge after decanter (centrifuge) and sludge drying beds is sent to Common Hazardous Waste Treatment Storage and Disposal Facility (CHWTSDF), Taloja, Dist. Raigad for disposal.

Year wise CETP Sludge received at CHWTSDF, Taloja, by the CETP Tarapur operator since April 2011 to September 2019 is given at Table 3.3.

**Table 3.3:** Year wise CETP Sludge received at CHWTSDF, Taloja

| Sl. No. | Financial Year             | CETP Sludge received at CHWTSDF Taloja from CETP Tarapur |
|---------|----------------------------|--|
| 1.      | 2011-12                    | 1789.32  |
| 2.      | 2012-13                    | 2347.38  |
| 3.      | 2013-14                    | 3795.96  |
| 4.      | 2014-15                    | 2771.865   |
| 5.      | 2015-16                    | 6318.375   |
| 6.      | 2016-17                    | 5533.89  |
| 7.      | 2017-18                    | 5643.93  |
| 8.      | 2018-19                    | 3993.08  |
| 9.      | 2019-20 (Up To Sept. 2019) | 1034   |

The above Table 3.3 reveals that **the CETP operator is either not generating consistent CETP sludge or the entire CETP sludge generated is not being sent to CHWTSDF.**

Further, as per authorisation dated 29/11/2019 granted by MPCB having validity from 31/12/2017 to 31/12/2020, the CETP has been **authorised for 7 Metric Tonne/Day as Chemical Sludge.** However, the unit is generating more than the authorised quantity as is evident from sludge sent to CHWTSDF, Talaja. **About 750 metric tons of sludge was stored as on 13.11. 2019 at CETP premises.**

### **3.8 PERFORMANCE OF CETP**

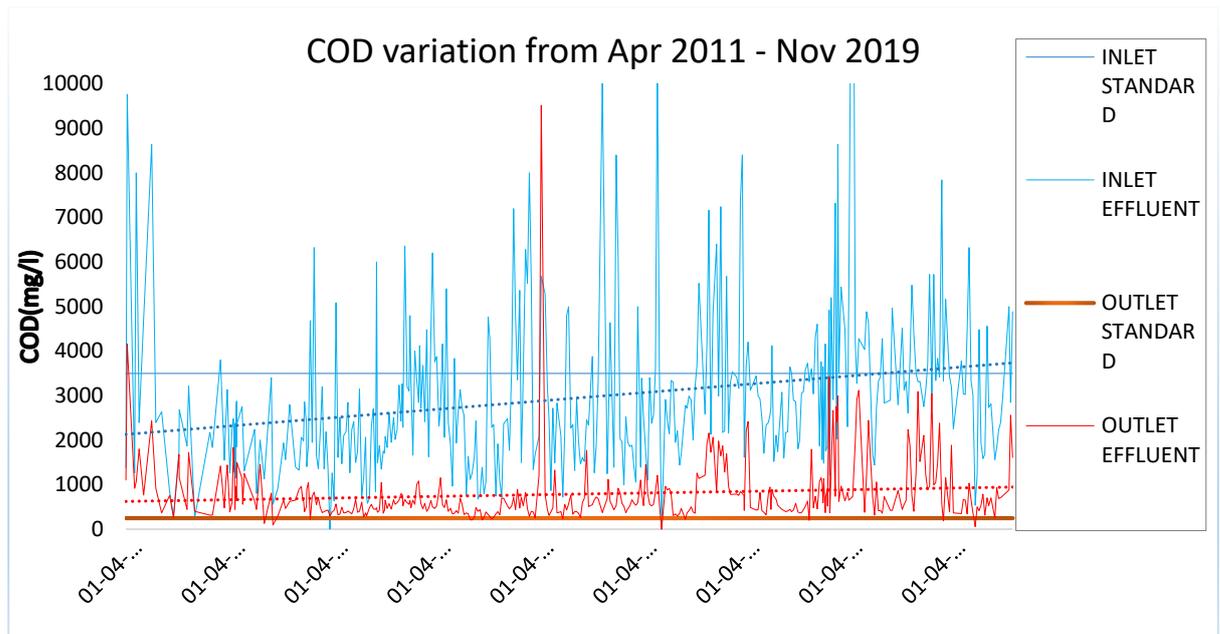
#### **3.8.1 As per Sampling & Monitoring by MPCB (April 2011-Nov.2019)**

Sampling & analysis of inlet and outlet grab effluent of CETP are carried out by MPCB basis since Jan 2009. The same have been carried out for parameters pH, BOD, COD, SS and TDS.

The analysis results of grab samples (collected at 1 to 5 occasions in a month) since April 2011 to Nov. 2019 are given at **Annexure - III**

Following are the observations on the aforesaid analysis results of MPCB since April 2011 to Nov. 2019:

##### **3.8.1.1 COD in Inlet and Outlet:**

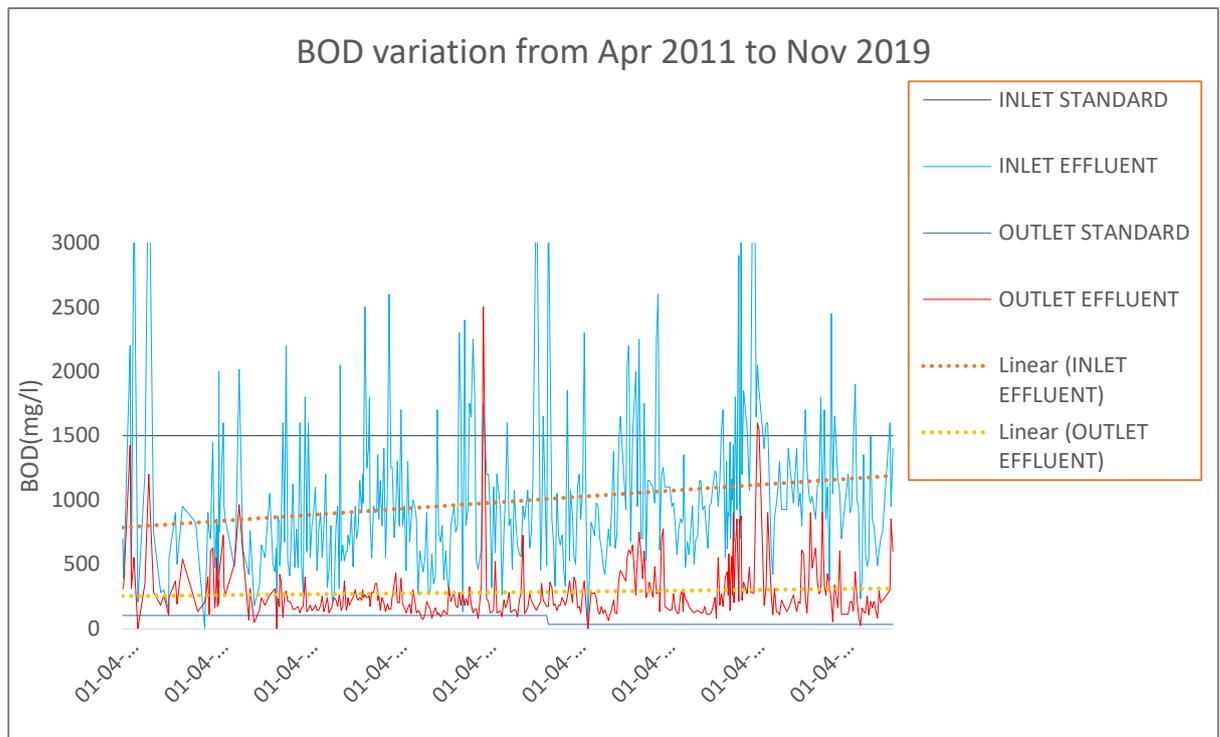


**Fig 3.4: Monthly COD analysis result (MPCB Result)**

The analysis result of COD of CETP inlet and outlet effluent is given in Figure 3.4. The data given at Annexure - III and the Figure 3.4 reveals that COD outlet has hardly complied with the standard of 250 mg/l stipulated under the Consent to Operate. **Among the 391 outlet samples collected during the said period of April 2011 to Nov. 2019, 379 samples have exceeded the said outlet standard and average COD concentration in CETP outlet has been observed as 813.64 mg/l.**

The CETP inlet effluent has also not complied continuously to the prescribed standard limit of 3500 mg/l. **Among 391 inlet samples collected during the said period of April 2011 to Nov. 2019, 100 samples have exceeded the said inlet standard and average COD concentration in CETP inlet has been observed as 5323.76 mg/l.**

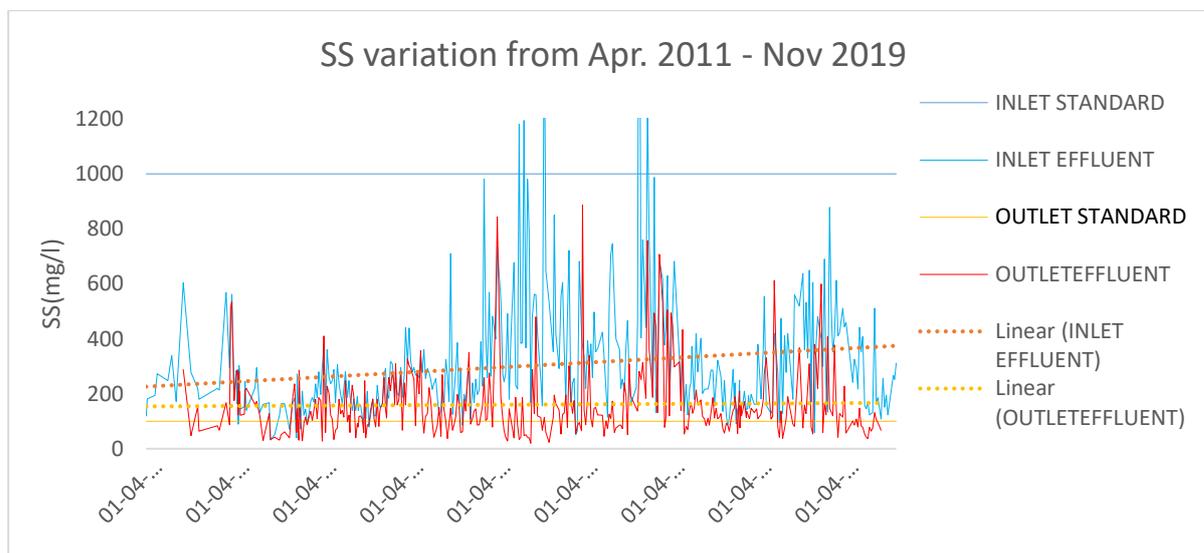
### 3.8.1.2 BOD in Inlet and Outlet:



**Fig 3.5: Monthly BOD analysis result (MPCB Result)**

The analysis result of BOD of CETP inlet and outlet effluent is given in Figure 3.5. The data given at Annexure - III and the Figure 3.5 reveals that **BOD outlet has hardly complied with the standard of 100 mg/l or 30 mg/l stipulated under Consent to Operate. Among the 391 outlet samples collected during the said period of April 2011 to Nov. 2019, BOD concentration of 390 samples have exceeded the said outlet standard of 100 mg/l or 30 mg/l and having average concentration as 315.6 mg/l.** The CETP inlet effluent has intermittently not complied to the prescribed standard limit of 1500 mg/l. **Among 391 samples collected during the said period of April 2011 to Nov. 2019, 61 samples have exceeded the said inlet standard and average BOD concentration in CETP inlet has been observed as 2098.6 mg/l.**

### 3.8.1.3 Suspended Solids (SS) in Inlet and Outlet:



**Fig 3.6: Monthly SS analysis result (MPCB Result)**

The analysis result of SS of CETP inlet and outlet effluent is given in Figure 3.6. The data given at Annexure - III and the Figure 3.6 reveals that SS outlet has not continuously complied with the standard of 100 mg/l stipulated under the Consent to Operate. Among the 389 outlet samples collected during the said period of April 2011 to Nov. 2019 and analysed for SS, 269 samples have exceeded the said outlet standard having average concentration as 206.53 mg/l.

The CETP inlet effluent has shown compliance to the prescribed standard limit of 1000 mg/l. However, among 389 samples collected during the said period of April 2011 to Nov. 2019 and analysed for SS, 5 samples have exceeded the said inlet standard having average concentration as 1536.4 mg/l.

Among the above monitored outlet parameters, **COD and BOD has hardly complied with the CETP outlet standards prescribed under the Consent to Operate** while SS has not continuously complied. The average exceedances are more than 3, 10 and 2 times of prescribed COD, BOD and TSS respectively to the said standards respectively since January 2011. pH and O&G shows consistence compliance to the stipulated CETP outlet standards.

COD concentration in CETP inlet is not complying continuously to the design norms while BOD is also intermittently not complying since January 2011. The average exceedances of COD and BOD are more than 2 times to

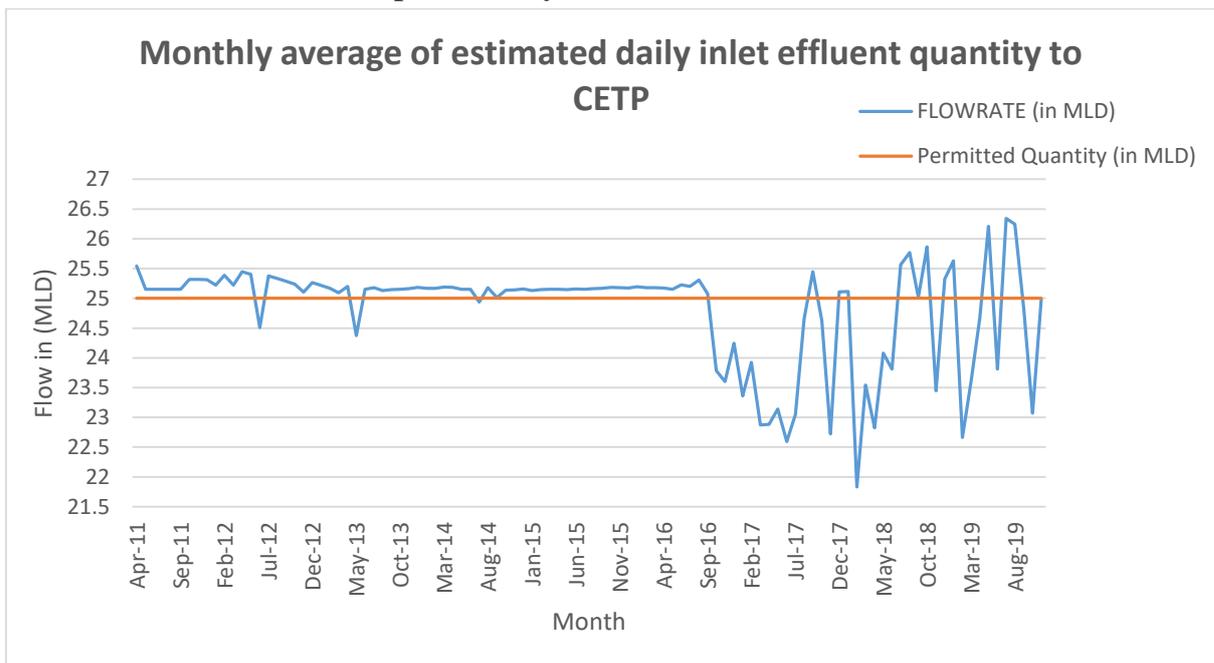
the said design norms. SS, pH and O&G are complying with the CETP inlet design norms/standards.

### 3.8.2 CETP Inlet effluent quantity

There is no arrangement to measure effluent coming to CETP from various sumps (i.e. Sump 1; Sump 3, Sump 4 and Gravity Line) nor at collection tank at CETP. However, effluent flow meter is provided at post equalization tanks which may not measure the overflow from equalization tanks or before.

However, the monthly average of the estimated daily inlet effluent quantity to CETP, as provided by M/s TEPS, since April 2011 to November 2019 is given at Annexure - IV and the same has been shown in the graphical form in Fig. 3.7.

**Fig 3.7: Monthly average of estimated daily inlet effluent quantity to CETP (as provided by M/s TEPS)**



The data at Annexure - IV and the above figure reveal that **of the 104 months since April 2011 to Nov 2019, the CETP inlet effluent quantity has exceeded for 75 months than the designed capacity of 25 MLD. During such 75 months, the said average inlet to the CETP has been reported as 25.27 MLD having maximum monthly average of daily inlet effluent quantity as 26.343**

**MLD against the said design of 25 MLD.** The excess hydraulic load may have resulted into drains as overflow.

### 3.8.3 CETP MONITORING JOINTLY BY CPCB AND MPCB

Central Pollution Control Board (CPCB) has also monitored the CETP jointly with MPCB on various occasions during 2007 to 2013 and in January 2018. The analysis result are given in Table 3.4.

**Table 3.4: Analysis result of waste water samples from inlet and outlet.**

| Sampling Locations         | Date of monitoring | Parameter(s)   |            |             |                         |                          |           |             |             |                    |     |
|----------------------------|--------------------|----------------|------------|-------------|-------------------------|--------------------------|-----------|-------------|-------------|--------------------|-----|
|                            |                    | pH             | TSS        | TDS         | BOD                     | COD                      | O&G       | Phenols     | CN          | NH <sub>3</sub> -N | S-2 |
| <b>Design/Inlet Norms</b>  |                    | <b>5.5-9.0</b> | --         | --          | <b>1500*</b>            | <b>3500<sup>\$</sup></b> | <b>20</b> | <b>5</b>    | <b>0.2</b>  | <b>50</b>          | --  |
| <b>Inlet to CETP</b>       | 02.03.2007         | 5.3            | 224        | 2463        | 696                     | <b>3780</b>              | --        | --          | --          | <b>70</b>          | --  |
|                            | 24.01.2008         | 2.41           | 329        | 2324        | 883                     | 1877                     | --        | 0.54        | --          | 28                 | --  |
|                            | 12.01.2011         | 7.1            | 1021       | 4122        | 1263                    | 3147                     | --        | 5.76        | 0.26        | <b>123</b>         | --  |
|                            | 29.09.2011         | 6.27           | 562        | 4458        | 1239                    | 2718                     | --        | 17.33       | --          | <b>281</b>         | --  |
|                            | 28.12.2011         | 2.37           | 310        | 5997        | 974                     | 2323                     | 62.1      | 18.6        | 0.28        | <b>136</b>         | --  |
|                            | 28.12.2011         | 2.76           | 452        | 5781        | 959                     | 2709                     | --        | 9.02        | 0.26        | <b>225</b>         | --  |
|                            | 04.05.2012         | 4.98           | 915        | 3597        | 956                     | 2914                     | --        | 4.64        | --          | <b>102</b>         | --  |
|                            | 25.09.2012         | 6.51           | 436        | 3972        | 1000                    | 2082                     | 50.9      | 10.33       | --          | 40.3               | --  |
|                            | 17.04.2013         | 6.52           | 604        | 3551        | 1052                    | 2460                     | --        | 11.8        | --          | <b>156</b>         | --  |
|                            | 17.01.2018         | 5.38           | 600        | 9259        | <b>2000</b>             | <b>5388</b>              | --        | 63.1        | --          | <b>354.5</b>       | --  |
| <b>Design/Outlet Norms</b> |                    | 5.5 - 9        | 100        | 100         | 30 (100 <sup>\$</sup> ) | 250                      | 10        | 5           | 0.2         | 50                 | --  |
| <b>Outlet of CETP</b>      | 02.03.2007         | 6.9            | <b>176</b> | <b>4419</b> | <b>550</b>              | <b>1554</b>              | 2.3       | 0.59        | 0.04        | <b>151</b>         | --  |
|                            | 24.01.2008         | 8.15           | <b>610</b> | <b>5434</b> | <b>585</b>              | <b>2229</b>              | --        | 2.9         | <b>1.08</b> | <b>168</b>         | --  |
|                            | 12.01.2011         | 7.4            | <b>128</b> | <b>4031</b> | <b>513</b>              | <b>1036</b>              | 11        | <b>7.02</b> | 0.09        | <b>90</b>          | --  |

|  |            |     |      |       |      |      |  |       |       |       |       |
|--|------------|-----|------|-------|------|------|--|-------|-------|-------|-------|
|  | 17.01.2018 | 6.8 | 2073 | 10080 | 1410 | 3960 |  | 100.3 | 0.065 | 402.7 | 52.54 |
|--|------------|-----|------|-------|------|------|--|-------|-------|-------|-------|

Note: Except pH, all other results are expressed in mg/L.

\* *The Consent stipulates CETP Inlet norms for SSI industries (discharge up to 25 m<sup>3</sup>/day) i.e. Industries' Outlet norms- BOD: 1500 mg/l, COD: 3500 mg/l. The SSI (more than 25 m<sup>3</sup>/day), MSI and LSI units, are required to discharge effluent to CETP within stipulated standards in their individual consent (i.e. COD: 250mg/l; BOD 100 mg/l and other parameters & limits specified therein).*

The analysis results reveal that the CETP did not meet discharge standards. Concentration of COD, BOD, Ammonical Nitrogen, TSS and TDS in CETP outlet exceed the outlet standard prescribed under the Consent to Operate in all the 04 samples. **The same exceed more than 4 to 15 times, 5 to 47 times, 1 to 8 times, 1 to 20 times and 40 to 100 times respectively to the said standards. Phenols also exceeded 1.4 to 20 times the outlet standard in two of the samples and Cyanide exceed 5.4 times in one of the samples.** In the inlet effluent also, Ammonical Nitrogen exceeded the inlet standard prescribed under the Consent to Operate in all the inlet samples except in two samples. The same exceed to more than 1.4 to 7 times the inlet standard. COD also exceeded (1.08 to 1.5 times) in two of the samples and BOD (1.3 times) in one of the samples.

#### **3.8.4 CETP MONITORING DURING COMMITTEE VISIT:**

Stage wise grab sampling from the current operational CETP and inlet & outlet sumps were carried out during the visit of the committee on 13.11.2019. The samples were analyzed at Central Laboratory, MPCB, Navi Mumbai. The sampling locations are given in **Table-3.5** and the analysis results are given in the **Table- 3.6, 3.7 & 3.8.**

**Table-3.5: Sampling locations of CETP and Sumps**

| <b>S.N.</b> | <b>Location Description(s)</b>   |
|-------------|--|
| 1           | Inlet to CETP (from MIDC Sump-1+ Gravity)                                    |
| 2           | Inlet to CETP (from MIDC Sump-3)   |
| 3           | Inlet to CETP (from MIDC Sump-4)   |
| 4           | CETP Inlet (mixed influent) (collection tank after O & G trap,)              |
| 5           | Outlet of Equalization Tanks   |
| 6           | Outlet of Primary clarifier  |
| 7           | Outlet of Secondary Clarifier  |
| 8           | Outlet of Oxidation with Hypo-chlorite treatment (Before Tertiary Treatment) |
| 9           | Outlet of CETP (from MIDC Sump-2) (premises near CETP)                       |
| 10          | Outlet of CETP (MIDC BPT) near Navapur seashore                              |

**Table-3.6: Analysis Results of Monitoring carried-out at CETP Tarapur  
Inlet Sumps & Inlet of CETP (13.11.2019)**

| Sampling Locations→<br>Parameters ↓   | Inlet to CETP<br>(from MIDC Sump 1+ Gravity) | Inlet to CETP<br>(from MIDC Sump-3) | Inlet to CETP<br>(from) MIDC Sump-4 | CETP Inlet<br>(mixed influent ) | Outlet of Equalization | Inlet Design Norm <sup>#</sup> | Inlet Standard as per the Consent |
|---------------------------------------|--|-------------------------------------|-------------------------------------|---------------------------------|------------------------|--------------------------------|-----------------------------------|
| pH                                    | 5.9  | 8.6                                 | 8.4                                 | 7                               | 8.5                    | 5.5-7                          | 6-9                               |
| TSS(mg/l)                             | 188  | 112                                 | 128                                 | 316                             | 352                    | 300-400                        | Refer Note below                  |
| Total Fixed Soild (TFS)               | 15025  | 11402                               | 15598                               | 10207                           | 12088                  | -                              |                                   |
| TDS(mg/l)                             | 17260  | 13787                               | 18187                               | 12350                           | 14769                  | -                              | NS                                |
| BOD(mg/l)                             | 1450   | 1950                                | 3800                                | 3150                            | 2200                   | 1500                           | Refer Note below                  |
| COD(mg/l)                             | 2624   | 4120                                | 8880                                | 5680                            | 4960                   | 3500                           |                                   |
| Phenols(mg/l)                         | 0.92   | 2.09                                | 1.63                                | 9.28                            | 4.83                   | --                             | 5                                 |
| Total Ammonical Nitrogen (TAN) (mg/l) | 2.4  | 6.2                                 | 6.5                                 | 14.7                            | 28.7                   | --                             | 50                                |

*All values are in mg/l except pH; Mode of sampling – Grab; NS – Not Specified*

<sup>#</sup> *As informed by M/s TEPS-CETP*

*Note: The Consent stipulates CETP Inlet norms for SSI industries (discharge up to 25 m<sup>3</sup>/day) i.e. Industries' Outlet norms- BOD: 1500 mg/l, COD: 3500 mg/l. The SSI (more than 25 m<sup>3</sup>/day), MSI and LSI units, are required to discharge effluent to CETP within stipulated standards in their individual consent (i.e. COD: 250mg/l; BOD 100 mg/l and other parameters & limits specified therein).*

**Table-3.7: Analysis Results of Stage Wise Sampling from Inlet to Outlet of CETP**

| S. No. | Sampling Locations→<br>Parameters ↓ | CETP Inlet | Outlet of Equalization | Outlet of Primary clarifier | Outlet of Secondary Clarifier | Outlet of Hypo treatment | Outlet of CETP (MIDC Sump 2) | Outlet of CETP (MIDC BPT) near Navapur beach | Outlet Standards MPCB |
|--------|-------------------------------------|------------|------------------------|-----------------------------|-------------------------------|--------------------------|------------------------------|--|-----------------------|
| 1      | pH                                  | 7          | 8.5                    | 8.5                         | 7.2                           | 7.1                      | 7.2                          | 6.9  | <b>6.0 -9.0</b>       |
| 2      | TSS(mg/l)                           | 316        | 352                    | 1162                        | 548                           | 464                      | <b>484</b>                   | <b>412</b>                                   | <b>100</b>            |
| 3      | Total Fixed Solid (TFS)             | 10207      | 12088                  | 15693                       | 7809                          | 17296                    | 9232                         | 8536   | NS                    |
| 4      | TDS(mg/l)                           | 12350      | 14769                  | 18694                       | 9233                          | 21489                    | 11320                        | 9974   | NS                    |
| 5      | BOD(mg/l)                           | 3150       | 2200                   | 1800                        | 950                           | 950                      | <b>1350</b>                  | <b>1175</b>                                  | <b>30*</b>            |
| 6      | COD(mg/l)                           | 5680       | 4960                   | 5680                        | 2720                          | 2528                     | <b>4880</b>                  | <b>2928</b>                                  | <b>250</b>            |
| 7      | Phenols(mg/l)                       | 9.28       | 4.83                   | 7.2                         | 10.59                         | 2.12                     | <b>5.84</b>                  | <b>11.42</b>                                 | <b>5</b>              |
| 8      | Total Ammonical Nitrogen (TAN)      | 14.7       | 28.7                   | 15.4                        | 12.8                          | 4.5                      | 13.4                         | 9.8  | <b>50</b>             |

*Mode of sampling – Grab; NS – Not Specified; All values are in mg/L, except pH*

*\* The limit of 30 mg/l has been stipulated since Consent to Operate dated 13/4/2016. Prior to that, the Limit was stipulated as 100 mg/l.*

**Table-3.8: Analysis Results- Heavy Metals**

| S. No. | Sampling Locations→<br>Parameters ↓ | Inlet standards<br>(as per Consent) | CETP Inlet | Equalization outlet | Outlet of CETP (MIDC Sump-2) | Outlet of CETP (MIDC BPT) near Navapur seashore | Outlet standards<br>(as per Consent) |     |
|--------|-------------------------------------|-------------------------------------|------------|---------------------|------------------------------|---|--------------------------------------|-----|
| 1      | Metals                              | Iron(mg/l)                          | NS         | 303.92              | 153.78                       | 133.04  | 85.04                                | 3   |
| 2      |                                     | Lead(mg/l)                          | 1          | 0.05                | 0.08                         | 0   | 0.01                                 | 0.1 |
| 3      |                                     | Nickel(mg/l)                        | 3          | 1.47                | 1.05                         | 0.61  | 0.56                                 | 3   |
| 4      |                                     | Cobalt(mg/l)                        | NS         | 0.12                | 0.07                         | 0.02  | 0.03                                 | NS  |
| 5      |                                     | Copper (mg/l)                       | 3          | 0.76                | 0.49                         | 0.02  | 0.14                                 | 3   |
| 6      |                                     | Total Chromium (mg/l)               | 2          | 0.71                | 0.65                         | 0.86  | 0.24                                 | NS  |
| 7      |                                     | Zinc(mg/l)                          | 15         | 4.53                | 5.18                         | 2.20  | 1.4                                  | 15  |
| 8      |                                     | Arsenic(mg/l)                       | 0.2        | 10.40               | 19.70                        | 12.9  | 3.55                                 | 0.2 |
| 9      |                                     | Barium(mg/l)                        | NS         | 0.08                | 0.11                         | 0.13  | 0.1                                  | NS  |
| 10     |                                     | Vanadium (mg/l)                     | NS         | 0.09                | 0.17                         | 0.17  | 0.07                                 | 0.2 |

*Mode of sampling – Grab; NS – Not Specified*

The above analysis results reveal that:

- (a) Gross non-compliance of the inlet design norms as well as outlet norms of the CETP.

BOD is 3150 mg/l at inlet of CETP which is more than 1500 mg/l- inlet design norms whereas COD is 5680 mg/l at Inlet of CETP, which is more than 3500 mg/l i.e. inlet design norms. BOD of influent is over double the inlet design norm whereas COD is 1.6 times of inlet design norm.

Phenols too is exceeding the CETP inlet standard prescribed under the Consent to Operate which was observed as 9.28 mg/l (1.8 times) against the said standard of 5 mg/l.

- (b) The samples of treated effluent of CETP were collected from two locations namely from MIDC Sump-2 near the CETP and from MIDC BPT near

Navapur Beach/shore from where it is being discharged to the Arabian Sea. Analysis results of the said samples reveal that concentration of TSS, BOD, COD, Phenols, Iron and Arsenic grossly exceed among the analysed parameters of the Outlet Standards prescribed by MPCB.

The concentration of TSS, BOD, COD, Phenols, Iron and Arsenic and their exceedance are shown in the following Table-3.9:

**Table-3.9: Exceedance of Pollutants in CETP outlet**

| Pollutants | Outlet of CETP (MIDC Sump-2) | Outlet of CETP (MIDC BPT) near Navapur seashore | Standards prescribed by MPCB | Exceedance                              |
|------------|------------------------------|---|------------------------------|---|
| TSS        | 484                          | 412   | 100                          | More than 4 times the standards         |
| BOD        | 1350                         | 1175  | 30                           | More than 39 and 45 times the standards |
| COD        | 4880                         | 2928  | 250                          | More than 9 and 11 times the standards  |
| Phenols    | 5.84                         | 11.42   | 5                            | More than 1 and 2 times the standards   |
| Iron       | 133.04                       | 85.04   | 3                            | More than 28 and 44 times the standards |
| Arsenic    | 12.9                         | 3.55  | 0.2                          | More than 17 and 64 times the standard. |

*(All the values are expressed in mg/l)*

**3.8.4.1 Other observations made during the said visit of the committee on 13/11/2019:**

- (i) All the treatment units of CETP were found operational except tertiary treatment system (comprising Pressure Sand and Activated Carbon Filter). The tertiary treatment was observed to be defunct since long time.
- (ii) During the visit, CETP was operational without valid consent. The earlier consent expired on 31.12.2017. MPCB issued consent on 29.11.2019 for the period from 31.12.2017 to 31.12.2020. This shows

the CETP was operational without consent from 31.12.2017 to 29.11.2019 i.e. almost for 23 months. MPCB granted consent even though CETP is grossly polluting consistently. MPCB has taken various actions against CETP as detailed in Point 3.11.

- (iii) There were leakages from pipes & pumps, overflow of effluent from some units (equalization tanks/aeration tanks) and overall housekeeping was found to be poor. There was heavy smell of SVOCs/VOCs (solvents/chemicals) near the inlet sumps. Inlet of CETP (with BOD: 3150 mg/l & COD: 5680 mg/l) indicating that member industries discharging their untreated/partially treated effluent to CETP without confirming the inlet design norms of CETP. CETP is not designed for such high strength effluent. There is an urgent need of separate arrangement for High COD and High TDS effluent such as Common MEE and Common Spray Dryer. Such effluent streams are required to be separately collected and transferred to common facilities with identification of such industries.

CETP has no proper mechanism in place for routine monitoring of individual defaulter member units.

- (iv) The inlet effluent is exceeding the 25 MLD design hydraulic load of CETP. The inlet flow meter and Online Continuously Monitoring System is not functioning consistently. The CETP operator also informed that inlet effluent quantity exceeds the design hydraulic load of CETP of 25 MLD that too with higher concentration at inlet. MPCB estimates that CETP inlet effluent quantity may be about 28 MLD against the design/consented capacity of 25 MLD.
- (v) Inlet Quality Standards are yet to be prescribed by MPCB for BOD & COD in the Consent of CETP as per MoEF&CC Notification dated 01.01.2016. The Consent stipulates that “Only for SSI units (having less than 25 CMD discharge effluent) BOD: 1500 mg/l and COD: 3500 mg/l is allowed and for rest of the industries, treated effluent as per their respective consents standards i.e. COD: 250 mg/l are allowed”.

- (vi) Significant quantity of sludge is deposited (approx.-2400 MT) in the MIDC Sump-2 (10.56 Million Liters- capacity) where treated effluent is collected and further transferred to the sea shore through BPTs. There is also overflowing/leakages from pumps etc. from this sump to nearby natural drain which meets with Navapur Creek and further to the Arabian Sea. It is informed that the operation of this Sump is under MIDC and responsibility lies with MIDC for proper maintenance and removal all the sludge from sump. MIDC needs to be directed to take immediate action for the same.
- (vii) MPCB has authorized 07 Metric Ton/Day as CETP Sludge in the Authorization under Hazardous Waste (M, H & TM) Rules, 2008 for treatment and disposal of Hazardous Waste. The quantum of sludge generation in the CETP may be more than such specified quantity. MPCB may review the same. Further dry weight or wet weight should be specified
- (viii) The stock of sludge about 750 MT stored in the premises needs to be disposed immediately to the CHWTSDF.
- (ix) CETP needs thorough up-gradation/revamping of its units/processes in terms of capacity, retention time, automatic chemicals dosing, scraping mechanism, aeration tanks, aeration capacity, de-sludging, transfer pumps & pipelines, removal of corrosion affected equipment/materials, decanters and its capacity, sludge drying beds, etc.

### **3.9 ACTIONS TAKEN BY MPCB:**

The following actions have been initiated against the TEPS-CETP by MPCB.

- (i) The Board has issued directions u/s 33A of the Water (Prevention & Control of Pollution) Act, 1974 to MIDC vide letter dated 06/03/2017 and directed to take over non-conforming CETPs including TEPS-CETP.
- (ii) The Board has refused consent to Tarapur CETP vide letter dated 28/2/2018. The Respondent Board thereafter has filed Criminal cases bearing No. 196/2018 against the Tarapur CETP before Hon'ble Judicial Magistrate First Class-Palghar. Being aggrieved by the Refusal Order of MPCB issued vide latter dated 28.02.2018, the TEPS-CETP vide dated 28.03.2018 has preferred an Appeal before the Principal Secretary, Environment

Department Government of Maharashtra, to review the refusal order and to grant permission to operate and maintain CETP at Tarapur to the TEPS-CETP and they will undertake the up gradation work of 25 MLD CETP. The Respondent Board in respect of resubmission of application for grant of consent by TEPS-CETP dated 07.11.2018, had once again issued Refusal Order dated 28.02.2019. Being aggrieved by the said Refusal Order dtd.28.02.2019, the TEPS-CETP has preferred an Appeal dated 15.04.2019 before the Principal Secretary, Environment Department Government of Maharashtra, to review the Refusal Order and to grant permission to operate and maintain CETP at Tarapur to the TEPS-CETP and they will undertake the up gradation work of 25 MLD CETP. Further as per fresh application submitted by TEPS CETP Consent to operate is issued on 29.11.2019 for period up to 31.12.2020.

- (iii) Directions u/s 5 of the Environment (Protection) Act, 1986 issued by the Central Pollution Control Board vide letter dated 23/07/2018 to Tarapur CETP and directed to take corrective action and operate properly to meet the stipulated norms, to identify the industries to keep a check on effluent quality of CETP, to install CEMS and provide data connectivity to MPCB and CPCB, to stop mixing and discharging of untreated waste water / effluent etc.
- (iv) Prosecution Notice issued u/s 15 of the (Environment) Act, 1986 vide letter dated 21/01/2019 by the Board for non-performing existing 25 MLD CETP within stipulated period. In response to the said prosecution notice, Tarapur CETP has submitted its reply dated 08.02.2019.
- (v) Proposed directions issued u/s 33A of the Water (Prevention & Control of Pollution) Act, 1974 vide letter dated 24/1/2019 by the Board and directed Tarapur CETP as to why it shall not be directed to deposit an amount of Rs.5,00,000/- per day (i.e. 2 paise per ltr./per day) towards the remediation cost to the environment as per 'Polluters Pay Principle'. The TEPS-CETP vide letter dated 10.02.2019 made submission that they submitted the action plan and the execution on action plan is already started.
- (vi) Directions issued u/s 33A of the Water (Prevention & Control of Pollution) Act, 1974 vide letter dated 14/02/2019 and directed Tarapur CETP to deposit an amount of Rs.5,00,000/- per day (i.e.2 paise per ltr./per day) towards the remediation cost to the environment as per 'Polluters Pay Principle'.

- (vii) Show cause notices for closure were issued in the month of May, 2019 to 113 industries and directed to submit the details about high COD stream with quantity of effluent generated from their processes and its treatment
- (viii) Bank Guarantees of the 23 non-complying industries to the tune of Rs.67 Lakhs have been forfeited.
- (ix) Directions u/s 33A of the Water (Prevention & Control of Pollution) Act, 1974 was issued to Tarapur Environment Protection Society CETP by the Board vide letter dated 28/6/2019 and directed to get the strainers installed on the discharge point of all the member industries along with the provision of positive discharge of effluent to collection system finally reaching to CETP.
- (x) Directions u/s 33A of the Water (Prevention & Control of Pollution) Act, 174 was issued to Maharashtra Industrial Development Corporation, Mumbai by the Board vide letter dated 28/6/2019 and directed to get the strainers installed on the discharge point of all the member industries along with the provision of positive discharge of effluent to collection system finally reaching to CETP. Other details of directions issued are given at Table 103 of Annexure V.
- (xi) The Board has filed Criminal cases bearing Nos.338/2010, 261/2017 and 196/2018 against the Tarapur CETP before the Hon'ble Chief Judicial Magistrate, Thane and Hon'ble Judicial Magistrate First Class-Palghar.

### **3.10 ACTION TAKEN BY CPCB:**

Recently, as compliance of the order of Hon'ble NGT OA. No. 593 of 2017 (arising from W.P. (Civil) No. 375/2012 on the file of the Hon'ble Supreme Court) Paryavaran Suraksha Samiti & Anr. Versus Union of India & Ors, CPCB, RD, Vadodara carried out visits & monitoring of CETP in Maharashtra including CETP Tarapur. Based on the monitoring reports, CPCB issued directions on 13.08.2019 under Section-18 (1) (b) of the Water (prevention and control of Pollution) Act, 1974 regarding non-compliance status of CETPs.

### **3.11 NEW CETP (50 MLD) UNDER INSTALLATION:**

New CETP of 50MLD (12.5 MLD x 4) is proposed in two phases at plot no. OS-30 in MIDC and its first phase (two modules of 12.5 MLD with total 25 MLD) was expected to start by December 2019, as informed by M/s TEPS.

Consent to establish has been granted for 50 MLD and TEPS has applied for consent to operate but the same has not yet been granted for the Phase-I (i.e. 12.5 MLD x 2) which is expected to start by Dec. 2019 and may take about 3 months for its stabilization.

For Phase-I (25 MLD), the treatment units provided are: Primary, Secondary, tertiary units. The CETP reportedly consists of Screen Chamber, Collection tank, Equalization Tank, Primary Treatment (diffused air floatation (DAF) for solid liquid separation), First Stage Bio-Degradation (silicon diffusers, compressed air provided by turbo blowers), Anoxic treatment for removal of TKN, First stage clarifier, Second stage bio-degradation (silicon diffusers, compressed air provided by turbo blowers), Second stage clarifier, Pressure Sand filter and Ozonization. Final treated effluent to be currently disposed in to the exiting disposal point near Navapur seashore.

## **Chapter-4**

### **DAMAGE TO THE ENVIRONMENT**

#### **4.1 MONITORING OF WATER BODIES AND SAMPLING LOCATION DETAILS**

The grievance expressed by the applicant of OA No. 64/2006 is severe environmental and ecological degradation of the water bodies situated in the vicinity of the Tarapur MIDC caused by the discharge of untreated effluent in MIDC. Details of water bodies in and around MIDC Tarapur has been given under section 2.3 of Chapter 2 of this report.

In order to assess damage caused to the environment, the following sampling were carried out in various waterbodies during November-December 2019:

- (i) water samples in 09 drains passing through MIDC Tarapur along with sediments at few locations;
- (ii) water and sediment samples from 03 locations of the two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek flowing North and South of Tarapur MIDC respectively) in which the above drains confluence and 01 location of each of the two streams before meeting the said two creeks;
- (iii) sea water and sand near to Navapur CETP outfall, Nandgaon beach and the other at Edvan beach about 85 kms from the said Navapur CETP outfall, and;
- (iv) ground water samples from 06 different bore-wells in and around MIDC area.

Location of sampling points of surface water viz. drains, creeks, streams and seashore with their latitude and longitude are given in Table 4.1. Similarly location of sampling points of ground water from bore-wells are given in Table 4.2.

**Table 4.1:** Latitude and longitude of sampling locations of surface water bodies

| <b>Drains passing through MIDC Tarapur</b> |  |                 |                  |
|--|--|-----------------|------------------|
| <b>Sl. No.</b>                             | <b>Sampling location</b>   | <b>Latitude</b> | <b>Longitude</b> |
| 1.   | Near Pasthan Village of the drain after confluence of Drains at Sl. No. 1,2 & 3 of Table 2.4 | 19.817857       | 72.725809        |
| 2.   | Near Shivaji Nagar Village of the drain after confluence of Drains at Sl. No. 5 of Table 2.4 | 19.801498       | 72.717366        |
| 3.   | Near Sump 1 of the drain at Sl. No. 11 of Table 2.4  | 19.787121       | 72.740833        |
| 4.   | Near Yashwant Shrushti of the drain at Sl. No. 14 of Table 2.4                               | 19.793819       | 72.756147        |
| 5.   | Near Sump no 3 of the drain at Sl. No. 7 of Table 2.4  | 19.780953       | 72.720936        |
| 6.   | Near opposite Everest kento of drains at Sl. No. 5 of Table 2.4                              | 19.785353       | 72.722793        |
| 7.   | Near Auro lab of the drain at Sl. No. 5 of Table 2.4   | 19.797272       | 72.721192        |
| 8.   | Near k18 (Aarti) of the drain at Sl. No. 5 of Table 2.4                                      | 19.798687       | 72.721577        |
| 9.   | Near Viraj of the drain after confluence of Drains at Sl. No. 12 of Table 2.4                | 19.780806       | 72.747490        |
| <b>Creeks/Stream around MIDC Tarapur</b>   |  |                 |                  |
| <b>S.No.</b>                               | <b>Sampling location</b>   | <b>Latitude</b> | <b>Longitude</b> |
| 10.  | Stream near Pasthan  | 19.823275       | 72.729953        |
| 11.  | Near dumping ground at upstream of Navapur Dandi Creek                                       | 19.820384       | 72.723379        |
| 12.  | Downstream of Navapur Dandi Creek  | 19.800780       | 72.689154        |

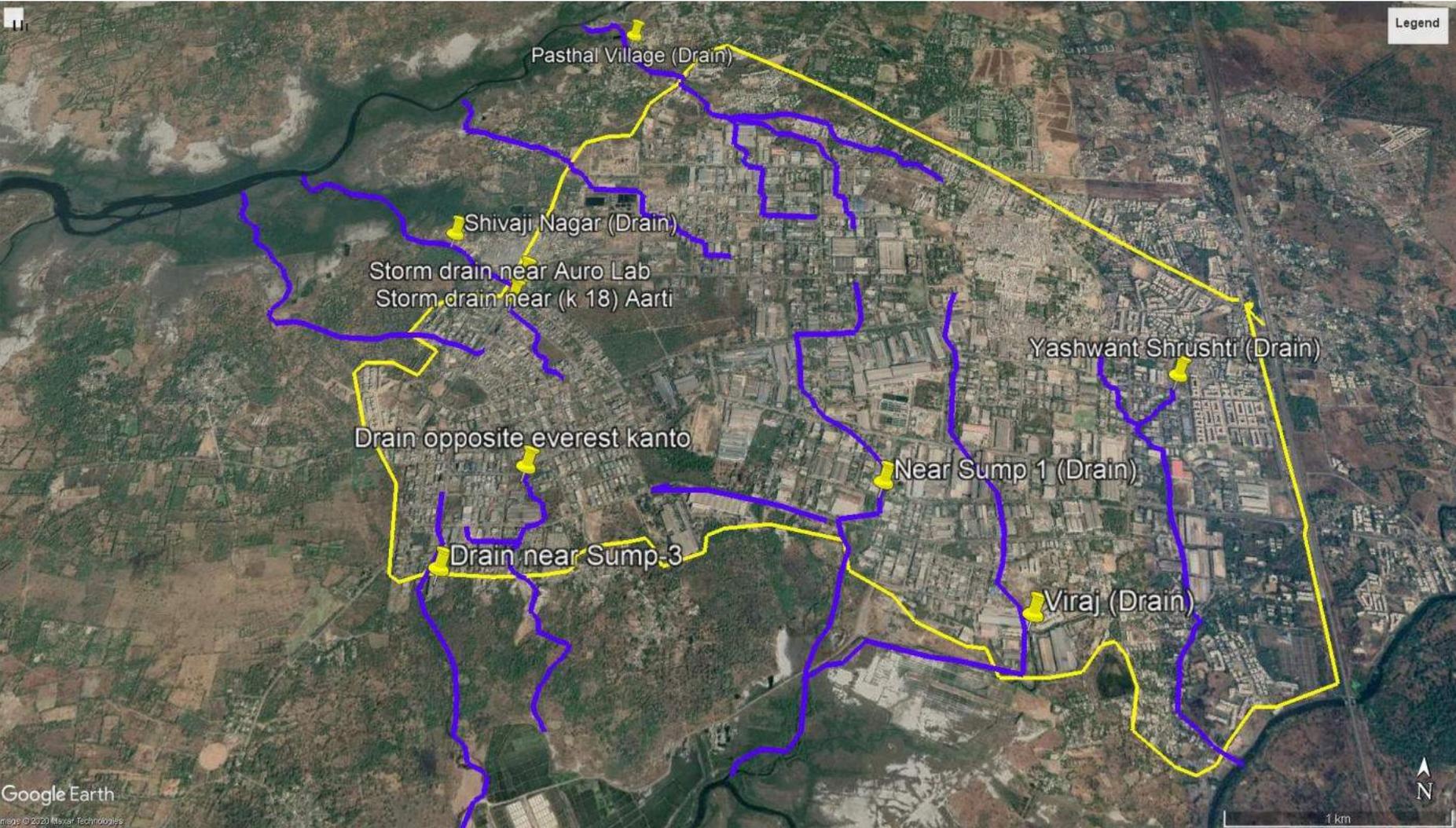
|                                   |                           |                 |                  |
|-----------------------------------|---------------------------|-----------------|------------------|
| 13.                               | Downstream of Murbe Creek | 19.744413       | 72.710654        |
| 14.                               | Stream near Betegaon      | 19.786119       | 72.767728        |
| <b>Seashore near MIDC Tarapur</b> |                           |                 |                  |
| <b>S. No.</b>                     | <b>Sampling location</b>  | <b>Latitude</b> | <b>Longitude</b> |
| 15.                               | Beach near Navapur Sea    | 19.785334       | 72.686667        |
| 16.                               | Edvan Sea Beach           | 19.536675       | 72.719858        |
| 17.                               | Beach near Nandgaon       | 19.768737       | 72.685932        |

**Table 4.2: Sampling locations of the ground water**

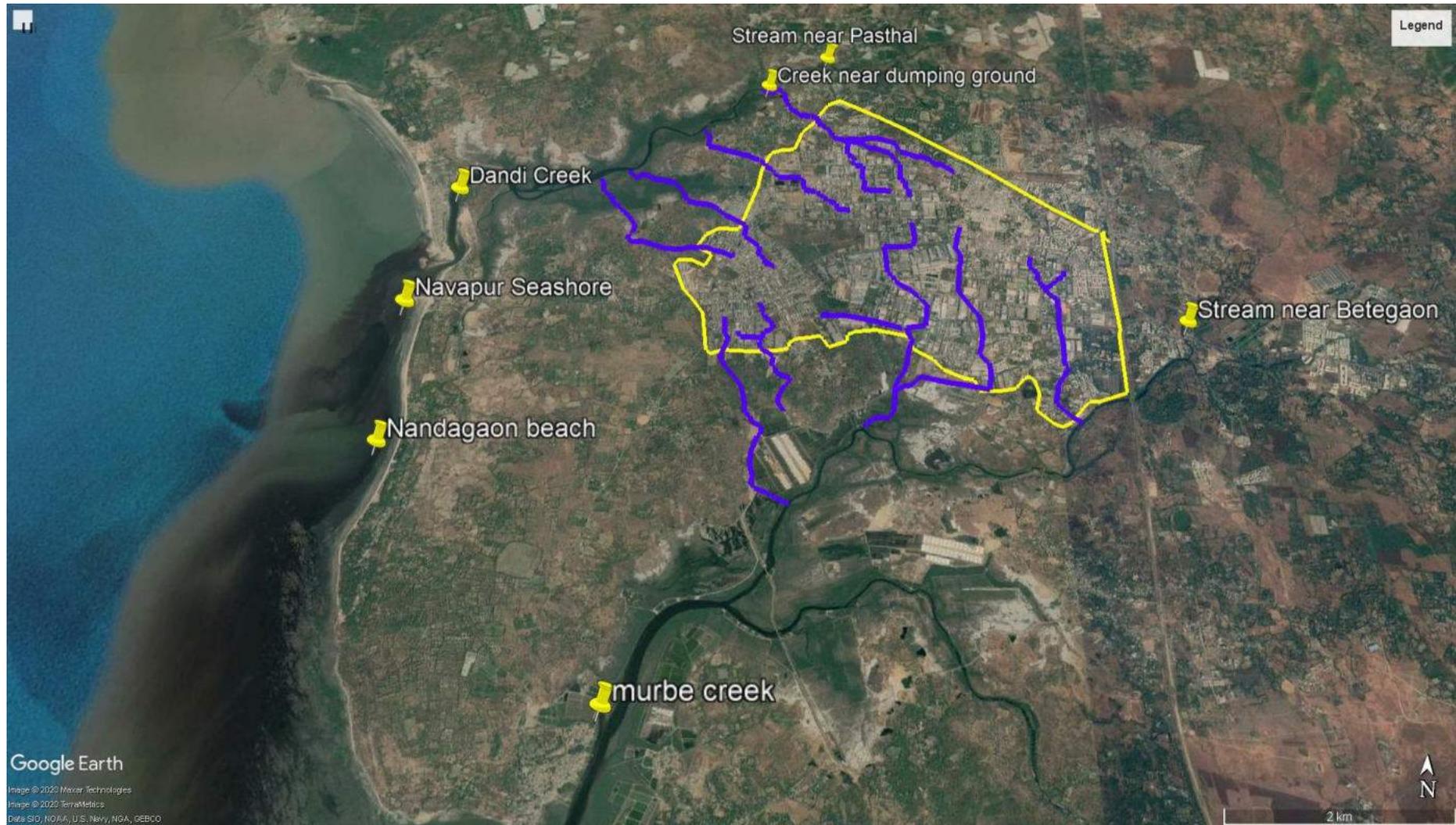
| <b>SI. No.</b> | <b>Sampling location of Ground Water</b> | <b>Latitude</b> | <b>Longitude</b> |
|----------------|--|-----------------|------------------|
| 1              | Pasthal Village                          | 19.818777       | 72.726988        |
| 2              | Shivaji Nagar                            | 19.801864       | 72.717545        |
| 3              | Lalabajpai                               | 19.785792       | 72.738748        |
| 4              | Dhodipuja                                | 19.797369       | 72.750608        |
| 5.             | Tex year Industrial Adhesive             | 19.795158       | 72.724411        |
| 6.             | Ramji Nagar                              | 19.782335       | 72.723899        |

Google earth maps showing sampling locations of the above Drains and Creeks, /Seashore are given in Fig. 4.1 and Fig.4.2 respectively. Google earth maps showing the above sampling locations of ground water is given in Fig.4.3.

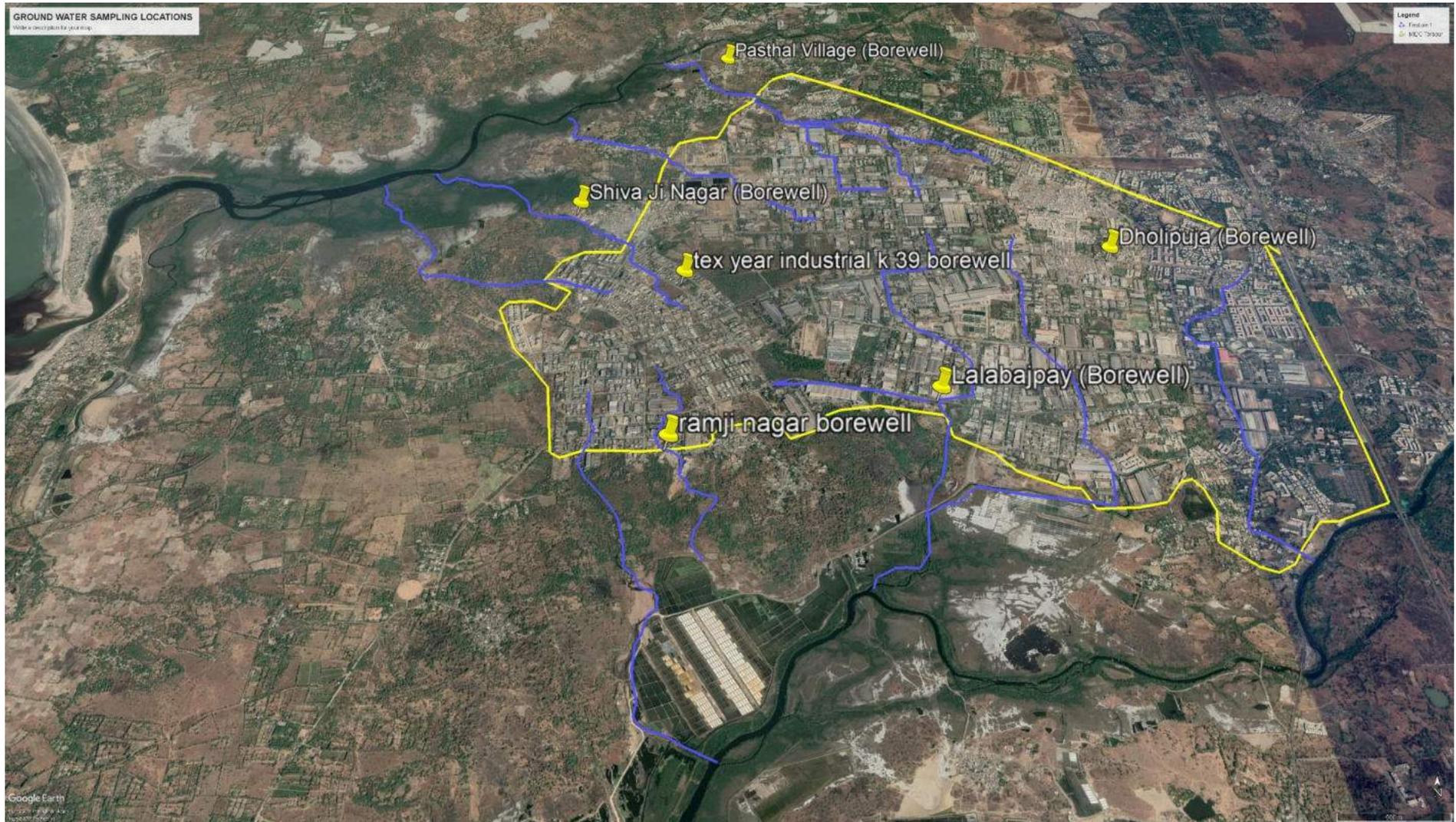
Figure 4.1: Google earth map showing sampling locations of Drains in and around Tarapur MIDC (Not to the scale)



**Figure 4.2: Google earth map showing sampling locations of Creeks, Stream and Sea shore around Tarapur MIDC (Not to the scale)**



**Figure 4.3: Google earth map showing sampling locations of ground water (Not to the scale)**



The surface water samples and ground water samples have been carried for the parameters as given in Table 4.3 in Central Lab of MPCB in Navi Mumbai.

**Table 4.3: Parameters under analysis for surface water and ground water**

| Sl. No. | Parameters   | Sl. No. | Parameters       |
|---------|--------------|---------|------------------|
| 1       | pH           | 13      | Iron             |
| 2       | TSS          | 14      | Lead             |
| 3       | TDS          | 15      | Nitrate Nitrogen |
| 4       | BOD          | 16      | Copper           |
| 5       | DO           | 17      | Manganese        |
| 6       | COD          | 18      | Zinc             |
| 7       | Phenols      | 19      | Chromium         |
| 8       | Free Ammonia | 20      | Barium           |
| 9       | Chlorides    | 21      | Vanadium         |
| 10      | Sulphate     | 22      | Arsenic          |
| 11      | Fluorides    | 23      | Cadmium          |
| 12      | TAN          |         |                  |

Analysis of sediments from water bodies and sand samples from sea shores for the parameters as given in Table 2 have been carried out by M/s Bhagavathi Ana Labs Pvt. Ltd., (Bureau Vertias Group Company), Hyderabad, and CPCB Delhi.

**Table 4.4 : Parameters analysed for sediment samples**

| Sl. No. | Parameters               | Sl. No. | Parameters                        |
|---------|--------------------------|---------|-----------------------------------|
| 1       | pH*                      | 12      | Water Soluble Chloride            |
| 2       | Electrical conductivity* | 13      | Water Soluble Nitrite             |
| 3       | Arsenic*                 | 14      | Ammonical Nitrogen                |
| 4       | Cadmium*                 | 15      | Total Soluble Sulphates           |
| 5       | Chromium*                | 16      | Available Phosphorous             |
| 6       | Manganese*               | 17      | Total Petroleum Hydrocarbon (TPH) |
| 7       | Copper*                  | 18      | Total Organic Carbon              |
| 8       | Vanadium*                | 19      | Phenolic Compounds                |
| 9       | Zinc*                    | 20      | PAH*                              |
| 10      | Iron*                    | 21      | TVOCs                             |
| 11      | Water Soluble Fluoride   |         |                                   |

\*These parameters have been carried out at CPCB Laboratory, Delhi, for sand collected from Navapur CETP outfall beach and Edvan Beach. Metals have been analysed for leachable concentrations as Toxicity Characteristic Leaching Procedure (TCLP) or Soluble Threshold Limit Concentration (STLC).

## **4.2 ANALYSIS RESULTS OF WATER SAMPLES AND SEDIMENTS OF DRAINS PASSING THROUGH MIDC TARAPUR**

### **4.2.1 Drain water samples**

The analysis results of water samples of various monitored drains passing through Tarapur MIDC (as shown in Figure 4.1) are given in Table 4.5. In the said Table 4.5, the analysis results have also been represented with standards prescribed under the Canadian water quality guidelines for discharge of environmental pollutants in inland surface water. Such standard has also been recommended in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India. The analysis results when compared with the said standards reveal that:

- (a) Very low pH of water in drain opposite Everest Kanto i.e. 1.8 indicate discharge of highly acidic untreated effluent in the drain from industries.
- (b) Elevated concentration of TDS, BOD and COD in all the monitored drains (except COD in drains near Yashwant Shrushti; near Viraj, and; near Sump1) indicate that industries are discharging untreated/partially treated effluent to drains.
- (c) No DO value in the monitored drains (Strom Drain near Aarti; Drain near Auro Lab; Drain opposite Everest kento and Drain Near Sump 3) also indicate discharge of untreated/partially treated effluent to such drains and unhealthy condition for aquatic life.
- (d) Elevated level of Phenols observed in drain near sump 3 and storm drain near Aarti industries (Plot No-K8) indicates industries are discharging untreated solvent/chemicals to the drains.
- (e) Values of analysed heavy metals (Lead, Copper, Zinc, Chromium, Barium, Vanadium, Arsenic, Cadmium) are within the aforesaid standards though elevated level of Iron and Manganese have been observed in storm drains near Auro Lab and Aarti industries (Plot No-K8).

Further, color of water samples were noticed as black, Grey, brown, pink and light yellow in different drains. Odour in water samples of drains indicate the presence of solvent/Chemical.

#### **4.2.2 Sediments samples from Drains**

The analysis results of sediments samples of various monitored drains passing through Tarapur MIDC (as shown in Figure 4.1) are given in Table 4.6. In the said Table 4.6, the analysis results have also been represented with screening levels recommended under the CCME Canadian Environmental Quality Guidelines. The said screening levels represent a level of negligible risk and provide a level that is regarded to enable a healthy functioning system for industrial land use. The same have also been recommended in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India. The analysis results when compared with the said screening levels reveal that:

- (a) pH of sediment sample of drain near M/s Everest Kanto is found highly acidic having pH of 2.34 at surface and 2.52 at depth of 30 cm from surface bed. pH of storm drain near Auro lab has slightly basic having pH of 8.48 indicate the discharge of basic effluent in the storm drain from nearby industries.
- (b) The concentration of heavy metals in sediments of all the sampling locations do not show exceedance to the said screening values.
- (c) The other measured parameters were found below the screening values.

The above findings indicate that the drains in and around Tarapur MIDC area is contaminated with elevated levels of TDS, BOD, COD, TSS, Fluorides and Phenols besides being highly acidic in one or more drains when compared with standards recommended under the Canadian water quality guidelines for discharge of environmental pollutants in inland surface water which has also been recommended in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of

Environment, Forest & Climate Change, Govt. of India. Further, odour and colour was also observed in drain waters. DO measured in four of the drains were also observed to be absent. These indicate that industries are discharging untreated effluent/solvent/chemicals to the drains.

However, sediments were not found to be exceeding the screening levels prescribed under the CCME Canadian Environmental Quality Guidelines which has also been recommended in the aforesaid guidance document of the Ministry of Environment, Forest & Climate Change, Govt. of India, except pH near M/s Everest Kanto which is highly acidic (having pH of 2.34 at surface and 2.52 at depth of 30 cm from surface bed) indicating discharge of acidic effluent and pH of storm drain near Auro lab which is slightly basic having pH of 8.48 indicating discharge of basic effluent in the storm drain from industries.

**Table 4.5 Analysis results of surface water samples collected from drains**

| Sl. No.              | Sampling Locations Parameters | Drain near Pasthal Village | Drain near Shivaji Nagar | Storm Drain near Aarti K8 | Storm Drain near Auro Lab | Drain near Yashwant Shrushti | Drain near Viraj | Drain near Sump 1 | Drain opposite Everest kento | Drain Near Sump 3 | Standards *     |
|----------------------|-------------------------------|----------------------------|--------------------------|---------------------------|---------------------------|------------------------------|------------------|-------------------|------------------------------|-------------------|-----------------|
| North Flowing Drains |                               |                            |                          |                           | South Flowing Drains      |                              |                  |                   |                              |                   |                 |
| 1.                   | Colour                        | Brown                      | Grey                     | Brownish                  | Pale yellow               | Slight colour                | Black            | Slight colour     | Pink                         | Brownish          |                 |
| 2.                   | Odour                         | Odourless                  | Sewage                   | Strong organic            | Organic                   | Sewage/ Organic              | Sewage/ Organic  | Slight odour      | Organic                      | Organic           |                 |
| 3.                   | pH                            | 7 <sup>s</sup>             | 7                        | 7.2                       | 7.3                       | 7.3                          | 7.5              | 7.3               | <b>1.8</b>                   | 7.5               | <b>5.5-9.0</b>  |
| 4.                   | TSS(mg/l)                     | -                          | 82                       | <b>268</b>                | 72                        | 42                           | 80               | 46                | 32                           | <b>156</b>        | <b>100</b>      |
| 5.                   | TDS(mg/l)                     | <b>4105</b>                | <b>3613</b>              | <b>7920</b>               | <b>2845</b>               | <b>701</b>                   | <b>747</b>       | <b>1153</b>       | <b>6637</b>                  | <b>13419</b>      | <b>100</b>      |
| 6.                   | DO(mg/l)                      | -                          | -                        | <b>0</b>                  | <b>0</b>                  | -                            | -                | -                 | <b>0</b>                     | <b>0</b>          | <b>NS</b>       |
| 7.                   | BOD(mg/l)                     | 11                         | <b>440</b>               | <b>430</b>                | <b>130</b>                | <b>80</b>                    | <b>66</b>        | 10                | <b>120</b>                   | <b>1450</b>       | <b>30(BIS)</b>  |
| 8.                   | COD(mg/l)                     | 212                        | <b>912</b>               | <b>1440</b>               | <b>524</b>                | 156                          | 140              | 20                | <b>1288</b>                  | <b>4680</b>       | <b>250(BIS)</b> |
| 9.                   | Phenols(mg/l)                 | 0.06                       | 0.41                     | <b>1.46</b>               | 0.43                      | 0.22                         | 0.11             | 0                 | 0.39                         | <b>5.49</b>       | <b>1</b>        |
| 10.                  | Free Ammonia                  | -                          | -                        | 0.02%                     | 0.03%                     | -                            | -                | -                 | 0%                           | 0.08%             | <b>NS</b>       |
| 11.                  | Chlorides(mg/l)               | 919.7                      | -                        | 2789.1                    | 922.2                     | -                            | -                | -                 | 842.2                        | 5073.4            | <b>NS</b>       |
| 12.                  | Sulphate(mg/l)                | 856.7                      | -                        | 1305.9                    | 763.5                     | -                            | -                | -                 | 2708.9                       | 2601.7            | <b>NS</b>       |
| 13.                  | Fluorides(mg/l)               | -                          | -                        | <b>3.6</b>                | 0.8                       | -                            | -                | -                 | 0.9                          | <b>5.6</b>        | <b>2</b>        |
| 14.                  | TAN                           | 0.7                        | 2.2                      | 3.8                       | 5.6                       | 6.5                          | 2.4              | 3                 | 4.5                          | 4.9               | <b>NS</b>       |
| 15.                  | Iron (Fe) (mg/l)              | 0                          | 0                        | <b>4.48</b>               | <b>3.44</b>               | 0                            | 0                | 0                 | 2.15                         | 1.88              | <b>3</b>        |
| 16.                  | Nitrate Nitrogen              | 8.4                        | -                        | 0                         | 0                         | -                            | -                | -                 | 0                            | 0                 | <b>10</b>       |
| 17.                  | Lead(mg/l)                    | 0.02                       | 0.03                     | 0                         | 0.01                      | 0.03                         | 0.03             | 0.02              | 0.1                          | 0.01              | <b>0.1</b>      |
| 18.                  | Copper(mg/l)                  | 0.08                       | 0                        | 0.07                      | 0.2                       | 0                            | 0                | 0                 | 0.48                         | <b>7.69</b>       | <b>3</b>        |
| 19.                  | Manganese                     | -                          | -                        | 1.88                      | <b>3.61</b>               | -                            | -                | -                 | 2.86                         | 1.11              | <b>3</b>        |
| 20.                  | Zinc                          | 0                          | 0                        | 0.45                      | 1.21                      | 0                            | 0                | 0                 | 0.37                         | 0.61              | <b>5</b>        |
| 21.                  | Chromium                      | 0                          | 0                        | 0                         | 0                         | 0                            | 0                | 0                 | 0.10                         | 0.07              | <b>0.1</b>      |
| 22.                  | Barium                        | 0                          | 0.09                     | 0.08                      | 0.08                      | 0.04                         | 0.05             | 0.05              | 0.03                         | 0.06              | <b>NS</b>       |
| 23.                  | Vanadium                      | 0.02                       | 0.01                     | 0.04                      | 0.02                      | 0.01                         | 0                | 0.03              | 0.64                         | 0.40              | <b>0.2</b>      |
| 24.                  | Arsenic                       | 0                          | 0                        | 0                         | 0                         | 0                            | 0                | 0                 | 0                            | 0                 | <b>0.2</b>      |
| 25.                  | Cadmium                       | 0                          | 0                        | 0                         | 0                         | 0                            | 0                | 0                 | 0                            | 0                 | <b>NS</b>       |

All values are in mg/l except pH, Odour and Colour; Mode of sampling-Grab; NS- Not Specified;(BIS) General Standards for discharge of effluents BIS,(IS:2296)

\*Canadian water quality guidelines for discharge of environmental pollutants in inland surface water; <sup>s</sup>Analysis result based on sampling on 06/2/2020

**Table 4.6: Analysis results of sediment samples collected from drains**

| Sl. No. | Sampling Locations<br>Parameters     | Screening Levels* | Drain opposite Everest Kanto |       | Storm Drain near k18 (Aarti) | Drain near Sump 3 |       | Storm Drain near Auro lab |
|---------|--------------------------------------|-------------------|------------------------------|-------|------------------------------|-------------------|-------|---------------------------|
|         |                                      |                   | 0 Cm                         | 30 Cm | 0 Cm                         | 0 Cm              | 30 Cm | 0 Cm                      |
|         |                                      | Depth→            | 0 Cm                         | 30 Cm | 0 Cm                         | 0 Cm              | 30 Cm | 0 Cm                      |
| 1       | pH                                   | 6-8               | 2.34                         | 2.52  | 7.52                         | 7.7               | 7.82  | 8.48                      |
| 2       | Electrical conductivity (µs/cm)      | NS                | 2310                         | 1920  | 2860                         | 2080              | 2180  | 2580                      |
| 3       | Arsenic(mg/l)                        | 12                | <0.05                        | <0.05 | <0.05                        | <0.05             | <0.05 | <0.05                     |
| 4       | Cadmium(mg/kg)                       | 22                | <0.05                        | <0.05 | <0.05                        | <0.05             | <0.05 | <0.05                     |
| 5       | Chromium (mg/kg)                     | 87                | 0.5                          | 0.5   | <0.05                        | 0.7               | 0.4   | <0.05                     |
| 6       | Manganese (mg/kg)                    | NS                | 5.5                          | 8.8   | 117                          | 111               | 151.5 | 137                       |
| 7       | Copper(mg/kg)                        | 91                | <0.05                        | <0.05 | <0.05                        | 0.6               | 0.2   | <0.05                     |
| 8       | Vanadium (mg/kg)                     | 130               | <0.05                        | 0.3   | 0.2                          | 0.5               | 0.3   | 1                         |
| 9       | Zinc(mg/kg)                          | 360               | 0.2                          | 0.2   | 6                            | 7                 | 2     | 14.5                      |
| 10      | Iron(mg/kg)                          | NS                | 3                            | 3     | <0.05                        | 31                | 27    | 1                         |
| 11      | Water Soluble Fluoride (mg/kg)       | 2000              | 0.07                         | 0.02  | 0.2                          | 0.3               | 0.07  | 0.4                       |
| 12      | Water Soluble Chloride(mg/kg)        | NS                | 489                          | 783   | 264                          | 1468              | 1370  | 1663                      |
| 13      | Water Soluble Nitrite (mg/kg)        | NS                | 0.01                         | 0.01  | 0.03                         | 0.05              | 0.3   | 0.2                       |
| 14      | Ammonical Nitrogen(mg/kg)            | NS                | 10                           | 14    | 19                           | 26                | 26    | 25                        |
| 15      | Total Soluble Sulphates (%)          | NS                | 0.34                         | 0.56  | 0.4                          | 0.2               | 0.3   | 0.55                      |
| 16      | Available Phosphorous (kg/hect)      | NS                | 223                          | 118   | 373                          | 89                | 51    | 353                       |
| 17      | Total Petroleum Hydrocarbon (TPH)(%) | NS                | 0.031                        | 0.016 | 0.022                        | 0.027             | 0.027 | 0.017                     |
| 18      | Total Organic Carbon (%)             | NS                | 4.1                          | 2.9   | 5.9                          | 4.3               | 4.1   | 4.9                       |
| 19      | Phenolic Compounds (mg/kg)           | 10                | <1                           | <1    | <1                           | <1                | <1    | <1                        |
| 20      | PAH(µg/kg)                           | NS                | BDL                          | BDL   | BDL                          | BDL               | BDL   | BDL                       |
| 21      | TVOCs                                | NS                | BDL                          | BDL   | BDL                          | BDL               | BDL   | BDL                       |

\*CCME Canadian Environmental Quality Guidelines. These levels represent a level of negligible risk and provide a level that is regarded to enable a healthy functioning system for industrial land use. The same have also been referred in the "Guidance document for assessment and remediation of contaminated sites in India" prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India Dutch intervention level and screening value for industrial;  
BDL: Below Detection Limit

## **4.3 ANALYSIS RESULTS OF WATER SAMPLES AND SEDIMENTS OF CREEKS PASSING ACROSS MIDC TARAPUR**

### **4.3.1 Creek water samples**

Analysis results of water samples collected from 03 locations of the two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek flowing North and South of Tarapur MIDC respectively in which various drains confluence) and 01 location of each of the two streams before meeting the said two creeks are given in Table 4.7. In the said Table 4.7, the analysis results have also been represented with standards prescribed under the Canadian water quality guidelines for discharge of environmental pollutants in inland surface water. Such standard has also been recommended in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India. The analysis results when compared with the said standards reveal that:

- (a) Concentration of TDS, COD and BOD show increasing trend in both the creeks as they receive effluent from Tarapur MIDC and flow towards the sea. Further, pH value is also decreasing. However, all the said values are within the aforesaid standard of COD at Dandi Creek (downstream of Navapur Dandi Creek) and BOD at Creek near Dumping ground (upstream of Navapur Dandi Creek) and Dandi Creek (downstream of Navapur Dandi Creek).
- (b) There is no DO in Creek near Dumping ground (upstream of Navapur Dandi Creek) and Dandi Creek (downstream of Navapur Dandi Creek).
- (c) Phenols at Dandi Creek (downstream of Navapur Dandi Creek) and Murbe Creek have been observed higher than other sampling locations of the Creek. However, the same is within the aforesaid standards.

Further, colour of water samples were noticed as pale yellow in Dandi Creek (downstream of Navapur Dandi Creek), slight color in Creek near Dumping Ground (upstream of Navapur Dandi Creek) and Murbe Creek and colourless at stream near Pasthan and stream near Betegaon. Odour in water samples were organic in Creek near dumping ground (upstream of Navapur Dandi Creek) and Dandi Creek (downstream of Navapur Dandi Creek) indicating the presence of solvent/Chemical.

#### **4.3.2 Sediments samples from Creeks**

The analysis results of sediments samples at various locations (as shown in Figure 4.2) of the Creeks passing across Tarapur MIDC and streams meeting the Creeks are given in Table 4.8. In the said Table 4.8, the analysis results have also been represented with screening levels prescribed under the CCME Canadian Environmental Quality Guidelines. The said screening levels represent a level of negligible risk and provide a level that is regarded to enable a healthy functioning system for industrial land use. The said screening levels have also been recommended in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India. The analysis results when compared with the said screening levels reveal that:

- (a) pH of sediment sample near the Dandi Creek (downstream of Navapur Dandi Creek) and Murbe Creek were found slightly basic having pH of 8.15 and 8.06 at surface and 8.31 and 8.43 at depth of 30 cm from the surface bed respectively indicating basic effluent discharge to both the creeks passing across Tapaur MIDC.
- (b) The other measured parameters were found below the screening values.

Odour of chemical/solvent in sediment sample of creek near dumping (upstream of Navapur Dandi Creek) ground was also observed.

The above findings indicate that the two creeks have elevated levels of COD and TDS at different stretches (where interference of water from Tarapur MIDC area begins). There was no DO in Creeks near Dumping ground (upstream of Navapur Dandi Creek) and Dandi Creek (downstream of Navapur Dandi Creek). Colour and odour were observed at different locations of the both the Creeks. Further, Phenols at downstream location of both the Creeks viz. Dandi Creek (downstream of Navapur Dandi Creek) and Murbe Creek (downstream of Kharekuran Murbe Creek) have been observed higher than other sampling locations of the Creeks and streams though the same are within the aforesaid standards.

In sediments of the monitored locations of the Creeks, pH of sediment sample near the Dandi Creek (downstream of Navapur Dandi Creek) and Murbe Creek were found slightly basic.

Thus, it indicates that the two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek flowing North and South of Tarapur MIDC respectively) receiving polluted effluent from the drains of MIDC Tapaur were found having impact of discharges from such drains. Presence of odour & colour indicate requirement of further analysis which may be carried out during detailed investigation and remediation requirement as suggested under Chapter 8 “Measures for restoration of Environment in and around MIDC Tarapur” of this report.

**Table 4.7: Analysis results of surface water samples collected from creek**

| SI. No. | Sampling Locations Parameters | Stream near Pasthal | Creek near dumping ground | Dandi Creek | Stream near Betegaon | Murbe Creek   | Standards* |
|---------|-------------------------------|---------------------|---------------------------|-------------|----------------------|---------------|------------|
| 1       | Colour                        | Colourless          | Slight colour             | Pale yellow | Colourless           | Slight colour |            |
| 2       | Odour                         | Odourless           | Organic                   | Organic     | Organic              | Slight odour  |            |
| 3       | pH                            | 7.6                 | 7.2                       | 6.8         | 7.8                  | 7.5           | 5.5-9.0    |
| 4       | TSS                           | 16                  | 22                        | 48          | 30                   | 20            | 100        |
| 5       | TDS                           | 376                 | 5969                      | 29346       | 509                  | 32453         | 100        |
| 6       | DO                            | 6                   | 0                         | 0           | 4.6                  | 3.9           | NS         |
| 7       | BOD                           | 3                   | 70                        | 80          | 8                    | 16            | 30(BIS)    |
| 8       | COD                           | 16                  | 180                       | 276         | 40                   | 220           | 250(BIS)   |
| 9       | Phenols                       | 0                   | 0                         | 0.19        | 0                    | 0.2           | 1          |
| 10      | Free Ammonia                  | 0.02%               | 0.04%                     | 0.01%       | 0.17%                | 0.06%         | NS         |
| 11      | Chlorides                     | 45                  | 2969.1                    | 16195       | 83.5                 | 16944.7       | NS         |
| 12      | Sulphate                      | 41.7                | 563.6                     | 2061        | 24.9                 | 2095.3        | NS         |
| 13      | Fluorides                     | 0.5                 | 0.5                       | 1.1         | 0.2                  | 2.9           | 2          |
| 14      | TAN                           | 1.1                 | 6.7                       | 7.6         | 4                    | 9.4           | NS         |
| 15      | Iron (Fe)                     | 0.59                | 3.91                      | 1.17        | 0.44                 | 0.35          | 3          |
| 16      | Nitrate Nitrogen              | 0.3                 | 0.1                       | 0           | 0                    | 0             | 10         |
| 17      | Lead                          | 0                   | 0                         | 0           | 0                    | 0             | 0.1        |
| 18      | Copper                        | 0                   | 0.05                      | 0           | 0                    | 0.02          | 3          |
| 19      | Manganese                     | 0.25                | 0.43                      | 0.28        | 0.62                 | 0.43          | 3          |
| 20      | Zinc                          | 0                   | 0.13                      | 0           | 0                    | 0             | 5          |
| 21      | Chromium                      | 0                   | 0                         | 0           | 0                    | 0             | 0.1        |
| 22      | Barium                        | 0.04                | 0.04                      | 0.02        | 0.08                 | 0.04          | NS         |
| 23      | Vanadium                      | 0.05                | 0.04                      | 0.01        | 0.02                 | 0             | 0.2        |
| 24      | Arsenic                       | 0                   | 0.05                      | 0.05        | 0                    | 0             | 0.2        |
| 25      | Cadmium                       | 0                   | 0                         | 0           | 0                    | 0             | NS         |

All values are in mg/l except pH; Mode of sampling-Grab; NS- Not Specified; (BIS) General Standards for discharge of effluents BIS,(IS:2296)

\*Canadian water quality guidelines for discharge of environmental pollutants in inland surface water

**Table 4.8: Analysis result of sediments samples collected from Creeks.**

| Sl. No. | Sampling Locations Parameters  | Screening value* | Stream near Pasthal |       | Creek near dumping ground | Dandi Creek |       | Stream near Betegaon |       | Murbe Creek |       |
|---------|--------------------------------|------------------|---------------------|-------|---------------------------|-------------|-------|----------------------|-------|-------------|-------|
|         |                                |                  | 0 Cm                | 30 Cm | 0 Cm                      | 0 Cm        | 30 Cm | 0 Cm                 | 30 Cm | 0 Cm        | 30 Cm |
| 1       | pH                             | 6-8              | 7.33                | 7.44  | 7.67                      | 8.15        | 8.31  | 7.63                 | 7.23  | 8.06        | 8.43  |
| 2       | Electrical conductivity(µs/cm) | NS               | 763                 | 2850  | 6670                      | 3740        | 3630  | 265                  | 290   | 5470        | 615   |
| 3       | Arsenic(mg/l)                  | 12               | <0.05               | <0.05 | <0.05                     | <0.05       | <0.05 | <0.05                | <0.05 | <0.05       | <0.05 |
| 4       | Cadmium(mg/kg)                 | 22               | 0.4                 | <0.05 | 0.2                       | <0.05       | <0.05 | <0.05                | <0.05 | <0.05       | <0.05 |
| 5       | Chromium(mg/kg)                | 87               | 0.6                 | <0.05 | 0.5                       | <0.05       | <0.05 | 0.45                 | 0.6   | 0.6         | 0.4   |
| 6       | Manganese (mg/kg)              | NS               | 138                 | 98    | 169                       | 7.5         | 7     | 215                  | 151   | 45          | 23    |
| 7       | Copper(mg/kg)                  | 91               | <0.05               | <0.05 | <0.05                     | <0.05       | <0.05 | <0.05                | <0.05 | <0.05       | <0.05 |
| 8       | Vanadium(mg/kg)                | 130              | 0.02                | 0.5   | 0.2                       | 0.6         | 0.4   | 0.7                  | 0.08  | 0.2         | 0.2   |
| 9       | Zinc(mg/kg)                    | 360              | 8                   | 6     | 11.5                      | <0.05       | <0.05 | 4                    | 2     | <0.05       | <0.05 |
| 10      | Iron(mg/kg)                    | NS               | 18                  | 8     | 21                        | <0.05       | <0.05 | 17                   | 5.4   | <0.05       | <0.05 |
| 11      | Water Soluble Fluoride (mg/kg) | 2000             | 0.06                | 0.05  | 0.4                       | 0.2         | 0.2   | 0.08                 | 0.1   | 0.2         | 0.1   |
| 12      | Water Soluble Chloride(mg/kg)  | NS               | 391                 | 3229  | 8904                      | 4990        | 4696  | 196                  | 98    | 6947        | 2515  |
| 13      | Water Soluble Nitrite (mg/kg)  | NS               | 0.04                | 0.04  | 0.01                      | 0.04        | 0.01  | 0.03                 | 0.02  | 0.01        | 0.02  |
| 14      | Ammonical Nitrogen(mg/kg)      | NS               | 4.5                 | 12    | 23                        | 5           | 5     | 7                    | 20    | 2           | 2     |
| 15      | Total Soluble Sulphates (%)    | NS               | 0.24                | 0.4   | 0.3                       | 0.34        | 0.24  | 0.25                 | 0.3   | 0.2         | 0.26  |
| 16      | Available Phosphorous(kg/hect) | NS               | 180                 | 87.5  | 177                       | 83          | 84.5  | 21                   | 31    | 42          | 75    |
| 17      | Total Petroleum Hydrocarbon(%) | NS               | 0.066               | 0.021 | 0.054                     | 0.032       | 0.018 | 0.024                | 0.018 | 0.019       | 0.018 |
| 18      | Total Organic Carbon(%)        | NS               | 5.1                 | 4.8   | 3.7                       | 5.2         | 4.1   | 3.8                  | 3.6   | 4.7         | 3.8   |
| 19      | Phenolic Compounds(mg/kg)      | 10               | <1                  | <1    | <1                        | <1          | <1    | <1                   | <1    | <1          | <1    |
| 20      | PAH(µg/kg)                     | NS               | BDL                 | BDL   | BDL                       | BDL         | BDL   | BDL                  | BDL   | BDL         | BDL   |
| 21      | TVOCs                          | NS               | BDL                 | BDL   | BDL                       | BDL         | BDL   | BDL                  | BDL   | BDL         | BDL   |

\*CCME Canadian Environmental Quality Guidelines. These levels represent a level of negligible risk and provide a level that is regarded to enable a healthy functioning system for industrial land use. The same have also been referred in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India Dutch intervention level and screening value for industrial;  
BDL: Below Detection Limit

#### 4.4 ANALYSIS RESULTS OF SEA WATER AND SAND SAMPLES IN SEASHORES

Analysis results of samples of sea water and sand from sea beach (as shown in Figure 4.2) near to Navapur CETP outfall, Nandgaon beach and the other at

Edvan beach about 85 kms from the said Navapur CETP outfall are given in Table 4.9 and Table 4.10.

The results though do not reveal trend of elevated concentration of measured parameters near to Navapur CETP outfall beach and Nandgaon beach where the two creeks confluence into the sea. However, presence of Phenols in both the beaches indicate impact of discharge from Tarapur MIDC area and requirement of further analysis which may be carried out during detailed investigation and remediation requirement as suggested under Chapter 8 “Measures for restoration of Environment in and around MIDC Tarapur” of this report.

**Table 4.9: Analysis result of water samples collected from sea beach**

| SI. No. | Sampling Locations Parameters | Navapur sea beach | Nandgaon sea beach | Edvan Sea beach |
|---------|-------------------------------|-------------------|--------------------|-----------------|
| 1.      | Colour                        | Slight colour     | Slight colour      | Slight colour   |
| 2.      | Odour                         | Foam smell        | Slight odour       | Slight odour    |
| 3.      | pH                            | 7.5               | 8.6                | 7.9             |
| 4.      | TSS                           | 92                | 78                 | 168             |
| 5.      | TDS                           | 42981             | 39904              | 37698           |
| 6.      | DO                            | 4                 | 4                  | 4.4             |
| 7.      | BOD                           | 14                | 14                 | 12              |
| 8.      | COD                           | 236               | 276                | 228             |
| 9.      | Phenols                       | 0.02              | 0.11               | 0               |
| 10.     | Free Ammonia                  | -                 | 0.19%              | -               |
| 11.     | Chlorides                     | -                 | 20043.8            | -               |
| 12.     | Sulphate                      | -                 | 2416.2             | -               |
| 13.     | Fluorides                     | -                 | 0.8                | -               |
| 14.     | TAN                           | 1.2               | 5.3                | 0.2             |
| 15.     | Iron (Fe)                     | -                 | 0.7                | 0               |
| 16.     | Nitrate Nitrogen              | -                 | 0.1                | -               |
| 17.     | Lead                          | 0                 | 0                  | 0               |
| 18.     | Copper                        | 0.01              | 0.01               | 0.01            |
| 19.     | Manganese                     | -                 | 0.03               | -               |
| 20.     | Zinc                          | 0                 | 0                  | 0               |
| 21.     | Chromium                      | 0                 | 0                  | 0               |
| 22.     | Barium                        | 0.02              | 0                  | 0.2             |
| 23.     | Vanadium                      | 0.11              | 0                  | 0.2             |
| 24.     | Arsenic                       | 0                 | 0                  | 0               |
| 25.     | Cadmium                       | -                 | 0                  | -               |

**Table 4.10: Analysis result of sand samples collected from Seashores**

| Sl. No | Sampling Locations Parameters                      | Screening value* | Navapur Seashore |       | Nandgaon Seashore |       | Edvan Seashore |       |
|--------|--|------------------|------------------|-------|-------------------|-------|----------------|-------|
|        |  |                  | 15 cm            | 30 cm | 0 Cm              | 30 Cm | 15 cm          | 30 cm |
| 1      | pH   | 6-8              | 9.03             | 9.01  | 8.39              | 8.39  | 9.18           | 9.03  |
| 2      | Electrical conductivity( $\mu\text{s}/\text{cm}$ ) | NS               | 2880             | 6620  | 3880              | 3080  | 2700           | 6530  |
| 3      | Arsenic(mg/l)                                      | 12               | 0.01             | BDL   | <0.05             | <0.05 | 0.02           | BDL   |
| 4      | Cadmium(mg/kg)                                     | 22               | BDL              | BDL   | <0.05             | <0.05 | BDL            | BDL   |
| 5      | Chromium(mg/kg)                                    | 87               | BDL              | 0.01  | 0.3               | 0.45  | BDL            | 0.01  |
| 6      | Manganese (mg/kg)                                  | NS               | 2.18             | 11.20 | 5                 | 4     | 2.10           | 11.29 |
| 7      | Copper(mg/kg)                                      | 91               | BDL              | BDL   | <0.05             | <0.05 | BDL            | BDL   |
| 8      | Vanadium(mg/kg)                                    | 130              | BDL              | 0.06  | 0.4               | <0.05 | BDL            | 0.05  |
| 9      | Zinc(mg/kg)  | 360              | 0.08             | 0.02  | <0.05             | <0.05 | BDL            | 0.02  |
| 10     | Iron(mg/kg)  | NS               | 0.88             | 9.32  | <0.05             | <0.05 | 0.84           | 9.75  |
| 11     | Water Soluble Fluoride (mg/kg)                     | 2000             | 0.14             | 0.05  | 0.06              | 0.06  | 0.14           | 0.03  |
| 12     | Water Soluble Chloride(mg/kg)                      | NS               | 1468             | 1321  | 5186              | 4109  | 4501           | 3865  |
| 13     | Water Soluble Nitrite (mg/kg)                      | NS               | 0.02             | 0.01  | 0.08              | 0.01  | 0.03           | 0.04  |
| 14     | Ammonical Nitrogen(mg/kg)                          | NS               | 0.5              | 0.3   | 3                 | 3     | 0.4            | 0.2   |
| 15     | Total Soluble Sulphates (%)                        | NS               | 0.14             | 0.15  | 0.3               | 0.2   | 0.17           | 0.08  |
| 16     | Available Phosphorous(kg/hect)                     | NS               | 16.6             | <5    | 81.5              | 3     | <5             | 86    |
| 17     | Total Petroleum Hydrocarbon(%)                     | NS               | 0.042            | 0.028 | 0.041             | 0.24  | 0.036          | 0.025 |
| 18     | Total Organic Carbon(%)                            | NS               | 3.6              | 3.3   | 4.4               | 3.9   | 4.5            | 3.9   |
| 19     | Phenolic Compounds(mg/kg)                          | 10               | <1               | <1    | <1                | <1    | <1             | <1    |
| 20     | PAH( $\mu\text{g}/\text{kg}$ )                     | NS               | BDL              | BDL   | BDL               | BDL   | BDL            | BDL   |
| 21     | TVOCs  | NS               | -                | -     | BDL               | BDL   | -              | -     |

\*CCME Canadian Environmental Quality Guidelines. These levels represent a level of negligible risk and provide a level that is regarded to enable a healthy functioning system for industrial land use. The same have also been referred in the "Guidance document for assessment and remediation of contaminated sites in India" prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India Dutch intervention level and screening value for industrial;  
BDL: Below Detection Limit

#### **4.5 ANALYSIS RESULTS OF GROUND WATER SAMPLES IN AND AROUND TARAPUR MIDC**

Analysis results of ground water samples from 06 different bore-wells (as shown in Figure 4.3) in and around MIDC area are given in Table 4.11. The same have been represented with the BIS Drinking Water Quality Standards IS:10500. Such comparison has also been recommended in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India. The analysis results when compared with the said standards reveal that:

- (a) Concentration of TDS in all the sampled ground water sample analysed in MIDC Tarapur is more than 1.7 to 09 times the limit of the BIS standard.
- (b) COD and BOD were also observed in all the sampled ground water.
- (c) Concentration of Chlorides were observed higher than the limit of the BIS standard at 03 of the 05 locations. Fluoride was also found higher in bore-well near M/s Tex year industrial adhesive.
- (d) Concentration of Sulphates were observed higher than the limit of the BIS standard at 02 of the 05 locations.
- (e) Total Ammonical Nitrogen were observed higher than the limit of the BIS standard at 02 of the 06 locations.
- (f) Concentration of Phenols was found higher than the limit of the BIS standard in Shivaji Nagar bore-well.
- (g) Concentration of Lead was found higher than the limit of the BIS standard in all the sampled ground water except in Ramji Nagar bore-well. Copper, Iron and Manganese were also found higher than the limit of the BIS standard in one or more samples. However, concentration of Zinc, Chromium, Barium, Vanadium, Arsenic and Cadmium is within the limit specified.

Further, organic odour was observed in ground water near M/s Tex year industrial adhesive and Ramji Nagar village indicating presence of chemicals/solvents. Color of ground water sample was found brownish in

Pasthal village bore-well and slight color were observed in bore-well of Ramji Nagar village and near M/s Tex year industrial adhesive.

The above observations of high TDS and presence of BOD and COD in all the monitored ground water samples and presence of colour, odour, Chlorides, Fluorides, Sulphates, Total Ammonical Nitrogen, Metals (Lead, Copper, Iron and Manganese) in one or more samples of the sampled ground water indicate that the ground water in and around Tarapur MIDC has been contaminated due to the industrial activities.

**Table 4.11: Analysis results of ground water samples collected in MIDC, Tarapur**

| SI. No | Sampling Locations Parameters | Standards* | Pasthal Village (Bore-well) | Dholi puja (Bore-well) | Shivaji Nagar (Bore-well) | LalaBajpai (Bore-well) | Ramji Nagar (Bore-well) | Tex year industrial adhesive (Bore-well) |
|--------|-------------------------------|------------|-----------------------------|------------------------|---------------------------|------------------------|-------------------------|--|
| 1.     | Colour                        |            | Brownish                    | Colourless             | Colourless                | Colourless             | Slight colour           | Slight colour                            |
| 2.     | Odour                         |            | Slight smell                | Odourless              | Odourless                 | Odourless              | Organic                 | Organic                                  |
| 3.     | pH                            | 6.5-8.5    | 7.4                         | 7                      | 6.8                       | 7.3                    | 7.3                     | 7.2                                      |
| 4.     | TSS(mg/l)                     | NS         | 32                          | -                      | -                         | -                      | -                       | -  |
| 5.     | TDS(mg/l)                     | 500        | 1433                        | 893                    | 4106                      | 1040                   | 2283                    | 4585                                     |
| 6.     | BOD(mg/l)                     | NS         | 14                          | 5                      | 30                        | 5                      | -                       | -  |
| 7.     | COD(mg/l)                     | NS         | 56                          | 28                     | 132                       | 16                     | 40                      | 104                                      |
| 8.     | Phenols(mg/l)                 | 0.001      | 0                           | 0                      | 0.09                      | 0                      | 0                       | 0  |
| 9.     | Free Ammonia                  | NS         | -                           | -                      | -                         | -                      | 0.03%                   | 0  |
| 10.    | Chlorides(mg/l)               | 250        | -                           | 111.5                  | 1299.6                    | 175.9                  | 542.3                   | 994.7                                    |
| 11.    | Sulphate(mg/l)                | 200        | -                           | 100.6                  | 193.6                     | 127.4                  | 259.9                   | 1644.9                                   |
| 12.    | Fluorides(mg/l)               | 1          | -                           | -                      | -                         | -                      | 0.3                     | 2.9                                      |
| 13.    | TAN                           | 0.5        | 2.3                         | 0.2                    | 0.5                       | 0.1                    | 1                       | 0.4                                      |
| 14.    | Iron (Fe) (mg/l)              | 0.3        | 0                           | 7.3                    | 0                         | 0                      | 1.3                     | 0.79                                     |
| 15.    | Nitrate Nitrogen              | NS         | -                           | 7.3                    | 3.2                       | 3.6                    | 0.1                     | 0  |
| 16.    | Lead(mg/l)                    | 0.01       | 0.02                        | 0.02                   | 0.04                      | 0.06                   | 0                       | 0.03                                     |
| 17.    | Copper(mg/l)                  | 0.05       | 0                           | 0                      | 0                         | 0                      | 0                       | 2.12                                     |
| 18.    | Manganese                     | 0.1        | -                           | -                      | -                         | -                      | 1.07                    | 5.14                                     |
| 19.    | Zinc                          | 5          | 0                           | 0                      | 0                         | 0                      | 1.15                    | 0.09                                     |
| 20.    | Chromium                      | 0.05       | 0                           | 0                      | 0                         | 0                      | 0                       | 0  |
| 21.    | Barium                        | 0.7        | 0.06                        | 0                      | 0.04                      | 0                      | 0.01                    | 0.02                                     |
| 22.    | Vanadium                      | NS         | 0.01                        | 0.08                   | 0                         | 0.1                    | 0.03                    | 0  |
| 23.    | Arsenic                       | 0.01       | 0                           | 0                      | 0                         | 0                      | 0                       | 0  |
| 24.    | Cadmium                       | NS         | 0                           | 0                      | 0                         | 0                      | 0                       | 0  |

All values are in mg/l except pH; Mode of sampling-Grab; NS- Not Specified; '-' result not available

\*BIS Drinking water quality standards IS:10500

## Chapter 5

### **POLLUTING UNITS AND HEARING GIVEN TO THEM**

In order to assess individual accountability of CETP and polluting industrial units for environmental damage cost and cost of restoration of the environment, the Hon'ble NGT also passed order that "The Committee may give hearing to the CETP operator and the units identified as polluting by the MPCB for which list will be furnished by the MPCB to the Committee indicating the period and nature of default within one month".

In compliance with aforesaid orders of the Hon'ble Tribunal, Maharashtra Pollution Control Board (MPCB) forwarded list of 225 defaulting units (identified as polluting units since 05 years from the date of filing original application in the Hon'ble Tribunal i.e. 28/4/2016 including the CETP) to the Committee vide email dated 27/11/2019 and hearing to the listed units were given by the Committee during Nov 30 – Dec 03, 2019 at Central Lab, M.P.C.B., Nirmal Bhavan, Mahape, Navi Mumbai.

MPCB informed that on the basis of pollution potential of industries i.e industry category (Red/Orange /Green) and scale of unit MPCB has followed specific surveillance protocol till March 2016. Subsequently in view of the Central and State Govt. initiative for Ease of Doing Business, MPCB has adopted Risk based Random Sampling Protocol w.e.f. April 2016. MPCB reviewed past records available and based on violation of discharge standards of individual units, discharge into storm water drain, drains passing through outside premises of the units, etc. and the actions taken i.e. Show-cause Notice, Closure Direction and other Interim/Proposed Directions issued under section 33 A of Water (Prevention & Control of Pollution) Act, 1974 since 28/4/2011. The said list of 225 units may be taken as the list of polluting units.

Along with the said list, a table outlining date of sample collection and analysis reports of ETP inlet, ETP outlet, Storm water drain, Drains passing through outside premises of the units, etc. of various samples collected and analysed at various occasions by MPCB since 28/4/2011, as part of surveillance by MPCB, was also provided by MPCB for each of the units. Directions or Show-cause notices have not been issued in all such cases but the sampling analysis results along with source & date of sample collection are communicated to respective units to improve upon the operation/pollution control devices.

However, the Committee observed that number of days of violation (i.e. day since the day of violation observed/ due date of compliance of directions and the day as on which the compliance was subsequently verified by MPCB) was not provided for every units of the list, more particularly where Show-cause Notice and Proposed/Interim Direction have been issued.

The committee gave hearing to representative (s) of each unit of the said list where MPCB presented nature and period of violations based on closure direction, show-cause notices, proposed/interim direction and subsequent revocation/conditional restart order, as well as the aforesaid table showing date & point of effluent sample collection and respective analysis results carried out at various occasions by MPCB informing them violation period for each of the units from records available with them. Representative of the respective unit was also given opportunity to submit records against such violations.

Due to repetition of 04 unit's name in the said list of 225 units, the effective list was of 221 units of which 05 units didn't attend the hearing. The committee, therefore, gave hearing to 216 units.

During the hearing, the committee observed that:

- (a) In cases where violations were informed about samples collected from their storm water drain, outlet of ETP having zero liquid discharge facility, etc., the unit denied citing the following arguments:
  - (i) Samples collected from their storm water drain are not being discharged but channelized to collection tank of their ETP;
  - (ii) Seepage/rainwater run-off from others premises actually enters into their premises due to undulating land terrain and find place in their storm water drain;
  - (iii) Effluent collection sump is at higher elevation than that of unit's ETP treated storage tank and as a result effluent from the collection sump enters into their ETP treated storage tank, and;
  - (iv) In cases of units having zero liquid discharge facility, outlet of ETP (prior to RO/MEE) exceeding the prescribed discharge limits may not be considered as violations since there is no discharge line and the outlet of ETP is further subjected to RO/MEE s;
  - (v) Communication informing the exceedance of prescribed norms in samples collected by Joint Vigilance Survey (JVS) or show-cause notice/interim direction have not been received by the units in some of the cases.

- (b) The SSI units represented that though in their Consent to Operate issued under the Water (Prevention & Control of Pollution) Act, 1974, MPCB has prescribed discharge effluent standard stringent to the design/standard of the CETP but incidences, where effluent from their unit have found within the inlet design/standard of the CETP should not be considered as violation for imposing environmental compensation/damage.

Accordingly, the committee made the following recommendations:

- (1) In view of (a) above and other similar cases, MPCB may furnish the list of only those polluting units for the purpose of environmental compensation/restoration cost for which due records are available for the violations noticed by MPCB.
- (2) Incidences of SSI units, where they have discharged into CETP exceeding their prescribed norms but within design/prescribed inlet standards of CETP, may not be included in the list of polluting units for the purpose of environmental compensation/restoration cost recovery. For if SSI units are required to meet its outlet effluent standard to that of outlet effluent discharge standard of CETP then there remains no role of CETP which has primarily been facilitated for smaller units. However, MPCB may examine the matter and take appropriate decision in exempting such exceedance cases in case of SSI units.
- (3) The violations which are not directly related to effluent discharge in to CETP or not causing damage to soil/ surface water/ground water, may not be taken in the list of polluting units for the purpose of environmental compensation in this matter under reference. However, MPCB may take appropriate actions for such defaults.

(4) Limiting period of violations

Taking reference from section 15(3) of the National Green Tribunal Act, 2010, and to limit a period since when default is to be considered for assessing environmental damage cost and cost of restoration, the period of default has been taken into account since five years prior to the day Original Application No. 64/2016 (WZ) was made before the Hon'ble Tribunal (i.e. 28/4/2016) and till the date of order of the Hon'ble Tribunal (i.e. 26/09/2019) viz. 28/4/2011 to 26/9/2019.

(5) Number of days (N) of violations:

- (i) In cases where closure direction has been issued, the period of default (N in days) may be taken as date of inspection till the effective date of closure of the unit.
- (ii) For other cases including where conditional restart order or show-cause notice/proposed direction/interim direction issued under the Water (Prevention & Control of Pollution) Act, 1974/ Environment(Protection) Act, 1986, have been issued, the period of default may be taken as number of days(N) for which violation took place. It may be the period between the day of violation observed/ due date of compliance of directions and the day as on which the compliance was verified by MPCB.

MPCB was requested by the committee to re-examine considering the above and provide revised list of polluting units along with nature and period of defaults to the Committee.

MPCB re-examined and identified 83 of the said 221 units as polluting units and another 20 units considering observations and recommendations of the committee for the purpose of imposing environmental damage cost/damage restoration cost. The following recommendations of the committee were considered by MPCB for arriving at 103 polluting units based on issuance of Closure Directions for environmental damage cost/damage restoration cost thereof:

MPCB re-examined and identified 83 of the said 221 units as polluting units and another 20 units considering observations and recommendations of the committee for the purpose of imposing environmental damage cost/damage restoration cost. MPCB informed that the following recommendations of the committee were considered by MPCB in arriving 103 units as the polluting units:

- (i) Inclusion of only those units for which due records are available for establishing the violations;
- (ii) Exempting SSI units (having effluent discharge less than 25 KLD) who were found discharging effluent to CETP meeting CETP inlet consent norms of COD-3500 mg/l and BOD 1500 mg/l;
- (iii) Non-inclusion of violations which are not directly related to effluent discharge in to CETP or not causing damage to soil/ surface water/ground water;
- (iv) Considering the period of default of five years since the date of making Original Application No. 64/2016 (WZ) i.e. 28/4/2011 to 26/9/2019 taking reference from section 15(3) of the National Green Tribunal Act,

2010, with regard to consideration of default for assessing environmental compensation and cost of restoration;

Period of violations for the aforesaid 103 identified polluting units for the purpose of imposing environmental damage cost/damage restoration cost were also revised as per recommendations of the committee that in cases where closure direction have been issued, the period of default (N in days) has been taken as date of inspection till the effective date of closure of the unit. For other cases including where conditional restart issued under W (P&CP) Act, 1974/ EP Act, 1986, the period of default has been taken as no of days (N) for which violation took place. Such N has been taken as the period between the day of violation observed/ due date of compliance of directions and the day as on which the compliance was verified. The period between effective closure of the unit till the date of restart order issued by MPCB has not been considered as violation period.

However, in case of the CETP, though closure direction was not issued being the common facility but has been prosecuted under the Water (Prevention & Control of Pollution) Act, 1974 in 2010, 2017 and 2018, directions under Water (Prevention & Control of Pollution) Act, 1974/ Air (Prevention & Control of Pollution) Act, 1981 have also been issued time to time for improving the performance of the CETP and the same have not complied yet. The periodical sampling & monitoring of CETP by MPCB reveals violations prior to the limiting period recommended by the committee i.e. 28/4/2011, therefore, period of violations for CETP has been considered since 28/4/2011.

The additional 20 units were called for hearing by the committee on 27/1/2020 at Central Lab, M.P.C.B., Nirmal Bhavan, Mahape, Navi Mumbai, where MPCB presented nature and period of violations to each of the units giving them opportunity to submit records against the said violations. All the 05 units, who did not attend the earlier hearing during Nov.30 - Dec. 04, 2019, and falling under the said list of 103 units were also called to attend the hearing giving them another opportunity. However, only 01 of the said 05 units attended the hearing on 27/1/2020 besides 03 of the said 20 units also did not attend the said hearing.

As per recommendations of the committee, notices were also served by MPCB to the 83 units (who were called/given the hearing earlier during Nov.30 - Dec. 04, 2019) on 28/1/2020 to submit their additional details, if any, by 31/1/2020. Replies received from 27 units of the said 83 units were examined by MPCB from the records available with them.

Details of each of the 103 units (including CETP) identified as polluting units for the purpose of environmental damage cost/damage restoration cost along with

nature and period of violation, prepared based on hearing given to them by the committee; recommendations of the committee; details submitted by the units to MPCB in support of compliance against the proposed violation details; vis-à-vis examination of records available at MPCB, as above, along with other details, as forwarded by MPCB, are given at Annexure V.

## Chapter 6

# ENVIRONMENTAL DAMAGE COST AND RESTORATION COST

### 6.1. Introduction

Industrialization growth is improving the economy of the country but to this quality of life and ecosystem, human health is damaging. In India, most of the industries are located along the banks of the rivers and the nearby coastal areas for the availability of water and easy for disposal of waste water.

The chapter 3 of this report outlines that the 25 MLD capacity CETP is discharging higher concentrated effluent (not meeting the prescribed standards under the Consent to Operate issued by MPCB) into coastal water of the Arabian sea besides discharge of partially treated/untreated effluent as overflow from it beyond its hydraulic load of 25 MLD. Such high concentrated effluent as overflow is discharged into natural drain and has impact on creeks and coastal water. The environment damage assessment, as given in chapter 4 of this report, also reveals discharge of high concentration quality effluent from industries into drains and that drains and ground water in and around MIDC Tarapur are contaminated and have impact on creeks and sea water. These precarious actions tend to disrupt the assimilative capacity of the bio-sphere, hindering the ecological balance of the water environment (both water stream and ocean). Discharge of high concentrated pollutants into the ocean can endanger marine life and put aquatic life at risk affecting the livelihood of fisherfolks and other dependent community. In addition to perils to aquatic life, high concentrated pollutants in water sources can adversely impact health of people residing in the surrounding areas through direct and indirect consumption.

Hundreds of fishes were found dead in the shores of Navapur bay, which was reportedly due to a low level of dissolved oxygen<sup>1</sup>. Local dwellers have reported that Navapur creek has developed foul odour and reddish tinge <sup>2</sup> that is clear evidence for toxic loadings.

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<sup>1</sup> URL 01: <https://www.lokmat.com/vasai-virar/thousands-fish-pollution-navapur-creek/>

<sup>2</sup> URL 02: <https://www.freepressjournal.in/cmcm/boisar-residents-stop-work-on-midc-toxic-pipeline-project>

Surface water pollution has several adverse effects mainly affecting aquatic life and human health. Toxic chemicals released from industries beyond the safety limit can result in both carcinogenic and non-carcinogenic health effects on humans when entered into the food chain.

Low-income population residing in close proximity to the polluting source and depended on the eco-system services for livelihood, food, and water, are particularly as high risk. The damages to local population includes increased likelihood of mortality, higher treatment cost due to morbidity, and loss of economic productivity.

Fishes are the aquatic species directly affected due to the presence of high concentrated industrial effluents. Further, toxic and trace metals from industrial effluent is often observed in fishes which is more likely to enter the human food chain. Low-level dissolved oxygen (DO) is another primary reason for aquatic loss. This mainly is due to the higher amount of DO consuming pollutants which consume the available DO. This results in depletion of DO making the survival of aquatic life difficult

Loading of water environment with pollutants result in aesthetic loss. The commonly observed nuisance includes foul odour, mosquitoes and insects, change in colour, etc. Eutrophication is common in slow-flowing water bodies that are loaded with nutrient content. This is the state where the water body is completely covered with aquatic plants consuming the nutrients present. The eutrophication process hinders the passage of sunlight endangering the indigenously present aquatic species and biodiversity.

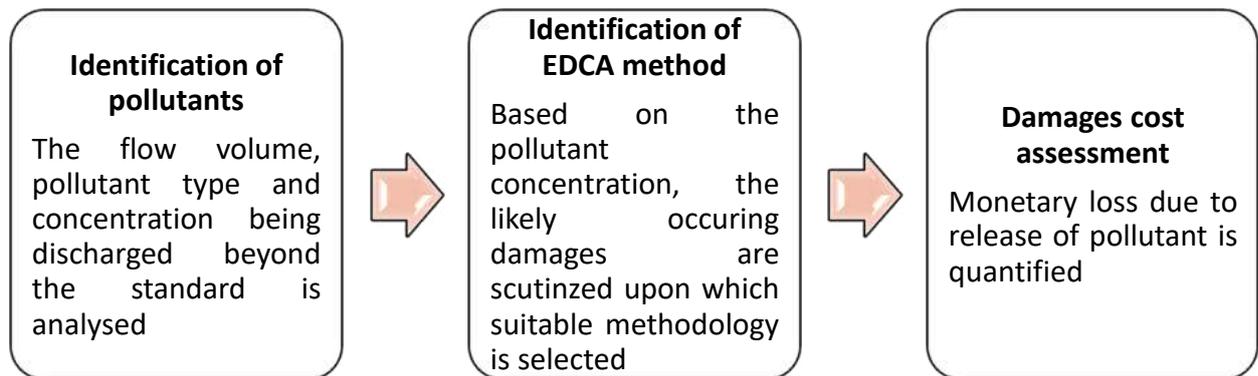
The valuation of environmental damages thus values the direct loss to life and wellbeing of humans, and other dependent species in the affected ecosystem. Additionally, the valuation of damages also imputes economic value to a wide range of eco-system services derived by the humans from the affected area. These eco-system services includes depreciation in land value situated near the polluted water bodies, reduction in income from fisheries and tourism, biodiversity loss, gene-pool loss, and change in nutrient cycle. The indirect value of the affected eco-system should also include non-use and indirect value of the eco-system like existence value, bequest value, and future option value. In addition there is

damages to reputation, goodwill and trust between the community, industries, and the government. This chapter focuses on assessing environmental damage cost due to the release of breached physio-chemical pollutants into water environment such as Sea and Wetlands .

In this chapter environmental damage cost has been assessed for the water environment.

## 6.2 Environmental Damages Cost Assessment

Environmental damage cost assessment (EDCA) is the tool that scrutinizes the potential loss in monetary terms due to anticipated impacts on the environment due to the release of pollutants beyond safety. EDCA is part of economics mainly emphasizing sustainability around the globe. The main purpose of the assessment is not to hinder any type of development in the country, but to retain the ecosystem in its pristine condition to avail the maximum benefits to human. EDCA is generally carried out using the following steps as shown in Figure 6.1.



**Figure 6.1:** Generic pathway towards Environmental damages cost assessment

Considering the factors of damages, damage cost assessment has been done for discharge from Tarapur CETP into Navapur creek, coastal waters and local nullahs/drains exceeding the prescribed standards. Due to the lack of availability of detailed baseline data related to identified damage parameters, various studies have been referred to arrive at the damage costs. Approach of direct value transfer is referred for assessment. Direct value transfer estimates the economic value of one location using the study carried out another location. The value benefit transfer method is widely used as a technique to calculate the economic value of benefits for the environment when an original study for valuation is not feasible.

This method calculates the value of damages by transferring the information, which is available from the studies already from the study site (completed) to the policy site (another location). The values estimated by Hernandez- Sancho et.al. paper of 2010<sup>3</sup> have been used.

$$\text{EDCA (INR)} = \text{Damage cost} * \text{loading rate} * \text{exchange rate} * \text{inflation} * 365 \text{ ----- (1)}$$

The damage cost per kg of the load has been used for the study for each pollutants (which are exceeding the standards<sup>4,5</sup> as per regular monitoring data of MPCB) individually which is discharged in to the sea and is represented in Table 1. In order to estimate the damages done due to the discharge of pollutants to the Sea the effluent discharge standards in the consent to operate issued by MPCB have been taken into consideration.

**Table 6.1:** Damage Cost for Each Pollutant in Euro per Kg for Sea

| <b>Pollutant</b>         | <b>Damage in Euro per Kg (2010)</b> |
|--------------------------|-------------------------------------|
| Suspended Solids         | 0.001                               |
| Biological Oxygen Demand | 0.005                               |
| Chemical Oxygen Demand   | 0.010                               |

While the discharge of effluent is being made in the sea/creek area of Navapur from the CETP, there are wetlands in the nearby areas of the discharge point. Wetlands are the transition areas between the shallow water overlying water logged soils as well as interspersed submerged or emergent vegetation. It has its own characteristics ecosystem and diverse habitat. Preservation of wetlands is important to save our inland diverse endangered habitat, especially in the light of climate changes. The discharge of pollutants more than the permissible limits leads to the damage of wetland ecosystems<sup>6</sup>. The wetlands and Mangroves for the region

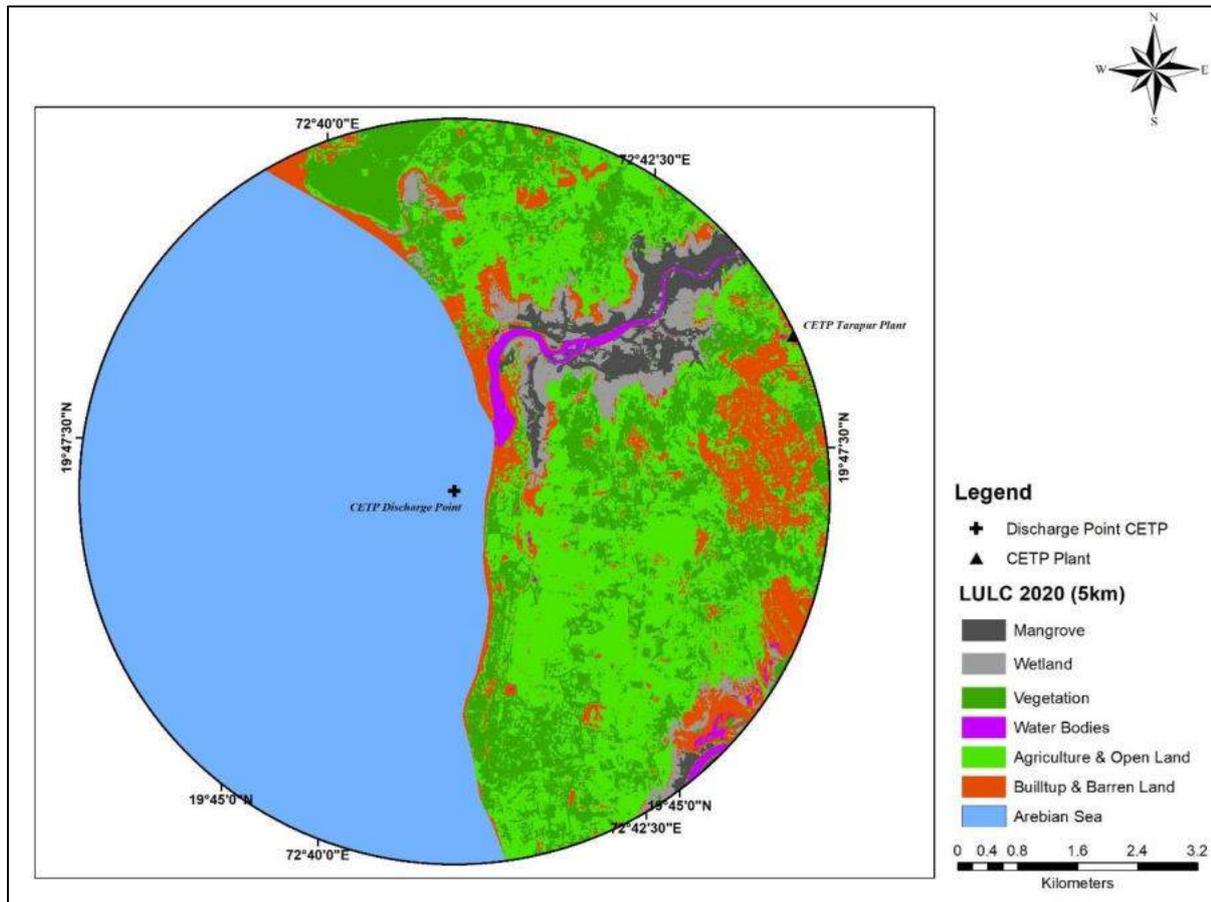
<sup>3</sup> Hernández-Sancho.F., Molinos-Senante, M., Sala-Garrido, R. (2010). Economic valuation of environmental benefits from wastewater treatment processes: an empirical approach for Sp ain. Sci Total Environ. 408(4), 953-7

<sup>4</sup> <http://www.mpcb.gov.in/sites/default/files/common-effluent-treatment-plant/guidelines/CETP%20Standards.pdf>

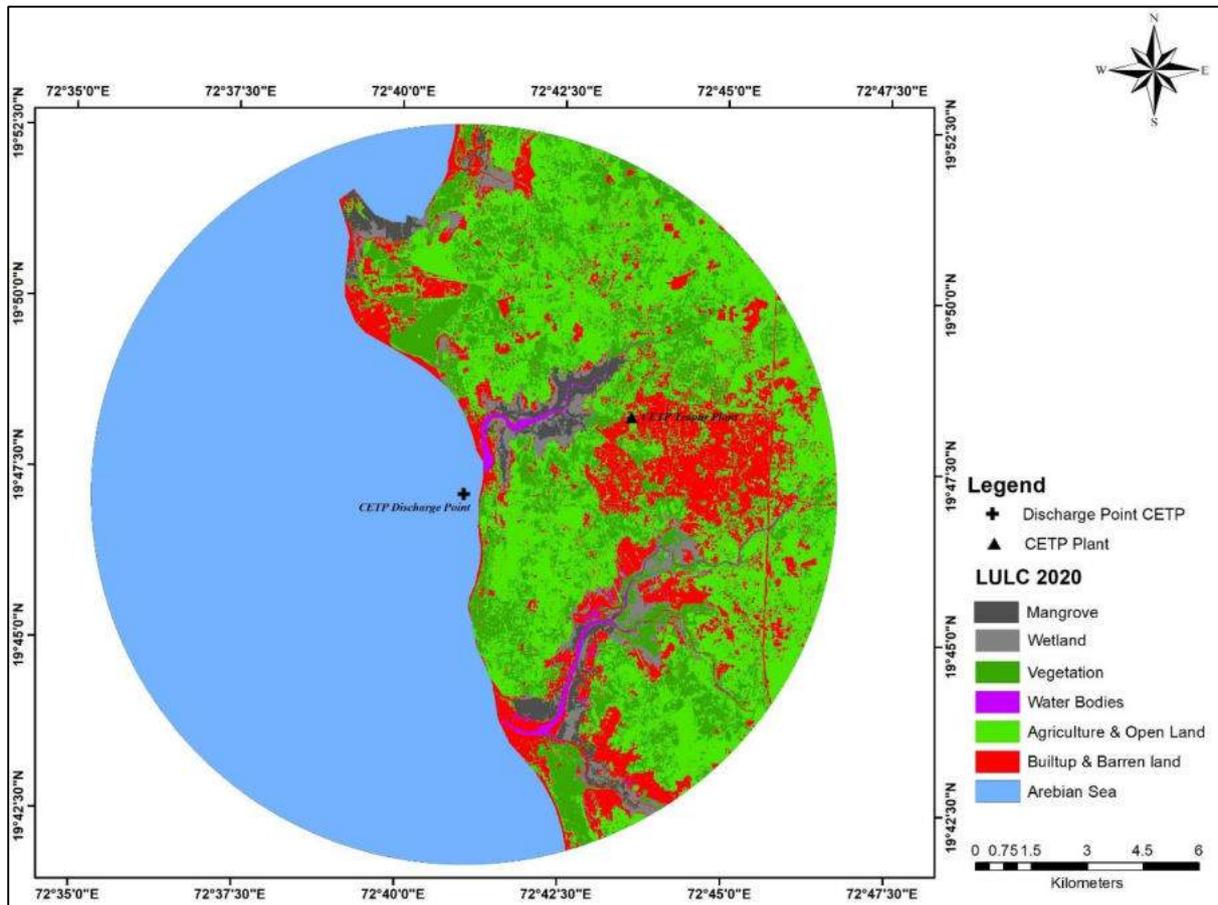
<sup>5</sup> The limit of BOD = 30 mg/l has been stipulated as per direction of MPCB dated 02.04.2016 and incorporated in Consent to Operate dated 13.04.2016 issued to CETP. Prior to that, the Limit was stipulated as 100 mg/l

<sup>6</sup> Sourav Saha, Water Quality Assessment of Four Different Wetlands And Its Implication to Climate Change, International Indexed & Refereed Research Journal.

have been mapped using remote sensing and have been shown in Figure 6.2 and 6.3. Sentinel 2A satellite data has been used to generate the LULC map of the region with 5 KM (Figure 6.2) and 10 KM (Figure 6.3) as the radius. Band 12 of 17<sup>th</sup> February 2020 data has been processed using ArcGIS to get the area of wetlands and mangroves of the region. The results are shown in Table 2.



**Figure 6.2:** LULC Classification of region within 5 km radius of discharge from CETP



**Figure 6.3:** LULC Classification of region within 10 km radius of discharge from CETP

**Table 6.2:** LULC Areas of the Region In and Around CETP Discharge

| Classes                 | Land Area with 5 km as Radius | Land Area with 10 km as Radius |
|-------------------------|-------------------------------|--------------------------------|
| Mangrove                | 2.04                          | 5.3                            |
| Wetland                 | 2.69                          | 7.8                            |
| Waterbodies             | 0.44                          | 1.29                           |
| Vegetations             | 10.88                         | 37.17                          |
| Built up & Barren       | 6.84                          | 34.42                          |
| Agriculture & Open Land | 17.1                          | 73.57                          |
| <b>Total</b>            | <b>39.99</b>                  | <b>159.55</b>                  |

It can be seen from Table 6.2, that in the vicinity of the discharge, there are wetlands and mangroves available which are affected due to the effluent discharge. It is necessary to evaluate the damages related to these as well. The damage cost per kg of the load on wetlands which is used for the study for each pollutant

individually is represented in Table 6.3. The valuation of damages have been carried out for both the scenarios i.e. for pure sea discharge and pure wetland discharge. However, both sea and wetlands are present in the region, hence combined damages are considered.

**Table 6.3: Damage Cost for Each Pollutant in Euro per Kg for Wetlands**

| <b>Pollutant</b>         | <b>Damage in Euro per Kg (2010)</b> |
|--------------------------|-------------------------------------|
| Suspended Solids         | 0.010                               |
| Biological Oxygen Demand | 0.117                               |
| Chemical Oxygen Demand   | 0.122                               |

The euro figure is converted into Indian Rupees using the inflation and exchange rate for 2010<sup>7 8</sup>. The damage cost estimated is then inflated for the year 2019 by using Eq (1).

The Total damage cost and loading rate for pollutant of the effluent discharge exceeding the standard are given in the following tables respectively for COD, BOD, TSS.

### **6.2.1 Environmental Damages Cost Assessment due to excess loading pollutant into the Sea**

Environmental damage cost is calculated from April 2011 to November 2019<sup>9</sup>.

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<sup>7</sup>URL 05: <https://www.inflationtool.com/indian-rupee>

<sup>8</sup> URL 06: <https://www.statista.com/statistics/412830/euro-to-indian-rupee-average-annual-exchange-rate/>

<sup>9</sup> This reporting period has been considered by the committee for the purpose of its report only so as to limit the period taking reference from section 15(3) of the National Green Tribunal Act, 2010 as mentioned in Chapter 5 of this report.

**Table 6.4:** Cost of Damages for Excess COD Discharge into sea ₹ Crore (2019) and loading rate

| <b>Year</b> | <b>Discharge in MLD (million litres per day)</b> | <b>Breaching Standard, the value of COD in mg/l (above 250 mg/l)</b> | <b>Load exceeding the standard in Kg/day</b> | <b>Damage cost in Rs Crore (as per 2019)</b> |
|-------------|--|--|--|--|
| 2011        | 25.24833   | 919.708  | 23223.351                                    | 0.6926                                       |
| 2012        | 25.23225   | 486.987  | 12287.775                                    | 0.4878                                       |
| 2013        | 25.09558   | 325.643  | 8172.200                                     | 0.3235                                       |
| 2014        | 25.13208   | 298.059  | 7490.834                                     | 0.2965                                       |
| 2015        | 25.15908   | 596.535  | 15008.267                                    | 0.5941                                       |
| 2016        | 24.86041   | 577.072  | 14346.256                                    | 0.5695                                       |
| 2017        | 23.69925   | 509.722  | 12080.034                                    | 0.4782                                       |
| 2018        | 24.34892   | 916.472  | 22315.092                                    | 0.8834                                       |
| 2019        | 24.73018   | 685.079  | 16942.123                                    | 0.6137                                       |

**Table 6.5:** Cost of Damages for Excess BOD Discharge into sea in Rs Crore (2019) and loading rate

| <b>Year</b> | <b>Discharge in MLD</b> | <b>Breaching Standard value of BOD in mg/l (above 100 mg/l upto 2015, 30 mg/l from 2016)</b> | <b>Load exceeding the standard in Kg/day</b> | <b>Cost in Rs Crore (2019)</b> |
|-------------|-------------------------|--|--|--------------------------------|
| 2011        | 25.25078                | 318.146  | 8033.430                                     | 0.1198                         |
| 2012        | 25.23225                | 260.665  | 6577.158                                     | 0.1305                         |
| 2013        | 25.09558                | 128.894  | 3234.673                                     | 0.0640                         |
| 2014        | 25.13208                | 114.444  | 2876.214                                     | 0.0569                         |

|      |          |         |          |        |
|------|----------|---------|----------|--------|
| 2015 | 25.15908 | 172.479 | 4339.418 | 0.0859 |
| 2016 | 24.86042 | 240.326 | 5974.614 | 0.1186 |
| 2017 | 23.69925 | 224.438 | 5319.000 | 0.1053 |
| 2018 | 24.34892 | 406.460 | 9896.871 | 0.1959 |
| 2019 | 24.73018 | 259.636 | 6420.854 | 0.1163 |

**Table 6.6:** Cost of Damages for Excess TSS Discharge in Sea in Rs Crore (2019) and loading rate due to SS

| <b>Year</b> | <b>Discharge in MLD</b> | <b>Breaching Standard, value of TSS in mg/l (above 100 mg/l)</b> | <b>Load exceeding the standard in Kg/day</b> | <b>Damage Cost in Rs Crore (2019)</b> |
|-------------|-------------------------|--|--|---------------------------------------|
| 2011        | 25.24833                | 101.917  | 2573.475                                     | 0.000765                              |
| 2012        | 25.23225                | 46.138   | 1164.163                                     | 0.000462                              |
| 2013        | 25.09558                | 35.555   | 892.279                                      | 0.000353                              |
| 2014        | 25.13208                | 68.787   | 1728.753                                     | 0.000684                              |
| 2015        | 25.15908                | 51.269   | 1289.892                                     | 0.000511                              |
| 2016        | 24.86041                | 60.736   | 1509.925                                     | 0.000599                              |
| 2017        | 23.69925                | 114.881  | 2722.583                                     | 0.001078                              |
| 2018        | 24.34892                | 66.342   | 1615.355                                     | 0.000639                              |
| 2019        | 24.73018                | 44.852   | 1109.186                                     | 0.000402                              |

The following table shows the total environmental damage cost for each year by taking each pollutant from 2011 to 2019.

**Table 6.7:** The total damage for each combining the damages of all the pollutant for sea

| <b>Year</b>                                     | <b>COD</b> | <b>BOD</b> | <b>TSS</b> | <b>Total Damages Cost in Cr INR</b> |
|---|------------|------------|------------|-------------------------------------|
| 2011  | 0.6926     | 0.1198     | 0.000765   | 0.8132                              |
| 2012  | 0.4878     | 0.1305     | 0.000462   | 0.6188                              |
| 2013  | 0.3235     | 0.0640     | 0.000353   | 0.3879                              |
| 2014  | 0.2965     | 0.0569     | 0.000684   | 0.3541                              |
| 2015  | 0.5941     | 0.0859     | 0.000511   | 0.6805                              |
| 2016  | 0.5695     | 0.1186     | 0.000599   | 0.6887                              |
| 2017  | 0.4782     | 0.1053     | 0.001078   | 0.5846                              |
| 2018  | 0.8834     | 0.1959     | 0.000639   | 1.0799                              |
| 2019  | 0.6137     | 0.1163     | 0.000402   | 0.7304                              |
| <b>Total (damage cost in Crore as per 2019)</b> |            |            |            | <b>5.9381</b>                       |

### **6.2.2 Environmental Damages Cost Assessment due to excess loading pollutant into the Wetland**

Wetlands are the transition areas between the shallow water overlying water logged soils as well as interspersed submerged or emergent vegetation. It has its own characteristics ecosystem and diverse habitat. Preservation of wetlands, thus, is the sole requirement to save our inland diverse endangered habitat, especially in the light of climate changes. Due to the discharge of pollutants more than the permissible limits which leads to the damage of wetland ecosystem. The damage cost per kg of the load used for the study for the above pollutants individually is represented in Table 6.8 to 6.11.

**Table 6.8:** Cost of Damages for Excess COD Discharge into wetlands ₹ Crore (2019) and loading rate

| <b>Year</b> | <b>Discharge in MLD (million litres per day)</b> | <b>Breaching Standard, the value of COD in mg/l (above 250 mg/l)</b> | <b>Load exceeding the standard in Kg/day</b> | <b>Damage cost in Rs Crore (as per 2019)</b> |
|-------------|--|--|--|--|
| 2011        | 25.24833   | 919.708  | 23223.351                                    | 7.7576                                       |
| 2012        | 25.23225   | 486.987  | 12287.775                                    | 5.4629                                       |
| 2013        | 25.09558   | 325.643  | 8172.200                                     | 3.6233                                       |
| 2014        | 25.13208   | 298.059  | 7490.834                                     | 3.3212                                       |
| 2015        | 25.15908   | 596.535  | 15008.267                                    | 6.6542                                       |
| 2016        | 24.86041   | 577.072  | 14346.256                                    | 6.3781                                       |
| 2017        | 23.69925   | 509.722  | 12080.034                                    | 5.3559                                       |
| 2018        | 24.34892   | 916.472  | 22315.092                                    | 9.8938                                       |
| 2019        | 24.73018   | 685.079  | 16942.123                                    | 6.8736                                       |

**Table 6.9:** Cost of Damages for Excess BOD Discharge into wetlands ₹ Crore (2019) and loading rate

| <b>Year</b> | <b>Discharge in MLD</b> | <b>Breaching Standard value of BOD in mg/l (above 100 mg/l upto 2015, 30 mg/l from 2016)</b> | <b>Load exceeding the standard in Kg/day</b> | <b>Damage Cost in Rs Crore (2019)</b> |
|-------------|-------------------------|--|--|---------------------------------------|
| 2011        | 25.24833                | 318.146  | 8033.430                                     | 2.8033                                |
| 2012        | 25.23225                | 260.665  | 6577.158                                     | 3.0546                                |

|      |          |         |          |        |
|------|----------|---------|----------|--------|
| 2013 | 25.09558 | 128.894 | 3234.673 | 1.4982 |
| 2014 | 25.13208 | 114.444 | 2876.214 | 1.3322 |
| 2015 | 25.15908 | 172.479 | 4339.418 | 2.0098 |
| 2016 | 24.86041 | 240.326 | 5974.614 | 2.7672 |
| 2017 | 23.69925 | 224.438 | 5319.000 | 2.4636 |
| 2018 | 24.34892 | 406.460 | 9896.871 | 4.5839 |
| 2019 | 24.73018 | 259.636 | 6420.854 | 2.9739 |

**Table 6.10:** Cost of Damages for Excess suspended solids Discharge into wetlands ₹ Crore (2019) and loading rate

| <b>Year</b> | <b>Discharge in MLD</b> | <b>Breaching Standard, value of TSS in mg/l (above 100 mg/l)</b> | <b>Load exceeding the standard in Kg/day</b> | <b>Damage Cost in Rs Crore (2019)</b> |
|-------------|-------------------------|--|--|---------------------------------------|
| 2011        | 25.25078                | 101.917  | 2573.475                                     | 0.0768                                |
| 2012        | 25.23225                | 46.138   | 1164.163                                     | 0.0462                                |
| 2013        | 25.09558                | 35.555   | 892.279                                      | 0.0353                                |
| 2014        | 25.13208                | 68.787   | 1728.753                                     | 0.0684                                |
| 2015        | 25.15908                | 51.269   | 1289.892                                     | 0.05106                               |
| 2016        | 24.86042                | 60.736   | 1509.925                                     | 0.0599                                |
| 2017        | 23.69925                | 114.881  | 2722.583                                     | 0.1078                                |
| 2018        | 24.34892                | 66.342   | 1615.355                                     | 0.0639                                |
| 2019        | 24.73018                | 44.852   | 1109.186                                     | 0.0402                                |

**Table 6.11:** The total damage for each combining the damages of all the pollutant for the wetlands

| <b>Year</b>                                     | <b>COD</b> | <b>BOD</b> | <b>Suspended Solids</b> | <b>Total Environemntal Damages Cost (EDC)</b> |
|---|------------|------------|-------------------------|---|
| 2011  | 7.7576     | 2.8033     | 0.0768                  | 10.6377                                       |
| 2012  | 5.4629     | 3.0546     | 0.0462                  | 8.5637  |
| 2013  | 3.6233     | 1.4982     | 0.0353                  | 5.1568  |
| 2014  | 3.3212     | 1.3322     | 0.0684                  | 4.7218  |
| 2015  | 6.6542     | 2.0098     | 0.05106                 | 8.71506                                       |
| 2016  | 6.3781     | 2.7672     | 0.0599                  | 9.2052  |
| 2017  | 5.3559     | 2.4636     | 0.1078                  | 7.9273  |
| 2018  | 9.8938     | 4.5839     | 0.0639                  | 14.5416                                       |
| 2019  | 6.8736     | 2.7213     | 0.0402                  | 9.6351  |
| <b>Total (damage cost in Crore as per 2019)</b> |            |            |                         | 79.10426                                      |

The above estimate is conservative as it only considers scope of damages due to effluent discharge beyond the standards on surface water wetlands. The impact on sea water pollution and wetlands is also very conservative due to lack of better information on other pollutants including nitrates/nitrogen and phosphates.

The chapter 4 reveals that groundwater is contaminated in the region due to illegal discharges of the effluent from the industries/CETP. These infractions are not recorded and there is lack of information on the sub-surface hydrology of the site to estimate the quantum of contaminates to ground water. Instead cost to be incurred in their detailed assessment (including other water bodies) and their remediation have been accounted as “Super Fund” and the initial amount for the super fund is being suggested as 75 Crores INR which may increase or decrease depending upon the selected remediation options based on outcome of the detailed assessment and application of other tools as suggested under Chapter 8. The total environmental damage cost has, therefore, been estimated as 85.042

Crore INR (79.014 + 5.938 Crore INR) and with creation of super fund having initial deposit of Rs. 75 Crore INR as environmental restoration cost.

**Therefore, the total estimated environmental damage and restoration cost comes out to be 160.042 Crore INR.**

## Chapter 7

### Accountability of CETP and defaulting units in meeting the environmental damage cost and cost of restoration

Distribution of the estimated environmental damage cost and restoration cost of 160.042 Crore INR (refer Chapter 6) has been done on the polluter pay principle and hence among the 103 polluting units identified after giving hearing to the units and following criteria as mentioned in Chapter 5 of this report.

#### 7.1 Methodology of Distribution of Environmental Damage and Restoration Cost (EC)

The methodology recommended in “Report of the CPCB In-house Committee on Methodology for Assessing Environmental Compensation and Action Plan to Utilize the Fund” has been used adding some additional features to meet objective of distributing the cost of 160.042 Crore INR among the 103 polluting units. The adopted methodology takes into account the pollution index depending on pollution hazard, scale of operation, load factor based on the population located around the industrial unit and the number of days for which violation took place for respective polluting unit.

In order to include deterrent effect for repeated/habitual violators, exponential factor for first, second, third and fourth repeat violations has also been taken in to account. However, only upto fourth repeat violation has been considered.

The following recovery cost (RC) factor for environmental damage and restoration cost recovery has been used for each of the units and each of the violations viz. first violations, first repeat violation, second repeat violation, third repeat violation and fourth repeat violation:

$$RC \text{ Factor} = PI * N * S * LF * DF \text{ ----- (1)}$$

Where,

PI = Pollution Index of industrial unit

N = N, number of days for which violation took place is the period between the day of violation observed/due date of direction's compliance and the day of compliance verified by MPCB

S = Factor for the scale of operation

LF = Location factor, which is based on population of the city/town and location of the industrial unit.

DF = Deterrent Factor based on first and subsequent repeated violations

Average Pollution Index based category of the industrial unit, as per the aforesaid report, is shown in table 7.1 below.

**Table 7.1:** Average Pollution Index based on the category of industrial unit

| <b>Industrial unit Category</b> | <b>Average Pollution Index</b> |
|---------------------------------|--------------------------------|
| Red                             | 80                             |
| Orange                          | 50                             |
| Green                           | 30                             |

N, the period of default in days, has been taken as date of inspection till the effective date of closure of the unit. For cases where unconditional restart order was not issued thereafter but conditional restart was permitted, additional number of days have been taken as date of issuance of such conditional restart till as on which the compliance was verified by MPCB. The period between effective closure of the unit till the date of such conditional restart order issued by MPCB has not been considered as period of default.

The LF is 1, as suggested in the aforesaid CPCB in-house report, for city/town having population less than one million and population in & around Industrial Area Tarapur MIDC is less than the same.

The factor for the scale of operation(S) is based on the type of industrial unit. The same has been taken as suggested in the aforesaid CPCB in-house report, and is given in Table 7.2 below.

**Table 7.2:** Factor of scale of operation (S) based on the type of industry

| S. No. | Scale of operation          | Factor for the scale of operation (S) |
|--------|-----------------------------|---------------------------------------|
| 1      | Small Scale Industry (SSI)  | 0.5                                   |
| 2      | Medium Scale Industry (MSI) | 1                                     |
| 3      | Large scale industry (LSI)  | 1.5                                   |

The deterrent factor (DF) has been taken exponentially in line with recommendations given in the said CPCB in-house committee report. The same has been taken as given in Table 7.3 below.

**Table 7.3:** Deterrent Factor for first and repeat violation

| S. No. | Violations              | Deterrent factor (DF) |
|--------|-------------------------|-----------------------|
| 1      | First Violation         | 1                     |
| 2      | First repeat violation  | 2                     |
| 3      | Second repeat violation | 4                     |
| 4      | Third repeat violation  | 8                     |
| 5      | Fourth repeat violation | 16                    |

Adding all the RC Factors corresponding to each of the first violation, first repeat violation, second repeat violation, third repeat violation and fourth repeat violation gives Total RC (TRC) factor for each polluting unit.

$$Total\ RC\ (TRC)\ Factor = RC_{first\ violation} + RC_{first\ repeat\ violation} + RC_{second\ repeat\ violation} + RC_{third\ repeat\ violation} + RC_{fourth\ repeat\ violation} \quad \text{----- (2)}$$

In order to distribute the given cost of 160.042 Crore INR among the 103 polluting units, summation of all the TRC factor, as at equation (2) above, has been divided by the respective TRC factor so as to get the Distributed Recovery Cost (DRC) Factor for each of the said 103 units.

*Distributed Recovery Cost (DRC) factor for a polluting unit =*

$$\frac{\text{TRC of corresponding polluting unit}}{\sum \text{TRC of each of the 103 polluting units}} \text{ ----- (3)}$$

Multiplication of the aforesaid DRC of a unit to that of 160.042 Crore INR gives damage recovery cost corresponding to the said unit.

*Damage Recovery cost for a polluting unit (in lakh INR) =*

$$\text{DRC factor} * 160.042 \text{ Crore} * 100 \text{ ----- (4)}$$

Thus, the above methodology gives distributed accountability of each of the identified 103 polluting units in recovering the estimated environmental damage cost and restoration cost of 160.042 Crore INR in terms of their respective pollution index depending on pollution hazard, scale of operation, load factor based on the population located around the industrial unit, number of days for which violation took place and also considering deterrence for repeat/habitual violators.

## **7.2 Accountability of polluting units including CETP in meeting the environmental damage cost and restoration cost**

Based on the above methodology and using equation (4) above and taking various the reported variable values for each polluting units as provided by MPCB (details given in Chapter 5) and given at Annexure V, distribution of accountability in terms of damage recovery cost in INR has been worked out for each of the 103 polluting units which includes the CETP also in meeting the estimated environmental damage cost and cost of restoration of Rs. 160.042 Crore INR.

The said damage recovery cost along with the corresponding Distributed Recovery Cost (DRC) Factor, derived as above, for each of the 103 polluting units including CETP is given at Sl. No. 16 of the respective tables given at Annexure V.

The range of such accountability as damage recovery cost for meeting the said environmental damage cost and cost of restoration comes out to be 0.887 Lakh INR (to a SSI unit who has reported violation period of 14 days with no repeat violation) to 1042.241 Lakh INR (to a LSI unit having first violation for a period of 482 days, first repeat violation of 1150 days, second repeat violation of 58 days and third repeat violation of 309 days).

The accountability of the CETP comes out to be 7231.470 Lakh INR as damage recovery cost for meeting the said environmental damage cost and cost of restoration.

As suggested in Chapter 6, of the 160.042 Crore INR, 75 Crore INR may be deposited in “Super Fund” and in case based on the detailed assessment and selection of remediation options, the assessment & remediation cost exceeds or comes out to be lower than the 75 Crore INR deposited in the super fund, the additional amount may be deposited or returned back to that of the damage recovery cost to each of the polluting units, as the case may be, proportionate to that as has been recovered. The amount to be deposited or returned back to each of the 103 polluting units may be arrived by multiplying their respective “Distributed Recovery Cost (DRC) Factor” (given for each of the polluting units at Sl. No. 14 in their respective table at Annexure V) and the said increased or decreased amount to that of 75 Crore INR, as the case may be, using the equation (4) above.

## **Chapter 8**

# **CONCLUSIONS AND MEASURES FOR RESTORATION OF THE EENVIRONMENT**

### **8.1 PERFORMANCE OF CETP AND MEASURES REQUIRED**

The CETP Tarapur is violating effluent discharge standards as well as CETP inlet design/inlet standards during the reported period of 28/4/2011 to 30/11/2019<sup>1</sup>. The CETP is not adequate to treat the effluent currently being received. Besides it is also operating at beyond its hydraulic load capacity of 25 MLD and resulting into the overflow from the CETP during such duration and such overflow effluent is being discharged into to drains leading to other water bodies (creeks, sea and ground water).

#### **8.1.1 PERFORMANCE OF CETP** (details given under chapter 3):

##### **8.1.1.1 Exceedance of parameters in previous sampling & analysis**

(a) The analysis results (samples collected at 1 to 5 occasions in a month) of MPCB of the past five years since the year of application filed in the Hon'ble NGT by the applicant during the said reporting period of 28/4/2011 to 30/11/2019<sup>1</sup> reveal that:

- (i) COD and BOD has hardly complied with the CETP outlet standards prescribed under the Consent to Operate while SS has not continuously complied. The average exceedances are more than 3, 10 and 2 times to the said standards respectively since 2011 (may refer Fig. 3.4 and Fig. 3.5 and Annexure III). pH and O&G show consistent compliance with the stipulated CETP outlet standards.
- (ii) COD concentration in CETP inlet is not complying continuously to the design norms while BOD is also intermittently not complying since 2011 (may refer Fig. 3.4 and Fig. 3.5 and Annexure III). The average exceedances of COD and BOD are more than 2 times to the said design norms. SS,

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<sup>1</sup> This reporting period has been considered by the committee for the purpose of its report only so as to limit the period taking reference from section 15(3) of the National Green Tribunal Act, 2010 as mentioned in Chapter 5 of this report.

pH and O&G are complying with the CETP inlet design norms/standards.

- (b) The sampling & analysis carried out jointly by CPCB and MPCB at various occasions (refer Table 3.4) during the said reporting period also reveals that the CETP did not meet discharge standards.
- (i) The concentration of COD, BOD, Ammonical Nitrogen, Phenols, TSS and TDS in CETP outlet exceed the outlet standard prescribed under the Consent to Operate in all the 02 samples. The same exceed more than 4 to 15 times, 5 to 47 times, 1 to 8 times, 1.4 to 20 times, 1.28 to 20 times and 40.5 to 100.8 times respectively to the said standards.
  - (ii) In the inlet effluent also, Ammonical Nitrogen exceeded the inlet standard prescribed under the Consent to Operate in all the inlet samples except in one sample. The same exceed more than 2 to 7 times the inlet standard. COD and BOD also exceeded 1.5 times and 1.3 times respectively in one of the samples.

#### **8.1.1.2 Overflow from the CETP**

Though there is no proper arrangement to measure CETP inlet effluent as the flow meter installed at post equalization tanks which may not measure the overflow from equalization tanks or before. However, based on data provided by the CETP operator, the monthly daily average CETP inlet effluent quantity has exceeded for 75 months than the designed capacity of 25 MLD (refer Annexure IV). During such 75 months, the said average inlet to the CETP has been reported as 25.27 MLD having maximum monthly average daily inlet effluent quantity as 26.343 MLD against the said design of 25 MLD. This inlet overflow having high concentration of pollutants is discharged into the drains and leading to other waterbodies (creeks, sea and ground water).

#### **8.1.1.3 Exceedance of parameters during Sampling & Analysis carried out during the visit of the committee to CETP on 13/11/2019**

The analysis results of various samples collected during the visit of the committee and analysed in MPCB laboratory reveals that (refer Table 3.9):

- (a) among the analysed parameters, COD exceeds more than 9 to 11

times; BOD 39 to 45 times; TSS more than 4 times; Phenols more than 1 to 2 times to the CETP outlet standards prescribed under the Consent to Operate. Further, Iron and Arsenic also exceeded more than 28 to 44 and 17 to 64 times respectively to the said standards.

- (b) BOD, COD and Phenols of influent is also exceeding more than 02 times, 1.6 times and 1.8 times respectively of the inlet design norm/standard.

#### **8.1.1.4 Other observations made by the Committee during the visit on 13/11/2019**

- (a) The tertiary treatment (comprising Pressure Sand and Activated Carbon Filter) was observed to be defunct since long time.
- (b) The inlet design norms of CETP are BOD: 1500 mg/l & COD: 3500 mg/l. However, with the present way of functioning of CETP comprising primary, secondary and defunct tertiary treatment (Sand & carbon Filtration), meeting of outlet standards (BOD: 30 mg/l, COD: 250 mg/l) prescribed by MPCB is not possible.
- (c) There were leakages from pipes & pumps and overflow of effluent from some units (equalization tanks/aeration tanks).

There was heavy smell of SVOCs/VOCs (solvents/chemicals) near the inlet sumps. Inlet of CETP (with BOD: 3150 mg/l & COD: 5680 mg/l) indicating that member industries discharging their untreated/partially treated effluent to CETP without conforming the inlet design norms of CETP. There is no separate arrangement for high COD and high TDS effluent. Also, no arrangement for treating the refractory COD. Thus, the operation of CETP is not efficient to meet the prescribed norms.

CETP is not designed for such high strength effluent. CETP has no proper mechanism in place for routine monitoring of individual defaulter member units.

- (d) The flow meters and Online Continuously Monitoring System are not functioning consistently. The inlet flow meter has been provided after

equalization tanks which may not take into account of overflow from or before of the equalization tanks.

- (e) Significant quantity of sludge is deposited (approx.-2400 MT) in the MIDC Sump-2 (10.56 Million Liters- capacity) where treated effluent is collected and thereafter conveyed to the sea shore through BPTs. Overflow/leakages were also observed from this sump to nearby natural drain which meets with Navapur Dandi Creek and further to the Arabian Sea. CETP operator informed that the operation of this Sump is under MIDC and responsibility lies with MIDC for proper maintenance and removal of sludge from sump.
- (f) Inlet effluent quality standards are yet to be prescribed by MPCB for BOD & COD in the Consent of CETP as per MoEF&CC Notification dated 01.01.2016. The Consent stipulates that “Only for SSI units (having less than 25 CMD discharge effluent) BOD: 1500 mg/l and COD: 3500 mg/l is allowed and for rest of the industries, treated effluent as per their respective consents standards i.e. COD: 250 mg/l are allowed”.
- (g) MPCB has authorized 07 Metric Ton/Day as CETP Sludge in the Authorization dated 29/11/2019 under Hazardous Waste (M, H & TM) Rules, 2008 for treatment and disposal of Hazardous Waste. The quantum of sludge generation in the CETP is more than such specified quantity.
- (h) The stock of sludge about 750 MT stored in the premises shows storage of the same beyond the prescribed storage duration stipulated under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. The same require to be disposed immediately to the CHWTSDF.
- (i) CETP needs thorough up-gradation/revamping of its units/processes in terms of capacity, retention time, automatic chemicals dosing, scraping mechanism, aeration tanks, aeration capacity, de-sludging, transfer pumps & pipelines, removal of corrosion affected equipment/materials, decanters and its capacity, sludge drying beds,

etc. Moreover, persons at CETP need to be more sensitized through constant follow up and training.

## **8.1.2 MEASURES REQUIRED**

In view of consistent gross violation of the CETP w.r.t. influent flow and quality both exceeding the inlet design parameters; outlet effluent quality grossly exceeding the prescribed outlet standards; overflows from CETP to surroundings, and; CETP not adequate to meet the prescribed outlet standards; the following measures, most of which have also been recommended in the joint inspection report of MPCB & CPCB submitted to the Hon'ble NGT by CPCB vide email dated Jan 02, 2020, are recommended:

### **1. Immediate measures:**

- (a) In order to control further impact on water bodies (Drains, Creeks and Sea), the capability of CETP be immediately assessed in terms of hydraulic load and inlet effluent quality that the CETP is able to meet the outlet norms (stipulated under the Consent to Operate by MPCB) as per the existing infrastructures. The said assessment studies may be carried out by MPCB through the expert institute.
- (b) Based on the above assessment, the CETP shall receive only such limited hydraulic load and influent quality as prescribed in the said assessment. In order to ensure the same, the following may need to be enforced immediately after the said assessment and MPCB should constantly overview the activities of CETP:
  - (i) MIDC to:
    - a) remove deposited sludge (approx.-2400 MT) in the MIDC Sump-2 (10.56 Million Liters- capacity) where treated effluent is collected and also from other sumps/tanks, if any.
    - b) ensure that the supply of water to MIDC Tarapur is so reduced (as compared to the current supply) and distributed that inlet quantity to CETP does not exceed the above prescribed CETP hydraulic load. Ensure that no overflowing/leakages from sumps/tanks etc. takes place during conveying the effluent to CETP or from CETP to seashore.

c) ensure that no bore wells operate in MIDC Tarapur to ensure the CETP hydraulic load does not exceed.

(ii)MPCB in association with CETP shall identify units not having adequate facilities to meet the aforesaid assessed CETP inlet effluent quality and such units be directed to segregate their high concentrated effluent and be stored separately at existing CETP or new CETP in case such storage is available at the new CETP or dispose of in Common TSDF Talaja for incineration. Such storage should not be allowed beyond 06 months. Storage and disposal of the same should be closely monitored by MPCB at regular intervals.

(iii)CETP must also initiate actions to identify units who are discharging higher concentration effluent and/or higher effluent quantity to CETP and shall stop such units from discharging into CETP immediately. The same shall immediately be reported to MPCB who may take actions in addition to closure of such units. The CETP should also develop round the clock surveillance mechanism to identify the member units discharging more than higher concentration at inlet of CETP.

MPCB shall also monitor CETP inlet and outlet effluent preferably on the daily basis.

**In case if the above measures are not implemented effectively and CETP (either existing or new) continues to perform non-compliance to the inlet/outlet norms for a month, and in case no alternate arrangement is in place for disposal of effluent, MPCB may close operation of CETP and its member units who discharge their effluent to the CETP till the compliance is achieved.**

2. CETP shall take all necessary measures to control the influent quality & quantity besides improvement in overall scientific operation & maintenance of CETP with trained manpower and adequate analytical facility to keep watch on operational parameters at every stage of operation on a regular basis.

3. There should be proper surveillance of all units and the penalty mechanism for the defaulter units to be derived by M/s TEPS –CETP for member industries in addition to inspections of MPCB to ensure that all the member industries discharge the trade effluent meeting the norms as per their consent.

In case of non-compliance observed during M/s TEPS-CETP monitoring surveillance, the list of defaulting industries should be provided to MPCB from time to time for necessary action against such units. MPCB should take stringent action against industries as found in surveillance of MPCB & TEPS including the recovery of environmental Compensation and prosecution of industries as per environmental laws.

4. There is urgent need of common facilities such as Common MEE and Common Spray Dryer for High COD and High TDS effluent and such types of effluent should be separately collected and transferred to common MEE and Spray Dryer facilities with identification of such industries. Similarly, there should be some advanced method (such as advanced oxidation, Ozonation etc.) to reduce the significant COD.

CETP may ensure commissioning of the same at the earliest. Till the same is commissioned, high COD and high TDS effluent be stored at suitable place in case available at the new CETP under commissioning stage, for not more than 06 months, otherwise such effluent be disposed in Common TSDF Talaja by incineration. Storage and disposal of the same should be closely monitored by MPCB at regular interval and operation of such violators be closed besides other necessary actions by MPCB.

5. SCADA system for monitoring quality and quantity of individual member industry be commissioned by the CETP operator in association with industries and MIDC within 04 months. MPCB may ensure timely commissioning of the same.

6. CETP shall regularly send the CETP sludge to CHWTSDF for proper disposal.

7. The 55 units of 1216 industrial units in MIDC Tarapur, which are not member of the CETP, may be examined by MPCB w.r.t. waste water

generation from their processes. In case it is found that their processes generate wastewater, necessary action be taken by MPCB.

8. MPCB to review authorization of CETP in terms of sludge quantity.
9. CETP is also required to work upon housekeeping of entire premises with cleanliness, plantation, internal roads etc.

## **8.2 DAMAGE TO THE WATER BODIES AND RESTORATION STEPS**

### **8.2.1 DAMAGE TO THE WATER BODIES** (details given under chapter 4):

The samples collected from various water bodies (drains, creeks, sea beach and ground water) in and around water bodies during November-December 2019 and their analysis results reveal that ground water and drains are contaminated and there are impacts on creeks and seashores. Industries are discharging untreated effluent/solvent/chemicals to the drains of Tarapur MIDC. The polluted effluent from drains are received in creeks and finally to seashores. Seashore also receives effluent from the CETP not meeting to the discharge standards.

#### **8.2.1.1 Drains passing through Tarapur MIDC**

Water in drains in and around Tarapur MIDC area is contaminated with elevated levels of TDS, BOD, COD, TSS, Fluorides and Phenols besides acidic water in one or more drains - when compared with recommended screening standards for inland surface water in MoEF&CC's "Guidance document for assessment and remediation of contaminated sites in India". Further, odour and colour was also observed in drain waters. Dissolved oxygen was absent in four of the 09 monitored drains. These indicate that industries are discharging untreated effluent/solvent/chemicals to the drains.

Sediments were not exceeding screening levels prescribed in aforesaid guidance document, except for pH near M/s Everest Kanto which is highly acidic (where pH value was 2.34 at surface and 2.52 at depth of 30 cm from bed surface) indicating discharge of acidic effluent. pH of storm drain near Auro Lab was slightly basic having pH of 8.48 indicating discharge of basic effluent in the storm drain from industries.

### **8.2.1.2 Groundwater in and around Tarapur MIDC**

High TDS and presence of BOD and COD in all the monitored ground water samples and presence of colour, odour, Chlorides, Fluorides, Sulphates, Total Ammonical Nitrogen, Metals (Lead, Copper, Iron and Manganese) in one or more samples of groundwater in and around Tarapur MIDC indicate that groundwater in and around Tarapur MIDC area has been contaminated due to the industrial activities.

### **8.2.1.3 Creeks around Tarapur MIDC**

The two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek flowing North and South of Tarapur MIDC respectively) receiving polluted effluent from the drains of MIDC Tapaur were found having impact of discharges from such drains.

Elevated levels of COD and TDS at different stretches (where interference of water from Tarapur MIDC area begins). There was no DO in Creeks near Dumping ground (upstream of Navapur Dandi Creek) and Dandi Creek (downstream of Navapur Dandi Creek). Colour and odour were observed at different locations of the both the Creeks. Further, Phenols at downstream location of both the Creeks viz. Dandi Creek (downstream of Navapur Dandi Creek) and Murbe Creek (downstream of Kharekuran Murbe Creek) have been observed higher than other sampling locations of the Creeks and streams though the same are within the aforesaid standards.

### **8.2.1.4 Seashores around Tarapur MIDC**

With regard to the seashores i.e. Navapur CETP outfall and Nandgaon, where the two creeks confluence into the sea, the results though do not reveal trend of elevated concentration of measured parameters near to Navapur CETP outfall beach and Nandgaon beach, however, presence of Phenols in both the beaches indicate impact of discharge from Tarapur MIDC.

## **8.2.2 RESTORATION/REMEDIAL STEPS**

While measures for control of partially/untreated effluent from CETP has been outlined under para 7.1.2 above, there is need to remediate the contaminated

ground water and drains as well as control impact on the two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek) receiving discharges from the drains/CETP outlet.

### **8.2.2.1 Remediation Plan and implementation**

As outlined in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India, a detailed project report (DPR) for contaminated sites in and around Tarapur MIDC area needs to be prepared as Phase-I work which shall include delineation of the contaminated areas and areas needing remediation, detailed site investigation & characterization, risk assessment studies & identification of remediation goals/objectives and preparation of remediation plans thereof, selection of remediation criteria, outlining remediation options, preparation of detailed technical document with specifications for the selected remediation option. Further, investigation of sediments in drains and creeks are also necessary to rule out the need for remediation in sediments.

The above selected remediation plan needs to be executed by an agency. Therefore, in Phase-II, there is need to monitor and assess the remediation works being implemented in the field so as to ensure that remediation works are implemented as per the technical specifications and standards finalized under the aforesaid Phase I work. Besides, it is also required to prepare bid documents (RFP / tender documents, etc.) to identify the executing agency who shall execute the selected remediation plan.

It is recommended that the aforesaid steps of remediation may be implemented by MPCB identifying a consultant who may prepare the Detailed Project Report (DPR) and provide consultancy services for remediation of contaminated sites in and around Tarapur MIDC for the aforesaid two phases. ToR for selecting the consultant outlining scope of work, time schedule, consultant qualification and team, etc. is given at Annexure VI which may be helpful to MPCB in selecting the consultant and implementing the remediation work.

Till the remediation plan is implemented, use of contaminated ground water in effected areas of in and around Tarapur MIDC may be prohibited for drinking purpose by Central Ground Water Authority, MIDC and District Administration.

### **8.2.2.2 Expenses to be met for implementing the above remediation plan**

The cost to be incurred in the aforesaid activities of Phase-I and Phase-II in remediation may be met from the “Super Fund” for which initial amount of Rs. 75 Crore has been suggested to be met as damage and restoration cost from the 103 polluting units which is in addition to the damage cost to sea and wetland as has been described under the Chapter 6 and 7 of this report. Depending upon the selected remediation options, the cost of remediation may increase or decrease to that of Rs. 75 Crores. In such case, the amount may be collected or refunded to each of the said polluting units, as the case may be, in the same proportion as the damage recovery cost has been recommended to be paid.

In case recovery of the remediation cost from the polluting units is delayed or not met partially or fully due to one or other reasons at any stage, the Govt. of Maharashtra may initially incur such assessment and remediation cost and initiate the remediation activities such as allocation of fund, selection of consultant, etc., as outlined under (ii) above, initiate in a month in consultation with MPCB.

## **8.3 POLLUTING UNITS AND HEARING GIVEN TO THEM**

In accordance with orders of the Hon’ble Tribunal, MPCB provided list of 221 defaulting units including the CETP in Tarapur MIDC as polluting units based on violation of discharge standards of individual units, discharge into storm water drain, drains passing through outside premises of the units, etc. and the actions taken i.e. Show-cause Notice, Closure Direction and other Interim/Proposed Directions issued under section 33 A of Water (Prevention & Control of Pollution) Act, 1974 since 28/4/2011. Hearing to the said listed units (of which 05 were absent) were given by the Committee during Nov 30 – Dec 03, 2019 where MPCB presented nature and period of violations. Representative of the respective unit was also given opportunity to submit records against such violations.

Based on observations made during the hearing, the committee requested MPCB to revise the list of polluting units as per recommendations of the committee (observations & recommendations details given at Chapter 5).

MPCB re-examined and identified 83 of the said 221 units as polluting units and another 20 units considering observations and recommendations of the committee for the purpose of imposing environmental compensation/damage restoration

cost. MPCB also informed that the following recommendations of the committee were considered by MPCB in arriving 103 units as the polluting units:

- (i) Inclusion of only those units for which due records are available for establishing the violations;
- (ii) Exempting SSI units (having effluent discharge less than 25 KLD) who were found discharging effluent to CETP meeting CETP inlet consent norms of COD-3500 mg/l and BOD 1500 mg/l;
- (iii) Non-inclusion of violations which are not directly related to effluent discharge in to CETP or not causing damage to soil/ surface water/ground water;
- (iv) Considering the period of default of five years since the date of making Original Application No. 64/2016 (WZ) i.e. 28/4/2011 to 26/9/2019 taking reference from section 15(3) of the National Green Tribunal Act, 2010, with regard to consideration of default for assessing environmental compensation and cost of restoration;

MPCB also revised period of violations for the aforesaid 103 identified polluting units for the purpose of imposing environmental compensation as per recommendations of the committee that in cases where closure direction have been issued, the period of default (N in days) has been taken as date of inspection till the effective date of closure of the unit. For other cases including where conditional restart order issued under the Water (Prevention & Control of Pollution) Act, 1974/ Environment(Protection) Act, 1986, the period of default has been taken as number of days(N) for which violation took place. Such N has been taken as the period between the day of violation observed/ due date of compliance of directions and the day as on which the compliance was verified by MPCB. MPCB has only considered closure and conditional restart directions period. The period between effective closure of the unit till the date of restart order issued by MPCB has not been considered as violation period.

The aforesaid additional 20 units were called for hearing by the committee on 27/1/2020 where MPCB presented nature and period of violations to each of the units from records available with them and representative of the respective unit was also given opportunity to submit records against such violations. All the 05 units, who did not attend the hearing during Nov.30 - Dec. 04, 2019, and falling under the said list of 103 units were also called to attend the hearing giving them another opportunity. However, only 01 of the said 05 units attended the hearing on 27/1/2020 besides 03 of the said 20 units also did not attend the said hearing.

Notices were also served by MPCB to the 83 units (who were called/given the hearing earlier during Nov.30 - Dec. 04, 2019) on 28/1/2020 informing them to submit additional details, if any, by 31/1/2020. Replies received from 27 units of the said 83 units were examined by MPCB from the records available with them.

Thus, details of each of the 103 units (including CETP) identified as polluting units for the purpose of environmental damage cost/damage restoration cost along with nature and period of violation, prepared based on hearing given to them by the committee; recommendations of the committee; details submitted by the units to MPCB in support of compliance against the proposed violation details; vis-à-vis examination of records available at MPCB, as above, along with other details, as forwarded by MPCB, are given at Annexure V. Such unit wise details (given at Annexure V) have been used in deriving accountability of each of the 103 polluting units which includes the CETP also in terms of damage recovery cost in INR in meeting the estimated environmental damage cost and cost of restoration.

#### **8.4 ENVIRONMENTAL DAMAGE COST AND RESTORATION COST**

Environmental damage cost assessment has been done (as given in Chapter 6) for substandard effluent quality discharge from Tarapur CETP and industries into drains/coastal waters/drains. Approach of direct value transferred has been referred for assessment of environmental damage cost. The value transfer method has been used to calculate the economic value of benefits for the environment when an original study for valuation is not feasible. In order to estimate the damages done due to the discharge of pollutants to the Sea and the wetlands, the effluent discharge standard prescribed in consent issued by MPCB have been taken into consideration. The damage cost per kg of the load has been used for each standard exceeding pollutant (viz. COD, BOD and SS among the historic reported parameters) individually which is discharged in to the sea and the wetlands.

Environmental damage cost has been calculated within the aforesaid reporting period<sup>2</sup> of 28/4/2011 to 26/9/2019. The damage cost from the direct value transfer method is about 5.938 Crore INR for Sea and 79.014 Crore INR for wetlands considering inflation value. The above estimate is conservative as it only considers scope of damages due to effluent discharge beyond the standards on surface water wetlands. The impact on sea water pollution is also very conservative due to lack of better information on pollutants including nitrogen.

However, it has been found that the ground water is contaminated in the region besides having impacts on creeks and coastal sea water due to illegal discharges of effluent from the industries/CETP, which have not been valued in the above damage cost assessment. Instead cost to be incurred in their further detailed assessment (including other water bodies) and their remediation have been accounted as “Super Fund” and the initial amount for the super fund has been suggested as 75 Crores INR which may increase or decrease depending upon the selected remediation options based on outcome of the detailed assessment and application of other tools as suggested under para 8.2.2.1 above .

The total environmental damage cost has, therefore, been estimated as 85.042 Crore INR (79.014 + 5.938 Crore INR) and with creation of super fund having initial deposit of Rs. 75 Crore INR as environmental restoration cost.

Therefore, the total estimated environmental damage and restoration cost comes out to be 160.042 Crore INR.

## **8.5 ACCOUNTABILITY OF POLLUTING UNITS INCLUDING CETP IN MEETING THE ENVIRONMENTAL DAMAGE COST AND RESTORATION COST**

Polluter Pay Principal and the methodology recommended in “Report of the CPCB In-house Committee on Methodology for Assessing Environmental Compensation and Action Plan to Utilize the Fund” have been used adding some additional features to meet objective of deriving accountability of each of the identified polluting units including CETP. The used methodology (details given in Chapter 7) gives distributed accountability among each of the identified 103 polluting units in terms of damage recovery cost in INR in recovering the

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<sup>2</sup> This reporting period has been considered by the committee for the purpose of its report only so as to limit the period taking reference from section 15(3) of the National Green Tribunal Act, 2010.

estimated environmental damage cost and restoration cost of 160.042 Crore INR in terms of their respective pollution index depending on pollution hazard, scale of operation, load factor based on the population located around the industrial unit, number of days for which violation took place and also considering deterrence for repeat/habitual violators.

The said damage recovery cost along with the corresponding Distributed Recovery Cost (DRC) Factor, derived as above, for each of the 103 polluting units including CETP is given at Sl. No. 16 of the respective tables given at Annexure V.

The range of such accountability as damage recovery cost for meeting the said environmental damage cost and cost of restoration comes out to be 0.887 Lakh INR (to a SSI unit who has reported violation period of 14 days with no repeat violation) to 1042.241 Lakh INR (to a LSI unit having first violation for a period of 482 days, first repeat violation of 1150 days, second repeat violation of 58 days and third repeat violation of 309 days).

The accountability of the CETP comes out to be 7231.470 Lakh INR as damage recovery cost for meeting the said environmental damage cost and cost of restoration.

As suggested in Chapter 6, of the 160.042 Crore INR, 75 Crore INR may be deposited in “Super Fund” and in case based on the detailed assessment and selection of remediation options, the assessment & remediation cost exceeds or comes out to be lower than the 75 Crore INR deposited in the super fund, the additional amount may be deposited or returned back to that of the damage recovery cost to each of the polluting units, as the case may be, proportionate to that as has been recovered. The amount to be deposited or returned back to each of the 103 polluting units may be arrived by multiplying their respective “Distributed Recovery Cost (DRC) Factor” (given for each of the polluting units at Sl. No. 14 in their respective table at Annexure V) and the said increased or decreased amount to that of 75 Crore INR, as the case may be, as used in Equation (4) in Chapter 7.

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# MAHARASHTRA POLLUTION CONTROL BOARD Annexure I

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Red/SSI

Date: 29/11/2019

Consent No: BO/JD(WPC)/ UAN No-0000062174/R/HOD/ 1911001395

To,  
M/s. Tarapur Environmental Protection Society,  
Common Effluent Treatment Plant (25 MLD),  
Plot No AM 29 (pt), MIDC Tarapur,  
Boisar, Dist Palghar.

Subject: Renewal of Consent to Operate for Common Effluent Treatment Plant under RED category.

- Ref: 1. Earlier consent granted vide no. BO/JD(WPC)/ UAN No-0000017747/R/CC-1703002119 dtd 31.03.2017 valid till 31.12.2017.  
2. Your application for renewal of consent dtd 08/12/2018

For: Renewal of Consent to Operate for CETP under RED category. under Section 26 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 5 of the Hazardous & Other Wastes (M & T M) Rules 2016 is considered and the consent is hereby granted subject to the following terms and conditions and as detailed in the schedule I, II, III & IV annexed to this order:

- The consent is granted for a period from 31/12/2017 upto 31/12/2020
- The actual capital investment of the industry is Rs. 20.67 Crs. (As per the C.A. Certificate submitted by industry)
- The Consent is valid for the manufacture of -

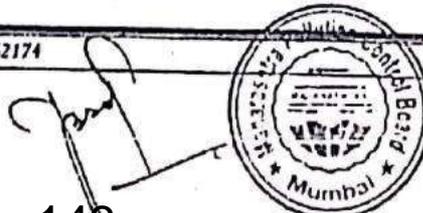
| Sr. No. | Treatment Facility  | Maximum Quantity | UOM |
|---------|---|------------------|-----|
| 1       | Common Effluent Treatment Plant -<br>The daily quantity of industrial effluent to be treated shall not exceed | 25               | MLD |

- Conditions under Water (P&CP), 1974 Act for discharge of effluent:

| Sr. no. | Description       | Permitted quantity of discharge | Standards to be achieved | Disposal   |
|---------|-------------------|---------------------------------|--------------------------|--|
| 1       | Trade effluent    | 25.0 MLD                        | As per Schedule -I       | Marine outfall, at a point to be specified by National Institute of Oceanography |
| 2       | Domestic effluent | 5.0 CMD                         | As per Schedule -I       | Marine outfall, at a point to be specified by National Institute of Oceanography |

- Conditions under Air (P& CP) Act, 1981 for air emissions:

| Sr. no. | Description of stack/source | Number of Stack | Standards to be achieved |
|---------|-----------------------------|-----------------|--------------------------|
| 1       | D.G Set (626 KVA)           | 01              | As per Schedule -II      |



29/11/2019

**Schedule-I**

**Terms & conditions for compliance of Water Pollution Control:**

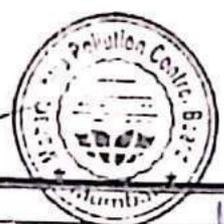
- 1) A) As per your application, you have provided Common Effluent Treatment Plant (CETP) with the design capacity of 25.0 MLD.
- B) The Consent is valid for collection, storage and treatment of Industrial and Domestic Effluent conforming to the inlet standards specified hereunder:-

| Sr. No. | Parameters                                 | Standards prescribed by Board (If any)<br>Limiting Concentration in mg/l. except for pH & Temperature |
|---------|--|---|
| 1.      | pH   |   |
| 2       | Temperature                                | 6.0 to 9.0  |
| 3       | Oil & Grease                               | 45 °C   |
| 4       | Phenolic Compounds                         | 20  |
| 5       | Ammonical Nitrogen (as N)                  | 5.0   |
| 6       | Cyanide (as CN)                            | 50  |
| 7       | Hexavalent Chromium (as Cr <sup>6+</sup> ) | 0.2   |
| 8       | Total Chromium (as Cr)                     | 2.0   |
| 9       | Copper (as Cu)                             | 2.0   |
| 10      | Lead (as Pb)                               | 3.0   |
| 11      | Nickel (as Ni)                             | 1.0   |
| 12      | Zinc (as Zn)                               | 3.0   |
| 13      | Arsenic (as As)                            | 15  |
| 14      | Mercury (as Hg)                            | 0.2   |
| 15      | Cadmium                                    | 0.01  |
| 16      | Selenium (as Se)                           | 1.0   |
| 17      | Fluoride (as F)                            | 0.05  |
| 18      | Boron (as B)                               | 15  |
|         |  | 2.0   |

In case of SSI unit, BOD of maximum of 1500 mg/l and COD of maximum 3500 mg/l will be allowed. In case of other primary and secondary treatment is required

- Note : i) These standards apply to the small scale industries i.e. total discharge up to 25 M<sup>3</sup>.
- ii) All (small Scale Units generating effluent quantity more than 25 m<sup>3</sup>/day and Medium & Large Scale Units irrespective of the quantity of effluent will have to achieve the standards as prescribed in the letter of Consent issued to them individually under the Water (P & CP) Act 1974, Air (P & CP) Act 1981, Hazardous Waste (M, H & TM) Amendment thereto before discharging the effluent into CETP.

C) Treatment and disposal for combined Industrial and Domestic effluent.  
**Treatment:** The CETP authority shall provide comprehensive treatment system consisting of primary / secondary and/or tertiary treatment as is warranted with reference to influent quality for strong stream and weak stream and operate and maintain the same continuously so as to achieve the quality of the treated effluent to the following standards:

*[Handwritten signature]*  
  
*[Handwritten signature]*

| Sr No. Parameters       |   | Standards prescribed by Board (If any)                          |
|-------------------------|---|---|
| I. General Parameters   |   | Max permissible values ( in mg/l, except for pH& Temperature)   |
| 01                      | pH  | 6.0 to 9.0  |
| 02                      | BOD 3 Days 27 Deg.C                                     | 30  |
| 03                      | COD   | 250   |
| 04                      | Suspended Solids  | 100   |
| 06                      | Fixed Dissolved Solids                                  | Not Specified   |
| II. Specific Parameters |   | Max permissible values ( in mg/l, except for pH& Temperature)   |
| 06                      | Temperature   | Shall not exceed more than 5° C above ambient water temperature |
| 07                      | Oil & Grease  | 10  |
| 08                      | Ammonical Nitrogen (as N)                               | 50  |
| 09                      | T.K.N   | 50  |
| 10                      | Nitrate Nitrogen  | 50  |
| 11                      | Phosphate as P  | Not Specified   |
| 12                      | Chlorides   | Not Specified   |
| 13                      | Sulphate (as SO <sub>4</sub> )                          | Not Specified   |
| 14                      | Fluoride (as F)   | 15  |
| 16                      | Sulphide (as S)   | 5   |
| 16                      | Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH) | 5   |
| 17                      | Total Residue Chlorine                                  | 1   |
| 18                      | Zinc (as Zn)  | 15  |
| 19                      | Iron  | 3   |
| 20                      | Copper (as Cu)  | 3   |
| 21                      | Trivalent Chromium                                      | 2   |
| 22                      | Manganese   | 2   |
| 23                      | Nickel  | 3   |
| 24                      | Arsenic (as As)   | 0.2   |
| 25                      | Cyanide (as CN)   | 0.2   |
| 26                      | Vanadium  | 0.2   |
| 27                      | Lead (as Pb)  | 0.1   |
| 28                      | Hexavalent Chromium                                     | 0.1   |
| 29                      | Selenium (as Se)  | 0.05  |
| 30                      | Cadmium (as Cd)   | 0.05  |
| 31                      | Mercury (as Hg)   | 0.01  |
| 32                      | Bio Assay Test  | 90 % survival of fish after 96 hrs in 100 % effluent            |

**Note:-**

- i) All efforts should be made to remove colour and unpleasant odour as per as possible.
- ii) If the CETP is not able to achieve the outlet parameters, then all the members and the said Society would be individually and jointly responsible and liable for legal actions under the provisions of sections 47 of the Water (Prevention & Control of Pollution) Act, 1974.

## Schedule-II

### Terms & conditions for compliance of Air Pollution Control:

1. As per your application, you have provided the Air pollution control (APC) system and also erected following stack (s) and to observe the following fuel pattern-

| Sr. No. | Stack Attached To           | APC System | Height Mtrs. | Type of Fuel | Quantity & UoM | S %  | SO <sub>2</sub> Kg/Day |
|---------|-----------------------------|------------|--------------|--------------|----------------|------|------------------------|
| 1       | D.G. Set (625 KVA) - 1 Nos. | ----       | 5.0*         | Diescl       | 80 Lit./Hr     | 1.0% | 26.88                  |

(\*Above the roof of the building in which it is installed)

2. The Applicant shall provide Specific Air Pollution control equipments as per the conditions of EP Act, 1986 and rule made there under from time to time.
3. The applicant shall operate and maintain above mentioned air pollution control system, so as to achieve the level of pollutants to the following standards:

|                    |               |                       |
|--------------------|---------------|-----------------------|
| Particulate matter | Not to exceed | 150mg/Nm <sup>3</sup> |
|--------------------|---------------|-----------------------|

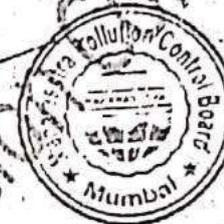
4. The Applicant shall obtain necessary prior permission for providing additional control equipment with necessary specifications and operation thereof or alteration or replacement well before its life come to an end or erection of new pollution control equipment.
5. The Board reserves its rights to vary all or any of the condition in the consent, if due to any technological improvement or otherwise such variation (including the change of any control equipment, other in whole or in part is necessary).



**Schedule-III**  
**Details of Bank Guarantees**

**Proposed Bank Guarantee:**

| Sr. No | Consent (C to E/O/R) | BG Guarantee  | Submission Period | Consent conditions                                      | Compliance period | Validity   |
|--------|----------------------|---------------|-------------------|---|-------------------|------------|
| 1      | C to R               | Rs.10.0 Lakhs | 15 Days           | Operation and Maintenance of CETP                       | Continuous        | 30.04.2021 |
| 2      | C to R               | Rs.2.5 Lakhs  | 15 Days           | Treatability Study                                      | Continuous        | 30.04.2021 |
| 3      | C to R               | Rs.2.5 Lakhs  | 15 Days           | Improvement in existing plants including sludge Removal | Continuous        | 30.04.2021 |

  
  
 Maharashtra Pollution Control Board  
 Mumbai

**Schedule-IV**  
**General Conditions:**

- 1) The applicant shall provide facility for collection of environmental samples and samples of trade and sewage effluents, air emissions and hazardous waste to the Board staff at the terminal or designated points and shall pay to the Board for the services rendered in this behalf.
- 2) Industry should monitor effluent quality, stack emissions and ambient air quality quarterly.
- 3) The applicant shall provide ports in the chimney/(s) and facilities such as ladder, platform etc. for monitoring the air emissions and the same shall be open for inspection to/and for use of the Board's Staff. The chimney(s) vents attached to various sources of emission shall be designated by numbers such as S-1, S-2, etc. and these shall be painted/ displayed to facilitate identification.
- 4) Whenever due to any accident or other unforeseen act or even, such emissions occur or is apprehended to occur in excess of standards laid down, such information shall be forthwith Reported to Board, concerned Police Station, office of Directorate of Health Services, Department of Explosives, Inspectorate of Factories and Local Body. In case of failure of pollution control equipments, the production process connected to it shall be stopped.
- 5) The applicant shall provide an alternate electric power source sufficient to operate all pollution control facilities installed to maintain compliance with the terms and conditions of the consent. In the absence, the applicant shall stop, reduce or otherwise, control production to abide by terms and conditions of this consent.
- 6) The firm shall submit to this office, the 30th day of September every year, the Environmental Statement Report for the financial year ending 31st March in the prescribed Form-V as per the provisions of rule 14 of the Environment (Protection) (Second Amendment) Rules, 1992.
- 7) The industry shall recycle/reprocess/reuse/recover Hazardous Waste as per the provision contain in the Hazardous & Other Waste (M & TM) Rules, 2016, which can be recycled /processed/reused/recovered and only waste which has to be incinerated shall go to incineration and waste which can be used for land filling and cannot be recycled/reprocessed etc should go for that purpose, in order to reduce load on incineration and landfill site/environment.
- 8) The industry should comply with the Hazardous & Other Waste (M & TM) Rules, 2016 and submit the Annual Returns as per Rule 5(6) & 22(2) of Hazardous & Other Waste (M & TM) Rules, 2016 for the preceding year April to March in Form-IV by 30<sup>th</sup> June of every year.
- 9) An inspection book shall be opened and made available to the Board's officers during their visit to the applicant.
- 10) The applicant shall make an application for renewal of the consent at least 60 days before the date of the expiry of the consent.
- 11) Industry shall strictly comply with the Water (P&CP) Act, 1974, Air (P&CP) Act, 1981 and Environmental Protection Act, 1986 and industry specific standard under EP Rules 1986 which are available on MPCB website([www.mpcb.gov.in](http://www.mpcb.gov.in)).
- 12) The industry shall constitute an Environmental cell with qualified staff/personnel/agency to see the day to day compliance of consent condition towards Environment Protection.
- 13) Separate drainage system shall be provided for collection of trade and sewage effluents. Terminal manholes shall be provided at the end of the collection system with arrangement for measuring the flow. No effluent shall be admitted in the pipes/sewers downstream of the terminal manholes. No effluent shall find its way other than in designed and provided collection system.
- 14) Neither storm water nor discharge from other premises shall be allowed to mix with the effluents from the factory.
- 15) The applicant shall install a separate meter showing the consumption of energy for operation of domestic and industrial effluent treatment plants and air pollution control system. A register showing consumption of chemicals used for treatment shall be maintained.
- 16) Conditions for D.G. Set
  - a) Noise from the D.G. Set should be controlled by providing an acoustic enclosure or by treating the room acoustically.

- b) Industry should provide acoustic enclosure for control of noise. The acoustic enclosure/acoustic treatment of the room should be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on higher side. A suitable exhaust muffler with insertion loss of 25 dB (A) shall also be provided. The measurement of insertion loss will be done at different points at 0.5 meters from acoustic enclosure/room and then average.
- c) Industry should make efforts to bring down noise level due to DG set, outside industrial premises, within ambient noise requirements by proper siting and control measures.
- d) Installation of DG Set must be strictly in compliance with recommendations of DG Set manufacturer.
- e) A proper routine and preventive maintenance procedure for DG set should be set and followed in consultation with the DG manufacturer which would help to prevent noise levels of DG set from deteriorating with use
- f) D.G. Set shall be operated only in case of power failure.
- g) The applicant should not cause any nuisance in the surrounding area due to operation of D.G. Set.
- h) The applicant shall comply with the notification of MoEF dated 17.05.2002 regarding noise limit for generator sets run with diesel
- 17) The industry should not cause any nuisance in surrounding area.
- 18) The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standard in respect of noise to less than 75 dB (A) during day time and 70 dB (A) during night time. Day time is reckoned in between 6 a.m. and 10 p.m. and night time is reckoned between 10 p.m. and 6 a.m.
- 19) The applicant shall maintain good housekeeping.
- 20) The applicant shall bring minimum 33% of the available open land under green coverage/ plantation. The applicant shall submit a statement on available open plot area, number of trees surviving as on 31<sup>st</sup> March of the year and number of trees planted by September end, with the Environment Statement.
- 21) The non-hazardous solid waste arising in the factory premises, sweepings, etc. be disposed of scientifically so as not to cause any nuisance/pollution. The applicant shall take necessary permissions from civic authorities for disposal of solid waste.
- 22) The applicant shall not change or alter the quantity, quality, the rate of discharge, temperature or the mode of the effluent/emissions or hazardous wastes or control equipments provided for without previous written permission of the Board. The industry will not carry out any activity, for which this consent has not been granted/without prior consent of the Board.
- 23) The industry shall ensure that fugitive emissions from the activity are controlled so as to maintain clean and safe environment in and around the factory premises.
- 24) The industry shall submit quarterly statement in respect of industries' obligation towards consent and pollution control compliance's duly supported with documentary evidences (format can be downloaded from MPCB official site).
- 25) The industry shall submit official e-mail address and any change will be duly informed to the MPCB.
- 26) The industry shall achieve the National Ambient Air Quality standards prescribed vide Government of India, Notification dt. 16.11.2009 as amended.
- 27) The Board reserves its rights to review plans, specifications or other data relating to plant setup for the treatment of waterworks for the purification thereof & the system for the disposal of sewage or trade effluent or in connection with the grant of any consent conditions. The Applicant shall obtain prior consent of the Board to take steps to establish the unit or establish any treatment and disposal system or an extension or addition thereto.
- 28) The industry shall ensure replacement of pollution control system or its parts after expiry of its expected life as defined by manufacturer so as to ensure the compliance of standards and safety of the operation thereof.

-----0000-----



6. Conditions about Non Hazardous Wastes:

| Sr. no.  | Type Of Waste | Quantity & UoM | Treatment | Disposal |
|----------|---------------|----------------|-----------|----------|
| --N.A.-- |               |                |           |          |

7. Conditions under Hazardous Waste (M, H & TM) Rules, 2008 for treatment and disposal of hazardous waste:

| Sr. No. | Type Of Waste | Category | Quantity | UOM  | Treatment | Disposal |
|---------|---------------|----------|----------|------|-----------|----------|
| 1       | CETP Sludge   | 35.3     | 7        | MT/D | —         | CHWTSDF  |

- The Board reserves the right to review, amend, suspend, revoke etc. this consent and the same shall be binding on the industry.
- This consent should not be construed as exemption from obtaining necessary NOC/permission from any other Government authorities.
- This renewal of grant of consent is issued without prejudice to order being passed by the Appellate Authority in the appeal filed vide letter dtd 15.04.2019..
- This renewal of grant of consent is issued without prejudice to Hon'ble NGT order passed or being passed in the application No 64/2016.

For and on behalf of the  
Maharashtra Pollution Control Board



Dr. Y. B. Sontakke  
Joint Director (WPC)

Received Consent fee of -

| Sr. No. | Amount (Rs.) | Transaction No. | Date        |
|---------|--------------|-----------------|-------------|
| 1       | 50000        | NEFT DR 7618540 | 11.12.2018  |
| 2       | 100000       | TXN1911001559   | 20.11.32019 |

Copy to:

- Regional Officer -Pune and Sub-Regional Officer-Pune- I MPCB, they are directed to ensure the compliance of the consent conditions.
- Chief Accounts Officer, MPCB, Mumbai.
- EIC desk- for record & website updation purposes.

**PHOTOGRAPHS  
(13.11.2019)**



**Equalization Tanks**



**Secondary Clarifier & Aeration Tanks**



**Leakages in pipeline and defunct tertiary treatment (Pressure Sand & Activated Carbon Filters)**



**Decanters- Sludge dewatering**

## Annexure III

| <b>MPCB Analysis results of samples since April 2011 to Nov. 2019</b> |  |            |            |           |   |            |            |           |
|---|--|------------|------------|-----------|---|------------|------------|-----------|
| <b>Date of Monitoring</b>   | <b>Inlet influent of CETP (All parameters are in mg/l except pH)</b> |            |            |           | <b>Outlet Effluent of CETP (All parameters are in mg/l except pH)</b> |            |            |           |
|   | <b>pH</b>  | <b>BOD</b> | <b>COD</b> | <b>SS</b> | <b>pH</b>   | <b>BOD</b> | <b>COD</b> | <b>SS</b> |
| 11-11-2019  | 6.6  | 1400       | 4880       | 312       | 7.2   | 600        | 1616       | 248       |
| 04-11-2019  | 8.1  | 950        | 2848       | 252       | 6.9   | 850        | 2560       | 360       |
| 30-10-2019  | 2.8  | 1600       | 5000       | 268       | 7.3   | 300        | 888        | 212       |
| 07-10-2019  | 4.9  | 950        | 2928       | 124       | 7.3   | 230        | 752        | 196       |
| 30-09-2019  | 7.6  | 750        | 2400       | 196       | 7.1   | 220        | 712        | 162       |
| 23-09-2019  | 6.6  | 700        | 2240       | 152       | 6.5   | 200        | 692        | 78        |
| 16-09-2019  | 6.7  | 600        | 1840       | 256       | 7.1   | 290        | 936        | 128       |
| 09-09-2019  | 7.2  | 490        | 1568       | 108       | 7.1   | 80         | 256        | 68        |
| 26-08-2019  | 6.7  | 800        | 2816       | 186       | 7   | 210        | 708        | 96        |
| 19-08-2019  | 8.6  | 850        | 2736       | 168       | 7.2   | 160        | 536        | 106       |
| 13-08-2019  | 6.6  | 1500       | 4560       | 512       | 6.8   | 210        | 708        | 132       |
| 05-08-2019  | 7  | 550        | 1688       | 132       | 6.9   | 105        | 316        | 76        |
| 29-07-2019  | 7.6  | 480        | 1584       | 128       | 6.5   | 250        | 788        | 64        |
| 22-07-2019  | 7.1  | 575        | 1936       | 124       | 6.7   | 120        | 540        | 78        |
| 15-07-2019  | 6.7  | 1350       | 4480       | 172       | 6.6   | 130        | 420        | 38        |
| 08-07-2019  | 7.2  | 380        | 1232       | 146       | 6.4   | 160        | 508        | 42        |
| 01-07-2019  | 7.7  | 230        | 540        | 158       | 7.1   | 20         | 60         | 54        |
| 24-06-2019  | 6.5  | 950        | 3008       | 408       | 7   | 110        | 372        | 78        |
| 17-06-2019  | 7.1  | 1000       | 3344       | 354       | 6.9   | 250        | 672        | 84        |
| 10-06-2019  | 5.7  | 1900       | 6320       | 442       | 6.8   | 440        | 1032       | 148       |
| 03-06-2019  | 1.9  | 1450       | 4480       | 218       | 6.7   | 135        | 348        | 80        |
| 27-05-2019  | 6.7  | 950        | 3024       | 294       | 6.8   | 210        | 652        | 108       |
| 20-05-2019  | 7.3  | 900        | 3040       | 326       | 6.9   | 205        | 668        | 86        |
| 13-05-2019  | 7.9  | 1200       | 3776       | 242       | 7.1   | 110        | 352        | 102       |
| 15-04-2019  | 7.8  | 700        | 2256       | 460       | 7   | 110        | 372        | 58        |
| 08-04-2019  | 6.9  | 1050       | 3200       | 444       | 7.4   | 600        | 1888       | 228       |
| 01-04-2019  | 6.5  | 1175       | 3424       | 512       | 6.8   | 160        | 392        | 116       |
| 18-03-2019  | 6.5  | 1650       | 5160       | 422       | 6.9   | 340        | 1160       | 128       |
| 11-03-2019  | 6.3  | 1050       | 3328       | 412       | 6.9   | 50         | 192        | 42        |
| 05-03-2019  | 8.3  | 2450       | 7840       | 612       | 7   | 210        | 560        | 142       |
| 25-02-2019  | 6.9  | 375        | 3424       | 408       | 6.9   | 325        | 2384       | 378       |
| 18-02-2019  | 6.9  | 1100       | 3840       | 354       | 6.7   | 425        | 1496       | 120       |
| 11-02-2019  | 7.4  | 850        | 3344       | 508       | 6.5   | 260        | 1048       | 134       |
| 04-02-2019  | 3.9  | 1700       | 5720       | 878       | 6.7   | 330        | 1000       | 148       |

|            |     |      |       |     |     |      |      |     |
|------------|-----|------|-------|-----|-----|------|------|-----|
| 28-01-2019 | 7.5 | 825  | 3024  | 134 | 6.5 | 900  | 3040 | 408 |
| 21-01-2019 | 6.4 | 1800 | 5720  | 236 | 7.1 | 290  | 968  | 124 |
| 14-01-2019 | 5.1 | 1150 | 3680  | 690 | 6.9 | 270  | 888  | 166 |
| 07-01-2019 | 7.4 | 1100 | 3120  | 300 | 7.3 | 370  | 1232 | 60  |
| 31-12-2018 | 5.2 | 850  | 2752  | 400 | 6.9 | 625  | 2112 | 600 |
| 17-12-2018 | 6.7 | 1025 | 3320  | 480 | 6.4 | 470  | 1520 | 220 |
| 10-12-2018 | 5.4 | 975  | 3312  | 382 | 6.8 | 900  | 3088 | 328 |
| 03-12-2018 | 7.4 | 1050 | 3488  | 60  | 6.8 | 370  | 1264 | 380 |
| 26-11-2018 | 6.4 | 1250 | 4400  | 606 | 6.7 | 120  | 408  | 54  |
| 19-11-2018 | 7   | 1700 | 5480  | 170 | 7   | 240  | 760  | 78  |
| 12-11-2018 | 6.6 | 1350 | 3800  | 650 | 6.8 | 580  | 1888 | 310 |
| 05-11-2018 | 6.6 | 800  | 2608  | 330 | 4.5 | 610  | 2240 | 220 |
| 29-10-2018 | 6.8 | 1050 | 3320  | 532 | 6.9 | 195  | 648  | 128 |
| 22-10-2018 | 5.5 | 950  | 3120  | 360 | 7   | 210  | 560  | 160 |
| 15-10-2018 | 6.5 | 1400 | 4520  | 638 | 6.9 | 130  | 448  | 76  |
| 01-10-2018 | 6.5 | 975  | 2800  | 520 | 7.2 | 260  | 872  | 368 |
| 10-09-2018 | 6.2 | 1400 | 4960  | 560 | 6.9 | 150  | 424  | 82  |
| 03-09-2018 | 5.9 | 925  | 2896  | 180 | 6.7 | 130  | 424  | 90  |
| 13-08-2018 | 7.2 | 925  | 2832  | 418 | 6.8 | 220  | 736  | 190 |
| 06-08-2018 | 6.9 | 1300 | 4280  | 278 | 7.5 | 105  | 360  | 110 |
| 30-07-2018 | 7.9 | 1100 | 3424  | 412 | 6.9 | 125  | 424  | 74  |
| 23-07-2018 | 6.5 | 975  | 3320  | 130 | 6.8 | 130  | 416  | 38  |
| 16-07-2018 | 8   | 850  | 2736  | 474 | 8   | 310  | 1064 | 138 |
| 09-07-2018 | 7.8 | 420  | 1440  | 96  | 7.2 | 105  | 320  | 42  |
| 02-07-2018 | 8   | 590  | 1680  | 280 | 7   | 260  | 728  | 80  |
| 18-06-2018 | 6.5 | 1600 | 4640  | 420 | 6.6 | 900  | 2448 | 612 |
| 11-06-2018 | 6.5 | 1600 | 4880  | 144 | 7.1 | 325  | 1176 | 118 |
| 04-06-2018 | 7.4 | 1400 | 4040  | 130 | 7.3 | 180  | 384  | 108 |
| 14-05-2018 | 6.8 | 1850 | 4280  | 159 | 7   | 1550 | 3120 | 331 |
| 07-05-2018 | 7.7 | 2050 | 3280  | 554 | 7   | 1600 | 2912 | 273 |
| 02-05-2018 | 6.8 | 1650 | 4240  | 370 | 6.9 | 1150 | 1952 | 181 |
| 23-04-2018 | 8.8 | 4800 | 18240 | 182 | 7.9 | 275  | 736  | 126 |
| 09-04-2018 | 6.7 | 1650 | 5320  | 380 | 7.3 | 280  | 652  | 110 |
| 04-04-2018 | 6.9 | 1075 | 2304  | 163 | 7.1 | 475  | 824  | 146 |
| 26-03-2018 | 7.6 | 1550 | 4480  | 162 | 7.4 | 270  | 640  | 132 |
| 12-03-2018 | 7   | 1850 | 5440  | 198 | 7.1 | 360  | 968  | 148 |
| 05-03-2018 | 7   | 1200 | 3504  | 148 | 7.3 | 220  | 624  | 110 |
| 01-03-2018 | 7   | 3100 | 8640  | 193 | 7.4 | 875  | 2992 | 118 |
| 26-02-2018 | 8.8 | 700  | 2032  | 146 | 7.1 | 825  | 2416 | 128 |
| 22-02-2018 | 6.6 | 1000 | 3488  | 144 | 7.3 | 850  | 2752 | 138 |
| 20-02-2018 | 6.7 | 2900 | 7320  | 142 | 7.2 | 210  | 744  | 114 |
| 12-02-2018 | 6.9 | 925  | 2912  | 210 | 7.2 | 850  | 2672 | 172 |

|            |     |      |      |     |     |     |      |     |
|------------|-----|------|------|-----|-----|-----|------|-----|
| 05-02-2018 | 6.7 | 1800 | 5200 | 162 | 7.1 | 600 | 1328 | 140 |
| 31-01-2018 | 6.8 | 675  | 1224 | 160 | 6.8 | 200 | 372  | 120 |
| 29-01-2018 | 7   | 1425 | 4920 | 140 | 7.2 | 900 | 3424 | 160 |
| 24-01-2018 | 6.9 | 1000 | 2624 | 140 | 7   | 260 | 516  | 76  |
| 22-01-2018 | 7.3 | 1160 | 1856 | 250 | 7.3 | 560 | 904  | 210 |
| 17-01-2018 | 6.8 | 700  | 1760 | 130 | 6.8 | 360 | 712  | 120 |
| 15-01-2018 | 5.1 | 1450 | 4160 | 146 | 6.6 | 140 | 376  | 56  |
| 10-01-2018 | 6.8 | 875  | 1488 | 94  | 7.1 | 580 | 1144 | 120 |
| 08-01-2018 | 4.7 | 900  | 3640 | 92  | 7.3 | 260 | 600  | 160 |
| 04-01-2018 | 7.1 | 620  | 1568 | 240 | 7.2 | 440 | 1040 | 190 |
| 01-01-2018 | 7.1 | 1300 | 3760 | 166 | 7.2 | 425 | 1160 | 148 |
| 26-12-2017 | 6.3 | 550  | 1872 | 288 | 7.3 | 400 | 1080 | 140 |
| 18-12-2017 | 6.2 | 1700 | 4600 | 186 | 7.3 | 170 | 464  | 110 |
| 11-12-2017 | 5   | 1550 | 4320 | 112 | 7.1 | 270 | 744  | 64  |
| 04-12-2017 | 6.4 | 1150 | 3040 | 86  | 6.9 | 180 | 480  | 88  |
| 28-11-2017 | 7.2 | 950  | 3600 | 120 | 7.2 | 550 | 1792 | 94  |
| 20-11-2017 | 6.8 | 1200 | 3312 | 248 | 7.6 | 80  | 204  | 58  |
| 14-11-2017 | 6.5 | 1225 | 3728 | 136 | 7.4 | 240 | 632  | 74  |
| 06-11-2017 | 7.7 | 1100 | 3584 | 264 | 7.4 | 160 | 520  | 128 |
| 30-10-2017 | 8.2 | 975  | 3088 | 294 | 7.1 | 120 | 440  | 114 |
| 23-10-2017 | 6.6 | 950  | 3056 | 322 | 7.6 | 110 | 376  | 110 |
| 16-10-2017 | 6.8 | 625  | 1984 | 240 | 6.7 | 110 | 368  | 148 |
| 10-10-2017 | 7.6 | 775  | 1808 | 156 | 7.9 | 115 | 392  | 112 |
| 03-10-2017 | 6.8 | 950  | 2864 | 286 | 7.5 | 170 | 584  | 186 |
| 25-09-2017 | 8.1 | 925  | 2896 | 286 | 7.4 | 120 | 432  | 130 |
| 18-09-2017 | 6.6 | 1150 | 3520 | 240 | 7.2 | 120 | 396  | 86  |
| 12-09-2017 | 7.1 | 1150 | 3640 | 218 | 6.8 | 130 | 448  | 112 |
| 04-09-2017 | 6.7 | 720  | 2192 | 218 | 7.1 | 140 | 412  | 84  |
| 28-08-2017 | 6.8 | 688  | 2176 | 216 | 7.3 | 130 | 400  | 110 |
| 21-08-2017 | 9.1 | 500  | 1600 | 202 | 7.4 | 120 | 424  | 118 |
| 14-08-2017 | 6.8 | 950  | 3080 | 402 | 7.2 | 130 | 448  | 178 |
| 31-07-2017 | 7.4 | 575  | 1744 | 280 | 7.4 | 170 | 544  | 162 |
| 25-07-2017 | 7.3 | 675  | 2112 | 420 | 7.2 | 210 | 680  | 214 |
| 17-07-2017 | 7.6 | 475  | 1520 | 180 | 7.2 | 230 | 744  | 148 |
| 10-07-2017 | 5.8 | 1350 | 4120 | 308 | 7.6 | 280 | 896  | 130 |
| 07-07-2017 | 7.1 | 875  | 2736 | 372 | 7.4 | 130 | 448  | 152 |
| 03-07-2017 | 6.7 | 825  | 2560 | 242 | 6.9 | 300 | 952  | 164 |
| 27-06-2017 | 6.7 | 850  | 2400 | 222 | 7.2 | 260 | 800  | 144 |
| 19-06-2017 | 6.1 | 775  | 2336 | 124 | 7.5 | 115 | 324  | 70  |
| 12-06-2017 | 6.7 | 575  | 1712 | 234 | 7.1 | 120 | 384  | 82  |
| 05-06-2017 | 7   | 825  | 2496 | 134 | 7.3 | 160 | 420  | 54  |
| 29-05-2017 | 8.4 | 975  | 2928 | 394 | 7.1 | 270 | 824  | 434 |

|            |     |      |      |      |     |     |      |     |
|------------|-----|------|------|------|-----|-----|------|-----|
| 22-05-2017 | 6.4 | 950  | 3000 | 210  | 7.2 | 145 | 440  | 140 |
| 15-05-2017 | 7.1 | 1100 | 3440 | 334  | 7.2 | 140 | 432  | 316 |
| 24-04-2017 | 6.8 | 1100 | 3120 | 682  | 7.4 | 170 | 488  | 298 |
| 17-04-2017 | 6.6 | 1250 | 4200 | 504  | 7.2 | 775 | 2416 | 450 |
| 10-04-2017 | 6.9 | 1200 | 3680 | 332  | 7.1 | 700 | 2200 | 494 |
| 03-04-2017 | 7   | 610  | 1616 | 186  | 7.2 | 130 | 424  | 120 |
| 02-04-2017 | 6.4 | 900  | 2784 | 154  | 7   | 275 | 764  | 234 |
| 27-03-2017 | 6.7 | 2600 | 8400 | 630  | 7.3 | 280 | 808  | 506 |
| 20-03-2017 | 6.7 | 2250 | 7400 | 440  | 7.2 | 270 | 848  | 112 |
| 14-03-2017 | 7.7 | 975  | 3160 | 378  | 7.4 | 480 | 764  | 78  |
| 06-03-2017 | 2.9 | 1100 | 3424 | 618  | 7.3 | 240 | 792  | 532 |
| 20-02-2017 | 7.2 | 1150 | 3536 | 682  | 7.3 | 360 | 784  | 708 |
| 13-02-2017 | 7   | 1150 | 3296 | 284  | 7.5 | 280 | 784  | 132 |
| 06-02-2017 | 6.6 | 525  | 2160 | 132  | 7.5 | 240 | 960  | 444 |
| 30-01-2017 | 6.5 | 1750 | 5680 | 988  | 7.5 | 600 | 1696 | 494 |
| 23-01-2017 | 7.1 | 700  | 2208 | 236  | 7.3 | 390 | 1288 | 188 |
| 16-01-2017 | 7.3 | 700  | 2176 | 492  | 7.4 | 590 | 1872 | 284 |
| 09-01-2017 | 5.4 | 2250 | 7240 | 766  | 7.4 | 750 | 1648 | 362 |
| 02-01-2017 | 7.1 | 950  | 2992 | 1268 | 7.3 | 530 | 1984 | 758 |
| 26-12-2016 | 5.9 | 2000 | 6400 | 442  | 8.9 | 260 | 832  | 184 |
| 13-12-2016 | 5.6 | 1500 | 4880 | 760  | 7.3 | 650 | 2064 | 314 |
| 05-12-2016 | 7.8 | 675  | 2128 | 404  | 7.6 | 580 | 1728 | 252 |
| 28-11-2016 | 5.2 | 2200 | 7160 | 2380 | 6.4 | 610 | 2160 | 282 |
| 21-11-2016 | 6.6 | 2050 | 4160 | 454  | 7   | 550 | 1920 | 138 |
| 15-11-2016 | 6.3 | 925  | 2592 | 222  | 6.8 | 370 | 1216 | 148 |
| 24-10-2016 | 6.2 | 1650 | 5520 | 162  | 7.3 | 450 | 1144 | 192 |
| 17-10-2016 | 5.6 | 1450 | 3680 | 260  | 7   | 380 | 1264 | 310 |
| 10-10-2016 | 4.8 | 725  | 3200 | 466  | 7   | 115 | 360  | 52  |
| 03-10-2016 | 6.8 | 625  | 2000 | 368  | 7.2 | 120 | 392  | 196 |
| 26-09-2016 | 6.9 | 1375 | 2896 | 210  | 6.9 | 220 | 508  | 240 |
| 19-09-2016 | 6.2 | 950  | 2992 | 254  | 9.2 | 150 | 416  | 74  |
| 12-09-2016 | 5.6 | 640  | 2720 | 220  | 6.6 | 110 | 368  | 86  |
| 06-09-2016 | 6.5 | 775  | 2784 | 362  | 6.8 | 62  | 224  | 86  |
| 22-08-2016 | 6.3 | 420  | 1680 | 400  | 7.1 | 145 | 468  | 76  |
| 16-08-2016 | 7.5 | 475  | 1440 | 538  | 6.8 | 115 | 352  | 60  |
| 08-08-2016 | 8.8 | 625  | 2208 | 746  | 6.6 | 170 | 300  | 174 |
| 01-08-2016 | 3.7 | 700  | 1952 | 708  | 6.6 | 110 | 348  | 110 |
| 25-07-2016 | 5.5 | 950  | 3296 | 522  | 6.5 | 130 | 308  | 126 |
| 18-07-2016 | 4.3 | 975  | 3344 | 116  | 6.5 | 240 | 772  | 74  |
| 11-07-2016 | 4.2 | 725  | 2144 | 214  | 5.9 | 280 | 920  | 102 |
| 04-07-2016 | 5.5 | 775  | 2432 | 338  | 6.6 | 270 | 888  | 46  |
| 27-06-2016 | 4.9 | 825  | 2912 | 424  | 6.5 | 280 | 960  | 122 |

|            |     |      |       |      |     |     |      |     |
|------------|-----|------|-------|------|-----|-----|------|-----|
| 06-06-2016 | 5.3 | 1000 | 3648  | 364  | 6.6 | 190 | 600  | 124 |
| 30-05-2016 | 4.6 | 2300 | 10720 | 354  | 6.5 | 370 | 1216 | 150 |
| 23-05-2016 | 7   | 1100 | 3600  | 498  | 7.4 | 290 | 848  | 148 |
| 16-05-2016 | 7.1 | 850  | 2576  | 260  | 7.6 | 120 | 560  | 80  |
| 09-05-2016 | 6.8 | 1200 | 2384  | 382  | 7.7 | 170 | 528  | 112 |
| 02-05-2016 | 6   | 1100 | 3408  | 294  | 7.5 | 160 | 560  | 340 |
| 25-04-2016 | 7.2 | 500  | 1104  | 394  | 7.2 | 360 | 800  | 188 |
| 18-04-2016 | 4.2 | 550  | 1704  | 220  | 6.9 | 400 | 1456 | 88  |
| 11-04-2016 | 7.9 | 875  | 2512  | 336  | 7.5 | 200 | 536  | 140 |
| 04-04-2016 | 3.6 | 1075 | 3392  | 376  | 7.7 | 320 | 824  | 886 |
| 31-03-2016 | 8.4 | 525  | 1392  | 416  | 8   | 370 | 1104 | 66  |
| 21-03-2016 | 8   | 1850 | 5000  | 682  | 8   | 240 | 600  | 96  |
| 14-03-2016 | 6.8 | 330  | 1056  | 66   | 7.4 | 180 | 544  | 84  |
| 07-03-2016 | 8   | 450  | 1416  | 52   | 7.4 | 210 | 592  | 56  |
| 29-02-2016 | 7.2 | 725  | 1888  | 256  | 7   | 240 | 664  | 176 |
| 22-02-2016 | 7.1 | 650  | 1856  | 240  | 7.4 | 180 | 520  | 130 |
| 15-02-2016 | 7   | 725  | 1952  | 156  | 7.4 | 180 | 464  | 174 |
| 08-02-2016 | 6.8 | 1050 | 2528  | 722  | 7.2 | 140 | 376  | 302 |
| 01-02-2016 | 8.4 | 330  | 1000  | 474  | 7.2 | 190 | 520  | 78  |
| 25-01-2016 | 1.6 | 675  | 1968  | 178  | 7.3 | 180 | 584  | 196 |
| 18-01-2016 | 9.3 | 850  | 2032  | 364  | 7.5 | 320 | 824  | 130 |
| 11-01-2016 | 7.3 | 2250 | 6080  | 606  | 7.2 | 360 | 920  | 126 |
| 04-01-2016 | 8.8 | 3400 | 8400  | 554  | 7.8 | 170 | 532  | 54  |
| 28-12-2015 | 6.6 | 490  | 1392  | 292  | 7.3 | 170 | 440  | 142 |
| 14-12-2015 | 6.1 | 1650 | 4640  | 420  | 7.5 | 220 | 636  | 164 |
| 07-12-2015 | 7.8 | 725  | 2080  | 850  | 8.2 | 350 | 1120 | 196 |
| 03-12-2015 | 7.1 | 450  | 1248  | 354  | 7.2 | 210 | 688  | 116 |
| 16-11-2015 | 6.6 | 3700 | 10080 | 534  | 7.4 | 140 | 376  | 24  |
| 02-11-2015 | 5.5 | 1150 | 3296  | 646  | 7.3 | 190 | 692  | 60  |
| 26-10-2015 | 6.3 | 750  | 1888  | 1660 | 7.3 | 220 | 724  | 114 |
| 19-10-2015 | 9.3 | 625  | 1272  | 156  | 7.7 | 270 | 660  | 68  |
| 12-10-2015 | 6.3 | 1075 | 3880  | 258  | 7.3 | 160 | 552  | 114 |
| 28-09-2015 | 7.7 | 850  | 2336  | 418  | 7.3 | 115 | 515  | 120 |
| 22-09-2015 | 5.9 | 950  | 2464  | 560  | 7.3 | 725 | 1776 | 480 |
| 14-09-2015 | 7.1 | 560  | 1520  | 562  | 6.9 | 275 | 696  | 128 |
| 07-09-2015 | 6.8 | 575  | 1608  | 484  | 8.1 | 220 | 600  | 288 |
| 31-08-2015 | 6.6 | 650  | 1464  | 168  | 7.8 | 90  | 264  | 20  |
| 24-08-2015 | 6.2 | 825  | 1968  | 788  | 8   | 140 | 360  | 40  |
| 17-08-2015 | 8.4 | 1075 | 2960  | 980  | 8.2 | 145 | 400  | 42  |
| 10-08-2015 | 8.5 | 460  | 1320  | 368  | 7.9 | 135 | 396  | 52  |
| 03-08-2015 | 5.7 | 850  | 2352  | 1194 | 8.1 | 125 | 340  | 48  |
| 27-07-2015 | 7.3 | 800  | 2272  | 386  | 7.8 | 280 | 768  | 188 |

|            |     |      |      |      |     |      |      |     |
|------------|-----|------|------|------|-----|------|------|-----|
| 20-07-2015 | 6.6 | 1600 | 5000 | 384  | 8.3 | 200  | 568  | 42  |
| 13-07-2015 | 6.3 | 1050 | 4800 | 1180 | 7.8 | 160  | 432  | 34  |
| 06-07-2015 | 6.2 | 750  | 2160 | 218  | 7.7 | 220  | 560  | 88  |
| 29-06-2015 | 8.3 | 260  | 728  | 232  | 7.3 | 90   | 232  | 188 |
| 22-06-2015 | 7.3 | 925  | 2112 | 678  | 7.6 | 135  | 400  | 40  |
| 08-06-2015 | 6.4 | 1200 | 2832 | 392  | 8.1 | 120  | 368  | 108 |
| 01-06-2015 | 7.4 | 590  | 1496 | 180  | 7.9 | 520  | 1328 | 146 |
| 25-05-2015 | 6.6 | 1100 | 2720 | 492  | 8.2 | 145  | 480  | 28  |
| 18-05-2015 | 8.2 | 320  | 872  | 274  | 8.1 | 125  | 392  | 42  |
| 11-05-2015 | 8   | 925  | 2496 | 244  | 7.6 | 120  | 312  | 68  |
| 05-05-2015 | 8.2 | 1200 | 3200 | 274  | 7.8 | 210  | 448  | 110 |
| 27-04-2015 | 7   | 1200 | 5280 | 544  | 7.7 | 230  | 776  | 188 |
| 13-04-2015 | 8.2 | 1750 | 5680 | 734  | 7.5 | 2500 | 9520 | 844 |
| 06-04-2015 | 7.1 | 630  | 2096 | 400  | 7.5 | 340  | 1216 | 518 |
| 23-03-2015 | 6.6 | 460  | 1680 | 482  | 7.6 | 76   | 256  | 80  |
| 16-03-2015 | 7.1 | 530  | 1344 | 264  | 7.8 | 150  | 388  | 190 |
| 09-03-2015 | 6.6 | 1800 | 5520 | 570  | 7.3 | 150  | 408  | 276 |
| 02-03-2015 | 6.7 | 2250 | 8000 | 260  | 7.6 | 120  | 288  | 110 |
| 23-02-2015 | 6.8 | 1650 | 5520 | 424  | 7.8 | 190  | 464  | 104 |
| 16-02-2015 | 6.9 | 1750 | 6280 | 982  | 7.4 | 325  | 824  | 258 |
| 09-02-2015 | 7.7 | 925  | 3472 | 228  | 7.7 | 180  | 528  | 156 |
| 02-02-2015 | 8.4 | 800  | 1504 | 390  | 8   | 230  | 720  | 122 |
| 27-01-2015 | 8.4 | 2400 | 5360 | 214  | 7.9 | 180  | 476  | 88  |
| 19-01-2015 | 6.7 | 130  | 3360 | 198  | 8.1 | 280  | 896  | 86  |
| 12-01-2015 | 6.6 | 1700 | 4800 | 254  | 8   | 180  | 440  | 146 |
| 05-01-2015 | 6.9 | 2300 | 7200 | 168  | 8.2 | 280  | 712  | 138 |
| 29-12-2014 | 6.3 | 800  | 3640 | 240  | 7.7 | 160  | 528  | 110 |
| 22-12-2014 | 6.9 | 750  | 1776 | 108  | 7.2 | 180  | 464  | 90  |
| 15-12-2014 | 6   | 950  | 2480 | 310  | 7.6 | 280  | 524  | 350 |
| 01-12-2014 | 8.4 | 800  | 2368 | 172  | 7.8 | 210  | 696  | 138 |
| 24-11-2014 | 7.7 | 260  | 720  | 198  | 7.5 | 320  | 696  | 180 |
| 17-11-2014 | 7.2 | 390  | 1088 | 86   | 7.2 | 110  | 328  | 62  |
| 10-11-2014 | 7   | 600  | 1920 | 286  | 7.5 | 120  | 400  | 60  |
| 03-11-2014 | 7   | 380  | 752  | 146  | 7   | 140  | 344  | 166 |
| 27-10-2014 | 6.3 | 800  | 2352 | 386  | 7   | 110  | 268  | 198 |
| 20-10-2014 | 7.4 | 675  | 2288 | 288  | 7.5 | 90   | 232  | 118 |
| 13-10-2014 | 5.1 | 750  | 4280 | 208  | 6.7 | 120  | 288  | 90  |
| 07-10-2014 | 6.9 | 1700 | 4760 | 126  | 7.1 | 110  | 336  | 68  |
| 29-09-2014 | 7.3 | 410  | 1072 | 710  | 6.9 | 160  | 392  | 148 |
| 22-09-2014 | 6.8 | 350  | 800  | 172  | 6.9 | 120  | 268  | 90  |
| 15-09-2014 | 6.8 | 580  | 1392 | 270  | 6.8 | 80   | 212  | 38  |
| 09-09-2014 | 6.4 | 300  | 800  | 326  | 6.9 | 150  | 440  | 102 |

|            |     |      |      |     |     |     |      |     |
|------------|-----|------|------|-----|-----|-----|------|-----|
| 01-09-2014 | 7.4 | 270  | 680  | 140 | 7.4 | 180 | 408  | 146 |
| 25-08-2014 | 7   | 900  | 2432 | 238 | 6.9 | 210 | 488  | 270 |
| 19-08-2014 | 6.7 | 560  | 1632 | 138 | 7   | 110 | 268  | 46  |
| 11-08-2014 | 4.3 | 440  | 1256 | 122 | 7   | 70  | 212  | 150 |
| 04-08-2014 | 7   | 510  | 1120 | 184 | 7.1 | 80  | 220  | 88  |
| 28-07-2014 | 6.9 | 600  | 1632 | 256 | 7.1 | 120 | 344  | 64  |
| 21-07-2014 | 8.1 | 270  | 768  | 238 | 7.4 | 140 | 368  | 42  |
| 14-07-2014 | 6.4 | 850  | 2560 | 216 | 7   | 120 | 332  | 98  |
| 07-07-2014 | 6.8 | 950  | 2720 | 254 | 7   | 220 | 560  | 180 |
| 30-06-2014 | 6.5 | 1000 | 3136 | 278 | 6.8 | 300 | 696  | 222 |
| 23-06-2014 | 7.1 | 850  | 2656 | 292 | 7.2 | 115 | 364  | 128 |
| 16-06-2014 | 6.3 | 675  | 1936 | 256 | 7.3 | 190 | 416  | 118 |
| 09-06-2014 | 7.1 | 1300 | 3840 | 360 | 7.1 | 155 | 360  | 58  |
| 02-06-2014 | 6.9 | 450  | 968  | 278 | 7.1 | 120 | 348  | 128 |
| 26-05-2014 | 7.6 | 950  | 1904 | 342 | 7.3 | 160 | 472  | 358 |
| 19-05-2014 | 7.2 | 800  | 2400 | 260 | 7   | 190 | 408  | 200 |
| 12-05-2014 | 6   | 1700 | 5400 | 272 | 7.5 | 390 | 664  | 284 |
| 05-05-2014 | 6.9 | 800  | 2064 | 268 | 6.8 | 200 | 488  | 84  |
| 28-04-2014 | 6.2 | 1300 | 4160 | 296 | 7.1 | 200 | 552  | 254 |
| 21-04-2014 | 4.4 | 925  | 2704 | 280 | 7.3 | 430 | 1160 | 274 |
| 15-04-2014 | 8   | 710  | 2320 | 320 | 7.5 | 340 | 864  | 292 |
| 07-04-2014 | 4.6 | 1250 | 3880 | 440 | 6.8 | 250 | 528  | 302 |
| 01-04-2014 | 6.8 | 1250 | 3760 | 310 | 7.4 | 150 | 472  | 328 |
| 24-03-2014 | 5.8 | 2600 | 6200 | 442 | 7.2 | 150 | 504  | 160 |
| 18-03-2014 | 7.5 | 1100 | 4400 | 272 | 6.9 | 190 | 650  | 240 |
| 10-03-2014 | 6.8 | 550  | 1632 | 188 | 7.5 | 130 | 472  | 68  |
| 03-03-2014 | 4.8 | 1400 | 4480 | 296 | 6.8 | 200 | 408  | 272 |
| 24-02-2014 | 7.6 | 800  | 2416 | 192 | 7   | 240 | 584  | 178 |
| 17-02-2014 | 7.2 | 1150 | 3680 | 204 | 7.3 | 140 | 464  | 160 |
| 10-02-2014 | 6.3 | 850  | 2720 | 242 | 6.8 | 260 | 580  | 310 |
| 06-02-2014 | 4.5 | 1350 | 4120 | 182 | 7   | 220 | 800  | 160 |
| 03-02-2014 | 8.7 | 950  | 2848 | 228 | 7   | 350 | 1088 | 238 |
| 27-01-2014 | 4.9 | 900  | 3360 | 310 | 6.3 | 350 | 1008 | 282 |
| 20-01-2014 | 7.3 | 950  | 4000 | 318 | 6.7 | 280 | 560  | 212 |
| 13-01-2014 | 7.8 | 550  | 1664 | 184 | 6   | 280 | 656  | 260 |
| 06-01-2014 | 7.5 | 850  | 3344 | 198 | 7.2 | 170 | 480  | 188 |
| 03-01-2014 | 6.4 | 1800 | 4800 | 156 | 6.9 | 260 | 648  | 112 |
| 30-12-2013 | 5.9 | 1400 | 3104 | 292 | 7.3 | 240 | 560  | 140 |
| 23-12-2013 | 9.5 | 1250 | 3200 | 272 | 7   | 240 | 600  | 260 |
| 16-12-2013 | 6.6 | 2500 | 6360 | 168 | 7   | 260 | 672  | 160 |
| 09-12-2013 | 6.8 | 975  | 2288 | 150 | 6.8 | 240 | 528  | 150 |
| 06-12-2013 | 6.4 | 1200 | 3264 | 154 | 6.6 | 300 | 784  | 134 |

|            |     |      |      |     |     |     |      |     |
|------------|-----|------|------|-----|-----|-----|------|-----|
| 02-12-2013 | 7.3 | 900  | 2432 | 174 | 7.1 | 220 | 796  | 82  |
| 25-11-2013 | 6.9 | 1150 | 3232 | 230 | 7.4 | 240 | 656  | 180 |
| 18-11-2013 | 6.9 | 775  | 2240 | 120 | 7.2 | 220 | 600  | 80  |
| 11-11-2013 | 4.6 | 700  | 2016 | 120 | 7.6 | 240 | 560  | 110 |
| 06-11-2013 | 4.5 | 950  | 2512 | 182 | 4.8 | 300 | 664  | 180 |
| 28-10-2013 | 6.7 | 480  | 1952 | 120 | 6.4 | 240 | 456  | 140 |
| 21-10-2013 | 7.7 | 900  | 2624 | 80  | 7.8 | 220 | 576  | 88  |
| 14-10-2013 | 5.9 | 650  | 1840 | 210 | 6.4 | 180 | 472  | 88  |
| 07-10-2013 | 4.7 | 725  | 2080 | 110 | 5.2 | 240 | 656  | 40  |
| 04-10-2013 | 7   | 600  | 1712 | 200 | 6.9 | 170 | 432  | 248 |
| 30-09-2013 | 7.3 | 600  | 1760 | 90  | 6.6 | 140 | 360  | 60  |
| 23-09-2013 | 6.6 | 525  | 1352 | 120 | 7.6 | 370 | 1048 | 110 |
| 16-09-2013 | 7   | 650  | 1880 | 160 | 6.8 | 170 | 424  | 120 |
| 09-09-2013 | 6.9 | 525  | 1496 | 160 | 6.9 | 140 | 384  | 118 |
| 06-09-2013 | 4.3 | 2050 | 6000 | 140 | 6.7 | 210 | 480  | 80  |
| 02-09-2013 | 6.2 | 310  | 848  | 190 | 7.1 | 260 | 448  | 92  |
| 26-08-2013 | 6.5 | 950  | 2704 | 140 | 6.2 | 170 | 464  | 40  |
| 19-08-2013 | 6.2 | 800  | 2304 | 182 | 6.9 | 220 | 560  | 190 |
| 12-08-2013 | 6.8 | 260  | 704  | 140 | 7.1 | 240 | 480  | 232 |
| 05-08-2013 | 6.8 | 210  | 584  | 180 | 7.2 | 190 | 360  | 160 |
| 02-08-2013 | 6.9 | 260  | 736  | 192 | 7.3 | 160 | 296  | 60  |
| 29-07-2013 | 5.7 | 800  | 2064 | 248 | 7.5 | 150 | 372  | 122 |
| 22-07-2013 | 6.6 | 450  | 1160 | 186 | 6.8 | 120 | 276  | 98  |
| 15-07-2013 | 6   | 320  | 748  | 280 | 9.3 | 240 | 612  | 248 |
| 08-07-2013 | 6.6 | 1200 | 3152 | 220 | 7.4 | 180 | 408  | 116 |
| 01-07-2013 | 6.9 | 775  | 1736 | 166 | 6.8 | 130 | 384  | 140 |
| 24-06-2013 | 6.8 | 550  | 1504 | 198 | 7.2 | 250 | 672  | 128 |
| 17-06-2013 | 7   | 900  | 2416 | 238 | 7.9 | 180 | 460  | 180 |
| 10-06-2013 | 7.4 | 750  | 2240 | 306 | 7.7 | 140 | 344  | 76  |
| 03-06-2013 | 7.8 | 450  | 1272 | 168 | 7.9 | 140 | 380  | 68  |
| 27-05-2013 | 7.6 | 1100 | 2848 | 288 | 8.4 | 180 | 412  | 34  |
| 20-05-2013 | 6.8 | 900  | 2192 | 248 | 7.7 | 150 | 376  | 108 |
| 13-05-2013 | 6.9 | 800  | 2112 | 238 | 7.6 | 140 | 368  | 122 |
| 06-05-2013 | 7.5 | 550  | 1472 | 258 | 8.4 | 180 | 496  | 200 |
| 29-04-2013 | 7.2 | 1600 | 2512 | 360 | 7.7 | 145 | 340  | 228 |
| 22-04-2013 | 8   | 600  | 1616 | 124 | 8.1 | 130 | 324  | 60  |
| 15-04-2013 | 6.9 | 1800 | 5080 | 380 | 8.2 | 400 | 568  | 410 |
| 08-04-2013 | 7.6 | 280  | 640  | 300 | 7.3 | 170 | 428  | 28  |
| 01-04-2013 | 8.3 | 475  | 1264 | 198 | 7.7 | 160 | 392  | 176 |
| 25-03-2013 | 7.6 | 1600 | NA   | 280 | 7.9 | 120 | 300  | 186 |
| 18-03-2013 | 8   | 475  | 1376 | 186 | 7   | 170 | 436  | 110 |
| 11-03-2013 | 8.2 | 775  | 2192 | 236 | 7.7 | 160 | 416  | 180 |

|            |     |      |      |     |     |     |      |     |
|------------|-----|------|------|-----|-----|-----|------|-----|
| 04-03-2013 | 7   | 475  | 1360 | 170 | 8.2 | 150 | 396  | 140 |
| 25-02-2013 | 7.5 | 1125 | 3200 | 186 | 7.8 | 150 | 376  | 104 |
| 18-02-2013 | 8.6 | 725  | 2176 | 172 | 7.8 | 190 | 492  | 136 |
| 11-02-2013 | 6.9 | 410  | 1360 | 124 | 7.9 | 210 | 712  | 112 |
| 04-02-2013 | 8   | 530  | 1648 | 90  | 8.1 | 210 | 552  | 88  |
| 28-01-2013 | 4.2 | 2200 | 6320 | 144 | 7.5 | 290 | 832  | 116 |
| 21-01-2013 | 7   | 675  | 1952 | 122 | 7.4 | 260 | 744  | 94  |
| 14-01-2013 | 5.4 | 1600 | 4680 | 210 | 7.4 | 85  | 228  | 30  |
| 07-01-2013 | 8.2 | 675  | 1880 | 72  | 7.3 | 370 | 1048 | 112 |
| 01-01-2013 | 6.5 | 490  | 1408 | 152 | 7.2 | 420 | 896  | 286 |
| 31-12-2012 | 7   | 825  | 2400 | 118 | 7.1 | 170 | 512  | 32  |
| 24-12-2012 | 7.3 | 875  | 2864 | 272 | 7.1 | 230 | 400  | 146 |
| 21-12-2012 | 7.6 | NA   | 1984 | 40  | 7.4 | NA  | 672  | 60  |
| 18-12-2012 | 6.4 | 625  | 2016 | 66  | 7.3 | 170 | 644  | 126 |
| 13-12-2012 | 8.2 | 440  | 2064 | 184 | 7.4 | 310 | 960  | 236 |
| 05-12-2012 | 7.3 | 500  | 1328 | 168 | 6.9 | 290 | 896  | 184 |
| 22-11-2012 | 6.8 | 1050 | 1400 | 72  | 7.3 | 260 | 656  | 40  |
| 02-11-2012 | 6.3 | 550  | 2800 | 164 | 7.7 | 180 | 624  | 62  |
| 18-10-2012 | 7.4 | 650  | 1568 | 164 | 7.4 | 240 | 472  | 52  |
| 11-10-2012 | 4.7 | 330  | 1936 | 122 | 7.1 | 140 | 656  | 32  |
| 20-09-2012 | 6.9 | 180  | 912  | 52  | 7   | 48  | 296  | 42  |
| 03-09-2012 | 6.8 | 760  | 560  | 32  | 7.4 | 310 | 100  | 34  |
| 29-08-2012 | 6.9 | 420  | 3400 | 168 | 6.7 | 66  | 816  | 128 |
| 03-08-2012 | 6.8 | 620  | 1136 | 162 | 6.7 | 610 | 132  | 30  |
| 20-07-2012 | 6.6 | 2016 | 2000 | 132 | 8.3 | 963 | 1456 | 120 |
| 07-07-2012 | 6.2 | 750  | 805  | 296 | 6.5 | 632 | 448  | 173 |
| 30-06-2012 | 8.4 | 480  | 2240 | 222 | 7.8 | 500 | 632  | 162 |
| 25-05-2012 | 7.9 | 850  | 1312 | 140 | 7.4 | 260 | 1248 | 220 |
| 19-05-2012 | 6.3 | 950  | 2336 | 244 | 7.1 | 320 | 560  | 212 |
| 17-05-2012 | 6.2 | 1600 | 2752 | 154 | 7.4 | 725 | 1144 | 126 |
| 29-04-2012 | 7.9 | 750  | 2368 | 144 | 6.7 | 430 | 1504 | 122 |
| 28-04-2012 | 7.6 | 2000 | 1856 | 168 | 7.2 | 190 | 1096 | 208 |
| 27-04-2012 | 6.9 | 940  | 2880 | 158 | 6.9 | 330 | 640  | 192 |
| 26-04-2012 | 8.8 | 420  | 2768 | 284 | 7.8 | 375 | 776  | 186 |
| 24-04-2012 | 7.4 | 800  | 1152 | 304 | 7.6 | 280 | 960  | 188 |
| 23-04-2012 | 7.7 | 510  | 2384 | 210 | 7.6 | 170 | 744  | 164 |
| 22-04-2012 | 7.3 | 675  | 1880 | 148 | 6.8 | 420 | 448  | 282 |
| 21-04-2012 | 6.9 | 320  | 2192 | 90  | 7.2 | 460 | 1360 | 142 |
| 20-04-2012 | 3.6 | 470  | 1440 | 176 | 6.8 | 490 | 1360 | 124 |
| 19-04-2012 | 6.6 | 850  | 1280 | 288 | 6.9 | 540 | 1360 | 176 |
| 18-04-2012 | 8.5 | 750  | 2192 | 240 | 6.8 | 550 | 1472 | 284 |
| 16-04-2012 | 5.2 | 700  | 2480 | 164 | 7.1 | 290 | 1840 | 286 |

|            |     |      |      |     |     |      |      |     |
|------------|-----|------|------|-----|-----|------|------|-----|
| 11-04-2012 | 2   | 475  | 2240 | 284 | 7   | 160  | 608  | 256 |
| 03-04-2012 | 8.3 | 1450 | 1264 | 198 | 7.7 | 625  | 392  | 176 |
| 25-03-2012 | 7.6 | 700  | 3136 | 562 | 6.8 | 600  | 1440 | 536 |
| 20-03-2012 | 6.8 | 750  | 2336 | 462 | 7   | 110  | 1008 | 514 |
| 15-03-2012 | 4.8 | 900  | 1552 | 294 | 7.4 | 400  | 480  | 88  |
| 02-02-2012 | 5   | 650  | 1840 | 214 | 7   | 130  | 320  | 68  |
| 24-01-2012 | 7.3 | 825  | 2176 | 220 | 7.3 | 190  | 320  | 84  |
| 01-12-2011 | 6.6 | 950  | 272  | --  | 7.2 | 540  | 406  | 286 |
| 09-11-2011 | 7.7 | 500  | 3216 | 180 | 7.1 | 190  | 1720 | 64  |
| 03-11-2011 | 6.2 | 900  | 1872 | 220 | 6.8 | 370  | 448  | 154 |
| 07-10-2011 | 6.4 | 540  | 2680 | --  | 7   | 240  | 1152 | --  |
| 06-10-2011 | 7.3 | 140  | 1736 | 278 | 7.1 | 100  | 1680 | 48  |
| 17-09-2011 | 6.9 | 300  | 280  | --  | 7.1 | 260  | 260  | --  |
| 03-09-2011 | 6.6 | 280  | 840  | 604 | 8.9 | 180  | 764  | 288 |
| 05-08-2011 | 6.5 | 750  | 2640 | 172 | 7   | 280  | 368  | 162 |
| 16-07-2011 | 5.2 | 4000 | 2400 | 340 | 7.1 | 1200 | 920  | 284 |
| 01-07-2011 | 8.1 | 1200 | 8640 | 248 | 7.1 | 350  | 2432 | 236 |
| 17-05-2011 | 7.2 | 3500 | 2400 | 274 | 7   | 550  | 1800 | 118 |
| 07-05-2011 | 7.9 | 390  | 8000 | 194 | 8.5 | 310  | 1072 | 144 |
| 01-05-2011 | 6.2 | 2200 | 1264 | --  | 7.4 | 1425 | 919  | 0   |
| 05-04-2011 | 6   | 390  | 9760 | 182 | 7.4 | 330  | 4160 | 554 |
| 01-04-2011 | 4.2 | 700  | 1376 | 120 | 6.9 | 307  | 1104 | 196 |

## Annexure IV

### Monthly average of estimated daily inlet effluent quantity to CETP (as provided by M/s TEPS)

| Month<br>Year | January | February | March  | April  | May    | June   | July   | August | September | October | November | December |
|---------------|---------|----------|--------|--------|--------|--------|--------|--------|-----------|---------|----------|----------|
| 2011          | -       | -        | -      | 25.543 | 25.153 | 25.154 | 25.153 | 25.153 | 25.153    | 25.317  | 25.32    | 25.311   |
| 2012          | 25.221  | 25.39    | 25.221 | 25.447 | 25.403 | 24.507 | 25.377 | 25.332 | 25.287    | 25.237  | 25.101   | 25.264   |
| 2013          | 25.214  | 25.166   | 25.092 | 25.2   | 24.374 | 25.151 | 25.178 | 25.128 | 25.144    | 25.154  | 25.164   | 25.182   |
| 2014          | 25.169  | 25.169   | 25.192 | 25.184 | 25.153 | 25.154 | 24.936 | 25.181 | 25.015    | 25.134  | 25.142   | 25.156   |
| 2015          | 25.133  | 25.149   | 25.15  | 25.151 | 25.148 | 25.156 | 25.153 | 25.161 | 25.168    | 25.185  | 25.18    | 25.175   |
| 2016          | 25.193  | 25.18    | 25.181 | 25.173 | 25.153 | 25.226 | 25.198 | 25.309 | 25.079    | 23.786  | 23.604   | 24.243   |
| 2017          | 23.36   | 23.922   | 22.872 | 22.885 | 23.142 | 22.591 | 23.05  | 24.661 | 25.448    | 24.628  | 22.723   | 25.109   |
| 2018          | 25.116  | 21.832   | 23.543 | 22.825 | 24.078 | 23.809 | 25.563 | 25.767 | 25.02     | 25.863  | 23.447   | 25.324   |
| 2019          | 25.628  | 22.661   | 23.605 | 24.67  | 26.209 | 23.809 | 26.343 | 26.246 | 24.81     | 23.069  | 24.982   | -        |

## Annexure – V

### DETAILS OF 103 POLLUTING UNITS (INCLUDING CETP) AND DAMAGE RECOVERY COST

**Table No. 1**

| Sl.No | Item   | Details   |
|-------|--|---|
| 1.    | Name of Industry   | Aarti Drugs Ltd, G-60, MIDC Tarapur   |
| 2.    | Year of Establishment/Commissioning  | 01.10.1994  |
| 3.    | Product Type   | Bulk drug   |
| 4.    | Category   | Red   |
| 5.    | Scale  | LSI   |
| 6.    | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 119   |
| 7.    | Date of Inspection   | 05.09.2013  |
| 8.    | Date of Closure Order  | 15.10.2013  |
| 9.    | Effective date of Closure of the unit  | 18.10.2013  |
| 10.   | Unconditional re-start Order date  | NA  |
| 11.   | Conditional re-start order date  | 31.10.2013  |
| 12.   | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 15.5.2014   |
| 13.   | Period of non-compliance (no. of days)   | 44+197= 241   |
| 14.   | Reason for Closure/non-compliance  | 1 Increase water consumption<br>2. Discharge of Substandard quality effluent<br>3. Change of Fuel pattern<br>4. Flow meter not provided to ETP outlet |
| 15.   | Liable for Compensation  | Yes   |
| 16.   | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>45.786</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0028609</b> )   |
| 17.   | Date of Hearing  | 30.11.2019  |

**Table No. 2**

| Sl. No | Item                                | Details                                   |
|--------|-------------------------------------|---|
| 1.     | Name of Industry                    | Aarti Drugs Ltd, N-198, 199, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning | 01.04.1994                                |
| 3.     | Product Type                        | Bulk drug                                 |
| 4.     | Category                            | Red                                       |
| 5.     | Scale                               | LSI                                       |

|     |  |  |  |  |   |
|-----|--|--|--|--|---|
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 63.1   |  |  |   |
| 7.  | Date of Inspection   | 12.4.2012.   | 5.9.2013.  | 23.11.2016.  | 22.4.2017.  |
| 8.  | Date of Closure Order  | 16.05.2012   | 15.10.2013.  | 3.12.2016.   | 25.4.2017.  |
| 9.  | Effective date of Closure of the unit  | 19.5.2012  | 18.10.2013.  | 6.12.2016.   | 28.4.2017.  |
| 10. | Unconditional re-start Order date  | NA   |  |  |   |
| 11. | Conditional re-start order date  | 19.06.2012   | 13.11.2013.  | 3.2.2017.  | 18.5.2017.  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 4.9.2013   | 22.11.2016.  | 18.3.2017.   | 15.3.2018.  |
| 13. | Period of non-compliance (no. of days)   | 482  | 43+1107=1150<br>(First repeat violation)   | 14+44=58<br>(Second repeat violation)                      | 309<br>(Third repeat violation)   |
| 14. | Reason for Closure/non-compliance  | Not operating ETP properly, Discharge of Substandard quality effluent to CETP    | Discharge of Substandard quality effluent to CETP, Fuel alteration, Flow meter not provided. | Discharge of Substandard quality effluent to CETP COD-1520 | Discharge of Substandard quality effluent to CETP COD 28000, pH 5.1, SS 800 |
| 15. | Liable for Compensation  | Yes  |  |  |   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>1042.241 Lakh</b> INR (Distribution Recovery Cost Factor = <b>0.0651229</b> ) |  |  |   |
| 17. | Date of Hearing  | 30.11.2019   |  |  |   |

**Table No. 3**

| Sl. No | Item   | Details                               |            |
|--------|--|---------------------------------------|------------|
| 1.     | Name of Industry   | Aarti Drugs Ltd, E-21,22 MIDC Tarapur |            |
| 2.     | Year of Establishment/Commissioning                            | 01.04.1994                            |            |
| 3.     | Product Type   | Bulk drug                             |            |
| 4.     | Category   | Red                                   |            |
| 5.     | Scale  | LSI                                   |            |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 88.3                                  |            |
| 7.     | Date of Inspection   | 12.4.2012.                            | 5.9.2013.  |
| 8.     | Date of Closure Order  | 16.5.2012 Voluntary Closure Direction | 15.10.2013 |

|     |  |   |  |
|-----|--|---|--|
| 9.  | Effective date of Closure of the unit  | 18.10.2013<br>(no effective date of voluntary closure & not obtained conditional restart for same hence non-compliance period is consider from 12.4.2012 to 18.10.2013)   |  |
| 10  | Unconditional re-start Order date  | NA  |  |
| 11. | Conditional re-start order date  | Not obtain  | 21.11.2013.  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | ---   | 3.4.2014.  |
| 13. | Period of non-compliance (no. of days)   | 555   | 134 (First repeat violation)   |
| 14. | Reason for Closure/non-compliance  | Board Issued Voluntary Closure Direction towards discharge of substandard quality effluent to the CETP. As per the voluntary closure direction industry has not stopped manufacturing activity till effective next closure i.e.18.10.2013 | 1 Excess water consumption<br>2 Primary, Secondary not in operation, territory treatment bypass<br>3 Effluent bypass outside<br>4 Change in fuel<br>5 Bore well supply<br>6 Discharge of substandard effluent BOD -1375 & COD-3200 |
| 15. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | Yes   |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>156.355</b> Lakh INR (Distribution Recovery Cost Factor <b>0.0097696</b> )   |  |
| 17. | Date of Hearing  | 30.11.2019  |  |

**Table No. 4**

| Sl. No | Item  | Details                                  |
|--------|---|--|
| 1.     | Name of Industry  | Aarti Industries Ltd, E-50, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning   | 01.10.1994                               |
| 3.     | Product Type  | Bulk drug                                |
| 4.     | Category  | Red                                      |
| 5.     | Scale   | LSI                                      |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 119                                      |
| 7.     | Date of Inspection  | 05.09.2013                               |
| 8.     | Date of Closure Order   | 15.10.2013                               |
| 9.     | Effective date of Closure of the unit   | 18.10.2013                               |
| 10     | Unconditional re-start Order date   | NA                                       |
| 11.    | Conditional re-start order date   | 31.10.2013                               |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 15.5.2014                                |
| 13.    | Period of non-compliance (no. of days)  | 43+196=239                               |

|     |  |  |
|-----|--|--|
| 14. | Reason for Closure/non-compliance  | 1 Discharge of substandard quality effluent pH -3.4<br>2 Change of Fuel<br>3 Flow meter not provided |
| 15. | Liabe for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>45.406</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0028371</b> )                    |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 5**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Aarti Industries Ltd, K-17,18,19, Tarapur   |
| 2.     | Year of Establishment/Commissioning  | 1995  |
| 3.     | Product Type   | Bulk drug   |
| 4.     | Category   | Red   |
| 5.     | Scale  | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 318.4   |
| 7.     | Date of Inspection   | 05.09.2013  |
| 8.     | Date of Closure Order  | 15.10.2013  |
| 9.     | Effective date of Closure of the unit  | 18.10.2013  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 31.10.2013  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 15.5.2014   |
| 13.    | Period of non-compliance   | 44+196=240  |
| 14.    | Reason for Closure/non-compliance (no. of days)  | 1.Excess water consumption and discharge of excess quantity effluent<br>2 Discharge of Substandard quality effluent on 05.09.2013 |
| 15.    | Liabe for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>45.596</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0028490</b> )   |
| 17.    | Date of Hearing  | 30.11.2019  |

**Table No. 6**

| Sl. No | Item                                | Details                                     |
|--------|-------------------------------------|---|
| 1.     | Name of Industry                    | Aarti Industries Ltd, L-5,8,9 MIDC, Tarapur |
| 2.     | Year of Establishment/Commissioning | 1993  |
| 3.     | Product Type                        | Bulk drug                                   |
| 4.     | Category                            | Red   |
| 5.     | Scale                               | LSI   |

|     |  |  |
|-----|--|--|
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 20.0   |
| 7.  | Date of Inspection   | 23.11.2018   |
| 8.  | Date of Closure Order  | 3.12.2016  |
| 9.  | Effective date of Closure of the unit  | 6.12.2016  |
| 10. | Unconditional re-start Order date  | NA   |
| 11. | Conditional re-start order date  | 2.3.2017   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 9.10.2018  |
| 13. | Period of non-compliance (no. of days)   | 13+587=600   |
| 14. | Reason for Closure/non-compliance  | 1 High COD stream not segregation<br>2 Discharge of substandard quality effluent having COD – 840 mg/l |
| 15. | Liable for Compensation  | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>113.989</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0071225</b> )                     |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 7**

| Sl. No | Item  | Details   |
|--------|---|---|
| 1.     | Name of Industry  | Bombay Rayon Fashion Ltd, C-6,7, MIDC, Tarapur .  |
| 2.     | Year of Establishment/Commissioning   | 2011  |
| 3.     | Product Type  | Textile   |
| 4.     | Category  | Red   |
| 5.     | Scale   | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                    | 6000.0  |
| 7.     | Date of Inspection  | 5.10.2016.  |
| 8.     | Date of Closure Order   | 14.10.2016  |
| 9.     | Effective date of Closure of the unit   | 17.10.2016  |
| 10.    | Unconditional re-start Order date   | NA  |
| 11.    | Conditional re-start order date   | 27.10.2018.   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance   | 26.9.2019.  |
| 13.    | Period of non-compliance (no. of days)  | 13+335=348  |
| 14.    | Reason for Closure/non-compliance   | 1 Discharging substandard quality effluent<br>2 Ozonisation not in operation<br>3 Decanter not in operation<br>4 Poor operation and maintenance of ETP<br>5.Excess water consumption & excess effluent generation hampering performance of CETP |
| 15.    | Liable for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost | <b>66.114</b><br>Lakh INR (Distribution Recovery Cost Factor =  |

|     |                      |                   |
|-----|----------------------|-------------------|
|     | and restoration cost | <b>0.0041310)</b> |
| 17. | Date of Hearing      | 30.11.2019        |

**Table No. 8**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Siyaram Silk Mills (Balkrishna Synthetics), H-3/1, MIDC, Tarapur .   |
| 2.     | Year of Establishment/Commissioning  | 1981   |
| 3.     | Product Type   | Textile  |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 2000.0   |
| 7.     | Date of Inspection   | 6.9.2013.  |
| 8.     | Date of Closure Order  | 15.10.2013.  |
| 9.     | Effective date of Closure of the unit  | 18.10.2013.  |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 29.10.2013.  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 22.12.2014.  |
| 13.    | Period of non-compliance (no. of days)   | 43+420=463.  |
| 14.    | Reason for Closure/non-compliance  | <ol style="list-style-type: none"> <li>1) Operation &amp; Maintenance of ETP observed very poor i.e. Aeration tank has become spetic,</li> <li>2) Discharge of sub standard quality effluent to CETP .</li> <li>3) The final effluent has temp 45 C which shows the effluent just passing through ETP units without any treatment.</li> <li>4) final treated effluent is connected to MIDC CETP drainage by movable plastic pipeline having several leakages causing injury to environment.</li> <li>5) Changed fuel from coal to pet coke without prior permission of the Board, thereby leading to excess emission load to environment.</li> </ol> |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>87.962</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0054962)</b>   |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 9**

| Sl. No | Item   | Details  |  |
|--------|--|--|--|
| 1.     | Name of Industry   | Camlin Fine Chemicals, D-2/3, MIDC, Tarapur .                                      |  |
| 2.     | Year of Establishment/Commissioning  | 1984   |  |
| 3.     | Product Type   | Chemical   |  |
| 4.     | Category   | Red  |  |
| 5.     | Scale  | LSI  |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 20.0   |  |
| 7.     | Date of Inspection   | 16.05.2012   | 22.04.2017   |
| 8.     | Date of Closure Order  | 24.10.2013   | 25.04.2017   |
| 9.     | Effective date of Closure of the unit  | 27.10.2013   | 28.04.2017   |
| 10.    | Unconditional re-start Order date  | NA   |  |
| 11.    | Conditional re-start order date  | 11.01.2013   | 16.05.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 03.04.2014   | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 530+447=977  | 7+864=871 (First repeat violation)                                     |
| 14.    | Reason for Closure/non-compliance  | 1 Discharge effluent sub-standard COD-88400, SS-845                                | Discharge of substandard effluent to CETP COD 23200 mg/l & SS 385 mg/l |
| 15.    | Liabile for Compensation   | Yes  |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>516.561</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0322766</b> ) |  |
| 17.    | Date of Hearing  | 30.11.2019   |  |

**Table No. 10**

| Sl. No | Item  | Details   |  |
|--------|---|---|--|
| 1.     | Name of Industry  | M/s. Ciron Drugs & pharmaceutical Pvt. LTD. N - 113,118,119 & 119/2, MIDC, Tarapur. |  |
| 2.     | Year of Establishment/Commissioning   | 2009  |  |
| 3.     | Product Type  | Pharma  |  |
| 4.     | Category  | Orange  |  |
| 5.     | Scale   | LSI   |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 4.5   |  |
| 7.     | Date of Inspection  | 30.7.2018.  |  |
| 8.     | Date of Closure Order   | 8.8.2018.   |  |
| 9.     | Effective date of Closure of the unit   | 11.8.2018.  |  |
| 10.    | Unconditional re-start Order date   | NA  |  |
| 11.    | Conditional re-start order date   | 23.8.2018.  |  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 13.11.2018.   |  |

|     |  |   |
|-----|--|---|
| 13. | Period of non-compliance (no. of days)   | 96  |
| 14. | Reason for Closure/non-compliance  | 1 Discharge of substandard quality effluent having COD 396 mg/L<br>2 Swage treatment plant not provided for domestic effluent<br>4 Contaminated plastic bags disposal |
| 15. | Liabe for Compensation   | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>11.399</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0007122</b> )   |
| 17. | Date of Hearing  | 30.11.2019  |

**Table No. 11**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | M/s. Dicitex Home Furnishing Pvt. Ltd, G -7/1 & 7/2. MIDC, Tarapur.               |
| 2.     | Year of Establishment/Commissioning  | 2004  |
| 3.     | Product Type   | Textile   |
| 4.     | Category   | Red   |
| 5.     | Scale  | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 510.0   |
| 7.     | Date of Inspection   | 7.10.2017.  |
| 8.     | Date of Closure Order  | 6.2.2018.   |
| 9.     | Effective date of Closure of the unit  | 9.2.2018.   |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 13.3.2018.  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 17.12.2018.   |
| 13.    | Period of non-compliance (no. of days)   | 406   |
| 14.    | Reason for Closure/non-compliance  | Industry has failed to provide Multiple effective Evaporator.                     |
| 15.    | Liabe for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>77.133</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0048195</b> ) |
| 17.    | Date of Hearing  | 30.11.2019  |

**Table No. 12**

| Sl. No | Item                                | Details   |
|--------|-------------------------------------|---|
| 1.     | Name of Industry                    | M/s. Dicitex Furnishing Pvt. Ltd., G-58, MIDC, Tarapur. |
| 2.     | Year of Establishment/Commissioning | 2001  |
| 3.     | Product Type                        | Textile   |

|     |  |   |
|-----|--|---|
| 4.  | Category   | Red   |
| 5.  | Scale  | LSI   |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 880.0   |
| 7.  | Date of Inspection   | 6.8.2013.   |
| 8.  | Date of Closure Order  | 15.10.2013.   |
| 9.  | Effective date of Closure of the unit  | 18.10.2013.   |
| 10. | Unconditional re-start Order date  | NA  |
| 11. | Conditional re-start order date  | 29.10.2013  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 11.11.2013  |
| 13. | Period of non-compliance (no. of days)   | 75+14=89  |
| 14. | Reason for Closure/non-compliance  | <p>1. Industry has made bypass arrangement to discharge sub standard quality effluent having COD -292 mg/L to CETP which is also confirmed by the exceeding sample results.</p> <p>2. Primary clarifier is also not in use for long period as indicated by algal growth.</p> <p>The Sludge / Slurry arises during treatment of effluent is being discharge in the final chamber before MIDC drain leading to CETP, which hampers effective functioning of CETP.</p> <p>Coal consumption is more than consented quantity, thereby leading to excess emission load to environment at inadequate height.</p> |
| 15. | Liable for Compensation  | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <p><b>16.908</b><br/>Lakh INR (Distribution Recovery Cost Factor = <b>0.0010565</b>)</p>  |
| 17. | Date of Hearing  | 30.11.2019  |

**Table No. 13**

| Sl. No | Item   | Details                                       |
|--------|--|---|
| 1.     | Name of Industry   | DC Polyester Pvt Ltd, E--26/2, MIDC, Tarapur. |
| 2.     | Year of Establishment/Commissioning                            | 2000  |
| 3.     | Product Type   | Textile                                       |
| 4.     | Category   | Red   |
| 5.     | Scale  | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 300.0   |
| 7.     | Date of Inspection   | 6.9.2013.                                     |
| 8.     | Date of Closure Order  | 15.10.2013.                                   |
| 9.     | Effective date of Closure of the unit                          | 18.10.2013.                                   |
| 10.    | Unconditional re-start Order date                              | NA  |
| 11.    | Conditional re-start order date                                | 29.10.2013.                                   |
| 12.    | Date of inspection when the conditions at                      | 17.5.2014.                                    |

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|-----|--|---|
|     | Sl. No. 11 was verified as compliance  |   |
| 13. | Period of non-compliance (no. of days)   | 244   |
| 14. | Reason for Closure/non-compliance  | 1.Excess production without obtaining consent from MPC Board might be leading extra effluent load on CETP.<br>2. Discharge of Substandard quality effluent to CETP.<br>3. Hazardous waste not disposed within stipulated time.<br>4. Flow meter not provided to measure effluent discharge to CETP. |
| 15. | Liabe for Compensation   | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>46.356</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0028965</b> )   |
| 17. | Date of Hearing  | 30.11.2019  |

**Table No. 14**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | DC Textile, E--26/1, MIDC, Tarapur.   |
| 2.     | Year of Establishment/Commissioning  | 2012  |
| 3.     | Product Type   | Textile   |
| 4.     | Category   | Red   |
| 5.     | Scale  | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 95.0  |
| 7.     | Date of Inspection   | 7.4.2014.   |
| 8.     | Date of Closure Order  | 11.4.2014.  |
| 9.     | Effective date of Closure of the unit  | 14.4.2014.  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 26.5.2014.  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.5.2014.  |
| 13.    | Period of non-compliance (no. of days)   | 9   |
| 14.    | Reason for Closure/non-compliance  | 1.Discharge of substandard effluent having pH 9-10 bypassing ETP, Unscientific primary treatment, Secondary treatment not provided at ETP ,<br>2.Less generation of Hazardous waste compared to production and effluent quantity.<br>3. Increase in production & fuel consumption |
| 15.    | Liabe for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>1.710</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0001068</b> )  |
| 17.    | Date of Hearing  | 30.11.2019  |



**Table No. 15**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | JSW Steel Ltd, B-6, MIDC, Tarapur.   |
| 2.     | Year of Establishment/Commissioning  | 1989   |
| 3.     | Product Type   | Steel (Engineering)  |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 603.   |
| 7.     | Date of Inspection   | 3.8.2011.  |
| 8.     | Date of Closure Order  | 21.12.2011.  |
| 9.     | Effective date of Closure of the unit  | 21.12.2011.  |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 23.12.2011.  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 23.8.2013.   |
| 13.    | Period of non-compliance (no. of days)   | 744  |
| 14.    | Reason for Closure/non-compliance  | Non-Provision of Multiple effective evaporator .                                   |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>141.347</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0088318</b> ) |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 16**

| Sl. No | Item  | Details  |   |
|--------|---|--|---|
| 1.     | Name of Industry  | M/s Kriplon Synthetics pvt Ltd., N -97/1/2,97,98, MIDC, Tarapur. |   |
| 2.     | Year of Establishment/Commissioning   | 2008   |   |
| 3.     | Product Type  | Textile  |   |
| 4.     | Category  | Red  |   |
| 5.     | Scale   | LSI  |   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 497.0  |   |
| 7.     | Date of Inspection  | 28.11.2016.  | 2.2.2018.   |
| 8.     | Date of Closure Order   | 3.12.2016.   | 2.2.2018.   |
| 9.     | Effective date of Closure of the unit   | 6.12.2016.   | 5.2.2018.   |
| 10.    | Unconditional re-start Order date   | NA   |   |
| 11.    | Conditional re-start order date   | 25.1.2017  | 21.2.2018   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 1.2.2018   | 11.7.2018   |
| 13.    | Period of non-compliance (no. of days)  | 9+373=382  | 3+141=144 (First repeat violation)                          |
| 14.    | Reason for Closure/non-compliance   | 1. Discharge of substandard quality effluent to CETP             | 1. Not provided providing of Multiple effective evaporator. |

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|-----|--|--|
| 15. | Liabe for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>127.288</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0079534</b> ) |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 17**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Mandhana Dyeing, E -25, MIDC, Tarapur.  |
| 2.     | Year of Establishment/Commissioning  | 1995  |
| 3.     | Product Type   | Textile   |
| 4.     | Category   | Red   |
| 5.     | Scale  | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 900.0   |
| 7.     | Date of Inspection   | 11.5.2017.  |
| 8.     | Date of Closure Order  | 17.5.2017.  |
| 9.     | Effective date of Closure of the unit  | 20.5.2017.  |
| 10     | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | copy not available. Industry also failed to submit.   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | Closure was issued for discharge of substandard quality effluent . Sample of 27.06.2017 meeting consented stadards. |
| 13.    | Period of non-compliance (no. of days)   | 77.   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD 1016 mg/L  |
| 15.    | Liabe for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>14.629</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0009140</b> )                                   |
| 17.    | Date of Hearing  | 30.11.2019  |

**Table No. 18**

| Sl. No | Item   | Details  |            |
|--------|--|--|------------|
| 1.     | Name of Industry   | E-Land Fashion (Mudra Life Style), D-1, MIDC, Tarapur. |            |
| 2.     | Year of Establishment/Commissioning                            | 2008   |            |
| 3.     | Product Type   | Textile  |            |
| 4.     | Category   | Red  |            |
| 5.     | Scale  | LSI  |            |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 115.0  |            |
| 7.     | Date of Inspection   | 12.4.2016.   | 12.5.2017. |
| 8.     | Date of Closure Order  | 14.10.2016.  | 17.5.2017. |
| 9.     | Effective date of Closure of the unit                          | 17.10.2016.  | 20.5.2017. |
| 10     | Unconditional re-start Order date                              | NA   |            |

|     |  |  |   |
|-----|--|--|---|
| 11. | Conditional re-start order date  | 28.10.2016.  | 23.6.2017.  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 12.5.2017.   | 1.12.2018.  |
| 13. | Period of non-compliance (no. of days)   | 386  | 567 (First repeat violation)  |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent to CETP having COD-828 mg/L, SS-142 mg/L         | Discharge of substandard effluent to CETP having COD 976 mg/L SS 125 mg/l |
| 15. | Liable for Compensation  | Yes  |   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>288.772</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0180435</b> ) |   |
| 17. | Date of Hearing  | 30.11.2019   |   |

**Table No. 19**

| Sl. No | Item   | Details   |  |
|--------|--|---|--|
| 1.     | Name of Industry   | Nipur Chemical, D -17, MIDC, Tarapur.   |  |
| 2.     | Year of Establishment/Commissioning  | 1980  |  |
| 3.     | Product Type   | Chemical  |  |
| 4.     | Category   | Red   |  |
| 5.     | Scale  | LSI   |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 120.0   |  |
| 7.     | Date of Inspection   | 9.7.2017.   |  |
| 8.     | Date of Closure Order  | 21.7.2017.  |  |
| 9.     | Effective date of Closure of the unit  | 24.7.2017.  |  |
| 10.    | Unconditional re-start Order date  | NA  |  |
| 11.    | Conditional re-start order date  | 28.8.2017.  |  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.10.2017.   |  |
| 13.    | Period of non-compliance (no. of days)   | 76  |  |
| 14.    | Reason for Closure/non-compliance  | 1 Scrubber not provided at loading & unloading<br>2 Seepages/ Leakages of acid from gamma acid plant having COD 440 mg/L causing injury to environment<br>3 SVS section scrubber not working. |  |
| 15.    | Liable for Compensation  | Yes   |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>14.439</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0009022</b> )   |  |
| 17.    | Date of Hearing  | 30.11.2019  |  |

**Table No. 20**

| Sl. No | Item             | Details                                       |  |
|--------|------------------|---|--|
| 1.     | Name of Industry | Manan Costyn Pvt Ltd, G -4/2,, MIDC, Tarapur. |  |

|     |  |   |  |
|-----|--|---|--|
| 2.  | Year of Establishment/Commissioning  | 2012  |  |
| 3.  | Product Type   | Textile   |  |
| 4.  | Category   | Red   |  |
| 5.  | Scale  | LSI   |  |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 225.0   |  |
| 7.  | Date of Inspection   | 27.12.2012.   | 11.9.2013.   |
| 8.  | Date of Closure Order  | 10.1.2013.  | 15.10.2013.  |
| 9.  | Effective date of Closure of the unit  | 13.1.2013.  | 18.10.2013.  |
| 10. | Unconditional re-start Order date  | NA  |  |
| 11. | Conditional re-start order date  | 31.12.2013.   | 31.12.2013.  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 31.12.2013.   | 9.7.2017.  |
| 13. | Period of non-compliance (no. of days)   | 19  | 1325 (First repeat violation)  |
| 14. | Reason for Closure/non-compliance  | Zero liquid discharge not provided , use of tanker water , Discharge of substandard quality effluent. | ETP not in operation, Made bypass arrangement for discharge of substandard quality effluent, Zero liquid discharge not provided . use of tanker water ,. |
| 15. | Liable for Compensation  | Yes   |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>507.062</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0316830</b> )                    |  |
| 17. | Date of Hearing  | 30.11.2019  |  |

**Table No. 21**

| Sl. No | Item  | Details   |                                      |
|--------|---|---|--------------------------------------|
| 1.     | Name of Industry  | Resonance Speciality Ltd. T-140, MIDC, Tarapur. |                                      |
| 2.     | Year of Establishment/Commissioning   | 1992  |                                      |
| 3.     | Product Type  | Chemical  |                                      |
| 4.     | Category  | Red   |                                      |
| 5.     | Scale   | SSI   |                                      |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 12.0  |                                      |
| 7.     | Date of Inspection  | 12.9.2013.                                      | 13.2.2018.                           |
| 8.     | Date of Closure Order   | 15.10.2013.                                     | 18.4.2018.                           |
| 9.     | Effective date of Closure of the unit   | 18.10.2013.                                     | 21.4.2018.                           |
| 10.    | Unconditional re-start Order date   | NA  |                                      |
| 11.    | Conditional re-start order date   | 7.11.2013                                       | 8.5.2018.                            |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 12.2.2018                                       | 26.9.2019                            |
| 13.    | Period of non-compliance (no. of days)  | 37+1559 = 1596                                  | 67+507 =574 (First repeat violation) |

|     |  |  |  |
|-----|--|--|--|
| 14. | Reason for Closure/non-compliance  | <p>1) manufacturing unauthorized products.</p> <p>2) Effluent treatment plant corroded and dismantled condition indicating, non operation of ETP, thereby leading to sub standard quality effluent discharge to CETP.</p> <p>3) using pet coke as fuel without prior permission of the Board, thereby leading to excess emission load to environment at inadequate height.</p> <p>4) The distillation residue is unscientifically stored and is burnt in the industrial premises leading to emission of harmful emissions and causing grave injury to the environment</p> <p>5) The smell of ammonia gas is felt all over the industrial premises, indicating non provision of ammonia scrubbing system.</p> | <p>1. Install R &amp; D facility without obtaining consent from Board.</p> <p>2. About 10 MT Distillation residue illegally stored in factory premises.</p> <p>3. Increased fuel quantity ,</p> <p>4. Analysis reports of sample collected on 12.07.2017 indicate substandard quality effluent having COD-3536, TDS – 4682 mg/L which is affecting performance of CETP ,</p> |
| 15. | Liabile for Compensation   | Yes  |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <p><b>173.770</b><br/>Lakh INR (Distribution Recovery Cost Factor = <b>0.0108578</b>)</p>  |  |
| 17. | Date of Hearing  | 30.11.2019   |  |

**Table No. 22**

| Sl. No | Item   | Details   |            |
|--------|--|---|------------|
| 1.     | Name of Industry   | Silvester Textiles P. Ltd., E-24,, MIDC, Tarapur. |            |
| 2.     | Year of Establishment/Commissioning                            | 1993  |            |
| 3.     | Product Type   | Textile   |            |
| 4.     | Category   | Red   |            |
| 5.     | Scale  | LSI   |            |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 410.0   |            |
| 7.     | Date of Inspection   | 4.9.2013.   | 9.7.2017.  |
| 8.     | Date of Closure Order  | 15.10.2013.                                       | 21.7.2017. |

|     |  |  |   |
|-----|--|--|---|
| 9.  | Effective date of Closure of the unit  | 18.10.2013.  | 24.7.2017.  |
| 10  | Unconditional re-start Order date  | NA   |   |
| 11. | Conditional re-start order date  | 29.10.2013.  | 18.8.2017.  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 30.6.2014.   | 27.7.2018.  |
| 13. | Period of non-compliance (no. of days)   | 290  | 360. (First repeat violation)                                       |
| 14. | Reason for Closure/non-compliance  | Operating without valid consent applied for renewal<br>2 Secondary treatment Not provided at ETP<br>3 Poor operation and maintenance ETP<br>4 sub standard quality effluent discharge to CETP.<br>5 Flow mtr. Not provided | sub standard quality effluent discharge to CETP having COD 432 mg/L |
| 15. | Liable for Compensation  | Yes  |   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>191.882</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0119895</b> )   |   |
| 17. | Date of Hearing  | 30.11.2019   |   |

**Table No. 23**

| Sl. No | Item   | Details   |  |
|--------|--|---|--|
| 1.     | Name of Industry   | Sarex Overseas, N-129, 130, 131, 132, MIDC, Tarapur.                                  |  |
| 2.     | Year of Establishment/Commissioning  | 1992  |  |
| 3.     | Product Type   | Chemical  |  |
| 4.     | Category   | Red   |  |
| 5.     | Scale  | LSI   |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 400.0   |  |
| 7.     | Date of Inspection   | 9.7.2017.   |  |
| 8.     | Date of Closure Order  | 21.7.2017.  |  |
| 9.     | Effective date of Closure of the unit  | 24.7.2017.  |  |
| 10     | Unconditional re-start Order date  | NA  |  |
| 11.    | Conditional re-start order date  | 28.7.2017.  |  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.9.2019.  |  |
| 13.    | Period of non-compliance (no. of days)   | 809.  |  |
| 14.    | Reason for Closure/non-compliance  | Operating without valid consent ,substandard effluent discharge having COD 432 mg/L . |  |
| 15.    | Liable for Compensation  | Yes   |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>153.695</b><br>Lakh INR (Distribution Recovery Cost Factor =                       |  |

|     |                 |                   |
|-----|-----------------|-------------------|
|     |                 | <b>0.0096034)</b> |
| 17. | Date of Hearing | 30.11.2019        |

**Table No. 24**

| Sl. No | Item   | Details  |  |
|--------|--|--|--|
| 1.     | Name of Industry   | Zeus International Ltd ,A-10 & 11, MIDC, Tarapur.                                  |  |
| 2.     | Year of Establishment/Commissioning  | 2009   |  |
| 3.     | Product Type   | Chemical   |  |
| 4.     | Category   | Red  |  |
| 5.     | Scale  | LSI  |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 400.0  |  |
| 7.     | Date of Inspection   | 11.10.2012   | 16.1.2017.   |
| 8.     | Date of Closure Order  | 24.5.2013  | 14.2.2017.   |
| 9.     | Effective date of Closure of the unit  | 27.5.2013.   | 17.3.2017.   |
| 10     | Unconditional re-start Order date  | NA   |  |
| 11.    | Conditional re-start order date  | 7.11.2013.   | 9.5.2017.  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 15.1.2017  | 26.9.2019  |
| 13.    | Period of non-compliance (no. of days)   | 229+1166 =1396   | 61+871 = 932 (First repeat violation)  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent to CETP  | Discharge of substandard effluent to CETP on following days,16.1.2017-COD- 504 mg/L<br>17.1.2017-COD -252 mg/l |
| 15.    | Liable for Compensation  | Yes  |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>619.341</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0386986</b> ) |  |
| 17.    | Date of Hearing  | 30.11.2019   |  |

**Table No. 25**

| Sl. No | Item   | Details  |             |
|--------|--|--|-------------|
| 1.     | Name of Industry   | Valiant Glass Pvt Ltd, , J-85 , MIDC, Tarapur. |             |
| 2.     | Year of Establishment/Commissioning                            | 2001   |             |
| 3.     | Product Type   | Textile  |             |
| 4.     | Category   | Red  |             |
| 5.     | Scale  | LSI  |             |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 2000.0   |             |
| 7.     | Date of Inspection   | 11.9.2013.                                     | 1.12.2018.  |
| 8.     | Date of Closure Order  | 15.10.2013.                                    | 24.12.2018. |
| 9.     | Effective date of Closure of the unit                          | 18.10.2013.                                    | 27.12.2018. |
| 10     | Unconditional re-start Order date                              | NA   |             |

|     |  |   |   |
|-----|--|---|---|
| 11. | Conditional re-start order date  | 28.10.2013.   | 2.1.2019.   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 13.8.2014.  | 12.4.2019.  |
| 13. | Period of non-compliance (no. of days)   | 327.  | 126 (First repeat violation)  |
| 14. | Reason for Closure/non-compliance  | 1 Not Provided<br>Secondary treatment<br>2 Use of Pet coke<br>3 Flow mtr not provided<br>4 STP not provided<br>discharge of substandard quality effluent having COD 1400 mg/L . | 1.Discharge of substandard quality effluent having COD 496<br>2.STP not provided. |
| 15. | Liable for Compensation  | Yes   |   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>110.000</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0068732</b> )  |   |
| 17. | Date of Hearing  | 30.11.2019  |   |

**Table No. 26**

| Sl. No | Item  | Details  |
|--------|---|--|
| 1.     | Name of Industry  | Aarti Drugs Ltd, E-9/3-4, MIDC, Tarapur.   |
| 2.     | Year of Establishment/Commissioning   | 1983   |
| 3.     | Product Type  | Bulk Drugs.  |
| 4.     | Category  | Red  |
| 5.     | Scale   | MSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 30.0   |
| 7.     | Date of Inspection  | 12.9.2013.   |
| 8.     | Date of Closure Order   | 15.10.2013.  |
| 9.     | Effective date of Closure of the unit   | 18.10.2013.  |
| 10.    | Unconditional re-start Order date   | NA   |
| 11.    | Conditional re-start order date   | 31.10.2013.  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 29.10.2013.  |
| 13.    | Period of non-compliance (no. of days)  | 38.  |
| 14.    | Reason for Closure/non-compliance   | 1) The ETP especially secondary & tertiary treatment was not found in operation, thereby leading to sub standard discharge of effluent quality to CETP<br>2) The provision of By-pass arrangement, thereby leading to sub standard discharge of effluent quality to CETP<br>3) The high COD stream is not disposed off properly ,thereby hampering operation of CETP.<br>4) disposing waste solvent in an unauthorized manner.<br>5) increased production of 2 Phenoxy Sulphonamide more than consented quantity without obtaining Environment clearance & consent from the Board. |

|     |  |  |
|-----|--|--|
|     |  | 6) Change of fuel from Briquette to coal without prior permission of the Board, thereby leading to excess emission load to environment at inadequate height. |
| 15. | Liabile for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>4.813</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0003007</b> )   |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 27**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Jakharia Textile, A-13, MIDC Tarapur   |
| 2.     | Year of Establishment/Commissioning  | 2011   |
| 3.     | Product Type   | Textile  |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 378  |
| 7.     | Date of Inspection   | 03.09.2013   |
| 8.     | Date of Closure Order  | 15.10.2013   |
| 9.     | Effective date of Closure of the unit  | 18.10.2013   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 29.10.2013   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 28.04.2017   |
| 13.    | Period of non-compliance (no. of days)   | 46+1278 = <b>1324</b>  |
| 14.    | Reason for Closure/non-compliance  | 1 Production more than consented<br>2 Discharge of untreated effluent outside premises<br>3 Flow meter not provided to measure effluent discharge quantity |
| 15.    | Liabile for Compensation   | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>251.536</b> Lakh INR (Distribution Recovery Cost Factor = <b>0.0157169</b> )  |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 28**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Pal Fashions Pvt Ltd, E-49 & E-49/2, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning                            | 1982  |
| 3.     | Product Type   | Textile   |
| 4.     | Category   | Red   |
| 5.     | Scale  | MSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 500   |

|     |  |   |
|-----|--|---|
| 7.  | Date of Inspection   | 13.09.2013  |
| 8.  | Date of Closure Order  | 15.10.2013  |
| 9.  | Effective date of Closure of the unit  | 18.10.2013  |
| 10  | Unconditional re-start Order date  | NA  |
| 11. | Conditional re-start order date  | 29.10.2013  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 17.11.2015  |
| 13. | Period of non-compliance (no. of days)   | 36+750= <b>786</b>  |
| 14. | Reason for Closure/non-compliance  | 1 Excess water consumption<br>2 Discharge of substandard quality effluent<br>3 No secondary treatment<br>4 40% water consumption not curtail<br>5 Hazardous waste quantity exceeds consented limit<br>6 Online monitoring system not provided |
| 15. | Liabe for Compensation   | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>99.551</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0062203</b> )   |
| 17. | Date of Hearing  | 30.11.2019  |

**Table No. 29**

| Sl. No | Item  | Details  |  |
|--------|---|--|--|
| 1.     | Name of Industry  | SD Fine Chemicals, E-27/28, MIDC Tarapur   |  |
| 2.     | Year of Establishment/Commissioning   | 1978   |  |
| 3.     | Product Type  | Chemicals  |  |
| 4.     | Category  | Red  |  |
| 5.     | Scale   | MSI  |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 16   |  |
| 7.     | Date of Inspection  | 12.09.2013   | 28.07.2018   |
| 8.     | Date of Closure Order   | 15.10.2013   | 08.08.2018   |
| 9.     | Effective date of Closure of the unit   | 18.10.2013   | 11.08.2018   |
| 10     | Unconditional re-start Order date   | NA   | NA   |
| 11.    | Conditional re-start order date   | 29.10.2013   | 23.08.2018   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 27.7.2018  | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)  | 37+1733 =1770  | 15+400 =415 (First repeat violation)   |
| 14.    | Reason for Closure/non-compliance   | Production more than consented quantity and discharge of substandard quality effluent to CETP , not provided flow meters | unconsented product, discharge of substandard quality effluent to CETP COD 408 mg/l , SS 119 mg/L , storage of out dated chemicals in premises . |
| 15.    | Liabe for Compensation  | Yes  |  |
| 16.    | Accountability in terms of recovery cost in                                     | <b>329.302</b> Lakh INR (Distribution Recovery Cost Factor =   |  |

|     |  |                   |
|-----|--|-------------------|
|     | meeting the environmental damage cost and restoration cost | <b>0.0205760)</b> |
| 17. | Date of Hearing  | 30.11.2019        |

**Table No. 30**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Iraa Clothing (P) Ltd (Shagun Clothing P Ltd), B- 7/3, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning  | 2016   |
| 3.     | Product Type   | Textile  |
| 4.     | Category   | Red  |
| 5.     | Scale  | MSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 180  |
| 7.     | Date of Inspection   | 16.01.2017   |
| 8.     | Date of Closure Order  | 14.02.2017   |
| 9.     | Effective date of Closure of the unit  | 17.02.2017   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 21.06.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 17+828= <b>845</b>   |
| 14.    | Reason for Closure/non-compliance  | discharge of Substandard quality effluent having – COD 2840 mg/L (industry dain which leads to MIDC drain & by pass – 1136 mg/L ( both samples collected on 16.1.2017) |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>107.023</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0066872)</b>  |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 31**

| Sl. No | Item   | Details                                    |            |
|--------|--|--|------------|
| 1.     | Name of Industry   | Auro Laboratories Ltd , K-56, MIDC Tarapur |            |
| 2.     | Year of Establishment/Commissioning                            | 1992                                       |            |
| 3.     | Product Type   | Bulk Durgs                                 |            |
| 4.     | Category   | Red  |            |
| 5.     | Scale  | MSI  |            |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 19   |            |
| 7.     | Date of Inspection   | 03.06.2016                                 | 28.07.2017 |
| 8.     | Date of Closure Order  | 28.07.2016                                 | 08.08.2018 |
| 9.     | Effective date of Closure of the unit                          | 31.07.2016                                 | 11.08.2018 |
| 10.    | Unconditional re-start Order date                              | NA   | NA         |
| 11.    | Conditional re-start order date                                | 17.05.2017                                 | 07.01.2019 |

|     |  |   |  |
|-----|--|---|--|
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 27.7.2017   | 26.09.2019   |
| 13. | Period of non-compliance (no. of days)   | 59+72 =131  | 380+263 =643(First repeat violation)   |
| 14. | Reason for Closure/non-compliance  | 1 ETP not in operation<br>2 Using storm water drain to carry effluent<br>3 Generating mother liquor but not shown is consent<br>4 HW stored near ETP unscientifically | 1. Discharge of substandard quality effluent having COD 70000 mg/L<br>2. ETP not operational |
| 15. | Liable for Compensation  | Yes   |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>179.470</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0112139</b> )  |  |
| 17. | Date of Hearing  | 02.12.2019  |  |

**Table No. 32**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Abhilasha Texchem Pvt Ltd, M-7, MIDC Tarapur                                  |
| 2.     | Year of Establishment/Commissioning  | 1996  |
| 3.     | Product Type   | Textile   |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 6   |
| 7.     | Date of Inspection   | 10.11.2016  |
| 8.     | Date of Closure Order  | 29.11.2016  |
| 9.     | Effective date of Closure of the unit  | 02.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 15.02.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 10.04.2017  |
| 13.    | Period of non-compliance (no. of days)   | 23+55= <b>78</b>  |
| 14.    | Reason for Closure/non-compliance  | Zero liquid discharge not provided  |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>4.940</b> Lakh INR (Distribution Recovery Cost Factor = <b>0.0003086</b> ) |
| 17.    | Date of Hearing  | 02.12.2019  |

**Table No. 33**

| Sl. No | Item   | Details   |  |
|--------|--|---|--|
| 1.     | Name of Industry   | Alexo Chemicals, N-174, MIDC Tarapur                            |  |
| 2.     | Year of Establishment/Commissioning  | 2011  |  |
| 3.     | Product Type   | Chemicals   |  |
| 4.     | Category   | Red   |  |
| 5.     | Scale  | SSI   |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.7   |  |
| 7.     | Date of Inspection   | 28.11.2016  | 26.07.2018   |
| 8.     | Date of Closure Order  | 03.12.2016  | 08.08.2018   |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  | 11.08.2018   |
| 10.    | Unconditional re-start Order date  | NA  | NA   |
| 11.    | Conditional re-start order date  | 17/03/2017  | 08.10.2018   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 07.06.2017  | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 92  | 371 (First repeat violation)   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD 32000 mg/l | Direct discharge of substandard effluent having COD – 70400 Mg/L, BOD – 23000 mg/L |
| 15.    | Liable for Compensation  | Yes   |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | 52.815 Lakh INR (Distribution Recovery Cost Factor = 0.0033001) |  |
| 17.    | Date of Hearing  | 02.12.2019  |  |

**Table No. 34**

| Sl. No | Item  | Details                                      |                                    |
|--------|---|--|------------------------------------|
| 1.     | Name of Industry  | Ashwin Synthetics P Ltd, C-8/2, MIDC Tarapur |                                    |
| 2.     | Year of Establishment/Commissioning   | 1989   |                                    |
| 3.     | Product Type  | Chemicals                                    |                                    |
| 4.     | Category  | Red  |                                    |
| 5.     | Scale   | SSI  |                                    |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 30   |                                    |
| 7.     | Date of Inspection  | 15.12.2016                                   | 30.08.2018                         |
| 8.     | Date of Closure Order   | 15.12.2016                                   | 30.08.2018                         |
| 9.     | Effective date of Closure of the unit   | 18.12.2016                                   | 02.09.2018                         |
| 10.    | Unconditional re-start Order date   | NA   | NA                                 |
| 11.    | Conditional re-start order date   | 16.06.2017                                   | 19.06.2019                         |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 29.08.2018                                   | 26.09.2019                         |
| 13.    | Period of non-compliance (no. of days)  | 4+400=444                                    | 3+100=103 (First repeat violation) |

|     |  |   |   |
|-----|--|---|---|
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent to CETP   | <ul style="list-style-type: none"> <li>• Violation of voluntary closure direction</li> <li>• Jeans washing activity without permission</li> <li>• Direct discharge in nalla</li> <li>• Using unauthorized water (tanker)</li> <li>• Not disposing Hazardous waste to Common disposal facility i.e. CHWTSDF</li> </ul> |
| 15. | Liable for Compensation  | Yes   |   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>41.163</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0025720</b> ) |   |
| 17. | Date of Hearing  | 02.12.2019  |   |

**Table No. 35**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Accusynth Speciality Chemical, E-29/1-2, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning  | 2007   |
| 3.     | Product Type   | Chemical   |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 2.5  |
| 7.     | Date of Inspection   | 05.01.2018   |
| 8.     | Date of Closure Order  | 12.01.2018   |
| 9.     | Effective date of Closure of the unit  | 15.01.2018   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 04.05.2018   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 11+511= <b>522</b>   |
| 14.    | Reason for Closure/non-compliance  | <ul style="list-style-type: none"> <li>• Increase water consumption</li> <li>• Violation of environment clearance</li> <li>• Exceeding fuel consumption</li> <li>• Illegal transportation of spent acid</li> <li>• Not disposing hazardous waste timely</li> </ul> |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>33.057</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0020655</b> )  |
| 17.    | Date of Hearing  | 02.12.2019   |

**Table No. 36**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Ajmera Organics, N-211/2/1, MIDC Tarapur   |
| 2.     | Year of Establishment/Commissioning  | 2017   |
| 3.     | Product Type   | Chemical   |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 6  |
| 7.     | Date of Inspection   | 14.08.2018   |
| 8.     | Date of Closure Order  | 03.09.2018   |
| 9.     | Effective date of Closure of the unit  | 06.09.2018   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | Till date not applied restart  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 03.09.2018   |
| 13.    | Period of non-compliance (no. of days)   | 24   |
| 14.    | Reason for Closure/non-compliance  | <ul style="list-style-type: none"> <li>• Discharge of substandard quality effluent having pH 3.5</li> <li>• Not provided positive discharge</li> </ul> |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>1.520</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0000950</b> )   |
| 17.    | Date of Hearing  | 02.12.2019   |

**Table No. 37**

| Sl. No | Item  | Details  |
|--------|---|--|
| 1.     | Name of Industry  | Aarey Drugs & Pharmaceuticals Ltd, E-34, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning   | 2012   |
| 3.     | Product Type  | Drug intermediate  |
| 4.     | Category  | Red  |
| 5.     | Scale   | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 40   |
| 7.     | Date of Inspection  | 05.02.2018   |
| 8.     | Date of Closure Order   | 27.02.2018   |
| 9.     | Effective date of Closure of the unit   | 02.03.2018   |
| 10.    | Unconditional re-start Order date   | NA   |
| 11.    | Conditional re-start order date   | Till date not applied restart  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 27.02.2018   |
| 13.    | Period of non-compliance (no. of days)  | <b>25</b>  |
| 14.    | Reason for Closure/non-compliance   | Discharge of substandard effluent having COD – 20480<br><ul style="list-style-type: none"> <li>• Unconsented production</li> </ul> |

|     |  |  |
|-----|--|--|
|     |  | • Not provided full-fledged ETP  |
| 15. | Liable for Compensation  | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>1.583</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0000989</b> ) |
| 17. | Date of Hearing  | 02.12.2019   |

**Table No. 38**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Aradhana Energy Pvt Ltd, K-34, MIDC Tarapur                                       |
| 2.     | Year of Establishment/Commissioning  | 2015  |
| 3.     | Product Type   | Chemicals   |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 00  |
| 7.     | Date of Inspection   | 20.01.2019  |
| 8.     | Date of Closure Order  | 12.03.2019  |
| 9.     | Effective date of Closure of the unit  | 15.03.2019  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 04.04.2019  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 04.01.2020  |
| 13.    | Period of non-compliance (no. of days)   | 54+275= <b>329</b>  |
| 14.    | Reason for Closure/non-compliance  | Unconsented / Production without Environment clearance                            |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>20.835</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0013018</b> ) |
| 17.    | Date of Hearing  | 02.12.2019  |

**Table No. 39**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Bajaj Health Care Ltd, N-216, N-217, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning                            | 1994  |
| 3.     | Product Type   | Drug Intermediate                                 |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 1.3   |
| 7.     | Date of Inspection   | 12.4.2012                      05.09.2013         |
| 8.     | Date of Closure Order  | 16.05.2012                      15.10.2013        |
| 9.     | Effective date of Closure of the unit                          | 19.05.2012                      18.10.2013        |

|     |  |   |  |
|-----|--|---|--|
| 10. | Unconditional re-start Order date  | NA  | NA   |
| 11. | Conditional re-start order date  | 19.06.2012  | 30.10.2013   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 4.09.2019   | 15.03.2014   |
| 13. | Period of non-compliance (no. of days)   | 38+443= 481   | 44+133 =177 (First repeat violation)   |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent to CETP   | 1. Manufacturing unconsented products.<br>2. Inadequate ETP, Discharge of substandard effluent to CETP |
| 15. | Liable for Compensation  | Yes   |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>52.878</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0033040</b> ) |  |
| 17. | Date of Hearing  | 02.12.2019  |  |

**Table No. 40**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Bostan Pharma, E-84, MIDC Tarapur   |
| 2.     | Year of Establishment/Commissioning  | 2000  |
| 3.     | Product Type   | Chemicals   |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.2   |
| 7.     | Date of Inspection   | 10.01.2017  |
| 8.     | Date of Closure Order  | 14.02.2017  |
| 9.     | Effective date of Closure of the unit  | 17.02.2017  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 14.07.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 05.01.2019  |
| 13.    | Period of non-compliance (no. of days)   | 39+541= <b>580</b>  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent to CETP , COD 18080 mg/L                        |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>36.730</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0022950</b> ) |
| 17.    | Date of Hearing  | 02.12.2019  |

**Table No. 41**

| Sl. No | Item             | Details   |
|--------|------------------|---|
| 1.     | Name of Industry | Panchamrut Chemical Pvt Ltd (Dragon Drugs Pvt Ltd), |

|     |  |   |
|-----|--|---|
|     |  | N-76, MIDC Tarapur  |
| 2.  | Year of Establishment/Commissioning  | 2012  |
| 3.  | Product Type   | Chemicals   |
| 4.  | Category   | Red   |
| 5.  | Scale  | SSI   |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 20  |
| 7.  | Date of Inspection   | 26.07.2018  |
| 8.  | Date of Closure Order  | 08.08.2018  |
| 9.  | Effective date of Closure of the unit  | 11.08.2018  |
| 10. | Unconditional re-start Order date  | NA  |
| 11. | Conditional re-start order date  | 17.03.2017 & 24.08.2018   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 04.01.2019  |
| 13. | Period of non-compliance (no. of days)   | 17+659= <b>676</b>  |
| 14. | Reason for Closure/non-compliance  | <ul style="list-style-type: none"> <li>• No segregation of High COD-37600</li> <li>• Trade effluent discharge in nalla bypassing ETP</li> <li>• ETP tampering by filling fresh water</li> </ul> |
| 15. | Liable for Compensation  | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>42.809</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0026749</b> )   |
| 17. | Date of Hearing  | 03.12.2019  |

**Table No. 42**

| Sl. No | Item  | Details  |
|--------|---|--|
| 1.     | Name of Industry  | Diakaffil Chemicals, E-4, MIDC Tarapur   |
| 2.     | Year of Establishment/Commissioning   | 1987   |
| 3.     | Product Type  | Chemicals  |
| 4.     | Category  | Red  |
| 5.     | Scale   | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 1  |
| 7.     | Date of Inspection  | 12.09.2013   |
| 8.     | Date of Closure Order   | 15.10.2013   |
| 9.     | Effective date of Closure of the unit   | 18.10.2013   |
| 10.    | Unconditional re-start Order date   | NA   |
| 11.    | Conditional re-start order date   | 01.11.2013   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 21.07.2014   |
| 13.    | Period of non-compliance (no. of days)  | 37+263= <b>300</b>   |
| 14.    | Reason for Closure/non-compliance   | 1) Only primary treatment provided<br>2) Not segregated high COD stream<br>3) Effluent generation from the process is more<br>4) Producing excess production without valid consent ie from 20 MT/M to 146 MT/M also taking crude and dilution products |

|     |  |  |
|-----|--|--|
|     |  | 5)ETP sludge is not disposed in last one year<br>6) Coal consumption is also excess than consented quantity<br>7) Flow meter is not provided |
| 15. | Liabe for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>18.998</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0011871</b> )  |
| 17. | Date of Hearing  | 02.12.2019   |

**Table No. 43**

| Sl. No | Item   | Details   |  |
|--------|--|---|--|
| 1.     | Name of Industry   | DRV Organics, N-184, N-185, MIDC Tarapur  |  |
| 2.     | Year of Establishment/Commissioning  | 1990  |  |
| 3.     | Product Type   | Drug Intermediate   |  |
| 4.     | Category   | Red   |  |
| 5.     | Scale  | SSI   |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 1.3   |  |
| 7.     | Date of Inspection   | 30.11.2016  | 26.07.2018   |
| 8.     | Date of Closure Order  | 03.12.2016  | 08.08.2018   |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  | 11.08.2018   |
| 10.    | Unconditional re-start Order date  | NA  | NA   |
| 11.    | Conditional re-start order date  | 04.03.2017  | 23.08.2018   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 25.7.2018   | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 7+509 = 516   | 17+400 = 417 (First repeat violation)                    |
| 14.    | Reason for Closure/non-compliance  | 1 Discharge of substandard effluent COD-6000 and 12460 mg/L<br>2 No segregation and treatment from high COD | Discharge of substandard effluent having COD -11760 mg/L |
| 15.    | Liabe for Compensation   | Yes   |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>85.239</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0053260</b> )                           |  |
| 17.    | Date of Hearing  | 02.12.2019  |  |

**Table No. 44**

| Sl. No | Item                                | Details  |
|--------|-------------------------------------|--|
| 1.     | Name of Industry                    | Dufon Laboratories P ltd, E-61/3, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning | 1986   |
| 3.     | Product Type                        | Drug Intermediate                              |

|     |  |  |  |
|-----|--|--|--|
| 4.  | Category   | Red  |  |
| 5.  | Scale  | SSI  |  |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 15   |  |
| 7.  | Date of Inspection   | 06.09.2013   | 24.11.2016   |
| 8.  | Date of Closure Order  | 15.10.2013   | 03.12.2016   |
| 9.  | Effective date of Closure of the unit  | 18.10.2013   | 06.12.2016   |
| 10. | Unconditional re-start Order date  | NA   | NA   |
| 11. | Conditional re-start order date  | 30.10.2013   | 15.07.2017   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 23.11.2016   | 26.09.2019   |
| 13. | Period of non-compliance (no. of days)   | 43+1122 = 1165   | 13+804=817 (First repeat violation)  |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent pH-8.5, COD- 9760 mg/l                         | Discharge of substandard effluent on 09/01/17 COD- 17600mg/l , Discharge of substandard effluent 10/01/17 COD- 2512 mg/L |
| 15. | Liable for Compensation  | Yes  |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>177.253</b><br>Lakh INR (Distribution Recovery Cost Factor <b>0.0110754</b> ) |  |
| 17. | Date of Hearing  | 02.12.2019   |  |

**Table No. 45**

| Sl.No | Item   | Details   |
|-------|--|---|
| 1.    | Name of Industry   | D.H. Organic N-89, MIDC Tarapur   |
| 2.    | Year of Establishment/Commissioning  | 1992  |
| 3.    | Product Type   | Bulk drug   |
| 4.    | Category   | Red   |
| 5.    | Scale  | SSI   |
| 6.    | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 1.8   |
| 7.    | Date of Inspection   | 24.11.2016  |
| 8.    | Date of Closure Order  | 03.12.2016  |
| 9.    | Effective date of Closure of the unit  | 06.12.2016  |
| 10.   | Unconditional re-start Order date  | NA  |
| 11.   | Conditional re-start order date  | 17.03.2017  |
| 12.   | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 04.01.2019  |
| 13.   | Period of non-compliance (no. of days)   | 12+ 658= 670  |
| 14.   | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having pH-8.5, COD-9760 mg/l            |
| 15.   | Liable for Compensation  | Yes   |
| 16.   | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>42.429</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0026511</b> ) |
| 17.   | Date of Hearing  | 02.12.2019  |

**Table No. 46**

| Sl.No | Item   | Details  |
|-------|--|--|
| 1.    | Name of Industry   | Gangwal Chemical, N-5, MIDC Tarapur  |
| 2.    | Year of Establishment/Commissioning  | 2009   |
| 3.    | Product Type   | Chemical   |
| 4.    | Category   | Red  |
| 5.    | Scale  | SSI  |
| 6.    | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.5  |
| 7.    | Date of Inspection   | 30.11.2016   |
| 8.    | Date of Closure Order  | 03.12.2016   |
| 9.    | Effective date of Closure of the unit  | 06.12.2016   |
| 10.   | Unconditional re-start Order date  | NA   |
| 11.   | Conditional re-start order date  | 04.03.2017   |
| 12.   | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 17.06.2017   |
| 13.   | Period of non-compliance (no. of days)   | 7+105 =112   |
| 14.   | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD-12,960 mg/l                 |
| 15.   | Liabe for Compensation   | Yes  |
| 16.   | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>7.093</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0004432</b> ) |
| 17.   | Date of Hearing  | 02.12.2019   |

**Table No. 47**

| Sl.No | Item  | Details   |
|-------|---|---|
| 1.    | Name of Industry  | Haren Textile Pvt Ltd, J-194, MIDC Tarapur                                |
| 2.    | Year of Establishment/Commissioning   | 2000  |
| 3.    | Product Type  | Textile processing  |
| 4.    | Category  | Red   |
| 5.    | Scale   | SSI   |
| 6.    | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 80  |
| 7.    | Date of Inspection  | 21.06.2018  |
| 8.    | Date of Closure Order   | 17.07.2018  |
| 9.    | Effective date of Closure of the unit   | 20.07.2018  |
| 10.   | Unconditional re-start Order date   | NA  |
| 11.   | Conditional re-start order date   | 31.07.2017  |
| 12.   | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 06.09.2019  |
| 13.   | Period of non-compliance (no. of days)  | 29+767 = 796  |
| 14.   | Reason for Closure/non-compliance   | Discharge of substandard quality effluent and excess consumption of water |
| 15.   | Liabe for Compensation  | Yes   |
| 16.   | Accountability in terms of recovery cost in meeting the environmental damage    | <b>50.409</b>   |

|     |                           |  |
|-----|---------------------------|--|
|     | cost and restoration cost | Lakh INR (Distribution Recovery Cost Factor = <b>0.0031497</b> ) |
| 17. | Date of Hearing           | 02.12.2019   |

**Table No. 48**

| SI.No | Item   | Details  |   |
|-------|--|--|---|
| 1.    | Name of Industry   | Indo Amines Ltd ( Previously known as Sri Sai Industries) K-33 ,MIDC Tarapur                   |   |
| 2.    | Year of Establishment/Commissioning  | 2000   |   |
| 3.    | Product Type   | Chemical   |   |
| 4.    | Category   | Red  |   |
| 5.    | Scale  | SSI  |   |
| 6.    | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 5.6  |   |
| 7.    | Date of Inspection   | 12.01.2017   | 21.01.2019  |
| 8.    | Date of Closure Order  | 14.02.17   | 12.03.19  |
| 9.    | Effective date of Closure of the unit  | 17.02.2017   | 15.03.2019  |
| 10.   | Unconditional re-start Order date  | NA   | NA  |
| 11.   | Conditional re-start order date  | 31.05.2017   | 04.05.2019  |
| 12.   | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 20.1.2019  | 08.06.2019  |
| 13.   | Period of non-compliance (no. of days)   | 36+707= 743  | 53+35= 88 (First repeat violation)                        |
| 14.   | Reason for Closure/non-compliance  | Discharge of substandard effluent having pH- 9.8<br>COD- 13280 Mg/L<br>Exceeding consent limit | Discharge of substandard effluent having COD<br>1272 mg/L |
| 15.   | Liabile for Compensation   | Yes  |   |
| 16.   | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>58.198</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0036364</b> )              |   |
| 17.   | Date of Hearing  | 02.12.2019   |   |

**Table No. 49**

| SI. No | Item   | Details                                  |            |
|--------|--|--|------------|
| 1.     | Name of Industry   | Indaco Jeans Pvt Ltd, G-21, MIDC Tarapur |            |
| 2.     | Year of Establishment/Commissioning                            | 2013                                     |            |
| 3.     | Product Type   | Textile processing                       |            |
| 4.     | Category   | Red                                      |            |
| 5.     | Scale  | SSI                                      |            |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 100                                      |            |
| 7.     | Date of Inspection   | 22.09.2018                               | 06.03.2018 |
| 8.     | Date of Closure Order  | 24.10.2018                               | 18.04.2018 |
| 9.     | Effective date of Closure of the unit                          | 27.10.2018                               | 21.04.2018 |

|     |  |   |  |
|-----|--|---|--|
| 10  | Unconditional re-start Order date  | NA  | NA   |
| 11. | Conditional re-start order date  | 01.11.2018  | 08.05.2018   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 18.02.2019  | 14.06.2018   |
| 13. | Period of non-compliance (no. of days)   | 35+109=144  | 46+37=83 (First repeat violation)                                |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard quality effluent BOD 135 mg/L , COD 288 mg/L             | discharging effluent outside premises BOD 175 mg/L , COD 744mg/L |
| 15. | Liabe for Compensation   | Yes   | yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>19.631</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0012266</b> ) |  |
| 17. | Date of Hearing  | 02.12.2019  |  |

**Table No. 50**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Mehta API Pvt Ltd, Gut NO- 546, 571, 519, 520, Vill-Lumbhavali, Tal & Dsit- Palghar |
| 2.     | Year of Establishment/Commissioning  | 2009  |
| 3.     | Product Type   | Bulk drug   |
| 4.     | Category   | Red   |
| 5.     | Scale  | MSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 7   |
| 7.     | Date of Inspection   | 13.04.2018  |
| 8.     | Date of Closure Order  | 12.06.2018  |
| 9.     | Effective date of Closure of the unit  | 15.06.2018  |
| 10     | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 06.08.2018  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 11.07.2018  |
| 13.    | Period of non-compliance (no. of days)   | 63+26=89  |
| 14.    | Reason for Closure/non-compliance  | 'Obtained fraudulent CETP membership for discharge of effluent ,                    |
| 15.    | Liabe for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>11.272</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0007043</b> )   |
| 17.    | Date of Hearing  | 02.12.2019  |

**Table No. 51**

| Sl. No | Item                                | Details   |
|--------|-------------------------------------|---|
| 1.     | Name of Industry                    | Moltus Research Laboratories, N-59 , MIDC tarapur |
| 2.     | Year of Establishment/Commissioning | 2015  |
| 3.     | Product Type                        | Chemical  |
| 4.     | Category                            | Red   |

|     |  |  |
|-----|--|--|
| 5.  | Scale  | SSI  |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.1  |
| 7.  | Date of Inspection   | 19.07.2017   |
| 8.  | Date of Closure Order  | 28.07.2017   |
| 9.  | Effective date of Closure of the unit  | 31.07.2017   |
| 10. | Unconditional re-start Order date  | NA   |
| 11. | Conditional re-start order date  | 06.12.2017   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 06.12.2017. Industry vide their letter dtd. 31.01.2020 stated that HW not belong t them and to wave EC as in MPCB report dtd 23.08.2017 results of HW mismatched . |
| 13. | Period of non-compliance (no. of days)   | 13+1=14  |
| 14. | Reason for Closure/non-compliance  | Hazardous waste dumped illegally   |
| 15. | Liable for Compensation  | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>0.887</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0000554</b> )   |
| 17. | Date of Hearing  | 02.12.2019   |

**Table No. 52**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | K P Chemicals, L-63, MIDC Tarapur   |
| 2.     | Year of Establishment/Commissioning  | 2002  |
| 3.     | Product Type   | Chemical  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 11  |
| 7.     | Date of Inspection   | 24.11.2016  |
| 8.     | Date of Closure Order  | 03.12.2016  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 17.03.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)   | 13+924 = 937  |
| 14.    | Reason for Closure/non-compliance  | Discharge of Substandard quality effluent having COD-8560 mg/l ,                  |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>59.338</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0037076</b> ) |
| 17.    | Date of Hearing  | 02.12.2019  |

**Table No. 53**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | JPN Pharma, T-108-109, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning  | 1990   |
| 3.     | Product Type   | Bulk drug  |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 3  |
| 7.     | Date of Inspection   | 29.11.2016   |
| 8.     | Date of Closure Order  | 03.12.2016   |
| 9.     | Effective date of Closure of the unit  | 06.12.2016   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 17.03.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 30.07.2018   |
| 13.    | Period of non-compliance (no. of days)   | 8+501=509  |
| 14.    | Reason for Closure/non-compliance  | Discharge of Substandard quality effluent COD-7280 mg/l ,                      |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>32.234</b> Lakh INR (Distribution Recovery Cost Factor = <b>0.0020141</b> ) |
| 17.    | Date of Hearing  | 02.12.2019   |

**Table No. 54**

| Sl. No | Item  | Details   |
|--------|---|---|
| 1.     | Name of Industry  | Khanna & Khanna K-10, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning   | 1987  |
| 3.     | Product Type  | Chemical  |
| 4.     | Category  | Red   |
| 5.     | Scale   | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 1.1   |
| 7.     | Date of Inspection  | 01.12.2016  |
| 8.     | Date of Closure Order   | 23.02.2017  |
| 9.     | Effective date of Closure of the unit   | 26.02.2017  |
| 10.    | Unconditional re-start Order date   | NA  |
| 11.    | Conditional re-start order date   | 23.03.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 12.04.2017  |
| 13.    | Period of non-compliance (no. of days)  | 88+20 = 108   |
| 14.    | Reason for Closure/non-compliance   | Discharge of Substandard quality effluent COD-10400 mg/l ,                    |
| 15.    | Liable for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage    | <b>6.839</b> Lakh INR (Distribution Recovery Cost Factor = <b>0.0004273</b> ) |

|     |                           |            |
|-----|---------------------------|------------|
|     | cost and restoration cost |            |
| 17. | Date of Hearing           | 02.12.2019 |

**Table No. 55**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Keshav Organics P Ltd,T-97,98,100, MIDC Tarapur                               |
| 2.     | Year of Establishment/Commissioning  | 1990  |
| 3.     | Product Type   | Chemical  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 4.5   |
| 7.     | Date of Inspection   | 25.11.2016  |
| 8.     | Date of Closure Order  | 03.12.2016  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 20.02.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 02.05.2017  |
| 13.    | Period of non-compliance (no. of days)   | 11+71 = 82  |
| 14.    | Reason for Closure/non-compliance  | Discharge of Substandard quality effluent COD-5720 mg/l ,                     |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>5.193</b> Lakh INR (Distribution Recovery Cost Factor = <b>0.0003245</b> ) |
| 17.    | Date of Hearing  | 02.12.2019  |

**Table No. 56**

| Sl. No | Item  | Details                                       |                                   |
|--------|---|---|-----------------------------------|
| 1.     | Name of Industry  | Nayakem Organics Pvt Ltd, T-128 ,MIDC Tarapur |                                   |
| 2.     | Year of Establishment/Commissioning   | 1990  |                                   |
| 3.     | Product Type  | Chemical                                      |                                   |
| 4.     | Category  | Red   |                                   |
| 5.     | Scale   | SSI   |                                   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 1.0   |                                   |
| 7.     | Date of Inspection  | 26.11.2016                                    | 30.07.2018                        |
| 8.     | Date of Closure Order   | 03.12.2016                                    | 08.08.2018                        |
| 9.     | Effective date of Closure of the unit   | 06.12.2016                                    | 11.08.2018                        |
| 10.    | Unconditional re-start Order date   | NA  | 01.09.2018                        |
| 11.    | Conditional re-start order date   | 17.03.2017                                    | NA                                |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 22.03.2017                                    | 01.09.2018                        |
| 13.    | Period of non-compliance (no. of days)  | 10+5=15                                       | 13+56=69 (First repeat violation) |

|     |  |  |  |
|-----|--|--|--|
| 14. | Reason for Closure/non-compliance  | Discharge of Substandard quality effluent t having Outlet COD - 8160 mg/l        | Discharge of substandard quality effluent having Outlet COD - 32400 mg/l |
| 15. | Liabe for Compensation   | Yes  | yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>9.689</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0006054</b> ) |  |
| 17. | Date of Hearing  | 30.11.2019   |  |

**Table No. 57**

| Sl. No | Item   | Details   |   |
|--------|--|---|---|
| 1.     | Name of Industry   | Nirbhay Rasayan Pvt Ltd,N-35,96,96/1, MIDC Tarapur  |   |
| 2.     | Year of Establishment/Commissioning  | 1996  |   |
| 3.     | Product Type   | Dyes  |   |
| 4.     | Category   | Red   |   |
| 5.     | Scale  | SSI   |   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 93  |   |
| 7.     | Date of Inspection   | 05.09.2013  | 30.11.2016  |
| 8.     | Date of Closure Order  | 15.10.2013  | 03.12.2016  |
| 9.     | Effective date of Closure of the unit  | 18.10.2013  | 06.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |   |
| 11.    | Conditional re-start order date  | 31.10.2013  | 23.02.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 29.11.2016  | 18.03.2017  |
| 13.    | Period of non-compliance (no. of days)   | 44+1126=1170  | 7+24=31 (First repeat violation)                      |
| 14.    | Reason for Closure/non-compliance  | Discharge of Substandard quality effluent , additional product without consent, 50 MT excess production | Discharging substandard effluent having COD 1248 mg/l |
| 15.    | Liabe for Compensation   | Yes   |   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>78.019</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0048749</b> )                       |   |
| 17.    | Date of Hearing  | 30.11.2019  |   |

**Table No. 58**

| Sl. No | Item                                | Details                                 |
|--------|-------------------------------------|---|
| 1.     | Name of Industry                    | Nutraplus India Ltd, N-92, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning | 1998                                    |
| 3.     | Product Type                        | Chemical                                |
| 4.     | Category                            | Red                                     |
| 5.     | Scale                               | SSI                                     |

|     |  |  |   |  |
|-----|--|--|---|--|
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 5.0  |   |  |
| 7.  | Date of Inspection   | 26.11.2016   | 25.07.2018  | 24.12.2018.  |
| 8.  | Date of Closure Order  | 03.12.2016   | 08.08.2018  | 27.12.2018   |
| 9.  | Effective date of Closure of the unit  | 06.12.2016   | 11.08.2018  | 30.12.2018   |
| 10. | Unconditional re-start Order date  | NA   | NA  | NA   |
| 11. | Conditional re-start order date  | 17.07.2017   | 09.11.2018  | No restart issued  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 24.7.2018  | 23.12.2018  | 26.09.2019<br>(operating illegally without restart till board visit 4.10.2019)                       |
| 13. | Period of non-compliance (no. of days)   | 11+391=402   | 18+45=63 (First repeat violation)   | 277 (Second repeat violation)  |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent, COD - 8560 mg/l                                 | High COD stream not segregated. online monitoring system for pH, flow, COD, TSS and positive discharge not provided. Separate storm water drain not provided. Hazardous waste storage not proper. Failed to curtail 40 % water consumption. | Accident due to improper operation of reactor. meta bromo nitro benzene kept aside spilled on floor. |
| 15. | Liable for Compensation  | Yes  |   |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>103.603</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0064735</b> ) |   |  |
| 17. | Date of Hearing  | 30.11.2019   |   |  |

**Table No. 59**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Sequent Scientific Ltd (Pi Drugs Pharmaceuticals), W-136, 137, 138, 151 MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning                            | 2000   |
| 3.     | Product Type   | Bulk drug  |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 37.8   |
| 7.     | Date of Inspection   | 22.04.2017   |

|     |  |   |
|-----|--|---|
| 8.  | Date of Closure Order  | 25.04.2017  |
| 9.  | Effective date of Closure of the unit  | 28.04.2017  |
| 10. | Unconditional re-start Order date  | NA  |
| 11. | Conditional re-start order date  | 04.01.2018  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 11.11.2019 (26.09.2019 period consider up to)                                       |
| 13. | Period of non-compliance (no. of days)   | 6+677 =683  |
| 14. | Reason for Closure/non-compliance  | By pass arrangement Discharge of substandard quality effluent having COD – 268 mg/L |
| 15. | Liable for Compensation  | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>43.253</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0027026</b> )   |
| 17. | Date of Hearing  | 03.12.2019  |

**Table No. 60**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Pulcra Chemicals India Ltd ,D-7/1/1 MIDC Tarapur                                  |
| 2.     | Year of Establishment/Commissioning  | 1992  |
| 3.     | Product Type   | Chemical  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 15  |
| 7.     | Date of Inspection   | 12.01.2017  |
| 8.     | Date of Closure Order  | 14.02.2017  |
| 9.     | Effective date of Closure of the unit  | 17.02.2017  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 18.04.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)   | 37+892= 929   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having Outlet COD - 32400 mg/l                  |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>58.831</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0036760</b> ) |
| 17.    | Date of Hearing  | 3.12.2019   |

**Table No. 61**

| Sl. No | Item             | Details   |
|--------|------------------|---|
| 1.     | Name of Industry | M/s. Pentagon Drugs Ltd Plot No. N-224, 225, MIDC Tarapur |

|     |  |   |
|-----|--|---|
| 2.  | Year of Establishment/Commissioning  | 1995  |
| 3.  | Product Type   | Bulk drug   |
| 4.  | Category   | Red   |
| 5.  | Scale  | SSI   |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 5.5   |
| 7.  | Date of Inspection   | 30.07.2018  |
| 8.  | Date of Closure Order  | 08.08.2018  |
| 9.  | Effective date of Closure of the unit  | 11.08.2018  |
| 10. | Unconditional re-start Order date  | NA  |
| 11. | Conditional re-start order date  | 01.09.2018  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019  |
| 13. | Period of non-compliance (no. of days)   | 13 + 391 = 404  |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent PH – 22,<br>COD – 59200<br>Not provided adequate system for high COD stream |
| 15. | Liabile for Compensation   | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>25.584</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0015986</b> )                             |
| 17. | Date of Hearing  | 03.12.2019  |

**Table No. 62**

| Sl. No | Item  | Details  |
|--------|---|--|
| 1.     | Name of Industry  | M/s. Paramount Syncot Textile, Plot No. N-13/2, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning   | 2011   |
| 3.     | Product Type  | Textile  |
| 4.     | Category  | Red  |
| 5.     | Scale   | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 40.0   |
| 7.     | Date of Inspection  | 26.7.2018  |
| 8.     | Date of Closure Order   | 08.08.2018   |
| 9.     | Effective date of Closure of the unit   | 11.08.2018   |
| 10.    | Unconditional re-start Order date   | NA   |
| 11.    | Conditional re-start order date   | 23.08.2018   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)  | 14+400=414   |

|     |  |   |
|-----|--|---|
| 14. | Reason for Closure/non-compliance  | 1. Generated effluent discharge formed into natur nalla<br>2. ETP was not founded in operation<br>3. Discharge untreated effluent along with sludge having COD -720, 684 mg/L<br>4. Not provided any position for recycling of treated effluent<br>5. Water consumption is exceeding consented quantity |
| 15. | Liabale for Compensation   | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>26.217</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0016382</b> )   |
| 17. | Date of Hearing  | 03.12.2019  |

**Table No. 63**

| Sl. No | Item   | Details  |  |
|--------|--|--|--|
| 1.     | Name of Industry   | M/s. IPCA Laboratories (Ramdev Chemicals), Plot No. E-41, MIDC Tarapur             |  |
| 2.     | Year of Establishment/Commissioning  | 2019   |  |
| 3.     | Product Type   | Bulk drug  |  |
| 4.     | Category   | Red  |  |
| 5.     | Scale  | MSI  |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 65.6   |  |
| 7.     | Date of Inspection   | 12.04.2012,  | 22.04.2017                                       |
| 8.     | Date of Closure Order  | 16.05.2012,  | 25.04.2017                                       |
| 9.     | Effective date of Closure of the unit  | 19.05.2012,  | 28.04.2017                                       |
| 10.    | Unconditional re-start Order date  | NA   | NA   |
| 11.    | Conditional re-start order date  | 23.01.2013   | 09.05.2017                                       |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 25.07.2014   | 26.09.2019                                       |
| 13.    | Period of non-compliance (no. of days)   | 38+458= 496  | 7+871=878 (First repeat violation)               |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent to CETP  | Discharge of substandard effluent COD – 508 mg/L |
| 15.    | Liabale for Compensation   | Yes  |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>285.226</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0178220</b> ) |  |
| 17.    | Date of Hearing  | 03.12.2019   |  |

**Table No. 64**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | M/s. Tryst Chemicals, Plot No. L-47, MIDC Tarapur                                 |
| 2.     | Year of Establishment/Commissioning  | 2002  |
| 3.     | Product Type   | Bulk drug   |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 2.8   |
| 7.     | Date of Inspection   | ..  |
| 8.     | Date of Closure Order  | 03.12.2016  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 17.03.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 18.05.2018  |
| 13.    | Period of non-compliance (no. of days)   | 3 + 428 = 431   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD 488000 mg/l , pH 11.8        |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>27.294</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0017054</b> ) |
| 17.    | Date of Hearing  | 03.12.2019  |

**Table No. 65**

| Sl. No | Item  | Details   |
|--------|---|---|
| 1.     | Name of Industry  | M/s. Omtech Chemicals Plot No. T-12, MIDC Tarapur   |
| 2.     | Year of Establishment/Commissioning   | 2000  |
| 3.     | Product Type  | Chemical  |
| 4.     | Category  | Red   |
| 5.     | Scale   | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 30.0  |
| 7.     | Date of Inspection  | 14.09.2013  |
| 8.     | Date of Closure Order   | 15.10.2013  |
| 9.     | Effective date of Closure of the unit   | 18.10.2013  |
| 10.    | Unconditional re-start Order date   | NA  |
| 11.    | Conditional re-start order date   | 01.11.2013  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 18.06.2014  |
| 13.    | Period of non-compliance (no. of days)  | 35 + 230 = 265  |
| 14.    | Reason for Closure/non-compliance   | Discharge of substandard quality effluent having Ph-10 to 11, ETP not in operation, flow meter not provided |
| 15.    | Liable for Compensation   | Yes   |

|     |  |   |
|-----|--|---|
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>16.782</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0010486</b> ) |
| 17. | Date of Hearing  | 01.12.2019  |

**Table No. 66**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | M/s. Shreenath Chemicals, Plot No. T-54, T-80, MIDC Tarapur                      |
| 2.     | Year of Establishment/Commissioning  | 1990   |
| 3.     | Product Type   | Chemical   |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 1.5  |
| 7.     | Date of Inspection   | 27.11.2016   |
| 8.     | Date of Closure Order  | 03.12.2016   |
| 9.     | Effective date of Closure of the unit  | 06.12.2016   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 17.03.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 25.05.2017   |
| 13.    | Period of non-compliance (no. of days)   | 10 + 70 = 80   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD – 4000 mg/L                 |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>5.066</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0003166</b> ) |
| 17.    | Date of Hearing  | 03.12.2019   |

**Table No. 67**

| Sl. No | Item   | Details  |            |            |            |
|--------|--|--|------------|------------|------------|
| 1.     | Name of Industry   | M/s. Salvi Chemicals Industries, Plot No. E-90 E-91 E-92, E-93 E-94 E-95, MIDC Tarapur |            |            |            |
| 2.     | Year of Establishment/Commissioning                            | 1990   |            |            |            |
| 3.     | Product Type   | Chemical   |            |            |            |
| 4.     | Category   | Red  |            |            |            |
| 5.     | Scale  | SSI  |            |            |            |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 55.5   |            |            |            |
| 7.     | Date of Inspection   | 20.08.2016   | 11.04.2018 | 13.07.2018 | 07.08.2019 |
| 8.     | Date of Closure Order  | 04.11.2016   | 17.04.2018 | 17.07.2018 | 25.09.2019 |

|     |  |   |  |  |   |
|-----|--|---|--|--|---|
| 9.  | Effective date of Closure of the unit  | 07.11.2016  | 20.04.2018   | 20.07.2018   | 26.09.2019  |
| 10. | Unconditional re-start Order date  | NA  | NA   | NA   | NA  |
| 11. | Conditional re-start order date  | 12.1.2017   | 24.5.2018  | 28.08.2018   | Not issued  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 10.4.2018   | 12.7.2018  | 6.08.2019  | Not issued before 26.09.2019  |
| 13. | Period of non-compliance (no. of days)   | 80+454=534  | 10+50 =60<br>(First repeat violation)  | 8+344=352<br>(Second repeat violation)   | 51 (third repeat violation)   |
| 14. | Reason for Closure/non-compliance  | Discharge of acidic effluent in MIDC drain, POOR operation and maintenance of ETP, No segregation of High COD stream. | Unauthorised storage HW at Plot E-131 and not disposed HW in 2016-17,<br><br>Discharge of substandard effluent COD 12080 ,BOD 5300,SS 668 ,O & G 15.2<br><br>Not provided MEE with up gradation of ETP | Manufacturing of unconsented products, No segregation of High COD stream. not completed multi effective evaporator (MEE), oil contaminated effluent is discharge to CETP | Voluntary not stopped production activity ETP, multi effective evaporator (MEE) not in operation ,failed to upgrade ETP |
| 15. | Liabile for Compensation   | Yes   |  |  |   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>156.418</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0097736</b> )                                    |  |  |   |
| 17. | Date of Hearing  | 03.12.2019  |  |  |   |

**Table No. 68**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | M/s. Sapna Detergent, Plot No. N-152/ N-153 & N-154, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning                            | 2001  |
| 3.     | Product Type   | Chemical  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 1.5   |
| 7.     | Date of Inspection   | 24.11.2016  |
| 8.     | Date of Closure Order  | 03.12.2016  |
| 9.     | Effective date of Closure of the unit                          | 06.12.2016  |
| 10.    | Unconditional re-start Order date                              | NA  |

|     |  |   |
|-----|--|---|
| 11. | Conditional re-start order date  | 17.03.2017  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019  |
| 13. | Period of non-compliance (no. of days)   | 13 + 924 = 937  |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having PH-4/4<br>COD – 4480 mg/l        |
| 15. | Liabile for Compensation   | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>59.338</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0037076</b> ) |
| 17. | Date of Hearing  | 03.12.2019  |

**Table No. 69**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | M/s. Sagitta P Ltd, Plot No. N-4, MIDC Tarapur                                    |
| 2.     | Year of Establishment/Commissioning  | 1985  |
| 3.     | Product Type   | Chemicals   |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 3.5   |
| 7.     | Date of Inspection   | 24.11.2016  |
| 8.     | Date of Closure Order  | 03.12.2016  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 17.03.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)   | 10 + 924 = 934  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having PH – 11.4, COD – 976 mg/L        |
| 15.    | Liabile for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>59.148</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0036958</b> ) |
| 17.    | Date of Hearing  | 03.12.2019  |

**Table No. 70**

| Sl. No | Item                                | Details  |
|--------|-------------------------------------|--|
| 1.     | Name of Industry                    | M/s. Surmount chemicals (I) P Ltd, Plot No. N-41, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning | 2018   |
| 3.     | Product Type                        | Chemicals  |
| 4.     | Category                            | Red  |

|     |  |  |
|-----|--|--|
| 5.  | Scale  | SSI  |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.8  |
| 7.  | Date of Inspection   | 01.02.2019   |
| 8.  | Date of Closure Order  | 22.02.2019   |
| 9.  | Effective date of Closure of the unit  | 25.02.2019   |
| 10. | Unconditional re-start Order date  | NA   |
| 11. | Conditional re-start order date  | 09.07.2019   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019   |
| 13. | Period of non-compliance (no. of days)   | 22 + 80 = 102  |
| 14. | Reason for Closure/non-compliance  | without consent High Alkaline Discharge – 9.9 in Nalla                           |
| 15. | Liabe for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>6.459</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0004036</b> ) |
| 17. | Date of Hearing  | 03.12.2019   |

**Table No. 71**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | M/s. Shri Vinayak Chemex India Pvt. Ltd. Plot No. T-11, MIDC Tarapur              |
| 2.     | Year of Establishment/Commissioning  | 2000  |
| 3.     | Product Type   | Chemical  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 1.5   |
| 7.     | Date of Inspection   | 23.11.2016  |
| 8.     | Date of Closure Order  | 03.12.2016  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 17.03.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)   | 14 + 924 = 938  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent COD – 68800 mg/L                        |
| 15.    | Liabe for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>59.401</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0037116</b> ) |
| 17.    | Date of Hearing  | 03.12.2019  |

**Table No. 72**

| Sl. No | Item   | Details   |   |
|--------|--|---|---|
| 1.     | Name of Industry   | M/s. Sunil Great Processers Plot No. N-47/3, MIDC Tarapur                         |   |
| 2.     | Year of Establishment/Commissioning  | 2005  |   |
| 3.     | Product Type   | Chemical  |   |
| 4.     | Category   | Red   |   |
| 5.     | Scale  | SSI   |   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 6.0   |   |
| 7.     | Date of Inspection   | 24.11.2016  | 29.07.2018  |
| 8.     | Date of Closure Order  | 03.12.2016  | 08.08.2018  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  | 11.08.2018  |
| 10.    | Unconditional re-start Order date  | NA  |   |
| 11.    | Conditional re-start order date  | 17.03.2017  | 20.10.2018  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 28.7.2018   | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)   | 13+499=512  | 14+342=356 (First repeat violation)                     |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD 16160 mg/L                           | Discharge of substandard effluent having COD 18160 mg/l |
| 15.    | Liable for Compensation  | Yes   |   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>77.513</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0048433</b> ) |   |
| 17.    | Date of Hearing  | 03.12.2019  |   |

**Table No. 73**

| Sl. No | Item  | Details   |  |
|--------|---|---|--|
| 1.     | Name of Industry  | M/s. Vardhman Dyestuff Pvt Ltd, Plot No. N-33, T-34, MIDC Tarapur |  |
| 2.     | Year of Establishment/Commissioning   | 1996  |  |
| 3.     | Product Type  | Dyes  |  |
| 4.     | Category  | Red   |  |
| 5.     | Scale   | SSI   |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 52.0  |  |
| 7.     | Date of Inspection  | 08.05.2012  |  |
| 8.     | Date of Closure Order   | 22.06.2012  |  |
| 9.     | Effective date of Closure of the unit   | 23.06.2012  |  |
| 10.    | Unconditional re-start Order date   | NA  |  |
| 11.    | Conditional re-start order date   | 15.09.2012  |  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 09.11.2012  |  |
| 13.    | Period of non-compliance (no. of days)  | 46 + 55 = 101   |  |

|     |  |  |
|-----|--|--|
| 14. | Reason for Closure/non-compliance  | Treated effluent samples collected on , 10/12/2013 -COD-336 mg/l, 02/12/2014 540 mg/l, 30/05/2015 392 mg/l, 05/02/2016-260 mg/l, 28/01/2014-pH-5, 31/11/2016-COD- 364 mg/l, & 14/10/2019-TDS-3322 mg/l which shos Exceeding treated effluents standard by 100% than consented norms, |
| 15. | Liablie for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>6.396</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0003996</b> )   |
| 17. | Date of Hearing  | 03.12.2019   |

**Table No. 74**

| Sl. No | Item   | Details   |   |
|--------|--|---|---|
| 1.     | Name of Industry   | M/s. Usha Fashion, Plot No. E-42, MIDC Tarapur  |   |
| 2.     | Year of Establishment/Commissioning  | 1987  |   |
| 3.     | Product Type   | Textile   |   |
| 4.     | Category   | Red   |   |
| 5.     | Scale  | SSI   |   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 305.0   |   |
| 7.     | Date of Inspection   | 05.09.2013  | 10.01.2017  |
| 8.     | Date of Closure Order  | 15.10.2013  | 14.02.2017  |
| 9.     | Effective date of Closure of the unit  | 18.10.2013  | 17.02.2017  |
| 10.    | Unconditional re-start Order date  | NA  | NA  |
| 11.    | Conditional re-start order date  | 07.11.2013,   | 08.05.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 14.03.2014,   | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)   | 43 + 127 = 170  | 38 + 871 = 909 (First repeat violation)   |
| 14.    | Reason for Closure/non-compliance  | Operation and maianatainace of ETP is poor. Discharge of substandard effluent to CETP. Flow meter not provided to outlet. Hazardous waste storage arrangement not provided. | Discharge of substandard effluent to CETP on following dates<br>13.01.2017 -COD - 1552<br>14.01.2017 –COD-1240 mg/L, 15.01.2017, COD-560 mg/L |
| 15.    | Liablie for Compensation   | Yes   |   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>125.895</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0078664</b> )  |   |
| 17.    | Date of Hearing  | 03.12.2019  |   |

**Table No. 75**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | M/s. Visen Industries Ltd Plot No. K-30, T-31, T-32, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning  | 1985   |
| 3.     | Product Type   | Chemical   |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 7.0  |
| 7.     | Date of Inspection   | 21.01.2019   |
| 8.     | Date of Closure Order  | 12.03.2019   |
| 9.     | Effective date of Closure of the unit  | 15.03.2019   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 22.04.2019   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 53 = 157 = 210   |
| 14.    | Reason for Closure/non-compliance  | Discharge of untreated effluent having PH-9.4, BOD-11000, COD- 36000 through domestic line into MIDC Chamber |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>13.299</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0008310</b> )                            |
| 17.    | Date of Hearing  | 03.12.2019   |

**Table No. 76**

| Sl. No | Item  | Details   |                           |
|--------|---|---|---------------------------|
| 1.     | Name of Industry  | M/s. U. K. Aromatics & Chemicals Plot No. K-6/3, MIDC Tarapur |                           |
| 2.     | Year of Establishment/Commissioning   | 2009  |                           |
| 3.     | Product Type  | Chemical  |                           |
| 4.     | Category  | Red   |                           |
| 5.     | Scale   | SSI   |                           |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 6   |                           |
| 7.     | Date of Inspection  | 01.12.2016  | 21.01.2019                |
| 8.     | Date of Closure Order   | 23.02.2017  | 12.03.2019                |
| 9.     | Effective date of Closure of the unit   | 26.02.2017  | 15.03.2019                |
| 10.    | Unconditional re-start Order date   | NA  | NA                        |
| 11.    | Conditional re-start order date   | 08.08.2017  | 28.03.2019                |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 28.07.2017  | 02.04.2019                |
| 13.    | Period of non-compliance (no. of days)  | 87 + 11 = 98  | 53 + 5 = 58 (First repeat |

|     |  |   |  |
|-----|--|---|--|
|     |  |   | violation)   |
| 14. | Reason for Closure/non-compliance  | Discharge of untreated effluent in MIDC drain having pH 4.8, COD-10320.           | Discharge of substandard effluent having BOD-72000, COD - 2,24,000 |
| 15. | Liabe for Compensation   | Yes   |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>13.552</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0008468</b> ) |  |
| 17. | Date of Hearing  | 03.12.2019  |  |

**Table No. 77**

| Sl. No | Item   | Details   |   |
|--------|--|---|---|
| 1.     | Name of Industry   | M/s. Ujwal Pharma P Ltd Plot No. N-52, MIDC Tarapur                               |   |
| 2.     | Year of Establishment/Commissioning  | 1989  |   |
| 3.     | Product Type   | Chemical  |   |
| 4.     | Category   | Red   |   |
| 5.     | Scale  | SSI   |   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 4.0   |   |
| 7.     | Date of Inspection   | 28.11.2016,   | 30.07.2018  |
| 8.     | Date of Closure Order  | 03.12.2016,   | 08.08.2018  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016,   | 11.08.2018  |
| 10.    | Unconditional re-start Order date  | NA  | NA  |
| 11.    | Conditional re-start order date  | 04.03.2017,   | 06.09.2018  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 30.07.2018,   | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)   | 8 + 513 = 521   | 12 + 385 = 397 (First repeat violation)                                 |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD-11360 mg/L                           | Discharge of substandard effluent having PH – 11.6, COD – 2,96,000 mg/L |
| 15.    | Liabe for Compensation   | Yes   |   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>83.275</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0052033</b> ) |   |
| 17.    | Date of Hearing  | 03.12.2019  |   |

**Table No. 78**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | M/s. Vividh Global Inds Ltd Plot No. D-21/1, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning  | 1996   |
| 3.     | Product Type   | Chemical   |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 40.0   |
| 7.     | Date of Inspection   | 23.11.2016   |
| 8.     | Date of Closure Order  | 23.02.2017   |
| 9.     | Effective date of Closure of the unit  | 26.02.2017   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 11.05.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 95 + 868 = 963   |
| 14.    | Reason for Closure/non-compliance  | MPCB- Discharge of substandard effluent in night hours to CETP, PH – 2.5 & COD – 52000<br>CPCB issued closure direction on 07.5.2018 for Acidic effluent openly discharged on ground, substandard effluent used for gardening, ZLD not in operation effectively. |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>60.984</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0038105</b> )  |
| 17.    | Date of Hearing  | 03.12.2019   |

**Table No. 79**

| Sl. No | Item  | Details  |
|--------|---|--|
| 1.     | Name of Industry  | M/s. Square Chemical Plot No. N-60, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning   | 1993   |
| 3.     | Product Type  | Chemical   |
| 4.     | Category  | Red  |
| 5.     | Scale   | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 4.0  |
| 7.     | Date of Inspection  | 11.02.2018                                       |
| 8.     | Date of Closure Order   | 19.03.2018                                       |
| 9.     | Effective date of Closure of the unit   | 22.03.2018                                       |
| 10.    | Unconditional re-start Order date   | NA   |
| 11.    | Conditional re-start order date   | 17.05.2018                                       |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 13.05.2019                                       |

|     |  |   |
|-----|--|---|
| 13. | Period of non-compliance (no. of days)   | 39 + 361 = 400  |
| 14. | Reason for Closure/non-compliance  | Manufacturing of unconsented products, sludge drained into MIDC chamber, No provision of positive discharge |
| 15. | Liable for Compensation  | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>25.331</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0015828</b> )                           |
| 17. | Date of Hearing  | 03.12.2019  |

**Table No. 80**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | M/s. Shree Chakra Organics Pvt Ltd Plot No. K-62, MIDC Tarapur                    |
| 2.     | Year of Establishment/Commissioning  | 1993  |
| 3.     | Product Type   | Chemical  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 25.0  |
| 7.     | Date of Inspection   | 29.07.2018  |
| 8.     | Date of Closure Order  | 08.08.2018  |
| 9.     | Effective date of Closure of the unit  | 11.08.2018  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 27.08.2018  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 29.01.2019  |
| 13.    | Period of non-compliance (no. of days)   | 13 + 155 = 168  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD-17440, SS-3049-                      |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>10.639</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0006648</b> ) |
| 17.    | Date of Hearing  | 03.12.2019  |

**Table No. 81**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | M/s. AArti Drugs, Plot No: E-106, 119, 120, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning                            | 2005   |
| 3.     | Product Type   | Bulk Drugs   |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 23 CMD   |

|     |  |  |
|-----|--|--|
| 7.  | Date of Inspection   | 25.11.2016   |
| 8.  | Date of Closure Order  | 03.12.2016   |
| 9.  | Effective date of Closure of the unit  | 06.12.2016   |
| 10. | Unconditional re-start Order date  | NA   |
| 11. | Conditional re-start order date  | 03/02/2017   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 27/02/2017   |
| 13. | Period of non-compliance (no. of days)   | 12+25=37   |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD – 704 mg/L                  |
| 15. | Liabe for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>7.029</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0004392</b> ) |
| 17. | Date of Hearing  |  |

**Table No. 82**

| Sl. No | Item   | Details   |   |
|--------|--|---|---|
| 1.     | Name of Industry   | Omega Colours Pvt Ltd., Plot No.- D-21/2/3, MIDC Tarapur  |   |
| 2.     | Year of Establishment/Commissioning  | 2007  |   |
| 3.     | Product Type   | Dyes  |   |
| 4.     | Category   | Red   |   |
| 5.     | Scale  | SSI   |   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 82  |   |
| 7.     | Date of Inspection   | 23.11.2016  | 05.04.2017  |
| 8.     | Date of Closure Order  | 03.12.2016  | 05.04.2017  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016  | 08.04.2017  |
| 10.    | Unconditional re-start Order date  | NA  | NA  |
| 11.    | Conditional re-start order date  | 23.02.2017  | 01.06.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 15.03.2017  | 06.08.2017  |
| 13.    | Period of non-compliance (no. of days)   | 14+21 =35   | 4+67 =71 (First repeat violation)                       |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent on following date<br>23.11.2016-COD- 320 mg/L ,30.11.2016 –COD- 512 | Discharge of substandard quality effluent having pH-4.9 |
| 15.    | Liabe for Compensation   | Yes   |   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>11.209</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0007004</b> )                             |   |
| 17.    | Date of Hearing  | 30.11.2019  |   |

**Table No. 83**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | REMI Edelstahi Tubulars Ltd.,<br>(Old Name-RAJENDRA MECHANICAL INDL LTD.)<br>Plot No.- N 2011 /1, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning  | 2005   |
| 3.     | Product Type   | Engineering  |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 20   |
| 7.     | Date of Inspection   | 28.11.2016   |
| 8.     | Date of Closure Order  | 03.12.2016   |
| 9.     | Effective date of Closure of the unit  | 06.12.2016   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 25.01.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 06.02.2017   |
| 13.    | Period of non-compliance (no. of days)   | 9+13=22  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD-976 mg/l , pH 2.7   |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>4.180</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0002612</b> )                               |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 84**

| Sl. No | Item  | Details   |
|--------|---|---|
| 1.     | Name of Industry  | Gini Silk Mills Ltd., Plot No.- E-15, MIDC Tarapur            |
| 2.     | Year of Establishment/Commissioning   | 1996  |
| 3.     | Product Type  | Textile   |
| 4.     | Category  | Red   |
| 5.     | Scale   | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 510   |
| 7.     | Date of Inspection  | 23.11.2016  |
| 8.     | Date of Closure Order   | 03.12.2016  |
| 9.     | Effective date of Closure of the unit   | 06.12.2016  |
| 10.    | Unconditional re-start Order date   | NA  |
| 11.    | Conditional re-start order date   | 03.03.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 28.01.2019  |
| 13.    | Period of non-compliance (no. of days)  | 14+614=628  |
| 14.    | Reason for Closure/non-compliance   | Discharge of substandard quality effluent having COD-896 mg/L |

|     |  |  |
|-----|--|--|
| 15. | Liabile for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>119.309</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0074548</b> ) |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 85**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Mayfair Bio tech (Ankit Petro) Plot No.- L-12, MIDC Tarapur                        |
| 2.     | Year of Establishment/Commissioning  | 1991   |
| 3.     | Product Type   | Chemical   |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | Nil  |
| 7.     | Date of Inspection   | 24.11.2016   |
| 8.     | Date of Closure Order  | 03.12.2016   |
| 9.     | Effective date of Closure of the unit  | 06.12.2016   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 24.10.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 13+703=716   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD-8880 mg/L                     |
| 15.    | Liabile for Compensation   | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>136.027</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0084995</b> ) |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 86**

| Sl. No | Item   | Details   |            |
|--------|--|---|------------|
| 1.     | Name of Industry   | Rediant Intermediates Plot No.- N-224, MIDC Tarapur |            |
| 2.     | Year of Establishment/Commissioning                            | 1996  |            |
| 3.     | Product Type   | Chemicals   |            |
| 4.     | Category   | Red   |            |
| 5.     | Scale  | SSI   |            |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 1.4   |            |
| 7.     | Date of Inspection   | 29.11.2016  | 30.07.2018 |
| 8.     | Date of Closure Order  | 03.12.2016  | 08.08.2018 |
| 9.     | Effective date of Closure of the unit                          | 6.12.2016   | 11.08.2018 |
| 10.    | Unconditional re-start Order date                              | NA  | NA         |
| 11.    | Conditional re-start order date                                | 03.03.2017  | 01.09.2018 |

|     |  |   |  |
|-----|--|---|--|
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 29.7.2018   | 26.09.2019                                   |
| 13. | Period of non-compliance (no. of days)   | 8+514= 522  | 13+391= 404 (First repeat violation)         |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent quality having COD-16360, pH 5.0                | Not segregating and treating high COD stream |
| 15. | Liable for Compensation  | Yes   |  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>84.225</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0052627</b> ) |  |
| 17. | Date of Hearing  | 30.11.2019  |  |

**Table No. 87**

| Sl. No | Item   | Details  |  |
|--------|--|--|--|
| 1.     | Name of Industry   | Premier Intermediate Plot No.- T-55, T-56, MIDC Tarapur                          |  |
| 2.     | Year of Establishment/Commissioning  | 1991   |  |
| 3.     | Product Type   | Bulk Drugs   |  |
| 4.     | Category   | Red  |  |
| 5.     | Scale  | LSI  |  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 5  |  |
| 7.     | Date of Inspection   | 28.11.2016   |  |
| 8.     | Date of Closure Order  | 03.12.2016   |  |
| 9.     | Effective date of Closure of the unit  | 06.12.2016   |  |
| 10.    | Unconditional re-start Order date  | NA   |  |
| 11.    | Conditional re-start order date  | 17.03.2017   |  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.04.2017   |  |
| 13.    | Period of non-compliance (no. of days)   | 9+41=50  |  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD-6400 mg/L,                          |  |
| 15.    | Liable for Compensation  | Yes  |  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>9.499</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0005935</b> ) |  |
| 17.    | Date of Hearing  | 30.11.2019   |  |

**Table No. 88**

| Sl. No | Item                                | Details  |  |
|--------|-------------------------------------|--|--|
| 1.     | Name of Industry                    | Maharashtra Organo Metalics Pvt. Ltd., Plot No.- N-220 & 221, MIDC Tarapur |  |
| 2.     | Year of Establishment/Commissioning | 1995   |  |
| 3.     | Product Type                        | Chemicals  |  |
| 4.     | Category                            | Red  |  |

|     |  |  |
|-----|--|--|
| 5.  | Scale  | LSI  |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 6  |
| 7.  | Date of Inspection   | 24.11.2016   |
| 8.  | Date of Closure Order  | 03.12.2016   |
| 9.  | Effective date of Closure of the unit  | 06.12.2016   |
| 10. | Unconditional re-start Order date  | NA   |
| 11. | Conditional re-start order date  | 17.03.2017   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | Analysis results of sample from 21.03.2017 to 06.04.2017 are within limit, hence compliance date is considered as 21.03.2017 |
| 13. | Period of non-compliance (no. of days)   | 44+5=49  |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD-1728, pH 4.4  |
| 15. | Liable for Compensation  | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>9.309</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0005817</b> )   |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 89**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Anuh Pharma Chem Plot No.- E-17/3 & 4, MIDC Tarapur                               |
| 2.     | Year of Establishment/Commissioning  | 1989  |
| 3.     | Product Type   | Bulk drug   |
| 4.     | Category   | Red   |
| 5.     | Scale  | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 10  |
| 7.     | Date of Inspection   | 12.03.2016  |
| 8.     | Date of Closure Order  | 30.11.2016  |
| 9.     | Effective date of Closure of the unit  | 03.12.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | Not obtained restart  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 30.11.2016  |
| 13.    | Period of non-compliance (no. of days)   | 266   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD-324, pH 1.7                          |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>50.535</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0031576</b> ) |
| 17.    | Date of Hearing  | 30.11.2019  |

**Table No. 90**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Ganesh Benzoplast Plot No.- D-21/2/2, MIDC Tarapur                                 |
| 2.     | Year of Establishment/Commissioning  | 1987   |
| 3.     | Product Type   | Bulk Drug  |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 5  |
| 7.     | Date of Inspection   | 07.01.2017   |
| 8.     | Date of Closure Order  | 14.02.2017   |
| 9.     | Effective date of Closure of the unit  | 17.02.2017   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 23.02.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019   |
| 13.    | Period of non-compliance (no. of days)   | 42+946=988   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD-7560, pH 3.9                          |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>187.702</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0117283</b> ) |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 91**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Zorba Dyechem Plot No.- W-14, MIDC Tarapur                    |
| 2.     | Year of Establishment/Commissioning  | 2006  |
| 3.     | Product Type   | Dyes  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.3   |
| 7.     | Date of Inspection   | 12.01.2017  |
| 8.     | Date of Closure Order  | 14.02.2017  |
| 9.     | Effective date of Closure of the unit  | 17.02.2017  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 15.06.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 29.06.2017  |
| 13.    | Period of non-compliance (no. of days)   | 36+15=51  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD-272, pH 4.8      |
| 15.    | Liable for Compensation  | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>3.230</b><br>Lakh INR (Distribution Recovery Cost Factor = |

|     |                 |                   |
|-----|-----------------|-------------------|
|     |                 | <b>0.0002018)</b> |
| 17. | Date of Hearing | 30.11.2019        |

**Table No. 92**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Prabhat Engineering Plot No.- L-50, MIDC Tarapur                                |
| 2.     | Year of Establishment/Commissioning  | 2015  |
| 3.     | Product Type   | Engineering (pickeling )  |
| 4.     | Category   | Red   |
| 5.     | Scale  | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.75  |
| 7.     | Date of Inspection   | 07.01.2017  |
| 8.     | Date of Closure Order  | 14.02.2017  |
| 9.     | Effective date of Closure of the unit  | 17.02.2017  |
| 10     | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | --  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | --  |
| 13.    | Period of non-compliance (no. of days)   | 42  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard effluent having COD - 296 pH- 2.2                      |
| 15.    | Liabe for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>7.979</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0004986)</b> |
| 17.    | Date of Hearing  | 30.11.2019  |

**Table No. 93**

| Sl. No | Item  | Details   |
|--------|---|---|
| 1.     | Name of Industry  | Aarviam Dye Chem Plot No.- L-9/2, MIDC Tarapur      |
| 2.     | Year of Establishment/Commissioning   | 1987  |
| 3.     | Product Type  | Dyes  |
| 4.     | Category  | Red   |
| 5.     | Scale   | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 20  |
| 7.     | Date of Inspection  | 12.01.2017  |
| 8.     | Date of Closure Order   | 14.02.2017  |
| 9.     | Effective date of Closure of the unit   | 17.02.2017  |
| 10     | Unconditional re-start Order date   | NA  |
| 11.    | Conditional re-start order date   | 18.05.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 20.06.2017  |
| 13.    | Period of non-compliance (no. of days)  | 34+36=70  |
| 14.    | Reason for Closure/non-compliance   | Discharge of substandard effluent having COD - 7400 |

|     |  |  |
|-----|--|--|
|     |  | pH - 11  |
| 15. | Liabile for Compensation   | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>4.433</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0002770</b> ) |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 94**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Dhanlaxmi Steel Plot No.- J-56, MIDC Tarapur                                      |
| 2.     | Year of Establishment/Commissioning  | 2012  |
| 3.     | Product Type   | Engg  |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.8   |
| 7.     | Date of Inspection   | 15.10.2016  |
| 8.     | Date of Closure Order  | 23.11.2016  |
| 9.     | Effective date of Closure of the unit  | 26.11.2016  |
| 10.    | Unconditional re-start Order date  | NA  |
| 11.    | Conditional re-start order date  | 03.03.2017  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 13.06.2019  |
| 13.    | Period of non-compliance (no. of days)   | 43+833=876  |
| 14.    | Reason for Closure/non-compliance  | not provided ETP for pickling effluent  |
| 15.    | Liabile for Compensation   | Yes   |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>55.475</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0034663</b> ) |
| 17.    | Date of Hearing  | 30.11.2019  |

**Table No. 95**

| Sl. No | Item   | Details   |
|--------|--|---|
| 1.     | Name of Industry   | Sarswati Steel (Shiv steel ) Plot No.- W-88/A, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning                            | 2012  |
| 3.     | Product Type   | Engineering   |
| 4.     | Category   | Red   |
| 5.     | Scale  | SSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 0.5   |
| 7.     | Date of Inspection   | 22.12.016   |
| 8.     | Date of Closure Order  | 29.12.2016  |
| 9.     | Effective date of Closure of the unit                          | 01.01.2017  |
| 10.    | Unconditional re-start Order date                              | NA  |
| 11.    | Conditional re-start order date                                | 18.10.2017  |

|     |  |  |
|-----|--|--|
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 04.01.2018   |
| 13. | Period of non-compliance (no. of days)   | 11+81=92   |
| 14. | Reason for Closure/non-compliance  | operating without consent , Discharge of untreated effluent discharge, not member of CHWTSDF |
| 15. | Liable for Compensation  | Yes  |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>5.826</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0003640</b> )             |
| 17. | Date of Hearing  | 30.11.2019   |

**Table No. 96**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Deep Industries Plot No.- W-146, MIDC Tarapur                                    |
| 2.     | Year of Establishment/Commissioning  | 2015   |
| 3.     | Product Type   | Engineering  |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 0.2  |
| 7.     | Date of Inspection   | 01.04.2017   |
| 8.     | Date of Closure Order  | 21.04.2017   |
| 9.     | Effective date of Closure of the unit  | 24.04.2017   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | ---  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | --   |
| 13.    | Period of non-compliance (no. of days)   | 24   |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard quality effluent  |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>1.520</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0000950</b> ) |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 97**

| Sl. No | Item   | Details                                  |
|--------|--|--|
| 1.     | Name of Industry   | SR Steel, Plot No.- W-80/A, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning                            | 2014                                     |
| 3.     | Product Type   | Engineering                              |
| 4.     | Category   | Red                                      |
| 5.     | Scale  | SSI                                      |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD) | 0.2                                      |
| 7.     | Date of Inspection   | 01.04.2017                               |

|     |  |   |
|-----|--|---|
| 8.  | Date of Closure Order  | 26.04.2017  |
| 9.  | Effective date of Closure of the unit  | 29.04.2017  |
| 10. | Unconditional re-start Order date  | NA  |
| 11. | Conditional re-start order date  | ---   |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 21.11.2017  |
| 13. | Period of non-compliance (no. of days)   | 209   |
| 14. | Reason for Closure/non-compliance  | ETP not found in operation, untreated effluent discharge in environment           |
| 15. | Liable for Compensation  | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>13.235</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0008270</b> ) |
| 17. | Date of Hearing  | 30.11.2019  |

**Table No. 98**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | J V Chem Industries, Plot No.- N-111,112, MIDC Tarapur                             |
| 2.     | Year of Establishment/Commissioning  | 2008   |
| 3.     | Product Type   | Chemical   |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 4  |
| 7.     | Date of Inspection   | 05.04.2017   |
| 8.     | Date of Closure Order  | 10.04.2017   |
| 9.     | Effective date of Closure of the unit  | 13.04.2017   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 04.07.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 06.03.2018   |
| 13.    | Period of non-compliance (no. of days)   | 9+246=255  |
| 14.    | Reason for Closure/non-compliance  | Discharge of Acidic substandard effluent outside factory premises COD – 24960 mg/L |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>16.148</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0010090</b> )  |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 99**

| Sl. No | Item                                | Details   |
|--------|-------------------------------------|---|
| 1.     | Name of Industry                    | Shriyans Chemical, Plot No.- W-43, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning | 2002  |

|     |  |   |
|-----|--|---|
| 3.  | Product Type   | Chemicals   |
| 4.  | Category   | Red   |
| 5.  | Scale  | SSI   |
| 6.  | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 1   |
| 7.  | Date of Inspection   | 05.04.2017  |
| 8.  | Date of Closure Order  | 05.04.2017  |
| 9.  | Effective date of Closure of the unit  | 08.04.2017  |
| 10. | Unconditional re-start Order date  | NA  |
| 11. | Conditional re-start order date  | 31.05.2017  |
| 12. | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 26.09.2019  |
| 13. | Period of non-compliance (no. of days)   | 4=849=853   |
| 14. | Reason for Closure/non-compliance  | Discharge of substandard quality effluent having COD -19680 mg/l                  |
| 15. | Liable for Compensation  | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>54.018</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0033753</b> ) |
| 17. | Date of Hearing  | 30.11.2019  |

**Table No. 100**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | The Pharmaceutical Product of India Ltd., Plot No.-N-24, N-25, MIDC Tarapur  |
| 2.     | Year of Establishment/Commissioning  | 1990   |
| 3.     | Product Type   | Bulk Drug  |
| 4.     | Category   | Red  |
| 5.     | Scale  | LSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 63   |
| 7.     | Date of Inspection   | 22.04.2017   |
| 8.     | Date of Closure Order  | 25.04.2017   |
| 9.     | Effective date of Closure of the unit  | 28.04.2017   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | --   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | ---  |
| 13.    | Period of non-compliance (no. of days)   | 131  |
| 14.    | Reason for Closure/non-compliance  | sample collected from inlet of ETP shows COD – 48000 m/L and outlet COD – 16 mg/L which seems malafide intentions of industry by diluting treated effluent with fresh water. |
| 15.    | Liable for Compensation  | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>24.888</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0015551</b> )  |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 101**

| Sl. No | Item   | Details  |
|--------|--|--|
| 1.     | Name of Industry   | Union Park Chemiclas Pvt. Ltd., Plot No.-E-11, MIDC Tarapur                      |
| 2.     | Year of Establishment/Commissioning  | 2000   |
| 3.     | Product Type   | Dyes   |
| 4.     | Category   | Red  |
| 5.     | Scale  | SSI  |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)   | 6  |
| 7.     | Date of Inspection   | 22.04.2017   |
| 8.     | Date of Closure Order  | 25.04.2017   |
| 9.     | Effective date of Closure of the unit  | 28.04.2017   |
| 10.    | Unconditional re-start Order date  | NA   |
| 11.    | Conditional re-start order date  | 26.06.2017   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance                        | 11.07.2017   |
| 13.    | Period of non-compliance (no. of days)   | 7+16=23  |
| 14.    | Reason for Closure/non-compliance  | Discharge of substandard Effluent having COD 3480 mg/L , SS 273 mg/L             |
| 15.    | Liabe for Compensation   | Yes  |
| 16.    | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>1.457</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0000910</b> ) |
| 17.    | Date of Hearing  | 30.11.2019   |

**Table No. 102**

| Sl. No | Item  | Details   |
|--------|---|---|
| 1.     | Name of Industry  | Lavino Kapoor Cottons Pvt. Ltd., Plot No.-H-1, MIDC Tarapur |
| 2.     | Year of Establishment/Commissioning   | 1990  |
| 3.     | Product Type  | Cotton  |
| 4.     | Category  | Red   |
| 5.     | Scale   | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day (CMD)                  | 1380  |
| 7.     | Date of Inspection  | 12.05.2017  |
| 8.     | Date of Closure Order   | 17.05.2017<br>08.08.2018                                    |
| 9.     | Effective date of Closure of the unit   | 11.08.2018  |
| 10.    | Unconditional re-start Order date   | NA  |
| 11.    | Conditional re-start order date   | 24.08.2018  |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | 26.09.2019  |
| 13.    | Period of non-compliance (no. of days)  | 9+399=408   |

|     |  |   |
|-----|--|---|
| 14. | Reason for Closure/non-compliance  | Discharge of substandard Effluent having COD 740 mg/L                             |
| 15. | Liable for Compensation  | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>77.513</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.0048433</b> ) |
| 17. | Date of Hearing  | 30.11.2019  |

**Table No. 103**

| Sl. No | Item  | Details   |
|--------|---|---|
| 1.     | Name of Industry  | M/s. Tarapur Environment Protection Society CETP (25 MLD), Plot No: AM-29, MIDC Tarapur.  |
| 2.     | Year of Establishment/Commissioning   | Enhanced capacity of 25 MLD since 2009  |
| 3.     | Product Type  | Collection, storage and treatment of effluent from member industries  |
| 4.     | Category  | Red   |
| 5.     | Scale   | LSI   |
| 6.     | Discharge Quantity as per the Consent in cubic meter/day CMD                    | 25 MLD  |
| 7.     | Date of Inspection  | Several continued inspections and monthly (1-5 times a month) sampling & analysis of CETP inlet & outlet effluent in a month since 2009   |
| 8.     | Date of Closure Order   | Though no closure direction, and hence conditional/unconditional restart thereof, issued during the limiting period <sup>1</sup> considered by the committee i.e. 28/4/2011 to 26/9/2019 for the purpose of distributing environmental damage cost and restoration cost among the polluting units, however, the CETP has been prosecuted by MPCB under the Water (Prevention & Control of Pollution) Act, 1974 and issued various directions w.r.t. non-compliances which have not been complied with.  |
| 9.     | Effective date of Closure of the unit   |   |
| 10.    | Unconditional re-start Order date   |   |
| 11.    | Conditional re-start order date   |   |
| 12.    | Date of inspection when the conditions at Sl. No. 11 was verified as compliance | Not applicable due to continued non-compliances/ violations (violations details also given under chapter 3 of this report)  |
| 13.    | Period of non-compliance  | Period of non-compliance has been considered from beginning and end of the limiting period <sup>1</sup> considered by the committee i.e. 28/4/2011 to 26/9/2019 for the purpose of distributing environmental damage cost and restoration cost as periodical sampling & monitoring of CETP by MPCB reveals violations prior to the said limiting period <sup>1</sup> and violation of various directions as given at Sl. 14 of this table. The segmented non-compliance periods, as per dates of various directions issued (which are not complied), are as |

<sup>1</sup> This reporting period has been considered by the committee for the purpose of its report only so as to limit the period taking reference from section 15(3) of the National Green Tribunal Act, 2010

|     |                                   |  |
|-----|-----------------------------------|--|
|     |                                   | <p>below:</p> <p><b>(i) First non-compliance period</b> = starting date of the said limiting period<sup>1</sup> i.e. from 28/4/2011 to the day before date of the first direction (which are non-complied) issued by MPCB during the said limiting period = 03/4/2012 - 28/4/2011 = 342 days</p> <p><b>(ii) First repeated non-compliance period</b> = date of the aforesaid first direction(which are non-complied) dated 04/4/2012 to the day before second date of directions (which are non-complied) issued by MPCB = 14/12/2012 - 04/4/2012 = 255 days</p> <p><b>(iii) Second repeated non-compliance period</b> = date of the aforesaid second direction(which are non-complied) dated 15/12/2012 to the day before third date of directions(which are non-complied) issued by MPCB = 18/01/2013 - 15/12/2012 = 35 days</p> <p><b>(iv) Third repeated non-compliance period</b> = date of the aforesaid third direction(which are non-complied) dated 19/1/2013 to the day before fourth date of directions(which are non-complied) issued by MPCB = 25/9/2013 - 19/01/2013 = 250 days</p> <p><b>(v) Fourth repeated non-compliance period</b> = date of the aforesaid fourth direction(which are non-complied) dated 26/9/2013 to the end date of the said limiting period<sup>1</sup> i.e. 26/9/2019 though non-compliances are continued beyond the said 26/9/2019 = 26/9/2019 - 26/9/2013 = 2192 days</p> <p>The committee has considered only up to fourth repeated violations (though the CETP has violated repeatedly beyond the same as given in Sl. No. 14 of this Table) to include deterrent effect for repeated violations in deriving accountability of the polluting units in recovering environmental damage cost and cost of restoration.</p> |
| 14. | Reason for Closure/non-compliance | Though closure direction was not issued being the common facility but has been prosecuted under the Water (Prevention & Control of Pollution) Act, 1974 in 2010, 2017 and 2018. Directions under Water (Prevention & Control of Pollution) Act, 1974/ Air (Prevention & Control of Pollution) Act, 1981 have also been issued time to time for improving the performance of the CETP and the same have not complied yet. The periodical sampling & monitoring of CETP by MPCB reveals continued violations prior to the said limiting <sup>1</sup> period recommended by the committee i.e.  |

<sup>1</sup>This reporting period has been considered by the committee for the purpose of its report only so as to limit the period taking reference from section 15(3) of the National Green Tribunal Act, 2010

|  |  |
|--|--|
|  | <p>28/4/2011, therefore, period of violations for CETP has been considered since 28/4/2011 to 26/9/2019. The average COD and BOD in CETP outlet has remained as 813.64 mg/l and 315.6 mg/l respectively exceeding the respective prescribed norm during the said limiting period<sup>1</sup> besides overflows (of untreated effluent from CETP) from CETP to the drain and thereby to creeks and seashore (more detailed non-compliances vis-à-vis standards given under chapter 3 of this report).</p> <p>Details of the directions issued by MPCB, which violated during the said limiting period, are as below:</p> <ul style="list-style-type: none"> <li>(i) <u>Directions dated 04.04.2012</u>: - Not to accept high COD effluent stream from the industries; CETP does not get overload resulting into non-performance or substandard performances; install online flow meter, pH meter &amp; TOC analyzer of inlet &amp; outlet with data logger &amp; real time display; submit complete proposal to achieve outlet parameters of CETP; discontinue receiving pretreated effluent from the unit when such effluent will not be able to be treated in CETP meeting outlet norms; etc.</li> <li>(ii) <u>Directions dated 15.12.2012</u>: - To restrict the effluent from the member industries to the capacity of CETP; introduce a system/mechanism of assessing the effluent from member industries &amp; informing to MPCB; submission concrete proposal for upgradation to achieve the standards; etc.</li> <li>(iii) <u>Directions dated 19.01.2013</u>: - To install TOC analyzer with data logging system by 30.04.2013; not to admit new members since the existing capacity of CETP is already exhausted; etc.</li> <li>(iv) <u>Directions dated 26.09.2013</u>: - To restrict inlet effluent quantity to CETP as 25 MLD; stop discharge of effluent from equalization tank and after secondary treatment; etc.</li> <li>(v) <u>Directions dated 20.02.2016</u>: - To install SCADA system and regular O &amp; M of the online system.</li> <li>(vi) <u>Directions dated 22.04.2016</u>: - To achieve discharge standards of BOD-30 mg/l within six months and meet other standards.</li> <li>(vii) <u>Directions dated 25.05.2016</u>: - To improve upon the treatment system.</li> <li>(viii) <u>Directions dated 26.09.2016</u>: - To install SCADA system by 15.10.2016 and upgradation of CETP</li> <li>(ix) <u>Directions dated 29.09.2016</u>: - Not to discharge substandard quality effluent to Navapur Sea; submit daily data/flow meter readings of CETP and daily data of flow meter reading of member industries; compliance of Hon'ble NGT order dtd. 09.09.2016.</li> <li>(x) <u>Directions dated 07.10.2016</u>: - Not to discharge substandard quality to Navapur Sea; operate online</li> </ul> |
|--|--|

|     |  |   |
|-----|--|---|
|     |  | <p>electronic flow meter/data logger and keep close vigil on incoming how to CETP; connect SCADA data of member industries to central server; compliance of Hon'ble NGT direction.</p> <p>(xi) <u>Directions dated 29.11.2016</u>: - To comply with consented disposal standards, maintenance of online monitoring data; connect SCADA system of industries at central server; constitution of vigilance team for CETP inlet &amp; outlet quality; etc.</p> <p>(xii) <u>Directions dated 21.01.2017</u>: - To improve upon the CETP performance.</p> <p>(xiii) <u>Directions dated 05.08.2017</u>: - To develop monitoring mechanism and implement.</p> <p>(xiv) <u>Directions dated 24.01.2019</u>: - To deposit Rs. 5.0 Lac/Day towards the remediation cost to the environment.</p> <p>(xv) <u>Directions dated 11.09.2019</u>: - To submit corrective steps on effluent being received higher than 25 MLD and reply why Environmental Compensation be not levied.</p> |
| 15. | Liabile for Compensation   | Yes   |
| 16. | Accountability in terms of recovery cost in meeting the environmental damage cost and restoration cost | <b>7231.470</b><br>Lakh INR (Distribution Recovery Cost Factor = <b>0.4518483</b> )   |
| 17. | Date of Hearing  | 30/01/2019  |

### ToR

#### Preparation of Detailed Project Report and Providing Consultancy Services for Remediation of Contaminated Sites in and around Tarapur MIDC, Maharashtra

##### 1. Background

MIDC Tarapur is an industrial estate set up by Maharashtra Industrial Development Corporation, Government of Maharashtra, in the year 1972. Tarapur is geographically located at 17°42'N 75°28'E 17.7°N 75.47°E and at an elevation of average 10 m above the MSL. Nearest highway is NH-8 connecting Mumbai to Ahmedabad. Tarapur MIDC is approximately 130 kms from Mumbai and 17 kms off the national highway NH-8. It is one of the largest chemical industrial estate in the State of Maharashtra. It is spread into 1028 hectares and has manufacturing units, specialty chemical manufacturing units, steel plants, textile plants, etc. Population in & around Industrial Area of 75 villages as per census 2001 is 1,84,345.

MIDC Tarapur, Tal Palghar Dist. Palghar, was declared by CPCB in 2009 among 88 critically polluting stretches in India. The Common Effluent Treatment Plant for industries in Tarapur MIDC, commissioned in 2006 do not meet discharge standards stipulated under the Consent to Operate by Maharashtra Pollution Control Board (MPCB). It has effluent collection and channelization pipeline network of about 59 km and the outlet of CETP is discharged into Navapur Seashore at distance of about 500 m from BPT (Break Pressure Tank)-2. Leakages from drains of CETP and overflow, illegal discharges and dumping of hazardous wastes have been noticed. Indiscriminate discharge of partially treated wastewater and other discharges have contaminated drains and ground water in and around Tarapur MIDC and have also impacted Creeks, and coastal sea.

In the matter of Original Application No. 64/2016 (WZ); Akhil Bhartiya Mangela Samaj & Ors. Versus Maharashtra Pollution Control Board & Ors., the Hon'ble National Green Tribunal constituted a committee to assess extent of damage, cost of restoration of the environment and also suggests steps for restoration of the environment. The committee's report outlines contamination in surface water and ground water.

The project is designed to provide a detailed site investigation, design of appropriate engineering solutions for remediation and implementation of the remediation of contaminated sites in and around Tarapur MIDC. This project is envisaged in two phases i.e. preparation of detailed project report (DPR) for remediation of each contaminated area in the first phase and subsequently undertaking environmentally sound remediation of these sites in the second phase of the project. The scope of implementing the project is described in Steps 1 to 8 in this ToR.

##### 5.2 Contaminated Areas in and around Tarapur MIDC

The aforesaid Committee's report reveal that drains and ground water in and around Tarapur MIDC are contaminated due to industrial activities which have also impacted Creeks and coastal areas. The said report of the committee is given at Annexure.....

Contamination at the various sites may be attributed to discharge of untreated wastewater and disposal of hazardous waste by various industry located in Tarapur MIDC.

Groundwater at some locations is at surface level forming water patches and swamps.

##### 5.3 Objective

The objective of this project is envisaged in two phases, i.e. preparation of detailed project report (DPR) followed by providing consultancy services for environmentally sound remediation of identified contaminated sites including coastal waters where effluent has been discharged. In phase-I, a detailed project report based on assessment studies and a technical bidding document with specifications for the approved remediation option should be prepared and in phase-II, the consultant should assess and monitor the remediation works so as to ensure that works are done as per the technical specifications and standards set for remediation. The objectives are to be achieved in following steps;

#### Phase-I

- (i) To assess the levels and nature of contaminants in surface water bodies (including coastal water), ground water and soils/sands/sediments in and around the Tarapur MIDC due to industrial effluent discharges from MIDC Tarapur including dumping of hazardous wastes;
- (ii) Detailed reassessment studies;
- (iii) Prepare detailed project report along with technical and engineering designs for remediation /rehabilitation plans;

#### Phase-II

- (iv) Monitoring and assessment during remediation works; and
- (v) Validation of remediation works and preparation of post-remediation monitoring plan.

Although the proposed project may not necessarily bring direct economic benefits; it will generate long term environmental and social benefits. These benefits will be mainly associated with a reduction in air, water and soil pollution and hence an improvement in human health and the environment.

## 5.4 Scope of Work

### 5.4.1 Phase-I works

To prepare a detailed project report for contaminated sites in and around Tarapur MIDC area in phase-I, which includes identification & assessment of contaminants, delineating the contaminated areas, and areas needing remediation as discussed and agreed with MPCB, detailed site investigation & characterization, risk assessment studies, selection of remediation criteria, outlining remediation options, preparation of detailed technical document with specifications for the selected remediation option in steps 1 to 5 as specified below;

#### *Step 1. Preliminary investigations of the contaminated site and development of site conceptual plan & sampling protocols*

- Reconnaissance of surface and water bodies in and around MIDC area including coastal waters through field visits, visual site inspections, review of existing documents, maps and literature and carry out the following activities.
  - Current sources contributing to the pollution of the site and disposal practices in the influence area.
  - Collection of history/background information of the contaminated site
  - Basic features of the site i.e. collection of available information on the site like site maps (topographical, geological), hydro-geological information, information from local authorities, information on the type of polluting-sources, storage and disposal of raw materials, by-products, waste water and wastes at site.
  - Study of previous site investigation reports

- Nature, location, type and characteristics of the site
  - Site photographs
  - Identification of previous and current land use pattern of the site
  - Identification of parameters causing immediate threat to the ecology and environment.
  - Discussion with local people and other informed people, district administration, municipal and regulatory authorities, NGOS, etc.
- Selection of the available observation wells (Bore Well) in the watershed covering the site, for monitoring water level and quality monitoring at appropriate locations, & Inventory details like total depth of the well, Water column; Frequency of sampling (Pre monsoon/ Post monsoon)
  - Description of area with respect to existing land use, potential areas of environmental/ecological risk including affected seashore/beach area, demographic profile, social economic and environmental conditions of the people in receptor areas, flora and fauna, etc.
  - Preparation of groundwater level contour maps w.r.t. msl; ascertaining groundwater flow direction.
  - Collection of preliminary samples and analysis of soil, sub-soil, surface water, sediments, ground water for comprehensive analysis of major ions and heavy metals, organic constituents, and other relevant parameters related to the contaminated site as per national / international accredited testing procedures.
  - Develop a sampling protocol aimed at assessing the contamination level of the site and to establish the baseline environmental status of the project area. The protocol shall include identification of criteria pollutant (parameters) for analysis, sampling frequency (number of seasons), number of samples, etc. and shall be submitted for approval of MPCB.
  - Identification of Benchmark /Background samples.
  - Use of rapid assessment tools / methods (for Field & Laboratory analysis)
  - Outlining the extent of contaminant plume through surfer maps Submission of report based on preliminary findings.
  - Development of conceptual site plan/model. The conceptual site plan comprise three elements (i) Potential sources of contamination, (ii) Potential receptors that may be harmed and (iii) Potential pathways linking the two

***Step 2. Detailed site investigation and characterization***

- Drilling of sampling bore-holes in and around contaminated sites.
  - Water quality assessment, geochemical analysis - analysis of criteria pollutants, specification of heavy metals, isotopic signatures etc.
  - Collect data on Geological, hydrogeological and hydrological features of the contaminated site - if required necessary studies shall be carried.
  - Groundwater flow processes & contaminant transport processes to visualize the contaminant plume in groundwater.
  - Clearly delineate the boundaries, longitudinal and cross section of the contaminated site through topographic and other engineering surveys and prepare a base map of the project site.
  - Development of groundwater flow, surface water flow, and mass transport models.
  - Estimate the quantity of contaminants and their concentrations including secondary pollutants.
- The expected approach for detailed site investigation:
    - i. The area of investigation should be identified considering the main pathways, air and water transport of contaminates.

- ii. Prior to any drilling or sampling work, a detailed map showing the site and its surroundings is required to document sampling points, findings and later the concentrations of contaminants. If such a map is not available, it should be generated based on a survey of the area.
- iii. All locations where effluents discharged/waste dumped shall be clearly identified. Available wells in the surroundings should be identified and tested for identified pollutant. The depth of the wells should be recorded and surveyed against mean seal level.
- iv. Drilling of test wells is necessary if existing wells are not appropriately placed or designed to gain consistent results.
- v. The depth of the bore wells should depend on the geological and hydro-geological conditions (minimum recommended depth is 30 feet). If these conditions are unknown, a test bore for geological logging needs to be installed. If results of the drilling reveal the presence of two aquifers, wells should not penetrate impermeable layer in-between. The filter sections of the wells should all be in same depth considering the geological conditions.
- vi. Background samples should be taken from up gradient wells. The groundwater flow directions shall be determined based on the water level measurements in the wells.
- vii. Surface water samples and sediment samples shall be collected from all identified surface water bodies including affected coastal waters. Composite samples are not recommended. Groundwater-monitoring along the down gradient should be carried out as per requirement.
- viii. About 2 samples each of contaminated soil, waste, ground water, sand, sediment/sludge, surface water representing each contaminated site should be tested comprehensively for all possible parameters (general parameters, inorganic compounds, metals, VOCs, PCBs, PAH, fractions of the TPH, halogenated organic compounds, etc.). The results shall be used for deciding on Constituents of Concern (CoC) and parameters for detailed investigation studies. The number of parameters for detailed investigations can be restricted as per the findings.
- ix. Soil/Sediment/Sand sampling shall be carried out in a grid pattern. The depth of sampling bore-holes shall be flexibly adapted to the extent of contamination (findings). According to the findings, the grid spaces can be reduced.
- x. Prepare a detailed sampling and analysis Protocol supported with a map providing the locations of the proposed sampling points, type of samples (surface water including affected sea area/groundwater/soil/contaminated soil/ waste/ash-from surface/subsurface etc.), indicating the number of samples and the parameter for analysis for detailed site investigations studies.
- xi. Intrusive investigation should include the soil underneath and surrounding the waste in order to identify the depth and extent of contamination.
- xii. If there is any potential source of contamination from any industry premises within or adjoining the identified contaminated sites, sampling should be carried from the premises of such industry to assess the impacts.
- xiii. Soil / contaminated soil or sand / waste samples collected should be tested for total concentration expressed in mg/Kg. The selected samples (in consultation with MPCB) should be tested for leachable concentration in mg/L in the leachate extracted as per Toxicity Characteristic Leaching Procedure (TCLP) or any standard methods of extraction such as APHA or USEPA, etc.

- xiv. Evaluation of the results should be carried out in order to identify potential sources pathways and receptors, and to identify the entire contamination quantitatively.
- xv. Waste should be tested as per Schedule-II of HOWM Rules, 2016

### ***Step 3. Risk Assessment***

- Socio - economic and environmental assessment of the contaminated area.
- Assess the potential environmental/ecological/health impacts on soil, ground water, surface water bodies including sea/coast area, population, flora and fauna
- Pathways of contaminant transport, fate of the contaminant and exposure.
- Assessment of toxicity, bioavailability, biodegradability and mobility of contaminants.
- Identification of significant receptors and establishing trigger values.
- Use suitable risk assessment model.
- Interaction with local groups. Reporting of meetings/opinions.
- Suggest risk based remediation standards

### ***Step 4. - Identification of remediation goals/objectives and preparation of Remediation plans***

- Identification of remediation goals/objectives.
- Identify list of prerequisite actions to be taken by stakeholders (including residents in pact area) before start of remediation works and after completion of remediation
- List and evaluate best options for remediation of the contaminated site including (soil, surface water including seashore/coast area, groundwater, etc.) based on economic feasibility, complexity, technology transfer from the international suppliers / agencies, effectiveness, execution aspects, previous performance, safety, locally available skills, etc.
- Assess the environmental and social impacts of remediation options, based on detailed field surveys and investigations
- Recommend at least 3 remedial options and appropriate implementation strategies along with cost of remediation for each of the options, considering the future land use and target contaminant concentrations. The options should be recommended based on (i) health and environmental risks due to the contamination, (ii) compliance with the standards based on techno-economic feasibility (iii) performance based approach that is based on verifiable success in similar situations.
- The implementation strategy should consider options such as technology neutral performance or conventional turnkey or Engineer-Procure-Construct (EPC) contracts. For each of the identified strategy, the consultant will analyze engineering, environmental and contractual requirements.
- Selection of a suitable site specific remediation technology

***Step 5. Design of remediation plan and submission of DPR along with technical document with detailed specification***

Submission of detailed project report along with remediation plan for the approved remediation option, comprising detailed designs, engineering drawings, cost estimates and implementation schedule

**5.4.2 Phase-II Work**

In Phase-II, the consultants have to monitor and assess the remediation works (for the selected contaminated sites) being implemented by another contractor or an agency so as to ensure that remediation works are implemented as per the technical specifications and standards proposed for remediation followed by verification of remediation works and submission of post remediation monitoring plan, in Steps 6 to 8.

***Step 6. Preparation of bid documents and bid process Management***

- Based on the approved implementation strategy, the consultant will assist MPCB in preparation of necessary bid documents (RFP / tender documents, etc.).

***Step 7: Monitoring and assessment of actual Remediation works***

After award of remediation work, the consultant shall monitor and assess the implementation of the remediation works to ensure that all the activities are being carried out as per approved design and agreed terms and also provide technical advice on the quality of work. Duration of such assessment and monitoring will depend on type of remediation work.

During assessment and monitoring, the consultant shall (i) ensure that all the activities agreed as part of the contract complied with the technical standards (ii) monitoring the progress of work in accordance with QC/QA and (iii) conduct random investigations/sampling/tests to verify the implementation works.

The Consultant shall provide the details of staff & deployment schedule to accomplish the task.

***Step 8. : Validation of Remediation works***

The consultant on completion of the remedial plan will carry out a confirmatory sampling, to demonstrate that the contamination has been removed or stabilized effectively and the remediation objectives have been achieved.

The consultant shall recommend a long term monitoring plan for post remediated site and suggest key environmental attributes for such activity.

**5.5 Finalization of Remediation Plan**

The consultant is required to submit atleast 03 alternate remediation options for each site with techno-economic feasibility and also in conformity to remediation criteria approved by Technical Expert Committee (TEC) constituted by MPCB. Detailed engineering design shall be prepared only for the remediation option approved by MPCB.

The final remediation plan should provide detailed remediation options with complete engineering solution that can be implementable in the country for the particular contaminant under investigation.

The report is subjected to more detailed review as and when appropriate, to allow decisions to be made on the interventions and possible remediation goals.

The consultant shall work in association with project team of MPCB and report its progress of work regularly to the members of the Project Steering Committee constituted by MPCB in this regard.

**5.6. Data Services and facilities to be provided by MPCB**

If desired by the consultant towards executing of above referred services, the MPCB shall provide

- Relevant reports available with MPCB
- Write letter to relevant agencies for making relevant reports and data available to the consultant, however to get the necessary data and reports would be sole responsibility of the consultant.
- All deliverables shall be provided by the consultant in color hardcopy (6 copies) and in electronic form.

**5.7 Final outputs (i.e. Reports, Drawing, etc.) that will be required of the consultant Delivery Schedules.**

| Activities/Deliverables   | Time in Months |   |   |   |   |   |   |   |   |    |    |    |    |    |    |          |       |  |
|---|----------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----------|-------|--|
|   | Phase-I        |   |   |   |   |   |   |   |   |    |    |    |    |    |    | Phase-II |       |  |
|   | 1              | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16-36    | 36-42 |  |
| Report on Reconnaissance and Preliminary Assessment and Preliminary investigations of the contaminated site and development of site conceptual plan & sampling protocols (Step 1-2) | █              | █ | █ |   |   |   |   |   |   |    |    |    |    |    |    |          |       |  |
| Report on Detailed site investigation and characterization(Step 3)  |                |   |   | █ | █ | █ |   |   |   |    |    |    |    |    |    |          |       |  |
| Report on Risk Assessment(Step 4)   |                |   |   |   |   |   | █ | █ | █ |    |    |    |    |    |    |          |       |  |
| Report on Identification of remediation goals/objectives and preparation of Remediation plans(Step 5)   |                |   |   |   |   |   |   |   |   | █  | █  | █  |    |    |    |          |       |  |
| Report on Design of remediation plan and submission of DPR along with technical document with detailed specification (Step 5)   |                |   |   |   |   |   |   |   |   |    |    |    | █  | █  |    |          |       |  |
| Preparation of bid documents and bid process Management (Step 6)  |                |   |   |   |   |   |   |   |   |    |    |    |    | █  | █  |          |       |  |
| Monitoring and assessment of actual Remediation works (Step 7)  |                |   |   |   |   |   |   |   |   |    |    |    |    |    |    | █        | █     |  |
| Validation of Remediation works (Step 8)  |                |   |   |   |   |   |   |   |   |    |    |    |    |    |    |          | █     |  |

- Consultant is required to plan his resources keeping in view the above time schedule.
- The consultant is required to present the findings of study to the Project Steering Committee members constituted by MPCB for their feedback on quarterly basis.

- The approved final DPR shall be provided by the consultant in colour hardcopy (6 copies) and in electronic form.

### **5.8. Composition of Project Steering Committee (PSC) to Monitor Consultants Work and Technical Expert Committee (TEC)**

MPCB shall constitute Project Steering Committee (PSC) having members drawn from MPCB, CPCB and MIDC. MPCB shall also constitute a technical expert committee (TEC) for suggesting remediation criteria and for recommending remediation options. The exact composition of both the committees would be intimated to the consultant after contract finalization.

### **5.9. Procedure for Review of Progress Reports, Inception, Status, Final Draft and Final Reports**

The reports submitted by the consultant would be circulated among all the members of the Project Steering Committee (PSC) and Technical Expert Committee (TEC) by MPCB. The consultant would be required to make presentation of all the reports as per the delivery schedule sought to the above referred project steering committee constituted by MPCB and seek its comments/suggestions. The Project Steering Committee recommendations shall be incorporated / implemented by the consultant and in case of disagreement the decision of the Chairperson, Project Steering Committee shall be binding on both the parties.

### **5.10 Consultant Qualifications and Team**

The Consultant team should reflect their range of experience and expertise and the list of key professional positions whose CV & experience will be evaluated is as under:

| <b>S. No.</b> | <b>Key Position</b>                      | <b>Qualifications</b>  | <b>Professional Experience</b>   |
|---------------|--|--|--|
| 1.            | Team Leader                              | Post Graduate in Environmental / Civil/Chemical Engineering /Science Or relevant discipline              | Minimum 15 years experience, with excellent understanding of environmental issues in industrial effluent management; strong track record in systems for remediation of contaminated sites including coastal environment; ability to balance technical, regulatory, financial and community requirements; knowledge of international best practice in contaminated sites clean up remediation techniques and application of cost effective methodologies. |
| 2.            | Remediation expert-1 (assessment expert) | Post Graduate in Environmental / Civil/Chemical Engineering /Hydrogeology/Science or relevant discipline | At least 10 years experience in assessment of contaminated sites including in coastal environment, risk assessment, priority setting, management of industrial effluent,   |

|    |   |  |  |
|----|---|--|--|
|    |   |  | characterization & disposal effluent/ hazardous wastes.  |
| 3. | Engineering Design Specialist in Remediation works) | Graduate/Post Graduate in Environmental / Civil/Chemical Engineering / relevant discipline | At least 7 years of experience in designing remediation works including in coastal environment i.e pump and treat, designing landfills, extraction wells, impermeable barriers, liners, capping etc. |
| 4. | Social Development expert                           | Master Degree in Social Sciences / Sociology / Planning                                    | At least 5years experience in social development sector and social impacts   |

### 5.11. Terms of Payment

| <b>Terms of Payment</b>   | <b>Amount payable</b>   |
|---|---|
| After signing of contract   | 25% of contract value of Phase-I works against bank guarantee for equal amount)     |
| Preliminary Assessment, Report on Preliminary investigations of the contaminated site and development of site conceptual plan & sampling protocols for Detailed site investigation and characterization( <b>Step - 1</b> )  | 15% of contract value of Phase-I works  |
| Report on Detailed site investigation and characterization and Report on Risk Assessment( <b>Step - 2&amp;3</b> )   | 25% of contract value of Phase-I works  |
| Report on Identification of remediation goals/objectives and preparation of Remediation plans, Report on Design of remediation plan and submission of DPR along with technical document with detailed specification and Report on Preparation of bid documents and bid process Management( <b>Step – 4 to 6</b> ) | 25% of contract value of Phase-I works  |
| Monitoring and assessment of actual Remediation works ( <b>Step - 7</b> )   | 60% of contract value of Phase-II works   |
| Validation of Remediation works( <b>Step - 8</b> )  | 40%of contract value of Phase-II works + 10% of the contract value of Phase-I works |

Item No. 07

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI  
(Through Video Conferencing)**

Original Application No. 64/2016 (WZ)  
(M.A. No. 400/2016)

Akhil Bhartiya Mangela Samaj & Ors. Applicant(s)

Versus

Maharashtra Pollution Control Board & Ors. Respondent(s)

Date of hearing: 26.09.2019

**CORAM : HON'BLE MR. JUSTICE S. P. WANGDI, JUDICIAL MEMBER  
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER  
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

For Applicant(s): Ms. Gayatri Singh, Senior Advocate along with Ms. Meenaz Kakalia, Advocate

For Respondent (s): Mr. Rahul Garg, Advocate for MoEF & CC  
Mr. Kanetkar, Senior Counsel alongwith Ms. Manasi Joshi, Advocate for Respondent No. 1  
Mr. Pradnyesh Oregaonkar i/b Little & Co.  
Mr. Sudhir Amlrive, Executive Engineer, MIDC, and Mr. Rajendra Totala, Dy. Engineer, MIDC, Tarapur for Respondent No. 2  
Mr. Ruturaj Bathe, Advocate for Respondent No. 3

**ORDER**

1. The grievance expressed by the applicant is severe environmental and ecological degradation of the water bodies situated in the vicinity of the Tarapur MIDC caused by the discharge of untreated sewage and industrial effluent in MIDC and the release of

unauthorised volume of effluent in excess of the permitted limit by the Maharashtra Pollution Control Board in the Arabian Sea at Navapur as well as in the water bodies in the vicinity of Tarapur MIDC from the Common Effluent Treatment Plant. This has impacted the livelihood of the fisherfolk and the health of the people in habiting this area and caused degradation of the aquatic ecology. The affected water bodies include Murbe creek running through Murbe till Mahagaon, Murbe-Satpati creek and the Navapur-Dandi creek. The villages affected include Tarapur, Kamboda, Ghivali, Uchchheli, Dandi, Navapur, Alevadi, Murabe, Kharekuran, Satapati, Shirganv, Wadarai, Tembi, Dadara, Mahim and Kelave. The Tarapur Environment Protection Society (TEPS-CETP), the Respondent No. 3, comprises of industries of industries located in the Tarapur MIDC and was formed for taking care of matters relating to environmental protection and pollution control in Tarapur MIDC industrial area. It was commissioned as a primary treatment plant with a capacity of 20 MLD in 2006 which was subsequently enhanced to 25 MLD in 2009. A 59 kilometre effluent carrying pipeline runs throughout the industrial area to dispose treated/partially treated effluent to Arabian Sea at Navapur which is about 8 km away from MIDC.

2. It is stated that the Tarapur MIDC has a long history of being one of the most polluted industrial area in the country ever since it began functioning in 1972, showing flagrant violations of prescribed norms for industries.

3. The industrial area was identified as a critically polluted area in 1996 by the Central Pollution Control Board. The Central Pollution Control Board conducted a performance status of the CETPs in India which included the Tarapur CETP. It was recorded that *'Tarapur CETP (Maharashtra) has four-stage treatment but still these plants were not meeting standards. This reflects gross neglect in operation.'*
4. There have been frequent leakages from the CETP which have been recorded in several reports, resulting in high pollution levels in the water bodies that lie in its vicinity.
5. In 2010, the Central Pollution Control Board in association with the Indian Institute of Technology, Delhi, carried out an environmental assessment of the industrial clusters across the country with the aim of identifying polluted industrial clusters and prioritizing planning need for intervention to improve the quality of the environment in these industrial clusters. The Assessment was based on the Comprehensive Environmental Pollution Index (CEPI).
6. As per the CEPI index, industrial cluster within aggregate score of 70 and above are to be considered to be critically polluted. The aggregate CEPI score of Tarapur was found to be 72.01 and, therefore, identified as critically polluted. The Maharashtra Pollution Control Board is stated to have failed to monitor to ensure that the industries conform to the consent orders and, the Respondent No. 2 had failed to provide the requisite infrastructure for operations, repairs and upgradation of the effluent collection

system. In other words, the regulatory authorities like the SPCBs have not been as effective as expected as noted by the Hon'ble Supreme Court in *Techi Tagi Tara vs. Rajendra Singh Bhandari & Ors.* (supra).

7. In Original Application No. 95/2018 in the matter of "*Aryavart Foundation v. M/s Vapi Green Enviro Ltd. & Ors.*" in a similar situation prevailing in the Vapi Industrial Cluster, the Tribunal had passed certain directions. Considering the identical nature of the issues involved, we pass the following directions as in that case:

- (i) We direct constitution of following Committee to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units:
  - a) Representative of CPCB.
  - b) Representative of IIM, Ahmadabad.
  - c) Nominee of IIT, Ahmadabad.
  - d) Scientist nominated by NEERI.
  - e) Representative of GPCB.
- (ii) The Committee may give its report within three months. The Committee will be entitled to take any factual or technical inputs in the manner found necessary. CPCB will be the nodal agency for the purpose. The Committee may also suggest steps for restoration of the environment.
- (iii) The Committee may give hearing to the CETP operator and the units identified as polluting by the GPCB for which list will be

furnished by the GPCB to the Committee indicating the period and nature of default within one month.

- (iv) The GPCB may inform the defaulting units for compliance of this order.
  - (v) The GPCB may also consider exercise of its statutory powers of prosecution which power is coupled with duty.
  - (vi) Having regard to the entirety of the fact situation in the present case, we direct that, except for the green and white categories of industries, other category of defaulting industries connected to the CETP, shall deposit with the CPCB the following amounts towards interim compensation within one month:
    - a) Large Industries – Rs. 1 Crore each.
    - b) Medium Industries – Rs. 50 Lakhs each.
    - c) Small Industries – Rs. 25 Lakhs each.
  - (vii) The CETP on its part shall deposit a sum of Rs. 10 Crores with the CPCB towards interim compensation within one month.
  - (viii) The amount may be utilized by the CPCB for restoration of the environment.
  - (ix) The CPCB shall undertake jointly with GPCB extensive surveillance and monitoring of the CETP at regular intervals of three months and submit its report to this Tribunal.
  - (x) Copy of the order may be sent to CPCB by email and all reports in pursuance of the above directions be sent to this Tribunal at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in)
8. In order to ensure uniformity in the proceedings, it is felt appropriate that the matter should be heard in Court No. 1 where

similar cases including Original Application No. 95/2018: *Aryavart Foundation v. M/s Vapi Green Enviro Ltd. & Ors.* is under consideration.

9. We accordingly direct that this case be listed in Court No. 1 on 07.01.2020.

S.P. Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

26<sup>th</sup> September, 2019  
O.A. 64/2016 (WZ)  
MN



Upon Mentioning

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI  
(Through Video Conferencing)**

Original Application No. 64/2016 (WZ)

Akhil Bhartiya Mangela Samaj & Ors.

Applicant(s)

Versus

Maharashtra Pollution Control Board & Ors.

Respondent(s)

Date of hearing: 22.10.2019

**CORAM: HON'BLE MR. JUSTICE S. P. WANGDI, JUDICIAL MEMBER  
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER  
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

For Respondent (s): Ms. Manasi Joshi, Advocate for Respondent No. 1.

**ORDER**

1. On being mentioned by Ms. Manasi Joshi learned counsel for Gujarat Pollution Control Board, this case has been taken up.
2. It is submitted that on all places where the name of Gujarat Pollution Control Board appears, name of Maharashtra Pollution Control Board be inserted by substitution.
3. Let the above correction be made and the corrected order uploaded in the website.

S. P. Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

October 22, 2019  
Original Application No. 64/2016 (WZ)

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

Principal Bench, New Delhi

Original Application No. 64/2016 (WZ)

In the matter of: -

Akhil Bhartiya Mangela Samaj &amp; Ors.

Applicant(s)

Vs.

Maharashtra Pollution Control Board &amp; Ors.

Respondent(s)

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| 1.      | <b>Status Report</b> of the committee on Action Plan for remedial measures and restoration of contaminated water bodies in and around MIDC Tarapur in the matter of O.A. No. 64/2016 (WZ) titled as Akhil Bhartiya Mangela Samaj & Ors. Vs. Maharashtra Pollution Control Board & Ors. in compliance to Hon'ble NGT order dated 17.09.2020. |          |
| 2.      | <b>Annexure-I:</b> Copy of Hon'ble NGT order dated 17.09.2020.  |          |
| 3.      | <b>Annexure -II:</b> Action plan for controlling the further impact on environment due to partial/untreated effluent discharge and restoration/remediation of contaminated water bodies in and around MIDC Tarapur.   |          |
| 4.      | <b>Annexure -III:</b> Action plan on prohibition of use of contaminated ground water in affected areas in and around Tarapur MIDC till remediation plan is implemented.   |          |
| 5.      | <b>Annexure-IV:</b> Action plan on remedying the health of the inhabitants including providing healthcare to the affected individuals of in and around Tarapur MIDC.  |          |
| 6.      | <b>Annexure -V:</b> Environmental Compensation calculation applicable on the 25 MLD CETP operator for continued violations till the reported period i.e. 28/12/2020.  |          |
| 7.      | <b>Appendix-A:</b> Daily water supplied to MIDC Tarapur & effluent pumped into/from the CETP.   |          |
| 8.      | <b>Appendix-B:</b> Analysis results of inlet and outlet effluent of the 25 MLD CETP and the new CETP (as sampled & analysed by MPCB).   |          |



(Ajay Aggarwal)

Scientist-E

Central Pollution Control Board,  
Parivesh Bhawan, East Arjun Nagar,  
Delhi- 110032.

Date: 11.01.2021

Place: Delhi

**Status Report of the Committee on Action Plan for remedial measures and restoration of contaminated water bodies in and around MIDC Tarapur and their compliance status in compliance with order dated 17/9/2020 of the Hon'ble National Green Tribunal in the matter of Original Application No. 64/2016 (WZ); Akhil Bhartiya Mangela Samaj & Ors. Versus Maharashtra Pollution Control Board & Ors.**

## **1. Background**

The Hon'ble National Green Tribunal (NGT) vide its order dated 17/9/2020 in the matter of Original Application No. 64/2016 (WZ); Akhil Bhartiya Mangela Samaj & Ors. Versus Maharashtra Pollution Control Board & Ors. directed as below:

*"... 11. In view of the above, we direct that the reports of the Committee be acted upon and further steps taken for preventing damage to the environment and for its restoration. The restoration measures will include improvement of quality of environment as well as remedying the health of the inhabitants, including providing healthcare to the affected individuals. The amount assessed be recovered and if there is nonpayment, the statutory regulatory bodies will be free to take coercive measures, including closure of the polluting activities. The same be utilized for restoration of the environment in terms of an action plan.*

*12. The Committee already constituted will continue to function to oversee the remedial measures and will also include District Magistrate, Palghar. The nodal agency for coordination will be the CPCB and the District Magistrate. The Committee may prepare a restoration plan within one month. The timeline for execution should be as expeditious as possible. It will be open to the Committee to associate any other expert/institution and decide the mode of execution of the restoration plan. MPCB may, inter-alia, monitor water quality of creeks, water bodies in vicinity and ground water quality particularly of potable sources in use with reference to parameters relevant. The Committee may meet atleast once in a month and in case physical meetings are not viable, virtual meetings may be organized.*

*13. The Committee may give a status report of the steps taken after three months by e-mail at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in) preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.*

*The application stands disposed of except for consideration of the status report to be filed.*

*All pending applications will also stand disposed of.  
List for further consideration on 11.01.2021."*

Copy of the aforesaid order dated 17/9/2020 of the Hon'ble Tribunal is given at Annexure- I.

In order to comply with the aforesaid order of the Hon'ble Tribunal, the committee already constituted earlier with inclusion of District Magistrate Palghar held 07 meetings through video conferences during October-December 2020 on 1.10.2020, 8.10.2020, 22.10.2020, 5.11.2020, 19.11.2020, 4.12.2020 and 29.12.2020. The said committee including District Magistrate Palghar comprised of the following:

1. Dr. Manik Gursal, Collector and District Magistrate Palghar.
2. Prof. Chinmay Ghoroi, Indian Institute of Technology, Gandhinagar.
3. Prof. Anish Sugathan, Indian Institute of Management Vastrapur, Ahmedabad.
4. Shri Hemant Bherwani, Scientist, Director's Research Cell National Environmental Engineering Research Institute (NEERI) Nehru Marg, Vasant Nagar, Nagpur.
5. Shri D. B. Patil, Regional Officer, Navi Mumbai, Maharashtra Pollution Control.
6. Shri Bharat K Sharma, Regional Director, Regional Directorate, Central Pollution Control Board, Pune.

## **2. Preparation of Action Plan for remedial measures and restoration of contaminated water bodies in and around MIDC Tarapur**

The aforesaid committee prepared an action plan for remedial measures as per the earlier report (which has been accepted by the Hon'ble Tribunal and directed to be acted upon vide the aforesaid order dated 17/9/2020) as well as remedying the health of the inhabitants, including providing healthcare to the affected individuals. The concerned agencies i.e. MPCB, MIDC, Zilla Parishad Palghar, Central Ground Water Authority Nagpur, and CETP operator (M/s TEPS-CETP) were asked to submit their action plan. The compliance status have been reviewed during the aforesaid meetings by the committee.

Continuation of non-compliance of the 25 MLD CETP and also lack of an effective action points/measures from the concerned organizations have been observed and the same have been raised by the committed several times until MPCB's revised action plan was discussed during the 05th meeting held on 04.12.2020. MPCB addressed the basic up-gradation/retrofitting plan of CETP and the other action points required to meet the inlet and outlet norm for CETP effluent including the other environmental restoration/remedial measures.

Action plan for controlling the further impact on environment due to partial/untreated effluent discharge and restoration/remediation of contaminated water bodies in and around MIDC Tarapur, as prepared by committee, is given in column no. 2 and 3 of the table given at Annexure-II. The same has been prepared in line with the recommendations made in the

committee's report accepted by the Hon'ble NGT and directed to be acted upon vide the aforesaid order dated 17.09.2020 of the Hon'ble NGT. The action plan on the prohibition of the use of contaminated ground water in affected areas and remedying the inhabitants' health, including providing healthcare to the affected individuals in and around Tarapur MIDC have also been prepared and given at Annexure-III and Annexure- IV respectively.

### **3. Status of works/remedial measures undertaken as per the Action Plan**

All the aforesaid action plans given at Annexure- II, III and IV also outline action points and their compliance status by the corresponding agencies as on 28.12.2020 and following are the brief of works/remedial measures undertaken as per the said compliance statuses:

#### **3.1 Control of further impact on environment due to partial/untreated effluent discharge**

Based on compliance status, as reported by MPCB, as given at Annexure-II, the following works/remedial measures have been undertaken to control further impact on environment due to partial/untreated effluent discharge:

- (a) One module of 12.5 MLD out of the 04 modules (50 MLD) of the new CETP has been commissioned w.e.f. 22/11/2020. About 1.5-8.4 MLD is being received to the new CETP which currently has pipeline connection for conveying effluent as inlet only through Sump 1 of the existing 04 pipeline connections (i.e. Sump 1, 3, 4 and Gravity Mains) used for conveying effluent to the old 25 MLD CETP.
- (b) The 25 MLD CETP has voluntarily shutdown its operation for upgrading/retrofitting w.e.f. 26/11/2020 during which member units connected to this CETP also voluntarily closed their wastewater generation processes. The CETP is expected to start with 07 MLD effluent inlet from 30/12/2020. Details of water supplied and effluent generation and disposal of treated effluent are given at Appendix A.
- (c) Reduction of water supply in MIDC Tarapur from 38 MLD to about 25 MLD during the aforesaid volunteer shut down period of the 25 MLD CETP.
- (d) Besides earlier on-going weekly monitoring by MPCB, daily monitoring of inlet and outlet of the 25 MLD CETP from 26/10/2020 up to 26/11/2020 (till the CETP was in operation) were carried out. Thereafter, samples have also been collected & analysed up to 07/12/2020. The analysis results are given at Appendix B.
- (e) MPCB has deployed teams from 18/11/2020 for identification of units not complying with the CETP inlet effluent norms. 226 industries have been monitored so far.

- (f) District Magistrate, Palghar, has issued order on 04.12.2020 under section 144 and 133 under the Criminal Procedure Code 1973, banning water tanker movement in Tarapur MIDC w.e.f. 05/12/2020 to 02/2/2021 except Fire Tender vehicles and in extraordinary situations with written permission from MIDC.
- (g) Completed removal of deposited sludge from various CETP inlet and outlet sumps (Sump 1, 2 and 3) and module 1 (Equalization tank; Primary settling tank; Aeration Tank and Secondary clarifier) of the two modules of the 25 MLD CETP and common Collection tank and common Oxidation tank.

Further, for improvement in overall scientific operation and maintenance of the 25 MLD CETP works such as replacement of old SS-316 sluice gates within equalization tank inlet with new sluice gates; floating aerators to submerged mixers in collection equalization tank and scrapping system in primary flocculators and secondary clarifiers with new SS-316 scrapping system, etc. have been completed in the 25 MLD. Other activities are proposed/under process such as installation of SCADA; development of facility to treat high COD and high TDS streams, up gradation of CETP, etc., as given at Annexure-II.

### **3.2 Restoration/remediation of contaminated ground water and drains and, if applicable, the two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek) and seashore also**

The committee's report, which has been accepted and directed to be acted upon by the Hon'ble NGT, outlines – (i) selection of consultant to prepare Detailed Project Report (DPR) and provide consultancy services for remediation of contaminated ground water and drains as well as control impact on the water bodies from the drains/CETP outlet for the Phase-I (detailed investigation, remediation plan, etc.) and Phase-II (execution as per the remediation plan) activities; (ii) execution as per the DPR; (iii) recovery of derived damage and restoration cost from the respective 103 polluting units (who have also been directed to pay the same vide order dated 17/9/2020 of the Hon'ble NGT) to meet the said expenses on remediation expenses. The compliance status given at Sl. No. 16 to 20 of the Table at Annexure-II reveal that:

- (a) Work of finalization of IIT Mumbai as consultant is in progress by MPCB and has already discussed this issue in length with IIT and NGRI, Hydrabad.
- (b) MPCB has issued the directions on 23/10/2020 to all 103 units for deposition of damage and restoration cost. One unit has deposited damage and restoration cost of Rs. 14.23 lakh. Initiation of necessary action against the 102 units is in progress by MPCB in the light of the Hon'ble Supreme Court order dated 14/12/2020.

- (c) MPCB has decided to meet the remediation cost from the polluting units in case recovery of the damage and restoration cost from the units is delayed or not met partially or fully due to one or other reasons at any stage.

### **3.3 Prohibition of use of contaminated ground water in affected areas**

- (a) Ground Water Surveys and Development Authorities(GSDA) Palghar, and Sub-divisional Water Testing Laboratory carried out sampling and analysis of 86 water samples from Government marked bore wells or dug wells, and 535 water samples from private bore wells, of that 5 government and 61 private samples were found unfit for consumption due to iron and turbidity. Heavy metals were also tested in 10 randomly selected samples and were found within the prescribed limit for drinking water. However, the committee observed that limited parameters were carried out during such sampling and analysis and various pollutants expected to be present in the ground water due to industrial activities of Tarapur MIDC were not carried out such as Ammonia, Phenolic compounds, PCB, Pesticide and PAH besides heavy metals.
- (b) It was informed that the aforesaid 13 Grampanchayat and 16 village are having regional water supply scheme by MIDC for drinking purpose and it was also observed during their survey that the aforesaid sources are not used for drinking purpose and are used for domestic purpose like washing utensils, clothing, etc.

### **3.4 Remedying the health of the inhabitants including providing healthcare to the affected individuals of in and around Tarapur MIDC**

- (a) 16 villages (having 24,815 households with population of 91,016) have been identified which may potentially have health impact on the basis of representation received from applicant of the OA No. 64/2016 (WZ) i.e. Akhil Bhartiya Mangela Samaj to DM Palghar as affected villages.
- (b) Training to 129 healthcare officials have been imparted for active and passive health survey, screening and specialist camp.
- (c) 55,844 among the aforesaid population of 91,016 have been covered in house-to-house health survey conducted by District Health Officers/Taluka Health Officers. The rest population goes out for work and hence could not be covered in the survey. The following suspected persons have been surveyed:

|                                |   |     |
|--------------------------------|---|-----|
| (i) Skin infection             | = | 361 |
| (ii) Respiratory ailments      | = | 100 |
| (iii) Tuberculosis             | = | 14  |
| (iv) Suspected cancer symptoms | = | 21  |

(d) Health screening camps for the surveyed people (planned during December 2020 but could not be done due to other activities of National Programmes) will be arranged in 3rd week of January 2021. Thereafter, Specialist camp for follow up of screened /identifies patients will be conducted in the 4th week January or 1st week of February. Distribution of medicine and patients referral to tertiary healthcare centre will be carried out as per the requirement with effect from February 2021.

## 4. Recommendations

### 4.1 Control of further impact on environment due to partial/untreated effluent discharge

Although various works/remedial measures have been undertaken, as stated at para 3.1 above, w.r.t. the 25 MLD (old CETP) which is continuously non-compliant since the reported period from 2011 (as mentioned in the committee's report submitted to the Hon'ble NGT) but - (i) continued non-compliance of inlet and outlet effluent of CETP even after the aforesaid order dated 17/9/2020 of the Hon'ble NGT till its volunteer closure for up-gradation/retrofitting on 26/11/2020 (ii) not able to identify/list out units contributing to the higher hydraulic load and/or higher concentrated effluent to the CETP despite surveillance by separate teams of CETP and MPCB during such period, and; (iii) continued effluent discharge to CETP and discharge of effluent from CETP through sumps (though small in quantity of about 01-02 MLD) even during the said volunteer shut-down of CETP; reveal that there may be lack of system/arrangement to identify units who contribute higher concentrated effluent or higher hydraulic load to the CETP occasionally or continuously.

It is recommended that:

- (i) resumption of the 25 MLD CETP expected from 30/12/2020 may not be allowed by MPCB unless – (a) CETP operator or MIDC (who conveys effluent from units to CETP) individually or collectively takes the responsibility that they have mechanism in place to identify and report non-compliant units in the event of every occasion of higher hydraulic load/effluent quality being received at the CETP, and (b) the CETP demonstrates compliance to the prescribed outlet norms.

- (ii) If the CETP's volunteer shutdown continues, there is a need to assess supplied water (25 MLD) to MIDC Tarapur. Water intake/usage of individual units connected to the 25 MLD old CETP is to be correctly quantified (during the shutdown period) and compared with the water use pattern during normal operation period. MPCB should properly review the same.
- (iii) environmental compensation of Rs. 14,70,000/- (Rupees Fourteen lakhs seventy thousand only), may be imposed (calculation details given at Annexure- V) on the 25 MLD CETP operator and collected by MPCB for violating the prescribed inlet/outlet effluent norms w.e.f. 17/10/2020 (as order dated 17/9/2020 of the Hon'ble NGT). Hon'able NGT has directed that the reports of the Committee be acted upon and the committee's report outlines. Accordingly, in case the suggested measures are not implemented effectively and CETP (either existing or new) continues to perform non-compliance to the inlet/outlet norms for a month, and that no alternate arrangement is in place for disposal of effluent, MPCB may close operation of CETP including its member units (who discharge their effluent to the CETP) till the compliance is achieved. Whereas the 25 MLD CETP continued the violations till the analysis reported period i.e. 07/12/2020 (except on 28/11/2020). MPCB didn't close the CETP and CETP continues to receive effluent and discharge the same till the reported period of 28/12/2020. MPCB need to take appropriate step as per the Hon'ble NGT order.
- (iv) MPCB shall supervise generation of sludge and their proper storage and disposal including record maintenance during desludging of various sumps and treatment units/tanks of CETP in accordance with provisions of the Hazardous and Other Waste (Management and Transboundary) Rules, 2016.
- (v) MIDC shall ensure that abandoned old effluent conveying pipeline system in Tarapur is not being used for illegal discharges of effluent. The same be dismantled in time bound manner for which action plan be submitted to MPCB.

**4.2 Restoration/remediation of contaminated ground water and drains and, if applicable, the two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek) and seashore also**

There is need to expedite selection of consultant by MPCB to prepare Detailed Project Report (DPR) and provide consultancy services for remediation of contaminated ground water and

drains as well as control impact on the water bodies from the drains/CETP outlet for the Phase-I (detailed investigation, remediation plan, etc.) and Phase-II (execution as per the remediation plan) activities which has not been completed even after 03 months of order of the Hon'ble Tribunal.

The DPR preparation, detailed investigation/assessment, selection of remediation target level and appropriate remediation technologies and execution thereof will proceed only after selection of suitable consultant. MPCB shall, therefore:

- (i) complete selection of consultant on priority within a month and proceed DPR preparation, detailed investigation/assessment, selection of remediation target level and appropriate remediation technologies and execution thereof, etc. as recommended in the committee's report.
- (ii) proceed for recovery of the damage and restoration cost from the 103 units of the 102 units who have not yet deposited the same in accordance with order dated 17/9/2020 of the Hon'ble NGT and order dated 14/12/2020 of the Hon'ble Supreme Court.

#### **4.3 Prohibition of use of contaminated ground water in affected areas**

Although regional water supply scheme prevails in all the aforesaid 16 village and District Water and Sanitation Mission (DWSM) Palghar, has issued letters to BDO Palghar and concern Gramsevak for not to use the ground water for drinking purposes from the aforesaid 5 and 61 contaminated sources, however, for effective stoppage of use of drinking water from the contaminated ground water sources, there is need to;

- (i) Issue order by Zilla Parishad to ban use of ground water for drinking purpose unless water samples are analyzed comprehensively with respect to parameter expected to be contaminated due to industrial activities of MIDC.  
Advertisement in the local newspaper may also be issued in this regard as suggested by the committee in its 07<sup>th</sup> meeting held on 29/12/2020.
- (ii) identify villages other than aforesaid 16 villages which may potentially have impact due to industrial activities of Tarapur MIDC by the GSDA Palghar based on aquifer recharging and ground water flow data and, if need be, similar remedial approaches, as above for the said 16 villages, be extended to the identified villages.

#### **4.4 Remediating the health of the inhabitants including providing healthcare to the affected individuals of in and around Tarapur MIDC**

- (i) Advertisement about the on-going/ proposed house-to-house survey, health screening camp and specialist camp, etc. in the aforesaid 16 villages may be done in local newspaper.
- (ii) Health impact due to legal discharge from Tarapur MIDC may be in other villages also other than aforesaid 16 villages which were selected as affected villages on the basis of application of the applicant i.e. Akhil Bhartiya Mangela Samaj to the District Magistrate Palghar. To begin with secondary health data from primary health centre/ sub-centre in and around Tarapur MIDC population may be analyzed by DHO and the on-going/proposed house-to-house health survey, health screening camps, specialist camp, distribution of medicine and patients referral to tertiary care healthcare centre, etc., be extended to the identified affected villages.

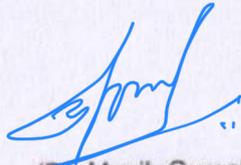
### **5. Conclusions**

The committee has completed preparation of Action Plans on Control of further impact on environment due to partial/untreated effluent discharged and Prohibition of use of contaminated ground water in affected areas and Remediating the health of the inhabitants including providing healthcare to the affected individuals of in and around Tarapur MIDC and also overseen their implementation during seven meetings conducted by the committee during Oct-Dec 2020. Status of works/remedial measures undertaken as per the Action Plan and recommendations are given under paras 3 and 4 above.

The compliance statuses reveal satisfactory progress towards Prohibition of use of contaminated ground water in affected areas and Remediating the health of the inhabitants including providing healthcare to the affected individuals.

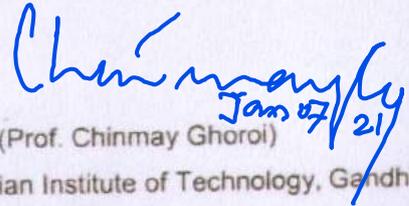
However, towards control of further impact on environment due to partial/untreated effluent discharge and Restoration/remediation of contaminated water bodies in and around MIDC Tarapur, there needs serious interventions including closure of the 25 MLD CETP as recommended under para 4.1 above. Since the action plan in this regard has already been prepared, the Hon'ble NGT may kindly consider further supervisions of the same under the Department of Environment, Govt. of Maharashtra, Department of Industries, Govt. of Maharashtra, and MPCB ensuring that concerned agencies effectively and expeditiously

enforce the action points, as deemed appropriate, as outlined in the action plan given at Annexure- II. These are the very urgent steps that require immediate attention. At the same time, MPCB needs to ensure no further tolerance to non-compliant/illegal effluent into or from CETP (old or the new CETP) or illegal discharge to the environment. .



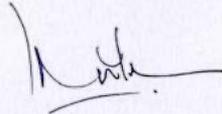
(Dr. Manik Gursal)

Collector and District Magistrate Palghar



(Prof. Chinmay Ghorol)

Indian Institute of Technology, Gandhinagar



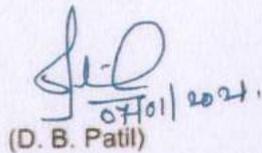
(Prof. Anish Sugathan)

Indian Institute of Management  
Ahmedabad



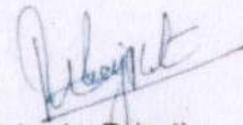
(Hemant Bherwani)

Scientist, NEERI, Nagpur



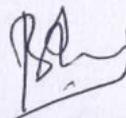
(D. B. Patil)

Regional Officer, Navi Mumbai  
Maharashtra Pollution Control Board



(Rajendra Rajput)

Regional Officer, Thane  
Maharashtra Pollution Control Board



(Bharat K Sharma)

Regional Director, Regional Directorate  
Central Pollution Control Board, Pune

Item No. 02

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

(By Video Conferencing)

Original Application No. 64/2016 (WZ)  
(M.A. No. 375/2017& I.A. No. 93/2020)

(With reports dated 18.06.2020 & 27.07.2020)

Akhil Bhartiya Mangela Samaj & Ors.

Applicant(s)

Versus

Maharashtra Pollution Control Board & Ors.

Respondent(s)

Date of hearing: 17.09.2020

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON  
HON'BLE MR. JUSTICE S. P. WANGDI, JUDICIAL MEMBER  
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

Applicant(s): Ms. Gayatri Singh, Senior Advocate and Ms. Meenaz Kakalia,  
Advocate

Respondent(s): Mr. Devashish Bharuka and Mr. Amit Agashe, Advocates for R-3  
and 9  
Mr. Aman Bhalla, Advocate for CPCB  
Mr. Mukesh Verma, Advocate for MPCB

**ORDER**

1. This application seeks direction to close polluting industries discharging effluents in the Arabian Sea and a direction not to grant permission for new industries till CETP norms are complied. Further prayer is to issue direction for restoration of the ecology of the area, including marine life, clearing the sludge and preventing discharge of untreated effluent into the Navapur river. Other incidental directions have also been sought. The area in question is in the vicinity of Tarapur MIDC in Palghar District, on the outskirts of Bombay in Maharashtra.

The affected water bodies include Murbe creek running through Murbe till Mahagaon, Murbe-Satpati creek and the Navapur-Dandi creek. The villages affected include Tarapur, Kamboda, Ghivali, Uchchheli, Dandi, Navapur, Alevadi, Murabe, Kharekuran, Satapati, Shirganv, Wadarai, Tembi, Dadara, Mahimand Kelave.

2. The application was filed before the Western Zonal Bench of NGT in the year 2016 and after issuing notice to the concerned parties, orders were passed from time to time. It will be suffice to refer to the last order dated 26.09.2019 which sums up the issue before the Tribunal and by which an Expert Committee was constituted to assess the extent of damage to the environment, after giving hearing to the CETP operator and the alleged polluting units, represented by respondents 3 and 9. The amount assessed is to be utilized for restoration of environment. Reference was made to an earlier order of the Tribunal in O.A. 95/2018, *Aryavart Foundation v. M/s Vapi Green Enviro Ltd. & Ors.*, dealing with the grievance against pollution caused on account of deficiencies in another CETP in Vapi, Gujrat. The Tribunal also directed collection of interim compensation from the alleged polluting units as well as CETPs at the scale specified in the order. The operative part of the order dated 26.09.2019 is as follows:

“7. *In Original Application No. 95/2018 in the matter of “Aryavart Foundation v. M/s Vapi Green Enviro Ltd. & Ors.” in a similar situation prevailing in the Vapi Industrial Cluster, the Tribunal had passed certain directions. Considering the identical nature of the issues involved, we pass the following directions as in that case:*

(i) *We direct constitution of following Committee to assess the extent of damage and cost of restoration of the environment and individual accountability of CETP and polluting industrial units:*

*a) Representative of CPCB.*

*b) Representative of IIM, Ahmadabad.*

- c) Nominee of IIT, Ahmadabad.
- d) Scientist nominated by NEERI.
- e) Representative of GPCB.

- (ii) *The Committee may give its report within three months. The Committee will be entitled to take any factual or technical inputs in the manner found necessary. CPCB will be the nodal agency for the purpose. The Committee may also suggest steps for restoration of the environment.*
- (iii) *The Committee may give hearing to the CETP operator and the units identified as polluting by the GPCB for which list will be furnished by the GPCB to the Committee indicating the period and nature of default within one month.*
- (iv) *The GPCB may inform the defaulting units for compliance of this order.*
- (v) *The GPCB may also consider exercise of its statutory powers of prosecution which power is coupled with duty.*
- (vi) *Having regard to the entirety of the fact situation in the present case, we direct that, except for the green and white categories of industries, other category of defaulting industries connected to the CETP, shall deposit with the CPCB the following amounts towards interim compensation within one month:*
  - a) *Large Industries – Rs. 1 Crore each.*
  - b) *Medium Industries – Rs. 50 Lakhs each.*
  - c) *Small Industries – Rs. 25 Lakhs each.*
- (vii) *The CETP on its part shall deposit a sum of Rs. 10 Crores with the CPCB towards interim compensation within one month.*
- (viii) *The amount may be utilized by the CPCB for restoration of the environment.*
- (ix) *The CPCB shall undertake jointly with GPCB extensive surveillance and monitoring of the CETP at regular intervals of three months and submit its report to this Tribunal.*
- (x) *Copy of the order may be sent to CPCB by email and all reports in pursuance of the above directions be sent to this Tribunal at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in).”*

The typing error of GPCB in place of MPCB was directed to be corrected by a later order.

3. Accordingly, the CPCB has filed its report dated 18.06.2020 on behalf of the Joint Committee recording that there is damage to the environment. Deficiencies found include discharge of waste water beyond prescribed norms, absence of proper management of sludge, violation of parameters in inlet and outlet of the CETP, contamination of ground water. It is found that restoration measures are required. Each aspect has been discussed in detail. The CETP and the industrial units have been given hearing. We may reproduce the conclusions of the Committee:-

## **“CONCLUSIONS AND MEASURES FOR RESTORATION OF THE ENVIRONMENT**

### **8.1 PERFORMANCE OF CETP AND MEASURES REQUIRED**

*The CETP Tarapur is **violating effluent discharge standards as well as CETP inlet design/inlet standards during the reported period of 28/4/2011 to 30/11/2019**<sup>1</sup>. The CETP is not adequate to treat the effluent currently being received. Besides it is also operating at beyond its hydraulic load capacity of 25 MLD and resulting into the overflow from the CETP during such duration and such overflow effluent is being discharged into to drains leading to other water bodies (creeks, sea and ground water).*

**8.1.1 PERFORMANCE OF CETP** (details given under chapter 3):

#### **8.1.1.1 Exceedance of parameters in previous sampling & analysis**

(a) *The analysis results (samples collected at 1 to 5 occasions in a month) of MPCB of the past five years since the year of application filed in the Hon’ble NGT by the applicant during the said reporting period of 28/4/2011 to 30/11/2019<sup>1</sup> reveal that:*

(i) **COD and BOD has hardly complied with the CETP outlet standards prescribed under the Consent to Operate while SS has not continuously complied.** *The average exceedances are more than 3, 10 and 2 times to the said standards*

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<sup>1</sup> This reporting period has been considered by the committee for the purpose of its report only so as to limit the period taking reference from section 15(3) of the National Green Tribunal Act, 2010 as mentioned in Chapter 5 of this report.

respectively since 2011 (may refer Fig. 3.4 and Fig. 3.5 and Annexure III). pH and O&G show consistent compliance with the stipulated CETP outlet standards.

(ii) **COD concentration in CETP inlet is not complying continuously to the design norms while BOD is also intermittently not complying since 2011** (may refer Fig. 3.4 and Fig. 3.5 and Annexure III). The average exceedances of COD and BOD are more than 2 times to the said design norms. SS, pH and O&G are complying with the CETP inlet design norms/standards.

(b) The sampling & analysis carried out jointly by CPCB and MPCB at various occasions (refer Table 3.4) during the said reporting period also reveals that the CETP did not meet discharge standards.

(i) The concentration of COD, BOD, Ammonical Nitrogen, Phenols, TSS and TDS in CETP outlet exceed the outlet standard prescribed under the Consent to Operate in all the 02 samples. The same exceed more than 4 to 15 times, 5 to 47 times, 1 to 8 times, 1.4 to 20 times, 1.28 to 20 times and 40.5 to 100.8 times respectively to the said standards.

(ii) In the inlet effluent also, Ammonical Nitrogen exceeded the inlet standard prescribed under the Consent to Operate in all the inlet samples except in one sample. The same exceed more than 2 to 7 times the inlet standard. COD and BOD also exceeded 1.5 times and 1.3 times respectively in one of the samples.

#### **8.1.1.2 Overflow from the CETP**

Though there is no proper arrangement to measure CETP inlet effluent as the flow meter installed at post equalization tanks which may not measure the overflow from equalization tanks or before. However, based on data provided by the CETP operator, the **monthly daily average CETP inlet effluent quantity has exceeded for 75 months than the designed capacity of 25 MLD** (refer Annexure IV). During such 75 months, the said average inlet to the CETP has been reported as 25.27 MLD having maximum monthly average daily inlet effluent quantity as 26.343 MLD against the said design of 25 MLD. This inlet overflow having high concentration of pollutants is discharged into the drains and leading to other waterbodies (creeks, sea and ground water).

#### **8.1.1.3 Exceedance of parameters during Sampling & Analysis carried out during the visit of the committee to CETP on 13/11/2019**

The analysis results of various samples collected during the visit of the committee and analysed in MPCB laboratory reveals that (refer Table 3.9):

- (a) among the analysed parameters, **COD exceeds more than 9 to 11 times; BOD 39 to 45 times; TSS more than 4 times; Phenols more than 1 to 2 times to the CETP outlet standards prescribed under the Consent to Operate.** Further, Iron and Arsenic also exceeded more than 28 to 44 and 17 to 64 times respectively to the said standards.
- (b) **BOD, COD and Phenols of influent is also exceeding more than 02 times, 1.6 times and 1.8 times respectively of the inlet design norm/standard.**

#### **8.1.1.4 Other observations made by the Committee during the visit on 13/11/2019**

(a) **The tertiary treatment (comprising Pressure Sand and Activated Carbon Filter) was observed to be defunct since long time.**

(b) The inlet design norms of CETP are BOD: 1500 mg/l & COD: 3500 mg/l. However, with the present way of functioning of CETP comprising primary, secondary and defunct tertiary treatment (Sand & carbon Filtration), **meeting of outlet standards (BOD: 30 mg/l, COD: 250 mg/l) prescribed by MPCB is not possible.**

(c) There were leakages from pipes & pumps and overflow of effluent from some units (equalization tanks/aeration tanks).

**There was heavy smell of SVOCs/VOCs (solvents/chemicals) near the inlet sumps.** Inlet of CETP (with BOD: 3150 mg/l & COD: 5680 mg/l) indicating that member industries discharging their untreated/partially treated effluent to CETP without conforming the inlet design norms of CETP. There is no separate arrangement for high COD and high TDS effluent. Also, no arrangement for treating the refractory COD. Thus, the operation of CETP is not efficient to meet the prescribed norms.

**CETP is not designed for such high strength effluent. CETP has no proper mechanism in place for routine monitoring of individual defaulter member units.**

(d) The flow meters and Online Continuously Monitoring System are not functioning consistently. The inlet flow meter has been provided after equalization tanks which may not take into account of overflow from or before of the equalization tanks.

(e) **Significant quantity of sludge is deposited (approx.-2400 MT) in the MIDC Sump-2 (10.56 Million Liters- capacity) where treated effluent is collected and thereafter conveyed to the sea shore through BPTs. Overflow/leakages were also observed from this sump to nearby natural drain which meets with Navapur Dandi Creek and further to the Arabian Sea. CETP operator informed that the operation of this Sump is under MIDC and responsibility lies with MIDC for proper maintenance and removal of sludge from sump.**

(f) *Inlet effluent quality standards are yet to be prescribed by MPCB for BOD & COD in the Consent of CETP as per MoEF&CC Notification dated 01.01.2016. The Consent stipulates that “Only for SSI units (having less than 25 CMD discharge effluent) BOD: 1500 mg/l and COD: 3500 mg/l is allowed and for rest of the industries, treated effluent as per their respective consents standards i.e. COD: 250 mg/l are allowed”.*

(g) *MPCB has authorized 07 Metric Ton/Day as CETP Sludge in the Authorization dated 29/11/2019 under Hazardous Waste (M, H & TM) Rules, 2008 for treatment and disposal of Hazardous Waste. The quantum of sludge generation in the CETP is more than such specified quantity.*

(h) *The stock of sludge about 750 MT stored in the premises shows storage of the same beyond the prescribed storage duration stipulated under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. The same require to be disposed immediately to the CHWTSDF.*

(i) **CETP needs thorough up-gradation/revamping of its units/processes in terms of capacity, retention time, automatic chemicals dosing, scraping mechanism, aeration tanks, aeration capacity, de-sludging, transfer pumps & pipelines, removal of corrosion affected equipment/materials, decanters and its capacity, sludge drying beds, etc. Moreover, persons at CETP need to be more sensitized through constant follow up and training.**

### **8.1.2 MEASURES REQUIRED**

*In view of consistent gross violation of the CETP w.r.t. influent flow and quality both exceeding the inlet design parameters; outlet effluent quality grossly exceeding the prescribed outlet standards; overflows from CETP to surroundings, and; CETP not adequate to meet the prescribed outlet standards; the following measures, most of which have also been recommended in the joint inspection report*

of MPCB & CPCB submitted to the Hon'ble NGT by CPCB vide email dated Jan 02, 2020, are recommended:

1. **Immediate measures:**

- (a) **In order to control further impact on water bodies (Drains, Creeks and Sea), the capability of CETP be immediately assessed in terms of hydraulic load and inlet effluent quality that the CETP is able to meet the outlet norms (stipulated under the Consent to Operate by MPCB) as per the existing infrastructures. The said assessment studies may be carried out by MPCB through the expert institute.**
- (b) *Based on the above assessment, the CETP shall receive only such limited hydraulic load and influent quality as prescribed in the said assessment. In order to ensure the same, the following may need to be enforced immediately after the said assessment and MPCB should constantly overview the activities of CETP:*
- (i) *MIDC to:*
- a) Remove deposited sludge (approx.-2400 MT) in the MIDC Sump-2 (10.56 Million Liters- capacity) where treated effluent is collected and also from other sumps/tanks, if any.**
- b) Ensure that the supply of water to MIDC Tarapur is so reduced (as compared to the current supply) and distributed that inlet quantity to CETP does not exceed the above prescribed CETP hydraulic load. Ensure that no overflowing/leakages from sumps/tanks etc. takes place during conveying the effluent to CETP or from CETP to seashore.**
- c) ensure that no bore wells operate in MIDC Tarapur to ensure the CETP hydraulic load does not exceed.**
- (ii) *MPCB in association with CETP shall identify units not having adequate facilities to meet the aforesaid assessed CETP inlet effluent quality and such units be directed to segregate their high concentrated effluent and be stored separately at existing CETP or new CETP in case such storage is available at the new CETP or dispose of in Common TSDF Talaja for incineration. Such storage should not be allowed beyond 06 months. Storage and disposal of the same should be closely monitored by MPCB at regular intervals.*
- (iii) *CETP must also initiate actions to identify units who are discharging higher concentration effluent and/or higher effluent quantity to CETP and shall stop such units from discharging into CETP immediately. The same shall*

*immediately be reported to MPCB who may take actions in addition to closure of such units. The CETP should also develop round the clock surveillance mechanism to identify the member units discharging more than higher concentration at inlet of CETP.*

*MPCB shall also monitor CETP inlet and outlet effluent preferably on the daily basis.*

***In case if the above measures are not implemented effectively and CETP (either existing or new) continues to perform non-compliance to the inlet/outlet norms for a month, and in case no alternate arrangement is in place for disposal of effluent, MPCB may close operation of CETP and its member units who discharge their effluent to the CETP till the compliance is achieved.***

*2. CETP shall take all necessary measures to control the influent quality & quantity besides improvement in overall scientific operation & maintenance of CETP with trained manpower and adequate analytical facility to keep watch on operational parameters at every stage of operation on a regular basis.*

***3. There should be proper surveillance of all units and the penalty mechanism for the defaulter units to be derived by M/s TEPS –CETP for member industries in addition to inspections of MPCB to ensure that all the member industries discharge the trade effluent meeting the norms as per their consent.***

*In case of non-compliance observed during M/s TEPS-CETP monitoring surveillance, the list of defaulting industries should be provided to MPCB from time to time for necessary action against such units. MPCB should take stringent action against industries as found in surveillance of MPCB & TEPS including the recovery of environmental Compensation and prosecution of industries as per environmental laws.*

*4. There is urgent need of common facilities such as Common MEE and Common Spray Dryer for High COD and High TDS effluent and such types of effluent should be separately collected and transferred to common MEE and Spray Dryer facilities with identification of such industries. Similarly, there should be some advanced method (such as advanced oxidation, Ozonation etc.) to reduce the significant COD. CETP may ensure commissioning of the same at the earliest. Till the same is commissioned, high COD and high*

*TDS effluent be stored at suitable place in case available at the new CETP under commissioning stage, for not more than 06 months, otherwise such effluent be disposed in Common TSDF Talaja by incineration. Storage and disposal of the same should be closely monitored by MPCB at regular interval and operation of such violators be closed besides other necessary actions by MPCB.*

*5. SCADA system for monitoring quality and quantity of individual member industry be commissioned by the CETP operator in association with industries and MIDC within 04 months. MPCB may ensure timely commissioning of the same.*

*6. CETP shall regularly send the CETP sludge to CHWTSDF for proper disposal.*

*7. The 55 units of 1216 industrial units in MIDC Tarapur, which are not member of the CETP, may be examined by MPCB w.r.t. waste water generation from their processes. In case it is found that their processes generate wastewater, necessary action be taken by MPCB.*

*8. MPCB to review authorization of CETP in terms of sludge quantity.*

*9. CETP is also required to work upon housekeeping of entire premises with cleanliness, plantation, internal roads etc.*

#### **8.2.1.2 DAMAGE TO THE WATER BODIES AND RESTORATION STEPS**

**8.2.1 DAMAGE TO THE WATER BODIES** (details given under chapter 4):

*The samples collected from various water bodies (drains, creeks, sea beach and ground water) in and around water bodies during November-December 2019 and their analysis results reveal that **ground water and drains are contaminated and there are impacts on creeks and seashores. Industries are discharging untreated effluent/solvent/chemicals to the drains of Tarapur MIDC. The polluted effluent from drains are received in creeks and finally to seashores. Seashore also receives effluent from the CETP not meeting to the discharge standards.***

##### **8.2.1.1 Drains passing through Tarapur MIDC**

*Water in drains in and around Tarapur MIDC area is contaminated with elevated levels of TDS, BOD, COD, TSS, Fluorides and Phenols besides acidic water in one or more drains - when compared with*

recommended screening standards for inland surface water in MoEF&CC's "Guidance document for assessment and remediation of contaminated sites in India". **Further, odour and colour was also observed in drain waters. Dissolved oxygen was absent in four of the 09 monitored drains. These indicate that industries are discharging untreated effluent/solvent/chemicals to the drains.**

Sediments were not exceeding screening levels prescribed in aforesaid guidance document, except for pH near M/s Everest Kanto which is highly acidic (where pH value was 2.34 at surface and 2.52 at depth of 30 cm from bed surface) indicating discharge of acidic effluent. pH of storm drain near Auro Lab was slightly basic having pH of 8.48 indicating discharge of basic effluent in the storm drain from industries.

#### **8.2.1.2 Groundwater in and around Tarapur MIDC**

High TDS and presence of BOD and COD in all the monitored ground water samples and presence of colour, odour, Chlorides, Fluorides, Sulphates, Total Ammonical Nitrogen, Metals (Lead, Copper, Iron and Manganese) in one or more samples of groundwater in and around Tarapur MIDC indicate that **groundwater in and around Tarapur MIDC area has been contaminated due to the industrial activities.**

#### **8.2.1.3 Creeks around Tarapur MIDC**

The two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek flowing North and South of Tarapur MIDC respectively) receiving polluted effluent from the drains of MIDC Tapaur were found having impact of discharges from such drains.

Elevated levels of COD and TDS at different stretches (where interference of water from Tarapur MIDC area begins). There was no DO in Creeks near Dumping ground (upstream of Navapur Dandi Creek) and Dandi Creek (downstream of Navapur Dandi Creek). Colour and odour were observed at different locations of the both the Creeks. Further, Phenols at downstream location of both the Creeks viz. Dandi Creek (downstream of Navapur Dandi Creek) and Murbe Creek (downstream of Kharekuran Murbe Creek) have been observed higher than other sampling locations of the Creeks and streams though the same are within the aforesaid standards.

#### **8.2.1.4 Seashores around Tarapur MIDC**

With regard to the seashores i.e. Navapur CETP outfall and Nandgaon, where the two creeks confluence into the sea, the results though do not reveal trend of elevated concentration of measured parameters near to Navapur CETP outfall beach and Nandgaon

beach, however, **presence of Phenols in both the beaches indicate impact of discharge from Tarapur MIDC.**

### **8.2.2 RESTORATION/REMEDIAL STEPS**

While measures for control of partially/untreated effluent from CETP has been outlined under para 7.1.2 above, there is need to remediate the contaminated ground water and drains as well as control impact on the two creeks (Navapur Dandi Creek and Kharekuran Murbe Creek) receiving discharges from the drains/CETP outlet.

#### **8.2.2.1 Remediation Plan and implementation**

As outlined in the “Guidance document for assessment and remediation of contaminated sites in India” prepared by the Ministry of Environment, Forest & Climate Change, Govt. of India, a detailed project report (DPR) for contaminated sites in and around Tarapur MIDC area needs to be prepared as Phase-I work which shall include delineation of the contaminated areas and areas needing remediation, detailed site investigation & characterization, risk assessment studies & identification of remediation goals/objectives and preparation of remediation plans thereof, selection of remediation criteria, outlining remediation options, preparation of detailed technical document with specifications for the selected remediation option. Further, investigation of sediments in drains and creeks are also necessary to rule out the need for remediation in sediments.

The above selected remediation plan needs to be executed by an agency. Therefore, in Phase-II, there is need to monitor and assess the remediation works being implemented in the field so as to ensure that remediation works are implemented as per the technical specifications and standards finalized under the aforesaid Phase I work. Besides, it is also required to prepare bid documents (RFP / tender documents, etc.) to identify the executing agency who shall execute the selected remediation plan.

It is recommended that the aforesaid steps of remediation may be implemented by MPCB identifying a consultant who may prepare the Detailed Project Report (DPR) and provide consultancy services for remediation of contaminated sites in and around Tarapur MIDC for the aforesaid two phases. ToR for selecting the consultant outlining scope of work, time schedule, consultant qualification and team, etc. is given at Annexure VI which may be helpful to MPCB in selecting the consultant and implementing the remediation work.

Till the remediation plan is implemented, **use of contaminated ground water in effected areas of in and around Tarapur MIDC may be prohibited for drinking purpose by Central Ground Water Authority, MIDC and District Administration.**

### **8.2.2.2 Expenses to be met for implementing the above remediation plan**

*The cost to be incurred in the aforesaid activities of Phase-I and Phase-II in remediation may be met from the “Super Fund” for which initial amount of Rs. 75 Crore has been suggested to be met as damage and restoration cost from the 103 polluting units which is in addition to the damage cost to sea and wetland as has been described under the Chapter 6 and 7 of this report. Depending upon the selected remediation options, the cost of remediation may increase or decrease to that of Rs. 75 Crores. In such case, the amount may be collected or refunded to each of the said polluting units, as the case may be, in the same proportion as the damage recovery cost has been recommended to be paid.*

***In case recovery of the remediation cost from the polluting units is delayed or not met partially or fully due to one or other reasons at any stage, the Govt. of Maharashtra may initially incur such assessment and remediation cost and initiate the remediation activities such as allocation of fund, selection of consultant, etc., as outlined under (ii) above, initiate in a month in consultation with MPCB.***

### **8.3 POLLUTING UNITS AND HEARING GIVEN TO THEM**

*In accordance with orders of the Hon’ble Tribunal, MPCB provided list of 221 defaulting units including the CETP in Tarapur MIDC as polluting units based on violation of discharge standards of individual units, discharge into storm water drain, drains passing through outside premises of the units, etc. and the actions taken i.e. Show-cause Notice, Closure Direction and other Interim/Proposed Directions issued under section 33 A of Water (Prevention & Control of Pollution) Act, 1974 since 28/4/2011. Hearing to the said listed units (of which 05 were absent) were given by the Committee during Nov 30 – Dec 03, 2019 where MPCB presented nature and period of violations. Representative of the respective unit was also given opportunity to submit records against such violations.*

*Based on observations made during the hearing, the committee requested MPCB to revise the list of polluting units as per recommendations of the committee (observations & recommendations details given at Chapter 5).*

*MPCB re-examined and identified 83 of the said 221 units as polluting units and another 20 units considering observations and recommendations of the committee for the purpose of imposing environmental compensation/damage restoration cost. MPCB also informed that the following recommendations of the committee were considered by MPCB in arriving 103 units as the polluting units:*

- (i) *Inclusion of only those units for which due records are available for establishing the violations;*
- (ii) *Exempting SSI units (having effluent discharge less than 25 KLD) who were found discharging effluent to CETP meeting CETP inlet consent norms of COD-3500 mg/l and BOD 1500 mg/l;*
- (iii) *Non-inclusion of violations which are not directly related to effluent discharge in to CETP or not causing damage to soil/surface water/ground water;*
- (iv) *Considering the period of default of five years since the date of making Original Application No. 64/2016 (WZ) i.e. 28/4/2011 to 26/9/2019 taking reference from section 15(3) of the National Green Tribunal Act, 2010, with regard to consideration of default for assessing environmental compensation and cost of restoration;*

*MPCB also revised period of violations for the aforesaid 103 identified polluting units for the purpose of imposing environmental compensation as per recommendations of the committee that in cases where closure directions have been issued, the period of default (N in days) has been taken as date of inspection till the effective date of closure of the unit. For other cases including where conditional restart order issued under the Water (Prevention & Control of Pollution) Act, 1974/ Environment(Protection) Act, 1986, the period of default has been taken as number of days(N) for which violation took place. Such N has been taken as the period between the day of violation observed/ due date of compliance of directions and the day as on which the compliance was verified by MPCB. MPCB has only considered closure and conditional restart directions period. The period between effective closure of the unit till the date of restart order issued by MPCB has not been considered as violation period.*

*The aforesaid additional 20 units were called for hearing by the committee on 27/1/2020 where MPCB presented nature and period of violations to each of the units from records available with them and representative of the respective unit was also given opportunity to submit records against such violations. All the 05 units, who did not attend the hearing during Nov.30 - Dec. 04, 2019, and falling under the said list of 103 units were also called to attend the hearing giving them another opportunity. However, only 01 of the said 05 units attended the hearing on 27/1/2020 besides 03 of the said 20 units also did not attend the said hearing.*

*Notices were also served by MPCB to the 83 units (who were called/given the hearing earlier during Nov.30 - Dec. 04, 2019) on*

28/1/2020 informing them to submit additional details, if any, by 31/1/2020. Replies received from 27 units of the said 83 units were examined by MPCB from the records available with them.

Thus, details of each of the 103 units (including CETP) identified as polluting units for the purpose of environmental damage cost/damage restoration cost along with nature and period of violation, prepared based on hearing given to them by the committee; recommendations of the committee; details submitted by the units to MPCB in support of compliance against the proposed violation details; vis-à-vis examination of records available at MPCB, as above, along with other details, as forwarded by MPCB, are given at Annexure V. Such unit wise details (given at Annexure V) have been used in deriving accountability of each of the 103 polluting units which includes the CETP also in terms of damage recovery cost in INR in meeting the estimated environmental damage cost and cost of restoration.

#### **8.4 ENVIRONMENTAL DAMAGE COST AND RESTORATION COST**

Environmental damage cost assessment has been done (as given in Chapter 6) for substandard effluent quality discharge from Tarapur CETP and industries into drains/coastal waters/drain. Approach of direct value transferred has been referred for assessment of environmental damage cost. The value transfer method has been used to calculate the economic value of benefits for the environment when an original study for valuation is not feasible. In order to estimate the damages done due to the discharge of pollutants to the Sea and the wetlands, the effluent discharge standard prescribed in consent issued by MPCB have been taken into consideration. The damage cost per kg of the load has been used for each standard exceeding pollutant (viz. COD, BOD and SS among the historic reported parameters) individually which is discharged in to the sea and the wetlands.

Environmental damage cost has been calculated within the aforesaid reporting period<sup>2</sup> of 28/4/2011 to 26/9/2019. The damage cost from the direct value transfer method is about 5.938 Crore INR for Sea and 79.014 Crore INR for wetlands considering inflation value. The above estimate is conservative as it only considers scope of damages due to effluent discharge beyond the standards on surface water wetlands. The impact on sea water pollution is also very conservative due to lack of better information on pollutants including nitrogen.

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<sup>2</sup> This reporting period has been considered by the committee for the purpose of its report only so as to limit the period taking reference from section 15(3) of the National Green Tribunal Act, 2010.

However, it has been found that the ground water is contaminated in the region besides having impacts on creeks and coastal sea water due to illegal discharges of effluent from the industries/CETP, which have not been valued in the above damage cost assessment. Instead cost to be incurred in their further detailed assessment (including other water bodies) and their remediation have been accounted as “Super Fund” and the initial amount for the super fund has been suggested as 75 Crores INR which may increase or decrease depending upon the selected remediation options based on outcome of the detailed assessment and application of other tools as suggested under para 8.2.2.1 above.

The total environmental damage cost has, therefore, been estimated as 85.042 Crore INR (79.014 + 5.938 Crore INR) and with creation of super fund having initial deposit of Rs. 75 Crore INR as environmental restoration cost.

Therefore, the total estimated environmental damage and restoration cost comes out to be 160.042 Crore INR.

#### **8.5 ACCOUNTABILITY OF POLLUTING UNITS INCLUDING CETP IN MEETING THE ENVIRONMENTAL DAMAGE COST AND RESTORATION COST**

Polluter Pay Principal and the methodology recommended in “Report of the CPCB In-house Committee on Methodology for Assessing Environmental Compensation and Action Plan to Utilize the Fund” have been used adding some additional features to meet objective of deriving accountability of each of the identified polluting units including CETP. The used methodology (details given in Chapter 7) gives distributed accountability among each of the identified 103 polluting units in terms of damage recovery cost in INR in recovering the estimated environmental damage cost and restoration cost of 160.042 Crore INR in terms of their respective pollution index depending on pollution hazard, scale of operation, load factor based on the population located around the industrial unit, number of days for which violation took place and also considering deterrence for repeat/habitual violators.

The said damage recovery cost along with the corresponding Distributed Recovery Cost (DRC) Factor, derived as above, for each of the 103 polluting units including CETP is given at Sl. No. 16 of the respective tables given at Annexure V.

The range of such accountability as damage recovery cost for meeting the said environmental damage cost and cost of restoration comes out to be 0.887 Lakh INR (to a SSI unit who has reported violation period of 14 days with no repeat violation) to 1042.241 Lakh INR (to a LSI unit having first violation for a period of 482

days, first repeat violation of 1150 days, second repeat violation of 58 days and third repeat violation of 309 days).

The accountability of the CETP comes out to be 7231.470 Lakh INR as damage recovery cost for meeting the said environmental damage cost and cost of restoration.

As suggested in Chapter 6, of the 160.042 Crore INR, 75 Crore INR may be deposited in "Super Fund" and in case based on the detailed assessment and selection of remediation options, the assessment & remediation cost exceeds or comes out to be lower than the 75 Crore INR deposited in the super fund, the additional amount may be deposited or returned back to that of the damage recovery cost to each of the polluting units, as the case may be, proportionate to that as has been recovered. The amount to be deposited or returned back to each of the 103 polluting units may be arrived by multiplying their respective "Distributed Recovery Cost (DRC) Factor" (given for each of the polluting units at Sl. No. 14 in their respective table at Annexure V) and the said increased or decreased amount to that of 75 Crore INR, as the case may be, as used in Equation (4) in Chapter 7."

4. Second joint inspection Monitoring Report has been filed by the CPCB on 27.07.2020 mentioning the steps taken after the earlier inspection and holding that there was continuous violation of environmental norms with the following conclusions and recommendations:

#### **"9. CONCLUSIONS:**

The analysis results of various effluent samples of CETP collected during the joint inspection-cum-monitoring on 12/3/2020 and various observations made under preceding paras reveal that no improvement has been made by the CETP operator to upgrade or improve performance of the CETP since the previous joint inspection conducted on 13/11/2019 except that of on-going de-sludging activities in Sump No. 2.

Therefore, the gross violations, also reported in earlier joint inspection report conducted on 13/11/2019, continue to be occurring in CETP operation as below:

#### **(a)Continued Non-compliance of CETP Inlet Effluent Quality with the Design Norms/Prescribed Limits**

**BOD and COD in CETP inlet effluent are exceeding 1.6 and 2.4 times the inlet design norms respectively; Phenol and TAN exceeding 1.6 and 5.5 times respectively and pH is 3.3 against the range of 6-9 prescribed under the Consent to Operate.**

**Each of the three inlet effluent sources to the CETP (viz. from MIDC Sump 1+ Gravity; MIDC Sump-3, and MIDC Sump-4) are also exceeding the aforesaid parameters in terms of respective CETP inlet design parameters/limit prescribed under the Consent to Operate and the effluent from MIDC Sump-3 contribute maximum exceedances among the three sources. (details given under para 3(a) of this report)**

**(b) Continued Non-compliance of CETP Outlet Effluent Quality with the Prescribed Limits**

*BOD, COD, TKN, TAN and Phenols in CETP outlet effluent are exceeding 48.3, 16.6, 9.9, 3.7 and 1.7 times respectively than the outlet limit prescribed under the Consent to Operate (details given under para 3(b) of this report)*

**(c) Continued exceedance of Hydraulic Load of CETP to the Design/Prescribed Limit and illegal Discharges**

*CETP is consistently not complying with design/consented capacity of 25 MLD and receiving excess effluent by about 3 MLD to the said capacity. The excess 3 MLD is being discharged into the adjacent storm water drain (originating from plot No. E-13 and further meeting into Navapur-Dandi creek through Salvad village).*

*Further, about 13 MLD of the CETP outlet effluent not conforming to the prescribed standard is also discharged through the said storm water drain into the Navapur-Dandi Creek violating to the consent condition that treated CETP effluent to be disposed at the designated Marine outfall point.*

*Other overflow from Sump No. 3 (used to pump the effluent to CETP ) also occurs intermittently and the same flows into the drain originating at Plot No. N-27, MIDC Tarapur and meeting to Murbhe-Kharekuram creek.*

**The above overflows may be causing further damages to the waterbodies which have been reported along with remediation measures in the report of the Committee submitted to the Hon'ble NGT vide email dated 19/6/2020 in compliance with orders dated 26/9/2019 read with order dated 22/10/2019 in the matter of Original Application No. 64/2016 (WZ); Akhil Bhartiya Mangela Samaj & Ors. Versus Maharashtra Pollution Control Board & Ors.**

*(details given under para 3(c) of this report)*

**(d) Poor CETP Sludge Management and inconsistency in CETP Sludge Generation**

*Inconsistency in CETP sludge sent to common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF), Taloja, indicates that **either CETP is not operated uniformly/regularly or there is wide variation in CETP inlet effluent quality or sludge is not sent to the CHWTSDF regularly.***

*Further, **there is poor management of sludge drying beds and sludge was found indiscriminately scattered in areas across Sump No. 2, Equalisation Tank and Sump No. 4 which may be because of overflows or poor management of sludge.***

*(details given under para 3(d) of this report)*

**(e) Continued Improper Operation of all Major Treatment Units of CETP & Sludge Depositions**

*None of the major treatment units of the CETP (viz. Equalization Tank, Primary Clarifier, Aeration Tank, Secondary Clarifier and Hypo-chlorite Oxidation Tank) are functioning properly whereas **Pressure Sand Filter and Activated Carbon Filters are completely defunct. Further, there could be sludge accumulation in equalization tank and aeration tanks due to poor operation.***

*(details given under para 4 of this report)*

**(f) Continued Improper CETP Inlet & Outlet Flow Meter Measurement and Non-operational Online Continuous Monitoring System**

*Online continuous monitoring system (OCMS) provided at CETP inlet and outlet are not in operation and in working condition. The flow meters provided as CETP inlet and outlet effluent measurement are installed at in appropriate places and, hence, not representing actual inlet and outlet flows.*

*(details given under para 5 of this report)*

**(g) Other Observations**

- *Updated information such as waste water handled, hazardous waste generated and sent to common TSDF, etc. are not being displayed in the display board (installed near entry of the CETP) as per the Hon'ble Supreme Court's order in WP(C) 657/1995 and Hon'ble NGT order in OA 804/2017*
- **A bore well is installed within the CETP premises without having requisite permission from concerned authority.**
- *About 102 M.T. and 10 M.T. of sludge are accumulated in sump No. 3 and Sump No. 4 (used for effluent inlet to CETP) occupying 60 % & 23 % of the sump capacity respectively. The same needs to be assessed and removed.*

- The Consent to Operate and Authorisation dated 24/12/2019 have been issued by MPCB to the new CETP at Plot No. OS-30(pt), MIDC Tarapur, for 25 MLD of the proposed 50MLD. B.  
(details given under para 6 of this report)

## **10. RECOMMENDATIONS:**

*In view of the consistent gross violation of the CETP w.r.t. quantity and quality both exceeding the CETP inlet design/standards parameters; outlet effluent quality grossly exceeding the prescribed outlet standards; significant illegal discharges of high concentrated effluent as overflows which may be causing further damages to the already damaged/affected waterbodies; etc., the recommended immediate and other measures in the report of previous joint inspection conducted on 13/11/2019 and submitted to the Hon'ble NGT vide email dated 02/1/2020 may be implemented.*

***Such measures outline various actions to be taken by CETP operator; MIDC and MPCB w.r.t. CETP assessment in terms of hydraulic load and inlet effluent quality; limiting the CETP inlet effluent as per the said assessment; removal of deposited sludge in various Sumps and tanks of CETP; non-operation of any bore wells in MIDC Tarapur; no overflowing/leakages from pumps/tanks etc.; identification of units discharging higher quantity and/or higher concentration effluent and/or higher quantity effluent to CETP and stopping the same; segregating high concentrated effluent; surveillance & penalty mechanism with recovery of environmental Compensation and prosecution of industries; improvement in overall scientific operation & maintenance of CETP; need of common facilities such as Common MEE and Common Spray Dryer for High COD and High TDS effluent; replacing underground drainage (from industrial premises to the MIDC drainage sump/pipeline) with over ground pipeline along with SCADA system; etc. including closure of the CETP in case the immediate measures are not implemented within Jan 31, 2020.***

*Copy of the said recommendations as recommended in the report of previous joint inspection conducted on 13/11/2019 and submitted to the Hon'ble NGT vide email dated 02/11/2020 is given at Annexure VII. The same may be enforced by CETP operator; MIDC and MPCB on priority and time bound manner including taking actions against other non-compliance observed in this inspection viz. updating information on the display board installed near gate of the CETP, installation of proper flow meters, making OCMS operational by the CETP operator and sealing the bore well at CETP and desludging Sump No. 3 and 4 by MIDC.*

*Though MPCB has taken actions as outlined under para 8 of the report but enforcement of the same needs to be expedited.”*

5. I.A. No. 93/2020 has been filed by Respondent Nos. 3 and 9 raising objections to the above reports of the Committee. The objections are set out as follows:

*“8. That the Applicants are, without prejudice to their right to contest the correctness of the findings contained in the said Reports by filing a detailed reply/ counter with the leave of this Hon'ble Tribunal, are submitting preliminary objections and comments to the said Reports, as under:*

- (a) The Report dated March 2020 is based on perfunctory investigation and relies on old/ historic and incorrect data pulled in from database of MPCB. The relevant and current data has not been collected and hence, not taken note of.*
- (b) The Committee has turned a blind eye to an unfair discretion used by MPCB in preparing alleged list of polluting units, on the basis of old data and for lack of availability of data of SSIs and many other units. The alleged final list of polluting industries as provide by MPCB, is manifestly arbitrary, irrational and prepared in a discriminatory manner (Reference — Chapter V Internal Page 59 to 62 of the Report dated March 2020).*
- (c) The Committee has neither done any new sampling nor has it carried out any field investigation as of today for verifying or ascertaining sources of effluents or sources from where the CETP is receiving alleged excess effluent load. The methodology applied by the Committee has thus vitiated the very purpose of the constitution of the Committee as a fact finding body.*
- (d) The Committee, relying on sole discretion of MPCB has excluded and exempted about 88% of the industries (including SSI and ZLD units) plus 55 non-member industries and also units in respect of which no data is available with the MPCB from any responsibility and has the placed entire burden onto less than 12% of the industrial units at Tarapur MIDC and the CETP managed by TEPS for the alleged environmental damage and restoration costs, which is neither legal nor acceptable for cause of environment protection (Reference Chapter V of the Report dated March 2020 read with Fig. 2.2 on Internal Page 7 read with 8.1.2 Para 7 on Internal Page 90 of the Report)*
- (e) The Report is prepared in breach of fundamental principles of natural justice. There was no real opportunity of hearing provided by the Committee to the representatives of the industrial units, which were arbitrarily identified as polluting units. The oral/ written representation made by these units has been totally ignored by the Committee and does not find any place of consideration in the entire Report;*
- (f) The Report fails to consider new technologies implemented by the industries including setting up of their own ETPs/STPs,*

*and investments made in taking various measures such as forestation drives, installing additional technologies for effluent treatment in their ETPs/ STPs, all for the cause of environment protection.*

- (g) The Report further ignores JVS (Joint Vigilance Sample) Reports, and compliances made by the industries from time to time, which were duly verified by MPCB.*
- (h) Imposing alleged environmental damage and restoration costs without providing evidence of any actual environmental damage at the subject MIDC location, is in itself illegal and strongly objected by the industries and their association at Tarapur.*
- (i) The methodology applied for calculating alleged damage and restoration cost is neither recognized nor legal nor correct. The period considered for fixing alleged individual liability is grossly erroneous. The Committee has also ignored past penalties paid by the industries and bank guarantees forfeited by the regulators for recovering compensation for alleged environmental violations/ non-compliances and has quantified the alleged damages and costs for the same period, causing double jeopardy and violating established principle of law that no person can be penalized twice for the same offence.*
- (j) Despite identifying list of total 14 natural and storm drains flowing through MIDC at Tarapur receiving sewage and human waste from five different villages surrounding the MIDC area, no efforts are made by the Committee to actually measure the impact/ contribution percentile of this sewage mixed in MIDC sewage disposal lines and its weightage impact on the sea waters or any other water bodies/ ground water etc.. (See Table 2.3 and Figure 2.3 on Internal page 9 and 10 of the Report)*
- (k) The Report does not bring forth evidence of any actual environmental damage to the water bodies and instead focuses on academic assessment of the same only for purpose of quantification of damages and restoration costs and placing accountability of the same on select industries which is done using theories/ formulae having no recognition in the eyes of law nor does the Report cites any precedents in which such assessment has ever been recognized by this Hon'ble Tribunal or any other Courts or Tribunals in India.*
- (l) The Report is totally unfair and biased against the industry. The Committee is suspiciously silent on role of MPCB (contesting Respondent No.1) and MIDC (contesting Respondent No.2), of their past and continued failure and breach of duties, as also vehemently pleaded by Akhil Bharatiya Mangela Samaj (original Applicant) in O.A. No. 64 of 2016 and also as pleaded by TEPS (Original Respondent No.3) in M.A. No. 375 of 2017 which pleadings and*

submissions are pending for consideration of this Hon'ble Tribunal;

- (m) *The Committee for the reasons best known to it, has totally ignored completion of the state-of-art 50 MLD (million liters per day) capacity new CETP plant constructed and installed by the Applicants and member industries by investing in excess of Rs.150 Cr. The Committee is further silent on the fact that said new 50 MLD CETP Plant, once commissioned in addition to existing 25 MLD plant will be able to treat up to 75 MLD of load, which is by far more than double the capacity of actual requirement of Tarapur Industrial cluster;*
- (n) *The Committee has erred in not considering the fact that the said new 50 MLD plant is ready to be commissioned immediately on completion of the work of laying a discharge/ disposal line by MIDC (Respondent No.2) which is pending for more than 4 years due to lackluster approach and inactions of MIDC.*
- (o) *The Committee has not mentioned the new 50 MLD plant in the chapter dealing with remedial measures, knowing that investment already put in by the industries will have to be factored in and alleged remedial costs and super fund that the Report recommends shall be wiped-off and/or drastically come down;*
- (p) *The Committee has not provided any logical reasoning, or actual calculations or quantification as to how it arrived at and made a provision for 'Super Fund' of INR 75 Crores and how such fund shall be utilized;*
- (q) *The Committee has irrationally held the Applicant TEPS damage and restoration costs, though 'TEN has taken every possible measure in its capacity to deal with the effluent load at the existing CETP plant. The Committee has intentionally ignored the fact that additional effluent load, if any received by CETP beyond its treating capacity is not the failure/ violation of the TEPS but is failure attributable to the regulators i.e. MPCB and MIDC who have total controlling powers to decide issuance of consent to operate, permitting expansion of industries, controlling supply of water etc. Despite this, Committee has for reasons unknown and possibly due to the influence and role of these statutory bodies, have refused to hold them responsible and accountable for alleged environmental damage at Tarapur, which in itself exposes false, irrational, arbitrary and discriminatory nature of the Reports submitted by the Committee.*
- (r) *The Applicants further state that the Reports seem to be full of contradictions. First of all, there is no conclusive evidence in the entire Report of any actual environmental damage. Except for vague statements about restoration measures, Report does not lay any definitive roadmap for protection of environment at Tarapur. Also, the Report has not appreciated water pollution*

*in terms of still or river water vis-a-vis flowing/tidal sea water and its long-time impact. Instead, these Reports are solely focused on quantifying and collecting money under the pretext of penalties, alleged restoration costs and creating alleged 'super-fund'. The contents of the Reports have no correlation with subject matter involved in the present original application and is unlikely to assist this Hon'ble Court in properly adjudicating this case."*

A letter has been filed by the Maharashtra Organo Metallic Catalysts Pvt. Ltd. objecting to the report on similar lines.

6. We have heard the learned Counsel for the applicant, the CPCB, the MPCB, the CEPT operator, respondent No.3 and the Tarapur Industrial Manufacture Association, Respondent No. 9.

7. At the outset, learned Counsel for the Respondent Nos. 3 and 9 have referred to orders of the Hon'ble Supreme Court dated 18.11.2019 in Civil Appeal No. 8539/2019, *Tarapur Environment Protection Society v. Akhil Bhartiya Mangel Samaj & Ors.* and order dated 18.12.2019 in Civil Appeal No. 9409/2019, *Tarapur Industrial Manufacturers Association v. Akhil Bhartiya Mangela Samaj Parishad & Ors.*, staying the interim order of this Tribunal dated 26.09.2019.

8. As against above, the stand of learned Counsel for the Applicant, the CPCB and the State PCB is that the said orders being only qua interim compensation, there is no bar to hearing of the matter and further orders being passed. Our attention has been drawn to para 1 of the memo of appeal in Civil Appeal 8539/2019 as follows:-

*"That the present Civil Appeal is directed against impugned interim order dated 26.09.2019 passed by the Hon'ble National Green Tribunal Principal Bench New Delhi in Original Application No. 64 of 2016 (WZ) **whereby, the Hon'ble Tribunal has imposed a penalty of Rs. 10 crores as interim compensation to be paid***

***by the appellant herein who manages and operates the 25 MLD CETP in Tarapur Industrial area.”***

9. We find merit in the contention raised on behalf of the applicant, the CPCB and the MPCB that the grievance raised before the Hon'ble Supreme Court is only against interim compensation and there is no stay against proceedings before this Tribunal for enforcement of environmental norms on consideration of the reports of the Expert Committee constituted by the Tribunal. We thus proceed to deal with the reports of the Committee.

10. We find that the reports of the Expert Committee have taken into consideration all relevant data after visit to the site and have considered the view point of the CETP operator and the Association of the industries. We do not find any reason to reject the report and the conclusions and recommendations therein. Application of 'Precautionary Principle' which is part of 'Sustainable Development' requires anticipatory action and scientific certainty before taking such remedial action is necessary, once an Expert Committee has found that there is continuous violation of environmental norms causing harm to the environment and health. Credentials of the Committee members and their expertise on the subject is beyond question. We do not find any merit in the objections of the contesting CETP and industries which will stand rejected and the report of the Committee is thus, accepted.

11. In view of the above, we direct that the reports of the Committee be acted upon and further steps taken for preventing damage to the environment and for its restoration. The restoration measures will include improvement of quality of environment as well as remedying the health of the inhabitants, including providing healthcare to the affected

individuals. The amount assessed be recovered and if there is non-payment, the statutory regulatory bodies will be free to take coercive measures, including closure of the polluting activities. The same be utilized for restoration of the environment in terms of an action plan.

12. The Committee already constituted will continue to function to oversee the remedial measures and will also include District Magistrate, Palghar. The nodal agency for coordination will be the CPCB and the District Magistrate. The Committee may prepare a restoration plan within one month. The timeline for execution should be as expeditious as possible. It will be open to the Committee to associate any other expert/institution and decide the mode of execution of the restoration plan. MPCB may, inter-alia, monitor water quality of creeks, water bodies in vicinity and ground water quality particularly of potable sources in use with reference to parameters relevant. The Committee may meet at least once in a month and in case physical meetings are not viable, virtual meetings may be organized.

13. The Committee may give a status report of the steps taken after three months by e-mail at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in) preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.

The application stands disposed of except for consideration of the status report to be filed.

All pending applications will also stand disposed of.

List for further consideration on 11.01.2021.

A copy of this order be forwarded to CPCB, IIM, Ahmedabad, IIT, Ahmedabad, NEERI, MPCB and the District Magistrate, Palghar by e-mail for compliance.

Adarsh Kumar Goel, CP

S. P. Wangdi, JM

Dr. Nagin Nanda, EM

September 17, 2020  
Original Application No. 64/2016 (WZ)  
(M.A. No. 375/2017& I.A. No. 93/2020)  
SN

## Annexure-II

### Action Plan and corresponding action points on remedial/restoration measures by various executing organisations on control of further impact on environment due to partial/untreated effluent discharge and restoration/remediation of contaminated water bodies in and around MIDC Tarapur in accordance with order dated 17/9/2020 of the Hon'ble NGT in the matter of OA No. 64/2016

| Sl. No<br>(1)   | Action points as recommended in the Committee's report for remedial measures/restoration of environment<br>(2)   | As per the committee report and order of the Hon'ble NGT<br>(3) |                            | Information to be provided by MPCB after reviewing and in consultation with MIDC and CETP operator (except for Sl. No. 18 and 19)<br>(4)   |                          |                               |  |
|---|--|---|----------------------------|--|--------------------------|-------------------------------|--|
|   |  | Time Target<br>(i)  | Responsible Agency<br>(ii) | Various activities proposed to meet the Action Plans as at Column<br>(i)   | Executing agency<br>(ii) | Proposed time target<br>(iii) | Compliance status as on 28.12.2020<br>(iv)                     |
| <b>Control of further impact on environment due to partial/untreated effluent discharge</b> |  |   |                            |  |                          |                               |  |
| 1   | In order to control further impact on water bodies (Drains, Creeks and Sea), the capability of CETP be immediately assessed in terms of hydraulic load and inlet effluent quality that the CETP is able to meet the outlet norms (stipulated under the Consent to Operate by MPCB) as per the existing infrastructures. The said assessment studies may be carried out by MPCB through the expert institute. | <b>Immediate</b>  | <b>MPCB</b>                | Due to sludge deposition in various treatment tanks, current hydraulic load of CETP has been assessed as about 07 MLD with COD<3500mg/l; BOD 1500 mg/ltrs.<br>The hydraulic load capacity will be resumed to 25.0 MLD based on progress of desludging and revamping of all units including bioreactor. | <b>CETP and MPCB</b>     | 19/11/2020                    | Complied.<br><br>Completed the said assessment by 19 Nov.2020. |

|   |  |  |      |   |   |           |  |
|---|--|--|------|---|---|-----------|--|
| 2 | Based on the above assessment, the CETP shall receive only such limited hydraulic load and influent quality as prescribed in the said assessment. In order to ensure the same, the following may need to be enforced immediately after the said assessment and MPCB should constantly overview the activities of CETP: |  | MIDC |   |   |           |  |
|   | (i) MIDC to:<br>a) Remove deposited sludge (approx.-2400 MT) in the MIDC Sump-2 (10.56 Million Liters- capacity) where treated effluent is collected and also from other sumps/tanks, if any.  |  |      | Removal of deposited sludge from Sump 2 | CETP                                    | June 2020 | Complied.<br>Desludging of sump-2, started on 01.04.2020 and completed on 16 June-2020.<br><br>About 5700 Metric Tons (MT) of sludge has been removed and disposed to CHWTSDF. |
|   | <b>In addition to Desludging of sump-2, MPCB identified requirement of Desludging of Sump-3 and other units of CETP (where there is accumulation of sludge) for efficient operation of CETP. Action plan of the same are as below;</b>   |  |      |   | Removal of deposited sludge from Sump 3 | CETP      | 05/12/2020   |

|  |  |  |   |             |  |   |
|--|--|--|---|-------------|--|---|
|  |  |  | <p>Module wise Desludging of the following units comprising of each module of the two modules of CETP in phased manner.</p> <p>A. 02 Equalization tank (ET) (3000 Cubic meter x 2 Nos)</p> <p>B. 01 Primary settling tank (PST)- 1450 Cum</p> <p>C. 01 Aeration Tank (AT)= 12256 Cum</p> <p>D. 01 Secondary clarifier (S.C.) = 1950 Cum</p> | <b>CETP</b> | <p>30/11/2020 (for one of the two modules of CETP )</p> <p>25/12/2020 (for the remaining modules of CETP )</p> | <p>Desludging of the said units as module- 1 of the CETP completed on 30/11/2020. About 3000 Cubic meter (approx. 1250 MT) sludge has been de-sludged and 563 MT sludge has been sent to CHWTSDF and remaining about 680 MT is drying at the site which will also be sent to CHWTSDF.</p> <p>Work of Desludging of other module started on 30/11/2020 and is in progress.</p> |
|  |  |  | <p>Desludging of common units in the two modules of the CETP after completion of Desludging work of aforesaid one module due to restriction in movement of equipment because of the said ongoing work;</p> <p>a) 01 Common collection tank (1000 Cum)</p> <p>b) 01 common Oxidation tank (1000 Cum)</p>                                     | <b>CETP</b> | 05/12/2020   | Complied.   |

|          |  |                  |             |   |             |  |   |
|----------|--|------------------|-------------|---|-------------|--|---|
|          |  |                  |             | Revamping of Pressure Sand filter (PSF) - 02 Sets (including conversion of ACF into PSF) in each of the two modules of the CETP.  | <b>CETP</b> | 25/12/2020 (for 1 <sup>st</sup> module of the CETP).<br><br>10/01/2021 (for the remaining module ) | Completed for 1st module of the CETP.<br>For the 2 <sup>nd</sup> module, media replacement work completed and work of tail end piping is under progress.  |
|          |  |                  |             | Commissioning of flow meters at Sump no. 3, 4 and Gravity main within the premises of CETP which are inlets of the CETP.  | <b>CETP</b> | 12/12/2020   | Flow meters installed and commissioning work are in progress which will be completed by 10/1/2021.  |
|          |  |                  |             | Commissioning of another flow meter at Sump-1 which is the only inlet to the new CETP   | <b>CETP</b> | 15/12/2020   |   |
| <b>3</b> | c) Ensure that the supply of water to MIDC Tarapur is so reduced (as compared to the current supply) and distributed that inlet quantity to CETP does not exceed the above prescribed CETP hydraulic load. | <b>Immediate</b> | <b>MIDC</b> | <b>Of about 26 MLD earlier effluent inlet to the old CETP; about 09+02 MLD would be diverted to new CETP from Sump-1 and 07 MLD to the old CETP. For the same the following action points are proposed:</b> |             |  |   |
|          | Ensure that no overflowing/leakages from sumps/tanks etc. takes place during conveying the effluent to CETP or from CETP to seashore.  |                  |             | Commissioning of two modules each of 12.5 MLD out of the 04 module (50 MLD) of the new CETP   | <b>CETP</b> | 30/06/2020   | 12.5 MLD of 50 MLD new CETP commissioned with charging of effluent w.e.f. 22/11/2020.<br>However, there was breakdown and repair work in treated effluent disposal line of MIDC during 15/12/2020 to 20.12.2020 during which water supply was also stopped. |

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|  |  |  |  | Diversion of the aforesaid 9 MLD effluent from Sump-1 to the new CETP  | <b>MIDC and CETP</b> | 22/11/2020 | Complied.<br>Effluent of 9 MLD is diverted from old CETP to new CETP of Sump-1 w.e.f. 22/11/2020.   |
|  |  |  |  | Retrofitting of valves in Gravity Mains for channelization of about 02 MLD effluent (from M/s Bombay Rayon and M/s Siyaram) to the new CETP  | <b>MIDC</b>          | 05/12/2020 | Complied on 13/12/2020.   |
|  |  |  |  | Proportionate reduction of water supply in MIDC Tarapur from 38 MLD to restrict generation of about 16 MLD (about 09 MLD to new CETP and about 07 MLD to the old CETP) and thereafter proportionate increase in water supply as per increased treatment capacity of old/ new CETP. | <b>MIDC</b>          | 22/11/2020 | Complying w.e.f. 26/11/2020.<br>Supply was restricted from 38 MLD to 30 MLD and subsequently about to 25 MLD w.e.f. 26/11/2020 and 30/11/2020 respectively.<br><br>Old CETP has remained shut down w.e.f. 26/11/2020 during which member units also voluntarily closed their wastewater generation processes. The CETP is expected to start with 07 MLD effluent inlet from 30/12/2020. |

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|  |  |  |  |  |             |                           | Further, during volunteer close down by the units during 28/11/2020 to 29/11/2020 for repairing works, the water supply was stopped by MIDC. Details of water supplied and effluent generation and disposal of treated effluent are given at Appendix-A. |
|  |  |  |  | Desludging of modules of CETP and Sumps to check overflow from sumps/tanks | <b>MIDC</b> | 05/12/2020 and 25/12/2020 | Desludging of module-1 of CETP and Sump-2 and Sump-3 completed.<br><br>MIDC has awarded AMC to check leakages in conveying pipeline to CETP and CETP to seashore the leakages are attended on priority within 24 hrs.                                    |

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|  |  |  |  | To check leakages during conveying the effluent to CETP or from CETP to seashore  | <b>MIDC</b>                             | Continuous process | MIDC has appointed AMC to check leakages in conveying pipeline to CETP and CETP to seashore the leakages are attended on priority within 24 hrs. Incidences of breakage of treated effluent discharge pipeline noticed at two occasions on 28/11/2020 and 15.12.2020 which were attended and repaired.  |
|  |  |  |  | Control of illegal tankers movement to check illegal water supply through tankers | <b>MIDC and District Administration</b> | Continuous         | Daily monitoring by MIDC started from 25/11/2020 with a mechanism to report the illegal tanker details to the District Administration for action. District Magistrate, Palghar. issued order on 04.12.2020 under section 144 and 133 under Criminal Procedure Code 1973 banning water tanker movement in Tarapur MIDC w.e.f. 05/12/2020 to 02/2/2021 except Fire Tender vehicles and in extraordinary situations with written permission from MIDC. |

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| 4 | c) Ensure that no bore wells operate in MIDC Tarapur to ensure the CETP hydraulic load does not exceed. | <b>Immediate</b> | <b>MIDC</b> |  | <b>MIDC</b> | Continuous | MIDC will work with District Administration. MIDC has reported that there is no bore-well operating since October 2020. |
|---|---|------------------|-------------|--|-------------|------------|---|

|   |  |                         |                             |  |                             |                   |   |
|---|--|-------------------------|-----------------------------|--|-----------------------------|-------------------|---|
| 5 | <p>MPCB in association with CETP shall identify units not having adequate facilities to meet the aforesaid assessed CETP inlet effluent quality and such units be directed to segregate their high concentrated effluent and be stored separately at existing CETP or new CETP in case such storage is available at the new CETP or dispose of in Common TSDF Talaja for incineration. Such storage should not be allowed beyond 06 months. Storage and disposal of the same should be closely monitored by MPCB at regular intervals.</p> | <p><b>Immediate</b></p> | <p><b>MPCB and CETP</b></p> |  | <p><b>MPCB and CETP</b></p> | <p>Continuous</p> | <p>MPCB has issued direction in this regards to CETP on 10/11/2020 and 13/11/2020. However, CETP has not yet identified any such member unit having inadequate facility to meet the CETP inlet effluent quality. MPCB has deployed teams from 18/11/2020 for identification of such units. 226 industries have been monitored so far. Based on their field observation, data available with the Board and analysis result of samples of effluent collected by the team, MPCB is in the process of evaluation such observations/data for eastablishing/identification of units requiring segregation and storage/disposal of high concentrated effluent and other non-</p> |
|---|--|-------------------------|-----------------------------|--|-----------------------------|-------------------|---|

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|  |  |  |  |  |  |  | <p>compliant units. Necessary actions against such identified non-compliant units such as, identification of units requiring segregation and storage/ disposal of high concentrated effluent OR closure of the units OR Environmental compensation OR actions under section 15 of the EPA against the identified defaulting units, as the case may be, are expected to start within a week onwards viz. 04/1/2020.</p> <p>Meanwhile, units connected to old CETP for further treatment/disposal of their effluent have voluntarily stopped their waste water generating processes w.e.f. 26/11/2020.</p> |
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| 6. | MPCB shall also monitor CETP inlet and outlet effluent preferably on the daily basis. | <b>Continuous till compliance is achieved</b> | <b>MPCB</b> |  | <b>MPCB</b> | 26/10/2020 onwards | <p>Complied.</p> <p>Besides on-going weekly monitoring by MPCB, daily monitoring inlet and outlet of CETP from 26/10/2020 up to 26/11/2020 (till the CETP was in operation) were carried out. Thereafter also, samples have also been collected &amp; analysed up to 07/12/2020.</p> <p>The analysis reports (given at Appendix- B) reveal that the old CETP is not complying inlet/outlet norms.</p> |
|----|---|---|-------------|--|-------------|--------------------|---|

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| 7 | In case if the above measures are not implemented effectively and CETP (either existing or new) continues to perform non-compliance to the inlet/outlet norms for a month, and in case no alternate arrangement is in place for disposal of effluent, MPCB may close operation of CETP and its member units who discharge their effluent to the CETP till the compliance is achieved. | 17/10/2020 | MPCB |  | MPCB | Continuous | <p>MPCB is closely monitoring operation of CETP and the measures have been taken in order to control discharge of effluent not meeting the norms by CETP such as volunteer shut down of CETP w.e.f. 26/11/2020, Commissioning of new CETP &amp; diversion of 9 MLD effluent to the new CETP w.e.f. 22/11/2020 which is compliant, reduction in water supply from 38 MLD to about 25 MLD to industrial units by MIDC in MIDC Tarapur</p> |
|   |   |            |      |  |      |            | <p>,desludging of various sumps and units of CETP, installation of flow meters to inlets/outlet of CETP, vigilance by MPCB &amp; CETP association, vigilance on illegal tanker movement and supervision of pipelines by MIDC, etc.</p> <p>In view of above progresses and target dates given by the CETP</p>  |

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|  |  |  |  |  |  |  |  | Operator for upgradation including ongoing identification of the defaulting units and proposed actions thereof by MPCB, decision on closure of CETP were deferred. However, in case the old CETP doesn't comply with the norms on resumption of its operation upon completing various upgradation works, MPCB shall close the CETP. |
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| 8 | <p>CETP shall take all necessary measures to control the influent quality &amp; quantity besides improvement in overall scientific operation &amp; maintenance of CETP with trained manpower and adequate analytical facility to keep watch on operational parameters at every stage of operation on a regular basis. With trained manpower and adequate analytical facility to keep watch on operational parameters at every stage of operation on a regular basis.</p> | Immediate | CETP | <p>A) For improvement in overall scientific operation and maintenance of the CETP</p> <ul style="list-style-type: none"> <li>I. Replacement of old SS-316 sluice gates within equalization tank inlet with new sluice gates.</li> <li>II. Replacement of floating aerators to submerged mixers in Collection equalization tank.</li> <li>III. Replacement of scrapping system in primary flocculators and secondary clarifiers with new SS-316 scrapping system.</li> <li>IV. Conversion of 1st aeration tank into anoxic treatment tank and channelization of effluent into said first aeration tank followed by into second, third and fourth aeration tanks in series having extended aeration for removal of BOD so as to improve BOD removal efficiency.</li> </ul> |  | 30.12.2020 | <p>Completed</p> <p>Completed</p> <p>Completed</p> <p>In process</p> <p>In process</p> |
|---|--|-----------|------|--|--|------------|--|

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|  |  |  |  | <p>V. Installation of new tank where flash mixer will be installed so as to get more retention time for flocculation prior to flocculator tank.</p> <p>VI. Installation of one new tank for holding primary and secondary sludge separately in two tanks as well as installation of two additional centrifuges along with two new filter presses.</p> <p>VII. Increase in chemical preparation tank size.</p> <p>VIII. Installation of auto dosing system with flow meter for in the proposed chemical dosing tank prior to flocculation tank.</p> <p>IX. Installation of flow meter for activated sludge recirculation in the first anoxic treatment aeration tank.</p> <p>X. Commissioning of OCEMS at inlet and outlet of CETP with prescribed parameters and connectivity with MPCB and CPCB servers.</p> |  |  | <p>In process</p> <p>In process</p> <p>In process</p> <p>In process</p> <p>In process</p> <p>In process</p> <p>In process<br/>Installation completed and commissioning will be completed by 10/1/2021</p> |
|  |  |  |  | <p>52</p> <p>301</p>  |  |  |   |

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|  |  |  |  | <p><b>B)</b> For adequate analytical facility to keep watch on every stage of operation of CETP on regular basis.</p> <p>i. Installation of laboratory facilities at CETP for sampling and analysis of operational parameters viz. BOD, DO, pH, TKN, TDS, SS, COD, O&amp;G, Alkalinity, conductivity, heavy metals etc.</p> <p><b>C)</b> For trained manpower for operation of the CETP</p> <p>i. Hiring of six additional trained manpower in addition to the currently six laboratory persons and six technical supervisors for plant operation.</p> |  |  | <p>Complied.</p> <p>TEPS CETP started new laboratory at new CETP, whereas Laboratory at old CETP is used for general environmental parameter. The CETP has temporarily procured trained manpower from member industries and deployed at site as a short term measures whereas for long term additional manpower will be appointed by TEPS. Whereas TEPS started providing trained and skilled manpower.</p> |
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| 9. | <p>There should be proper surveillance of all units and the penalty mechanism for the defaulter units to be derived by M/s TEPS – CETP for member industries in addition to inspections of MPCB to ensure that all the member industries discharge the trade effluent meeting the norms as per their consent.</p> <p>In case of non-compliance observed during M/s TEPS-CETP monitoring surveillance, the list of defaulting industries should be provided to MPCB from time to time for necessary action against such units. MPCB should take stringent action against industries as found in surveillance of MPCB &amp; TEPS including the recovery of environmental Compensation and prosecution of industries as per environmental laws.</p> | <b>Immediate</b> | <b>MPCB and CETP</b> | <p>i. Deployment of two teams each team having officials from MPCB and representative of CETP / industry association.</p> <p>ii. Finalization of penalty mechanism which includes termination/ Suspension of CETP membership of defaulting industry and enforcement thereof.</p> <p>iii. Providing list of defaulting units to the MPCB for taking stringent action including environmental compensation and prosecution of the industries.</p> | <b>CETP &amp; MPCB</b> | <p>Continuous from 18.11.2020</p> <p>10.12.2020</p> <p>Continuous activity</p> | <p>Day &amp; Night Survey has been carried out by TEPS CETP appointed Committee and detected 11 units with abandoned old as well as new active connections to MIDC Chambers.</p> <p>CETP has not yet provided penalty mechanism to MPCB.</p> <p>CETP has not yet provided list of defaulting units to MPCB.</p> |
|----|--|------------------|----------------------|---|------------------------|--|---|

|    |   |           |                     |  |      |   |  |
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| 10 | <p>There is urgent need of common facilities such as Common MEE and Common Spray Dryer for High COD and High TDS effluent and such types of effluent should be separately collected and transferred to common MEE and Spray Dryer facilities with identification of such industries. Similarly, there should be some advanced method (such as advanced oxidation, Ozonation, etc.) to reduce the significant COD. CETP may ensure commissioning of the same at the earliest. Till the same is commissioned, high COD and high TDS effluent be stored at suitable place in case available at the new CETP under commissioning stage, for not more than 06 months, otherwise such effluent be disposed in Common TSDF Taloja by incineration. Storage and disposal of the same should be closely monitored by MPCB at regular interval and operation of such violators be closed besides other necessary actions by MPCB.</p> | Immediate | CETP, MIDC and MPCB | <ul style="list-style-type: none"> <li>i. Finalization of the DPR for common facility to treat high COD and high TDS streams.</li> <li>ii. Commissioning of the facility to treat high COD and high TDS streams as per DPR.</li> <li>iii. Identification of high COD and high TDS streams generating units.</li> <li>iv. Disposal of segregated high COD and high TDS streams to CHWTSDF/ resource recovery of the same (at authorized facility) by the identified units.</li> </ul> | CETP | <p>31.01.2021</p> <p>30.06.2021</p> <p>Immediate</p> <p>Immediate</p> | <p>Letter of intent issued by TEPS to M/s. Tesla for installation of high COD treatment facility having capacity 2500 CMD. Also, additional facility will be commissioned for high TDS stream. Till they are commissioned, the concentrated streams will be disposed to TSDF by member industries.</p> |
|----|---|-----------|---------------------|--|------|---|--|

|    |   |                        |               |  |               |   |   |
|----|---|------------------------|---------------|--|---------------|---|---|
| 11 | SCADA system for monitoring quality and quantity of individual member industry be commissioned by the CETP operator in association with industries and MIDC within 04 months. MPCB may ensure timely commissioning of the same. | 17/1/2021              | CETP and MIDC | <ol style="list-style-type: none"> <li>1. Installation &amp; commissioning of prescribed SCADA system in more than 25 CMD effluent generation units and less than 25 CMD effluent generating units.</li> <li>2. Installation of SCADA in various sumps and gravity line.</li> <li>3. Commissioning of the centralized SCADA system.</li> </ol> | CETP and MIDC | <p>17.01.2021 for 31.01.2021 for &lt;25 MLD units</p> <p>31.01.2021</p> <p>31.01.2021</p> | <p>The SCADA platform for 55 industries installed and is under trial. Rest industries SCADA connectivity is planned on or before 31.01.2020., For that help desk is created and weekly one full day the engineers stationed at new CETP, for attending queries with respect to SCADA and industries to connect their hardware to TEPS CETP SCADA.</p>                             |
| 12 | CETP shall regularly send the CETP sludge to CHWTSDf for proper disposal.   | Immediate & Continuous | CETP          | CETP sludge to be sent to CHWTSDf facility regularly ensuring storage not more than 90 days.   | CETP          | Continuous  | <p>About 6260 MT of sludge (5700 + 563) generated during desludging of sumps and CETP have been sent to TSDf for disposal. About 680+200= 880 MT of sludge lying at the CETP be also sent to TSDf as early as possible and within 90 days of its generation. Further, sludge generated during the on-going desludging activity shall also be sent within the required period.</p> |

|           |  |                                   |             |   |                  |            |   |
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| <b>13</b> | The 55 units of 1216 industrial units in MIDC Tarapur, which are not member of the CETP, may be examined by MPCB w.r.t. wastewater generation from their processes. In case it is found that their processes generate wastewater, necessary action be taken by MPCB. | <b>Immediate</b>                  | <b>MPCB</b> | Assessment of current number of units in MIDC Tarapur vis-à-vis their CETP membership and identification of waste water generating units not having CETP membership for disposing their waste water and taking necessary action against such identified units.                    | <b>CETP/MPCB</b> | 15/12/2020 | MPCB communicated list of members with CETP and CETP has confirmed that 1216 units have membership to CETP. |
| <b>14</b> | MPCB to review authorization of CETP in terms of sludge quantity.  | <b>Immediate</b>                  | <b>MPCB</b> | Assessment of CETP sludge generation and stipulating quantity of CETP sludge in combined consent cum authorization.   | <b>MPCB/CETP</b> | 31.12.2020 | MPCB has already worked and Authorization for CETP sludge is under revision from 7 MT/D to 10 MT/D.         |
| <b>15</b> | CETP is also required to work upon housekeeping of entire premises with cleanliness, plantation, internal roads etc.   | <b>Immediate &amp; Continuous</b> | <b>CETP</b> | <ol style="list-style-type: none"> <li>1. Removal of unwanted scraps/material from the Old CETP site.</li> <li>2. Repairing of internal roads and converting pathways into pucca.</li> <li>3. Plantation of trees in open spaces consultation with agriculture expert.</li> </ol> | <b>CETP</b>      | -          | Will be initiated upon completion of upgradation work.  |

**Restoration/remediation of contaminated ground water and drains and, if applicable, the two creeks (NavapurDandi Creek and KharekuranMurbe Creek) and seashore also**

|           |  |                   |             |   |                                     |             |  |
|-----------|--|-------------------|-------------|---|-------------------------------------|-------------|--|
| <b>16</b> | Selection of a consultant to prepare Detailed Project Report (DPR) and provide consultancy services for remediation of contaminated sites in and around Tarapur MIDC for the Phase-I (detailed investigation, remediation plan, etc.) and Phase-II (execution as per the remediation plan) work. | <b>Immediate</b>  | <b>MPCB</b> | <p>1. Consultation with expert institute on selection of consultant and procedures of selection</p> <p>2. Selection of consultant for DPR preparation and providing consultancy services.</p> | <p>31.01.2021</p> <p>30/04/2021</p> | <b>MPCB</b> | <p>MPCB has received sample TOR from the CPCB and is in process to finalize IIT Mumbai as a consultant to carry out the study.</p> <p>MPCB has already discussed this issue in length with IIT and NGRI, Hyderabad. Work is in progress.</p> |
| <b>17</b> | Execution of Phase-I and Phase-II work as per the DPR  | <b>As per DPR</b> | <b>MPCB</b> | Award of work to the expert institute and execution of work as per the DPR.   | As per the DPR                      | <b>MPCB</b> | Will be executed as per the DPR.   |

**Expenses to be met for implementing the above remediation plan as at Sl. No. 16 and 17 above**

|           |  |                  |             |  |                         |            |   |
|-----------|--|------------------|-------------|--|-------------------------|------------|---|
| <b>18</b> | Recovery of damage and restoration cost from the respective 103 polluting units as recommended in the committee's report | <b>Immediate</b> | <b>MPCB</b> | Issuance of directions to the 102 units and the TEPS CETP for deposition of damage and restoration cost. | MPCB                    | 23/10/2020 | Completed. Board has issued the directions on 23/10/2020 to all 103 units.  |
|           |  |                  |             | Deposition of damage and restoration cost from the 103 polluting units                                   | <b>Respective units</b> | 24/10/2020 | One unit has deposited damage and restoration cost of Rs. 14.23 lakh. Initiation of necessary action against the 102 units is in progress in the light of the Hon'ble Supreme Court order dated 14/12/2020. |

|           |  |                               |             |   |             |                    |   |
|-----------|--|-------------------------------|-------------|---|-------------|--------------------|---|
| <b>19</b> | In case the cost of remediation increases or decreases to that of Rs. 75 Cr., the amount may be collected or refunded to each of the said polluting units, as the case may be, in the same proportion as has been recommended in the committee's report  | <b>As &amp; when required</b> | <b>MPCB</b> | Will be refunded or collected depending upon DPR preparation and completion of remediation work                             | <b>MPCB</b> | As & when required | Will be refunded or collected as and when required.   |
| <b>20</b> | In case recovery of the remediation cost from the polluting units is delayed or not met partially or fully due to one or other reasons at any stage, the Govt. of Maharashtra may initially incur such assessment and remediation cost and initiate the remediation activities such as allocation of fund, selection of consultant, etc., as outlined above, in a month in consultation with MPCB. | <b>Immediate</b>              | <b>MPCB</b> | Allocation of funds of Rs. 75 Cr. for meeting the expenditure towards remediation activities of contaminated sites by MPCB. | <b>MPCB</b> | As & when required | Completed.<br>In case recovery of the remediation cost from the polluting units is delayed or not met partially or fully, MPCB has decided to meet such cost. |

## Annexure-III

### Action Plan on Prohibition of use of contaminated ground water in affected areas in and around Tarapur MIDC till remediation plan is implemented

| Sr. No | Action points as recommended in the Committee's report for remedial measures   | Time Target | Responsible agency identified by the Committee | Action Points to meet the Action Plans as at Column           | Executing agency   | Proposed time target | Compliance status as on 28.12.2020  |
|--------|--|-------------|--|---|--|----------------------|---|
| 1.     | Till the remediation plan is implemented, use of contaminated ground water in affected area of in and around Tarapur MIDC may be prohibited for drinking purpose | Immediate   | CGWA, MIDC and District Administration         | Identification of affected area of ground water contamination | Ground Water Surveys and Development Authorities (GSDA) Palghar; BDO Palghar, and; Sub-divisional Water Testing Laboratory | Immediate            | <p>13 GPs and 16 villages were identified in and around Tarapur MIDC with respect to ground water contamination.</p> <p>86 water samples from Government marked borewells/dug wells and 535 water samples from private borewells were sampled and analysed for chemical and bacteriological testing. Out of that 5 Government and 61 private samples are found unfit for consumption for Iron and Turbidity factor. In addition 10 randomly selected samples were taken from these villages and tested for heavy metals and found fit for consumption. No heavy metals detected in these 10 samples.</p> <p>However, there is need to identify villages other than aforesaid 16 villages where there may have potential impact on ground water.</p> |

|  |  |  |  |   |  |           |  |
|--|--|--|--|---|--|-----------|--|
|  |  |  |  | Remedial measures to prevent use of such unfit water sources for drinking purpose                                       | District Water and Sanitation Mission (DWSM) Palghar; BDO Palghar, and concerned Gramsevak | Immediate | <p>(i) DWSM cell Palghar already issued letter dated 19/10/2020, PZP/WSD/434/2020 to BDO Palghar and concern Gramsevak to stop use of drinking from these 5 contaminated sources and another letter issued dated 03/12/2020, Ref. No PZP/WSD/522/2020 for non using the water from 61 water samples for drinking purpose.</p> <p>(ii) All these 13 GPs and 16 Villages are having regional water supply scheme by MIDC for drinking purpose.</p> <p>(iii) In the survey conducted for collection of water samples from all these villages in the month of November ,December 2020, it is observed that all these sources are not used for drinking purpose, they are being used for domestic purposes like clothing, washing utensils etc.</p> |
|  |  |  |  | Advertisement in local newspaper about not to use ground water from affected ground water sources for drinking purpose. | CEO, ZilaParishadPalghar   | 04/1/2021 | <p>This was suggested by the committee in 07<sup>th</sup>meeting held on 29/12/2020.</p> <p>The advertisement in this regard will be given immediately in local newspaper.</p>   |

## Annexure-IV

### Action Plan on Remediating the health of the inhabitants including providing healthcare to the affected individuals of in and around Tarapur MIDC

| Sr. No | Activity to be carried out as per order dated 17/9/2020 of the Hon'ble NGT                            | Time Target | Responsible agency identified by the Committee | Action Points to meet the Action Plans as at Column  | Executing agency                 | Proposed time target | Compliance status as on 28.12.2020   |
|--------|---|-------------|--|--|----------------------------------|----------------------|--|
| 1.     | Remediating the health of the inhabitants, including providing healthcare to the affected individuals | Immediate   | Zila Parishad Palghar                          | Identification of areas/inhabitants which may potentially have health impact due to illegal discharges from Tarapur MIDC | District Health Officer (DHO)    | Immediate            | Completed.<br>Identified 16 villages (having population of 24,815 households with population of 91,016 covered under the 05 PHCs; 12 sub-centers) which may potentially have health impact due to illegal discharges from Tarapur MIDC.<br><br>These 16 villages have been selected on the basis of representation received from applicant of the OA No. 64/2016 (WZ) i.e.Akhil Bhartiya Mangela Samaj to DM Palghar as affected villages.<br>However, there is need to identify villages other than aforesaid 16 villages where there may have potential impact due to industrial activities in Tarapur MIDC. |
|        |   |             |  | Orientation and Training programme to health officials about Active and  | DHO/ Taluka Health Officer (THO) | 28/11/2020           | Completed.<br>Imparted Training to 129 health care officials (12 Medical Officers, 06 Health Assistant, 08 Ladies Health Vistors/Genral Nursing & Midwifery; 04 Pharmacy Officers;   |

|  |  |  |  |  |         |            |  |
|--|--|--|--|--|---------|------------|--|
|  |  |  |  | Passive, Survey, Screening and Specialist Camp   |         |            | 08 Community Health Officers, 02 Lab Technician; 13 Auxillary Nurse Midwife; 04 Multipurpose Worker; 08 Block Facilitator; 64 Accredited Social Health Activist) in last week of November and first week of December 2020 in different Primary health centers and also block level.  |
|  |  |  |  | Advertisement in local newspaper about free health care and free screening camps to affected habitants | DHO     | 04/1/2020  | This was suggested by the committee in 07 <sup>th</sup> meeting held on 29/12/2020. The advertisement in this regard will be given immediately in local newspaper.   |
|  |  |  |  | House-to-House health survey   | DHO/THO | 18/12/2020 | Completed.<br>Conducted house-to-house survey during Dec. 01-18, 2020 in which 55,844 population was screened and following suspected persons were surveyed:<br>(a) Skin infections = 361<br>(b) Respiratory Ailments = 100<br>(c) Tuberculosis =14<br>(d) Suspected Cancer Symptoms =21<br>The rest population goes out to work and was not available during survey. Their households are being instructed that said person can consult for their ailments in free screening camps if they require, also contact No. of ASHA'S is given to every household in jurisdiction of area distributed to ASHA'S. |

|  |  |  |  |  |         |  |  |
|--|--|--|--|--|---------|--|--|
|  |  |  |  | Conducting Health Screening Camps for the surveyed people                          | DHO/THO | Dec. 2020  | Due to other national programmes the screening camps are arranged in third week of January as a revised plan. Screening camps will be conducted at respective primary health centres and medical officers and health staffs will primarily screen the surveyed people & others and if found suspected then will submit them for investigations and for specialist camps. |
|  |  |  |  | Conducting Specialist Camps for follow up of identified patients                   | DHO     | Quarterly (From fourth week of January or first week of February 2021) | Specialist Camps for follow up of identified patients will be conducted quarterly at PHC (after completing screening through the aforesaid Screening Health Camps). Specialists camps will be conducted after screening camps in fourth week of January or first week of February as per date availability of specialists  |
|  |  |  |  | Distribution of medicines and patient referral to tertiary care healthcare centres | DHO     | As and when required w.e.f. February 2021                              | This will be done after specialist camps as and when required w.e.f. February 2021   |

**Environmental Compensation calculation applicable on the 25 MLD CETP operator for continued violations till the reported period i.e. 28/12/2020**

Environmental Compensation (EC), as per the Report of the CPCB In-house Committee on Methodology for Assessing Environmental Compensation and Action Plan to Utilize the Fund and as referred in order dated 28.08.2019 of the Hon'ble National Green Tribunal in the matter of Paryavaran Suraksha Samiti & Anr. Applicant(s) Versus Union of India & Ors., is as below:

$$EC = PI \times N \times R \times S \times LF$$

Where,

**EC** is Environmental Compensation in ₹

**PI** = Pollution Index of industrial sector

**N** = Number of days of violation took place

**R** = A factor in Rupees (₹) for EC

**S** = Factor for scale of operation

**LF** = Location factor

As per the aforesaid CPCB report, the above factors applicable in the matter under reference to M/s TEPS-CETP is:

**PI**= 80;

**N**= one month after order dated 17/9/2020 of the Hon'ble NGT (by which operation of the CETP were to be closed in the event of violations/non-compliances) till the analysis reported up to 07/12/2020 wherein inlet/outlet effluent from the CETP didn't meet the prescribed norms (except on 23/11/2020)= 49 days

**R** = Rs. 250/- (although maximum range is given up to Rs. 500/- in the aforesaid CPCB report, it has been suggested to consider R as 250, as the Environmental Compensation in cases of violation.)

**S** = 1.5

**LF** = 1

Therefore, EC= Rs. 14,70,000/- (Rupees Fourteen lakhs seventy thousand only) w.e.f. 17/10/2020 till the reported period up to 07/12/2020.

**(Note: The committee has not applied deterrent factor giving benefit of volunteer shut down by the CETP operator)**

**Appendix- A**

**Daily water supplied to MIDC Tarapur & effluent pumped into/from  
the CETP**

| Date       | Water supplied to MIDC Tarapur (in MLD) | Effluent pumped from Sump to CETP (MLD) |        |        |         | Treated effluent pumped to Sea (MLD) |          |       | Remarks   |
|------------|---|---|--------|--------|---------|--------------------------------------|----------|-------|---|
|            |   | Sump 1*                                 | Sump 3 | Sump-4 | Gravity | Sump 2                               | Sump 5\$ | Total |   |
| 28-11-2020 | 4.50                                    | 0                                       | 1.2    | 0      |         | 0                                    | 0        | 0     | Effluent pumping & water supply stopped due to breakdown of main disposal line. |
| 29-11-2020 | 5.60                                    | 0                                       | 0.8    | 0      |         | 0                                    | 0        | 0     |   |
| 30-11-2020 | 24.50                                   | 0                                       | 0.3    | 1.2    |         | 2                                    | 0        | 2     |   |
| 01-12-2020 | 25.00                                   | 3.62                                    | 0      | 1.4    |         | 1.95                                 | 2.12     | 4.07  |   |
| 02-12-2020 | 24.50                                   | 1.5                                     | 0      | 1.2    |         | 1.9                                  | 6.03     | 7.93  |   |
| 03-12-2020 | 24.00                                   | 3.50                                    | 1.05   | 0.80   |         | 1.80                                 | 7.18     | 8.98  |   |
| 04-12-2020 | 24.50                                   | 4.00                                    | 1.20   | 0.80   |         | 1.95                                 | 4.25     | 6.20  |   |
| 05-12-2020 | 24.50                                   | 2.50                                    | 0.00   | 1.00   |         | 1.85                                 | 4.90     | 6.75  |   |
| 06-12-2020 | 24.00                                   | 2.50                                    | 0.90   | 0.80   |         | 1.80                                 | 0.00     | 1.80  |   |
| 07-12-2020 | 23.50                                   | 4.50                                    | 1.20   | 0.60   |         | 1.90                                 | 8.83     | 10.73 |   |
| 08-12-2020 | 24.00                                   | 5.75                                    | 0.75   | 0.80   |         | 1.95                                 | 4.87     | 6.82  |   |
| 09-12-2020 | 24.50                                   | 5.00                                    | 0.60   | 0.60   |         | 1.70                                 | 7.40     | 9.10  |   |
| 10-12-2020 | 24.00                                   | 4.00                                    | 0.52   | 0.50   |         | 1.85                                 | 8.72     | 10.57 |   |
| 11-12-2020 | 19.00                                   | 5.50                                    | 0.90   | 0.60   |         | 1.95                                 | 7.79     | 9.74  |   |
| 12-12-2020 | 24.50                                   | 7.00                                    | 0.60   | 0.60   |         | 1.80                                 | 7.23     | 9.03  |   |
| 13-12-2020 | 24.00                                   | 8.05                                    | 0.90   | 0.50   |         | 1.75                                 | 7.18     | 8.93  |   |
| 14-12-2020 | 24.50                                   | 8.05                                    | 0.95   | 0.40   |         | 2.00                                 | 8.94     | 10.9  |   |
| 15-12-2020 | 23.50                                   | 5.60                                    | 0.70   | 0.40   |         | 1.63                                 | 0.00     | 1.63  |   |
| 16-12-2020 | 4.50                                    | 0.00                                    | 0.00   | 0.00   |         | 0.00                                 | 0.00     | 0.00  | Effluent pumping & water supply stopped due to breakdown of main disposal line  |
| 17-12-2020 | 5.00                                    | 0.00                                    | 0.00   | 0.00   |         | 0.00                                 | 0.00     | 0.00  |   |
| 18-12-2020 | 6.50                                    | 0.00                                    | 0.00   | 0.06   |         | 1.82                                 | 0.00     | 1.82  |   |

|            |       |      |      |      |  |      |       |       |  |
|------------|-------|------|------|------|--|------|-------|-------|--|
| 19-12-2020 | 23.50 | 0.00 | 0.00 | 0.00 |  | 1.53 | 0.00  | 1.53  |  |
| 20-12-2020 | 24.00 | 3.15 | 0.95 | 0.55 |  | 1.92 | 10.44 | 12.36 |  |
| 21-12-2020 | 23.50 | 7.00 | 0.85 | 0.60 |  | 1.68 | 7.56  | 9.24  |  |
| 22-12-2020 | 24.00 | 7.70 | 0.40 | 0.80 |  | 1.85 | 7.72  | 9.57  |  |
| 23-12-2020 | 24.50 | 7.00 | 0.40 | 0.20 |  | 1.61 | 6.59  | 8.20  |  |
| 24-12-2020 | 24.50 | 8.05 | 0.55 | 0.35 |  | 1.45 | 7.11  | 8.56  |  |
| 25-12-2020 | 24.00 | 7.00 | 0.60 | 0.45 |  | 1.72 | 7.57  | 9.29  |  |
| 26-12-2020 | 23.50 | 6.30 | 1.05 | 0.80 |  | 1.85 | 8.99  | 10.84 |  |
| 27-12-2020 | 24.00 | 8.40 | 1.25 | 0.40 |  | 1.96 | 10.13 | 12.09 |  |
| 28-12-2020 | 24.50 | 8.40 | 0.80 | 0.40 |  | 1.95 | 4.62  | 6.57  |  |

\* Effluent coming from units to Sump 1 which is pumped to the new CETP

§ Treated effluent from the new CETP is pumped for disposal into sea

**Analysis results of inlet and outlet effluent of the 25 MLD CETP and  
the new CETP (as sampled & analysed by MPCB)**

**25 MLD CETP INLET (Old)**

| Sr. No                   | Date of sample collection | pH             | COD          | Suspended Solids | TDS   |
|--------------------------|---------------------------|----------------|--------------|------------------|-------|
|                          |                           |                | mg/l         | mg/l             | mg/l  |
| <b>Consent Standards</b> |                           | <b>5.5-9.0</b> | <b>≤3500</b> |                  |       |
| 1                        | 05.10.2020                | 6.9            | 2100         | 230              | 14560 |
| 2                        | 12.10.2020                | 5.6            | 3880         | 468              | 9281  |
| 3                        | 14.10.2020                | 4.3            | 775          | 320              | 9234  |
| 4                        | 21.10.2020                | 5.1            | 4800         | 244              | 17208 |
| 5                        | 26.10.2020                | 5              | 4800         | 116              | 19851 |
| 6                        | 26.10.2020                | 4              | 5680         | 65               | 17112 |
| 7                        | 28.10.2020                | 6              | 5520         | 92               | 24975 |
| 8                        | 30.10.2020                | 7.3            | 5440         | 423              | 15813 |
| 9                        | 31.10.2020                | 4.7            | 6600         | 577              | 18538 |
| 10                       | 01.11.2020                | 5.5            | 5640         | 396              | 20694 |
| 11                       | 02.11.2020                | 7.4            | 3600         | 353              | 14378 |
| 12                       | 03.11.2020                | 8.1            | 4920         | 496              | 16232 |
| 13                       | 04.11.2020                | 6.7            | 3792         | 529              | 11374 |
| 14                       | 05.11.2020                | 7.9            | 540          | 365              | 13587 |
| 15                       | 06.11.2020                | 5.8            | 4920         | 502              | 9077  |
| 16                       | 07.11.2020                | 6.4            | 3328         | 498              | 11224 |
| 17                       | 08.11.2020                | 7.6            | 3504         | 380              | 9841  |
| 18                       | 09.11.2020                | 8.2            | 4480         | 360              | 14528 |
| 19                       | 10.11.2020                | 6.8            | 4920         | 322              | 21878 |
| 20                       | 11.11.2020                | 6.1            | 6680         | 292              | 11620 |
| 21                       | 12.11.2020                | 6.2            | 4480         | 348              | 11176 |
| 22                       | 13.11.2020                | 6.3            | 2400         | 248              | 5794  |
| 23                       | 14.11.2020                | 6.4            | 2896         | 264              | 5774  |
| 24                       | 15.11.2020                | 6.4            | 2752         | 198              | 5800  |
| 25                       | 16.11.2020                | 6.4            | 2752         | 292              | 5818  |
| 26                       | 18.11.2020                | 6              | 2624         | 322              | 8068  |
| 27                       | 19.11.2020                | 7.4            | 4640         | 268              | 13248 |
| 28                       | 20.11.2020                | 6              | 6720         | 88               | 8374  |
| 29                       | 21.11.2020                | 8.8            | 47600        | 589              | 24000 |
| 30                       | 22.11.2020                | 7.2            | 3560         | 374              | 8970  |
| 31                       | 23.11.2020                | 6.6            | 3920         | 85               | 9990  |

|    |            |     |      |     |       |
|----|------------|-----|------|-----|-------|
| 32 | 23.11.2020 | 6.6 | 2000 | 83  | 4778  |
| 33 | 24.11.2020 | 7   | 5440 | 95  | 9760  |
| 34 | 25.11.2020 | 6.4 | 4040 | 82  | 12540 |
| 35 | 26.11.2020 | 8.7 | 6040 | 268 | 11440 |
| 36 | 27.11.2020 | 7.3 | 5120 | 86  | 5318  |
| 37 | 28.11.2020 | 7.4 | 8320 | 174 | 8856  |
| 38 | 29.11.2020 | 6.1 | 6400 | 140 | 8826  |
| 39 | 30.11.2020 | 6.6 | 3160 | 180 | 7172  |
| 40 | 01.12.2020 | 8.5 | 3400 | 104 | 7486  |
| 41 | 05.12.2020 | 7.4 | 9200 | 498 | 10344 |
| 42 | 06.12.2020 | 6.4 | 8400 | 220 | 22228 |
| 43 | 07.12.2020 | 6.4 | 8480 | 436 | 22176 |

**25 MLD CETP OUTLET (Old)**

| Sr. No                   | Date of sample collection | pH             | COD<br>mg/l | Suspended Solids<br>mg/l | TDS<br>mg/l |
|--------------------------|---------------------------|----------------|-------------|--------------------------|-------------|
| <b>Consent Standards</b> |                           | <b>5.5-9.0</b> | <b>≤250</b> | <b>≤100</b>              |             |
| 1                        | 05.10.2020                | 6.4            | 2992        | 190                      | 13160       |
| 2                        | 12.10.2020                | 6.6            | 3720        | 280                      | 13518       |
| 3                        | 14.10.2020                | 6.6            | 3640        | 386                      | 14795       |
| 4                        | 21.10.2020                | 6.1            | 3008        | 97                       | 10276       |
| 5                        | 26.10.2020                | 6.2            | 4000        | 5.4                      | 10316       |
| 6                        | 26.10.2020                | 6.1            | 3760        | 5.6                      | 16502       |
| 7                        | 28.10.2020                | 5.7            | 4000        | 122                      | 26366       |
| 8                        | 30.10.2020                | 6.3            | 3840        | 754                      | 16708       |
| 9                        | 31.10.2020                | 6              | 3744        | 840                      | 14720       |
| 10                       | 01.11.2020                | 6              | 4240        | 670                      | 14083       |
| 11                       | 02.11.2020                | 5.8            | 3568        | 991                      | 15655       |
| 12                       | 03.11.2020                | 6.2            | 3328        | 705                      | 13212       |
| 13                       | 04.11.2020                | 6.4            | 3232        | 592                      | 12120       |
| 14                       | 05.11.2020                | 6.6            | 3136        | 391                      | 11738       |
| 15                       | 06.11.2020                | 6.6            | 3088        | 465                      | 11904       |
| 16                       | 07.11.2020                | 6.3            | 3152        | 338                      | 12369       |
| 17                       | 08.11.2020                | 6.5            | 3760        | 508                      | 12232       |
| 18                       | 09.11.2020                | 6.6            | 3616        | 612                      | 12108       |
| 19                       | 10.11.2020                | 6.8            | 3264        | 608                      | 11196       |
| 20                       | 11.11.2020                | 6.5            | 2864        | 460                      | 11142       |
| 21                       | 12.11.2020                | 6.6            | 3088        | 540                      | 12152       |
| 22                       | 13.11.2020                | 7              | 3040        | 574                      | 11358       |

|    |            |     |      |     |       |
|----|------------|-----|------|-----|-------|
| 23 | 14.11.2020 | 7.1 | 2928 | 544 | 11310 |
| 24 | 15.11.2020 | 7   | 2784 | 358 | 11138 |
| 25 | 16.11.2020 | 6.7 | 2944 | 618 | 10988 |
| 26 | 18.11.2020 | 6.9 | 2960 | 412 | 11218 |
| 27 | 19.11.2020 | 7.1 | 2800 | 292 | 11070 |
| 28 | 20.11.2020 | 6.8 | 3200 | 57  | 10180 |
| 29 | 21.11.2020 | 6.7 | 3320 | 292 | 10236 |
| 30 | 22.11.2020 | 6.8 | 5680 | 151 | 11970 |
| 31 | 23.11.2020 | 6.8 | 3840 | 94  | 10928 |
| 32 | 23.11.2020 | 7.6 | 68   | 11  | 2720  |
| 33 | 24.11.2020 | 6.9 | 3320 | 170 | 10320 |
| 34 | 25.11.2020 | 6.8 | 4120 | 247 | 10330 |
| 35 | 26.11.2020 | 7   | 2976 | 209 | 9808  |
| 36 | 27.11.2020 | 7.6 | 3400 | 333 | 11070 |
| 37 | 28.11.2020 | 7.3 | 3280 | 293 | 9518  |
| 38 | 29.11.2020 | 7.4 | 4720 | 389 | 10446 |
| 39 | 30.11.2020 | 7.3 | 4240 | 470 | 10620 |
| 40 | 01.12.2020 | 7.3 | 5400 | 544 | 10872 |
| 41 | 05.12.2020 | 6.9 | 1488 | 188 | 7508  |
| 43 | 06.12.2020 | 7   | 3480 | 154 | 11352 |
| 44 | 07.12.2020 | 7.1 | 3472 | 714 | 11092 |

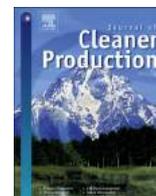
| <b>CETP INLET (New)</b>  |                                  |                |              |                         |             |
|--------------------------|----------------------------------|----------------|--------------|-------------------------|-------------|
| <b>Sr. No</b>            | <b>Date of sample collection</b> | <b>pH</b>      | <b>COD</b>   | <b>Suspended Solids</b> | <b>TDS</b>  |
|                          |                                  |                | <b>mg/l</b>  | <b>mg/l</b>             | <b>mg/l</b> |
| <b>Consent Standards</b> |                                  | <b>5.5-9.0</b> | <b>≤3500</b> |                         |             |
| 1                        | 22.11.2020                       | 6.6            | 976          | 105                     | 5570        |
| 2                        | 29.11.2020                       | 7.5            | 3000         | 454                     | 3598        |
| 3                        | 30.11.2020                       | 7.3            | 928          | 77                      | 4040        |
| 4                        | 01.12.2020                       | 7.3            | 1360         | 55                      | 4180        |
| 5                        | 05.12.2020                       | 6.6            | 196          | 80                      | 4372        |
| 6                        | 06.12.2020                       | 6.4            | 2464         | 612                     | 4604        |
| 7                        | 07.12.2020                       | 6.7            | 3056         | 848                     | 4564        |
| 8                        | 08.12.2020                       | 5.8            | 2200         | 118                     | 7812        |
| 9                        | 10.12.2020                       | 8.7            | 1544         | 112                     | 4686        |
| 10                       | 11.12.2020                       | 7.5            | 1856         | 168                     | 6332        |
| 11                       | 12.12.2020                       | 6              | 1584         | 170                     | 6228        |
| 12                       | 13.12.2020                       | 5.4            | 2680         | 278                     | 8300        |

| <b>CETP Outlet (New)</b> |                                  |                |             |                         |             |
|--------------------------|----------------------------------|----------------|-------------|-------------------------|-------------|
| <b>Sr. No</b>            | <b>Date of sample collection</b> | <b>pH</b>      | <b>COD</b>  | <b>Suspended Solids</b> | <b>TDS</b>  |
|                          |                                  |                | <b>mg/l</b> | <b>mg/l</b>             | <b>mg/l</b> |
| <b>Consent Standards</b> |                                  | <b>5.5-9.0</b> | <b>≤250</b> | <b>≤100</b>             |             |
| 1                        | 22.11.2020                       | 7.6            | 48          | 19                      | 3350        |
| 2                        | 29.11.2020                       | 6.7            | 232         | 16                      | 4160        |
| 3                        | 30.11.2020                       | 6.7            | 104         | 28                      | 4226        |
| 4                        | 01.12.2020                       | 6.8            | 220         | 60                      | 4280        |
| 5                        | 05.12.2020                       | 6.3            | 2176        | 270                     | 4932        |
| 6                        | 06.12.2020                       | 6.6            | 228         | 84                      | 4268        |
| 7                        | 07.12.2020                       | 6.7            | 244         | 90                      | 4140        |
| 8                        | 08.12.2020                       | 7              | 320         | 40                      | 5372        |
| 9                        | 10.12.2020                       | 7.2            | 284         | 20                      | 4572        |
| 10                       | 11.12.2020                       | 6.9            | 232         | 32                      | 5136        |
| 11                       | 12.12.2020                       | 7.1            | 272         | 35                      | 5224        |
| 12                       | 13.12.2020                       | 7              | 152         | 71                      | 3076        |



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## Environmental costs assessment for improved environmental-economic account for Indonesia



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### ABSTRACT

The overall purpose of this study is to assess priorities for new environmental accounts in Indonesia. We use environmental costs related to air pollution and resource extraction in Indonesia as a measure for priority. This study uses the damage costs approach to estimate the environmental degradation costs value and the Net Present Value (NPV) approach to obtain the environmental cost of natural resources depletion of several natural resources that are most important for the Indonesian economy. Our estimate of the total environmental costs amounts to around 13% of GDP in 2010. Environmental costs are mostly due to depletion of energy and mineral resources, followed by environmental degradation cost from air pollution, and the use of forestry resources and related depletion of ecosystems. The Indonesian Central Bureau of Statistics (BPS) has already published damage costs data related to resource depletion, which we find is a priority. However, the BPS should consider completing its data with additional information on the depletion costs of ecosystem services related to forestry. Moreover, the BPS could expand Indonesia's economic-environmental accounts by including environmental degradation costs due to air pollution. We found that from a substance perspective, the priorities are SO<sub>x</sub>, NO<sub>x</sub>, CO<sub>2</sub>, CH<sub>4</sub>, and particulate matter. At the same time, from a sector perspective, the priorities are electricity, manufacture of basic iron and steel and of ferro-alloys and first products thereof, mining of coal and lignite, and extraction of peat, because if the national accounts included the external costs of air pollution and the depletion of natural resources, these sectors would create a negative value-added.

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## 1. Introduction

Achieving the Sustainable Development Goals (SDGs) requires that economic development, particularly in developing countries, ensure that adverse effects of economic activities to the environment are minimized (also compare WCED, 1987 pp.12). For monitoring progress towards SDGs, environmental and economic accounts are needed, but many low-income countries still have problems developing such accounts (Pirmana et al., 2019).

A starting point of proper environmental management

concerning economic development is to recognize the cost of environmental impacts due to economic activities and to include them in the decision-making process (World Bank, 1994). Studies have calculated and valued not only the natural resource depletion but also the environmental degradation as a side effect from economic activities (World Bank, 1997; Alisjahbana and Yusuf, 2000a; Bolt et al., 2002; Anielski and Wilson, 2005; Asici, 2013; Obst and Vardon, 2014).

To ensure that the development process proceeds well, Indonesia also needs to develop an accurate and comprehensive environmental-economic account. Indonesia is one of 17 countries with an extraordinary biodiversity (OECD, 2019). Indonesia is well known as the country with the largest area of tropical forests in the world, and it has a very rich coastal and marine ecosystem. The

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abundance of natural resources has made Indonesia one of the largest producers and exporters of minerals, energy sources, woods, and agricultural products. At the same time, the country still faces challenges in reducing environmental impacts due to economic activities. Indonesia was the fourth-largest emitter of greenhouse gas in the world in 2015 (Chrysolite et al., 2020), due to emissions from deforestation and peat forest fires, as well as from burning fossil fuels for energy. Other challenges comprise unwise behavior in natural resources extraction, high pollution, and environmental degradation.

In Indonesia, the Central Bureau of Statistics (BPS) has conducted several studies on establishing economic–environmental accounts (including the Green GDP measurement). Those publications are still limited to specific accounts, for instance, forest, energy and mineral accounts. Meanwhile, Indonesia is in the process of expanding its work on environmental accounts, for example, on CO<sub>2</sub> emissions.<sup>1</sup> However, since the collection of new environmental statistics can be costly, it is useful to analyze which kind of environmental accounts are relevant to the respective economic sectors.

Generally, the purpose of this study is to assess the priorities for improving and expanding environmental accounts in Indonesia. We used environmental costs related to emissions and resource extraction in Indonesia as a measure for priority. Based on this background, the present study intends to answer the following research questions: (i) How high are the total environmental costs in Indonesia? (ii) What part of these environmental costs is caused by the environmental degradation cost from air pollution? What sectors and types of air pollutants have the highest environmental degradation cost in the Indonesian economy? (iii) What part of these environmental costs is caused by natural resource depletion from resource extraction sectors in Indonesia? (iv) Which sectors and types of environmental interventions are hence of the highest priority to be covered by environmental accounts?

This paper is broadly structured as follows: Section 2 contains literature reviews on environmental cost accounting methods. Section 3 introduces earlier work on environmental costs accounts for Indonesia and the methodology used throughout this paper. Section 4 presents the results of this study on environmental degradation costs and the costs of natural resource depletion from resource extraction sectors in Indonesia. Section 5 provides a discussion of the findings and the conclusion of the study.

## 2. Methods for environmental cost calculations

Fig. 1 summarizes the most widely used approaches in environmental cost accounting. Usually, two broad groups of costs are discerned: (a) costs related to environmental degradation caused by emissions (with impacts on the ecosystem and on human health), and (b) costs associated with the use of natural capital and the depletion of natural resources (Alisjahbana and Yusuf, 2004; Jin-nan et al., 2008).

The costs of the first category can be estimated via two main approaches: the damage-based approach and the cost-based approach. The damage-based approach calculates pollution costs due to pollutant discharge, which can cause environmental deterioration (Jin-nan et al., 2008). On the other hand, the cost-based approach calculates the costs required to abate pollutant discharge in the production and consumption processes, the result

of which is called maintenance costs.

Cost calculations for the second category usually discern two main types: (1) renewable (biotic) natural resources, such as crops, timber and fish, and (2) non-renewable (abiotic) natural resources, such as metals and non-metal minerals, and fossil energy resources, including water (Hertwich et al., 2010). Renewable natural resources are, in principle, self-regenerating, making use of solar energy. They can be harvested to yield ecosystem goods (such as wood). Non-renewable natural resources cannot be regenerated. Mineral deposits and fossil fuel are the best examples. These resources generally yield no services until extracted. Overexploitation of biotic resources can lead to the collapse of resource stocks (e.g., forests and fisheries) and cause complex environmental problems. Methods for measuring the depreciation/depletion of natural resources can be categorized into three broad groups of approaches: (i) The Market Price Approach, (ii) The Income Approach, and (iii) The Cost Approach.

Environmental cost accounting seeks to monetize the various forms of environmental pressures shown in Fig. 1. Monetization makes it possible to prioritize such pressures and to calculate how environmental costs are related to the Gross Domestic Product (GDP) of a country—for instance, by calculating a “correction” of the GDP. The next section will provide a more detailed discussion of the available methods and approaches for monetizing environmental degradation and natural resource depletion, with an emphasis on the Indonesian context.

### 2.1. Environmental degradation cost

Environmental degradation is defined as a decrease in the quality of the environment due to development activities. Its value does not include the actual cost of economic activities under the market economy framework (World Bank, 2006; Perman et al., 2011). There is no consensus on the “best” method of valuing environmental damages from economic activities. In practice, several approaches and methods are used to measure environmental degradation costs.

Among others (Jin-nan et al., 2008), pointed out that the environmental costs of pollution can be assessed in two ways, namely by calculating the expenditure on environmental protection and by calculating environmental degradation. The first approach calculates the sum needed to reduce pollutant discharge from production and consumption activities with the Best Technology (treatment) currently available (BAT). The United Nations Economic and Environmental Account System (UN SEEA; see UN, 2003; UN, 2012) defines prevention costs such as ‘maintenance costs’. The second approach is to calculate what damage is caused by pollutant disposal (e.g., for human health, or environmental degradation). UN SEEA refers to these costs as ‘costs of environmental degradation’, or ‘damage value’.

The damage costs approach is more complicated than the maintenance cost approach. However, the damage costs approach provides a better insight into the dangers of pollution for human health and for the environment (Xia et al., 2006).

Table 1 provides an overview of authoritative studies that calculated these damage costs in different contexts. We observed that few studies specifically examine these costs in developing countries. As we will explain further in section 3, we opted for using the studies in Table 1 by adjusting them to an Indonesian context, rather than estimating damage costs via complex emission–effect calculations in the Indonesian situation, for which no data are available.

<sup>1</sup> On November 23, 2016, the Indonesian government signed an MoU with the Dutch Government to collaborate in the context of climate change, waste management, and circular economy as a follow up to the 2015 Paris Agreement to achieve sustainable low carbon conditions in the future.

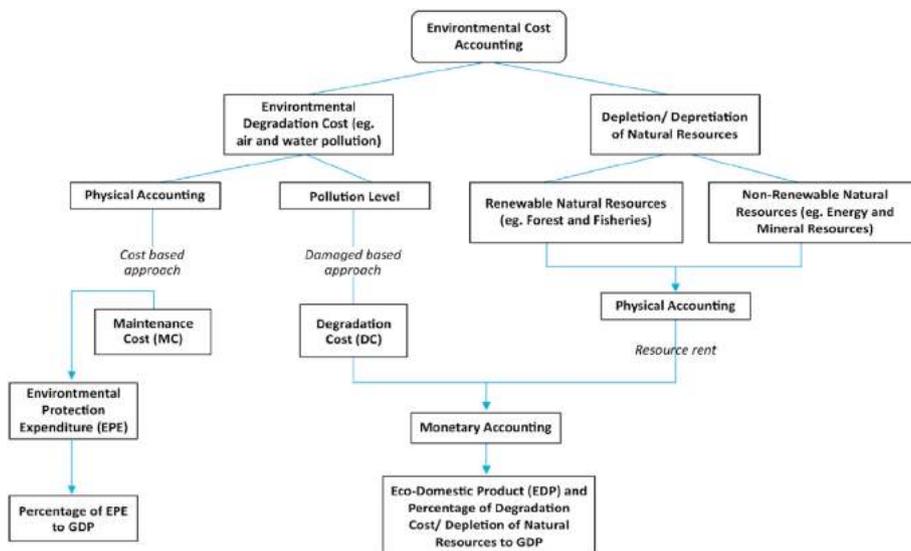


Fig. 1. Approaches to environmental cost accounting Source : Authors, inspired by Alisjahbana and Yusuf (2004); Jin-nan et al., 2008.

Table 1 Publications on Damage/Abatement cost Value for Air Pollution.

| Descriptions   | Source/ Institution                          | Population whose values are considered | Prices            | Website   | Comments  |
|--|--|--|-------------------|---|---|
| <b>DAMAGE COST</b>   |  |  |                   |   |   |
| 1 EPS Impact Assessment Method   | Steen (2015)/ Swedish Life Cycle Center      | Global                                 | €/Kg (2015)       | <a href="https://www.lifecyclecenter.se/publications/eps-2015d1-including-climate-impacts-from-secondary-particles/">https://www.lifecyclecenter.se/publications/eps-2015d1-including-climate-impacts-from-secondary-particles/</a>   | Including climate impact from secondary particles   |
| 2 EPS Impact Assessment Method   | Steen (2015)/ Swedish Life Cycle Center      | Global                                 | €/Kg (2015)       | <a href="https://www.lifecyclecenter.se/publications/eps-2015d1-excluding-climate-impacts-from-secondary-particles/">https://www.lifecyclecenter.se/publications/eps-2015d1-excluding-climate-impacts-from-secondary-particles/</a>   | Excluding climate impact from secondary particles   |
| 3 Environmental Prices Handbook EU28 version   | De Bruyn et al. (2018)/CE Delft, Netherlands | 28 EU country                          | €/Kg (2015)       | <a href="https://www.cedelft.eu/en/publications/2191/environmental-prices-handbook-eu28-version">https://www.cedelft.eu/en/publications/2191/environmental-prices-handbook-eu28-version</a>   | Environmental prices were calculated for over 2500 pollutants.  |
| 4 Environmental Prices Handbook 2017: Methods and numbers for valuation of environmental impacts | De Bruyn et al. (2018)/CE Delft, Netherlands | Netherlands                            | €/Kg (2015)       | <a href="https://www.ce.nl/en/publications/2113/environmental-prices-handbook-2017">https://www.ce.nl/en/publications/2113/environmental-prices-handbook-2017</a>   | Environmental prices were calculated for over 2500 pollutants.  |
| 5 Eco-costs 2007 LCA data on emissions and materials depletion                                   | Delft University of Technology, 2010         | EU countries                           | €/Kg (2007)       | <a href="https://ecocostsvalue.com/EVR/img/Ecocosts%202,007%20LCA%20data%20on%20emissions%20and%20materials%20depletion.xls">https://ecocostsvalue.com/EVR/img/Ecocosts%202,007%20LCA%20data%20on%20emissions%20and%20materials%20depletion.xls</a>                         | Eco-costs is a measurement tool that shows the amount of environmental burden of a product based on load prevention €2007/kg emission     |
| 6 Costs of air pollution from European industrial facilities 2008–2012                           | European Environment Agency (2014)           | EU countries                           | €/Kg (2007)       | <a href="https://www.eea.europa.eu/publications/costs-of-air-pollution-2008-2012/download">https://www.eea.europa.eu/publications/costs-of-air-pollution-2008-2012/download</a>   | This publication is an updated version of the earlier assessment of the costs of air pollution from European industrial facilities (2011) |
| <b>ABATEMENT COST</b>  |  |  |                   |   |   |
| 7 Industrial Pollution Projection System (IPPS)  | World Bank, n.d                              | Global                                 | US\$/Ton (1994)   | <a href="https://datacatalog.worldbank.org/dataset/wps1431-ipps-pollution-intensity-and-abatement-cost/resource/7972b102-9c7b-4146-8df2">https://datacatalog.worldbank.org/dataset/wps1431-ipps-pollution-intensity-and-abatement-cost/resource/7972b102-9c7b-4146-8df2</a> | Abatement costs value limited to manufacturing sectors only.  |
| 8 Pollution Abatement Costs and Expenditures (PACE) Survey                                       | U.S. Bureau of the Census (2008)             | USA                                    | Million \$ (2005) | <a href="https://www.epa.gov/environmental-economics/pollution-abatement-costs-and-expenditures-2005-survey">https://www.epa.gov/environmental-economics/pollution-abatement-costs-and-expenditures-2005-survey</a>   | Abatement costs value limited to manufacturing sectors only.  |

Source: Authors compilation

2.2. Depletion of natural resources

The theory and literature on environmental costs accounting generally base the valuation of natural resource depletion on market prices. The assumption is that a market price represents a revealed preference and shows how economic decisions are made

and can be compared. Several approaches have been used to estimate the depletion of natural resources (Da Motta and Amaral, 2000; United Nations, 2005; Domingo and Lopez Dee, 2007). Domingo and Lopez Dee (2007) categorized these approaches into three categories: (i) the market price approach, (ii) the income approach, and (iii) the cost approach.

### 2.2.1. The market price approach

Environmental assets are tradable, and their value follows the prices prevailing in the market. Domingo and Lopez Dee (2007) pointed out some advantages and limitations of using the market price approach. Data on quantities, prices, and costs are relatively easy to obtain, especially in established markets. On the other hand, one of several limitations of using this approach is the availability or lack of market data for non-traded resources. Due to policy failures or market imperfections, market transactions may not fully reflect the actual economic value of these goods and services. Moreover, researchers must consider factors affecting prices and seasonal variations. Domingo and Lopez Dee (2007) also pointed out that the market price approach may overstate benefits since this measurement does not subtract the market value of other resources that are necessary to bring ecosystem products to market.

### 2.2.2. The income approach

An alternative to the market price approach is the income approach, which is an indirect way of using market value or considered a proxy measure of market value where, in reality, a true market does not exist. Four approaches fall into this income approach group: (1) the Net Price Method, (2) the Net Present Value (NPV) method, (3) the El Sherafy/User Cost method, and (4) the Appropriation method. Each approach has advantages and limitations.

Table 2 below presents each approach's advantages and disadvantages for concisely measuring natural resource depletion.

### 2.2.3. The cost approach

This approach is an alternative measurement for valuing natural resource assets, such as mineral resources. The advantages of this method are reflected in the availability of technical data and specific information on exploration costs (Domingo and Lopez Dee, 2007). On the other hand, the disadvantage of using this method relates to the experience assessments that are needed to distinguish past expenditures that are considered productive from those estimated to make no contribution to the value of the property and to predict what will be reasonable exploration programs and costs in the future.

## 3. Estimation method for Indonesia

Several attempts have been made to measure environmental costs and to adjust the conventional GDP for the case of Indonesia. These attempts have been initiated since the early 1990s, both by individuals and by local and international institutions. Table 3 below summarizes the most critical studies on environmental cost measurement for the case of Indonesia.

The table shows that in most studies, the measurements of environmental costs only focus on the calculation of natural resource depletion. A few studies attempted to include the calculation of environmental degradation cost caused by emissions, and they usually concentrate on a small number of emissions, such as BOD, CO<sub>2</sub>, NO<sub>x</sub>, etc. Furthermore, most of these studies are quite dated. There is hence a need to highlight how significant the environmental degradation costs of emissions are in comparison to those of resource extraction. The next section will discuss and elaborate on how environmental costs were estimated in this study.

### 3.1. Estimation procedures

This sub-section will explain in more detail the methodologies used in the present study for calculating environmental costs for the Indonesian context, divided into the procedures for calculating the costs of (i) environmental degradation due to emissions, (ii)

destruction of ecosystems, and (iii) depletion of natural resources.

#### 3.1.1. Environmental degradation due to emissions

Damage costs usually are calculated by estimating damage cost values per unit discharge of a specific pollutant, multiplied by the volume of emission discharge. The formula used to arrive at environmental degradation costs in this study is as follows:

$$ED = \sum_m \sum_n p_{mn} \cdot uc_n \tag{1}$$

where *ED* is the environmental degradation costs resulting from the sum of environmental degradation costs by type of pollutant and by sector, *p<sub>mn</sub>* is the volume of pollutant *m* produced per unit output of sector *n* (pollution intensity), and *uc<sub>n</sub>* is the unit cost of pollutants *m* in sector *n* (environmental price, Rp/kg).

The environmental degradation cost calculation in this study is limited to air pollution. For calculating the environmental degradation costs related to air emissions and resource extractions by sector, two main data sets are needed:

- a) The volume of air pollution emissions by type of air pollutants and by economic sector. Due to the limited availability of data from official sources in Indonesia, this study utilizes emission information from a Global Multi-regional Environmentally Extended Input-Output (GMRIO) database, EXIOBASE, which was developed by a consortium consisting of the Institute of Environmental Sciences (CML), the Netherlands Organisation for Applied Scientific Research (TNO), the Norwegian University of Science and Technology (NTNU) and other partners (Stadler et al., 2018). This consortium estimated emissions by sector for a large number of countries, using, for instance, information of the International Energy Agency (IEA) on fuel use by sector in combination with emission factors. While this information is not official, this source provides a good proxy for emission data by type of air pollutants and by economic sectors. A problem is, however, that EXIOBASE uses a different sector classification than the Indonesian system of national accounts.
- b) Several studies/publications are based on environmental prices, primarily obtained from academic institutions and NGOs in Europe (see Table 1). Publications or studies on environmental damage costs of emissions in developing countries are absent or very rare. We conducted an extensive analysis of available studies on damage costs of emissions, including emissions of CO<sub>2</sub>, Pb, PM10, and CH<sub>4</sub>, and we reported our findings in Table 1. We decided to base our present study mainly on damage costs as indicated in the Environmental Prices Handbook EU28 publication version CE Delft, the Netherlands (De Bruyn et al., 2018b). This decision was based on the consideration that in comparison with other publications, the environmental price data published by this institution are up to date and provide the most detailed data based on the type of air pollutants. This data set is also compatible with the classification of types of air pollutants in EXIOBASE. The use of this data set poses various problems, however. For instance, the currency is different, and the data are for a different base year (2015) than the year we used in this study (2010). Finally, there may be a different valuation of the same level of damage in Europe than in Indonesia.

To solve the problems posed by using emission data given in the EXIOBASE classification and by using damage cost data that are sourced for the year 2015 in Europe and calculated in Euro, we used the following approach:

1. Align EXIOBASE and Indonesian data. We first created a

**Table 2**  
Methods based on the income approaches to measure depletion/depreciation of natural resources.

| Approach                    | General description  | Advantages   | Limitations  |
|-----------------------------|--|--|--|
| Net Price method            | The market price minus all factor costs. (UN, 2005)  | Simple   | (i) This method is built on the assumption of a perfectly competitive market structure; in reality, the premise that rents will increase along with the discount rate may not apply because of market imperfections.<br>(ii) The rent used may also include other forms of rent. (iii) Global mineral prices are not regulated by perfect market mechanisms. (iv) Overestimates the market value of subsoil assets.                              |
| Net Present Value           | This approach is commonly used to predict the net income stream of an asset over its entire economic life. This includes forecasting future net income streams that can be generated if mineral resources are exploited optimally and then discounting them using appropriate capital costs.   | (i) <b>The time aspect.</b> This approach recognizes the notion that dollars earned today are worth more than dollars earned ten years from now. (ii) <b>Risk.</b> This approach combines the risks associated with resources via the expected income stream and/or the discount rate. (iii) <b>Flexibility.</b> NPV provides resilience and intensity because the equation can adjust for inflation and can be used together with other analytic tools. | (i) it is difficult to specify the Income flow, which reflects the estimated Net Benefits during the natural life of the resource. (ii) In this approach, choosing an appropriate discount rate is crucial. (iii) The calculation is done in a static manner, which does not allow for any future adjustments. (iv) The capital requirements may possibly change over time, requiring decisions along the path that may change the risk profile. |
| EI Sherafy/User Cost method | This approach distinguishes between the "actual income" and the "gross revenue" generated by an asset. In this approach, actual income is defined as "the amount of revenue that will be maintained indefinitely regardless of the actual life of the asset by investing a portion of the gross revenue generated which can be a depletion expense or referred to as a user cost". | One of the strengths of this method is that the user cost $(1 - (X/R))$ can be proxied by a formula involving the discount rate and the ratio of annual production to the total stock of resources $(1 / (1 + r))^{n + 1}$   | (i) Several assumptions are needed to calculate the user costs. (ii) During the lifetime of the resource, the current level of receipts is held constant. (iii) Until the final exhaustion of the resource, the rate of extraction is also held constant. (iv) Assumes a constant discount rate.   |
| The Appropriation method    | This approach is based on the notion that governments theoretically can collect all rents from resource extraction. The government can collect resource rent through taxes, fees, and royalties imposed on companies that extract the natural resources.   |  | (i) The level of payments to the authority may not move with the market price for the extracted product. (ii) In practice, taxes, royalties, and fees tend to underestimate resource rents because they can be determined by the government.   |

Source: Summarized from Domingo and Lopez Dee (2007), bib\_Domingo\_and\_Lopez\_Dee\_2007.

correspondence between EXIOBASE and the sector classification in the Indonesia Input-Output Table (IIOT). In this study, a mapping of the two-sector classification of the dataset was carried out by making a concordance matrix. The EXIOBASE data are categorized into 163 sectors, while the 2010 IIOT distinguishes between 185 industries. By aggregating both EXIOBASE and the IIOT, both were converted into a standard classification of 86 sectors. Furthermore, EXIOBASE itemizes highly specific emission extensions, differentiating, for instance, CO<sub>2</sub> emissions by fuel type and other sources. We aggregated the original 417 emission extensions to 34 substances.

2. Align the base year for environmental prices (damage costs). The volume data of emissions/air pollutants from the EXIOBASE dataset are for 2010, while the available data on environmental prices are based on other years. We therefore re-priced environmental damage costs according to the year and country of origin using the GDP deflator of the OECD National Accounts Statistics.

3. Convert the 2010 environmental prices by type of air pollutant into Indonesian rupiah. The sources we used reported damage costs in Euro and \$ per kg emission. For the present study, it was necessary to convert these values into rupiah/kg. We decided to apply a monetary conversion for 2010 based on Purchasing Power Parity (PPP) rather than just using the market exchange rate. For developing countries, the latter would lead to an underestimation of damage costs, since purchasing power is usually higher than an income calculated via the market exchange rate.

4. Multiply the emission volumes estimated under point 1) with the damage costs per kg calculated under point 3. The last step to calculate the environmental cost value was to multiply the amount of air pollutant discharge for each sector with the environmental price value for each type of air pollutant.

These conversion steps are shown in detail in an extensive

spreadsheet added as Supplementary Information (SI). Table 4 shows the resulting damage costs in Rupiah (Rp)/kg per pollutant for Indonesia for 2010. The total damage costs of emissions by sector in Indonesia are discussed in section 4.

### 3.1.2. Value loss of ecosystems

To estimate the value of ecosystems, or more particularly in this study, of forest resources, we covered two primary sources of destruction: (i) Net depletion of renewable resources (timber resources), often referred to as "excess felling" and defined as the volume of wood produced that exceeds its natural growth. (ii) The loss of ecosystem services from tropical forests due to deforestation.

To compute (i), the net depletion of timber resources, we use the main sources available in Indonesia on physical forest accounts published by the BPS, which cover two types of timber: teak wood and deep forest roundwood.

The stocks (both opening and closing stocks) of timber resources are the stocks of products assessed at a certain period. Additions to the stocks of this type of resources include both plantation and natural growth, whereas the decrease in stocks of these assets covers damages and harvesting or production. We assume that log values destroyed by fires constitute a part of destroyed forests.

In constructing the monetary account for timber resources, a unit rent has to be estimated. Data of the physical account is then multiplied by its unit rent to arrive at a monetary account for forest resources.

$$D^R = \sum_j s_j (h_j - g_j) \tag{2}$$

where  $D^R$  is depletion/depreciation of renewable natural resources;

**Table 3**  
Summary of previous studies of environmental cost and related adjustments of Indonesia's GDP.

| Authors                        | Coverage   | Valuation Methods                               | Results (Adjustment of GDP,%) |
|--------------------------------|--|---|-------------------------------|
| Repetto et al. (1989)          | - Resource depletion: Oil, soil degradation and forest (including deforestation)   | Net price method                                | 17.9 (1984)                   |
| Pearce and Atkinson (1993)     | - Resource depletion: Oil, soil degradation and forest (including deforestation)   | Market price                                    | 17.9 (1984)                   |
| BPS, various years (1996–2011) | - Resource depletion: Forest, mineral resources (oil, gas, coal, gold, silver, nickel ore, bauxite)  | Net price method                                | 11.7 (1996)                   |
| Vincent and Castenada (1997)   | Resource depletion: several mineral resources, forest, and sub-soil resources.   | Hotelling rent                                  | 2.5 (1992)                    |
| Hamilton (1999)                | - Resource depletion: oil, gas, broad coverage of minerals, forest;<br>- Env. degradation: damage due to emission of CO <sub>2</sub> .   | Net present Value (NPV) method                  | 14.7 (1994)                   |
| Alisjahbana and Yusuf (2000a)  | - Resource depletion: petroleum, natural gas, several of the most important mineral resources, forest resources<br>- Env. degradation: pollution damage from local and global sources            | User cost method                                | 5.2 (1995)                    |
| Alisjahbana and Yusuf (2000b)  | - Resource depletion: petroleum, natural gas, several of the most important mineral resources, forest resources<br>Env. degradation: pollution damage from local and global sources <sup>2</sup> | Net price method, the maintenance cost approach | 10.5 (1997)                   |
| Yusuf and Pirmana (2009)       | Resource depletion: Forest, oil, natural gas, and several of the most important mineral resources<br>Env. degradation: pollution damage from local and global sources                            | Net price method, the maintenance cost approach | 4.27 (2007)                   |
| Yuniarti, P. Irma (2013)       | Resource depletion: crude oil, natural gas, forest, several of the most important mineral resources<br>Env. degradation: pollution damage from local (NOx) and global sources                    | Net price method, the maintenance cost approach | 4.2 (2007)                    |
| BPS, various years (2012–2016) | - Resource depletion: forest, crude oil, natural gas, and several of the most important mineral resources<br>- Land cover and land use   | Net present Value (NPV) method                  | 6.74 (2016)                   |

<sup>2</sup> s All types of pollutants classified into local sources of pollution except for CO<sub>2</sub> emission.  
Source: Author's compilation

**Table 4**  
Damage cost value by type of air pollutant.

| No. | Air Pollutants  | Environmental prices/kg in ThousandRp, 2010) |
|-----|---|--|
| 1   | CO <sub>2</sub>   | 0.12   |
| 2   | CH <sub>4</sub> -Methane                                  | 4.33   |
| 3   | N <sub>2</sub> O  | 36.82  |
| 4   | SO <sub>x</sub>   | 61.95  |
| 5   | NO <sub>x</sub>   | 36.82  |
| 6   | NH <sub>3</sub>   | 43.54  |
| 7   | CO  | 0.13   |
| 8   | Benzo (a) pyrene  | 13.16  |
| 9   | Benzo (b) fluoranthene                                    | 0.50   |
| 10  | Benzo (k) fluoranthene                                    | 0.50   |
| 11  | Indeno (1,2,3-cd) pyrene                                  | 1.53   |
| 12  | PCBs-Polychlorinated biphenyls                            | 0.04   |
| 13  | PCDD_F -polychlorinated dibenzo-p-dioxin and dibenzofuran | 70,78*)                                      |
| 14  | HCB-Hexachlorobenzene                                     | 4.63   |
| 15  | NM VOC  | 2.86   |
| 16  | PM10  | 66.18  |
| 17  | PM2.5   | 96.29  |
| 18  | TSP   | 35.56  |
| 19  | As-Arsenic  | 2144.73                                      |
| 20  | Cd-Cadmium  | 1465.48                                      |
| 21  | Cr-Chromium   | 1.24   |
| 22  | Cu-Copper   | 9.65   |
| 23  | Hg  | 85,813.91                                    |
| 24  | Ni  | 213.23                                       |
| 25  | Pb  | 13,353.53                                    |
| 26  | Se  | 87.58  |
| 27  | Zn  | 16.57  |
| 28  | PAH   | 18.77  |
| 29  | SF6   | 3309.15                                      |
| 30  | HFC-Hydrofluorocarbons                                    | 2650.72                                      |
| 31  | PFC-Perfluorocarbons                                      | –  |
| 32  | Nitrogen  | 7.74   |
| 33  | Phosphorus  | 11.82  |
| 34  | Emissions n.e.c – Waste                                   | –  |

Notes: \*) in Billion rupiah.

Source: Author's calculation based on various sources of the damage cost values by types of air pollutants, see supporting information. In short, data on damage costs were taken mostly from the Environmental Prices Handbook for the EU28, produced by CE Delft in 2018, and were adjusted to the Indonesian context. For other types of air pollutants, we used values from other sources. The value for CO<sub>2</sub> was taken from the US EP, the value for PCDD\_F was taken from EEA publication (EEA, 2014), and the values for TSP, Se and HFC were taken from the Eco-cost 2007 LCA data, the only source providing them. Data for PAH were taken from the EPS Impact Assessment Method dataset of the Swedish Life Cycle Center.

$s_j$  is unit rent of renewable natural resources  $j$ ;  $h_j$  is the quantity of a renewable natural resource  $j$ , and  $g_j$  is the natural growth of that renewable resource  $j$ .

Equation [2] shows how to calculate the depletion or depreciation value of renewable natural resources. Based on this equation, rather than multiplying the unit rent by the number of resources obtained, the authors of this study considered it better to multiply the unit rent by the net depletion or the quantity of the resource obtained ( $h_j$ ) minus its natural growth ( $g_j$ ).

To calculate (ii) the loss of ecosystem service value of tropical forests, we multiplied the area of primary forest cover loss (ha) with the unit values of ecosystem services from tropical forests. Due to the limited availability of data from official sources, we utilized data for primary forest cover loss for 2010 from Margono et al. (2014). The estimated value per ha of ecosystem services from tropical forests was taken from Costanza et al. (2014). Since the unit value data is only available for 1997 and 2011, with values in int.\$/ha/year in 2007 constant prices, we converted the data in the following steps: we first converted the unit value \$2007/ha/year into unit value \$2010/ha/year using the US CPI data. Next, we calculated the loss of value of ecosystem services of tropical forests by multiplying the unit value with the number of ha of forest cover loss. We finally converted the value into Indonesian rupiah using the PPP. The SI shows these calculation steps in detail.

### 3.1.3. Depletion of natural resources

This study estimated the value of non-renewable resources depletion for the essential mineral and energy resources in the Indonesian economy, i.e., crude oil, natural gas, bauxite, tin, coal, nickel ore, gold, and silver, in terms of monetary accounts, based on a physical accounts dataset from the BPS publication on SISNERLING. After considering and comparing the strengths and limitations of each of the natural resource depletion measurement methods in section 2, we decided to use the NPV approach to assess the costs of resource depletion for non-renewable resources. The use of this approach is also recommended by SEEA-CF 2012 (United Nations, 2014).

The formula used to estimate the depletion/depreciation of non-renewable natural resources in this study is as follows:

$$D^{NR} = \sum_i r_i q_i \quad (3)$$

where  $DNR$  is depletion/depreciation of non-renewable or exhaustible natural resources;  $i$  is the type of non-renewable natural resources;  $r_i$  is the unit rent (or value) of non-renewable natural resources type  $i$ , and  $q_i$  is the extracted quantity of non-renewable natural resources type  $i$ .

Data on the extracted quantity of each of these natural resources ( $q_i$ ) was obtained from the publication "Statistics of Oil and Gas Mining" and "Statistics of Non-Oil and Gas Mining" published by the BPS. For each resource, the unit rent ( $r_i$ ) is estimated by subtracting the extraction costs per unit from the price. Again, the SI shows these calculation steps in detail.

## 4. Findings on environmental cost calculation for Indonesia

### 4.1. Total environmental costs

The environmental costs estimated in this study consist of two main components, i.e. (1) environmental degradation caused by air pollution; (2) natural resource depletion. Using the approach explained in the earlier sections, we estimated the total environmental costs at Rp. 915,11 trillion, broken down into Rp 348,35 trillion (38.07%) due to environmental degradation by air pollution,

Rp 61.43 trillion (6.71%) due to the depletion of renewable resources (split up into Rp. 33.09 trillion for the value of excess felling of wood, and Rp 28.35 trillion for the loss of ecosystem service value) and Rp 505.33 trillion (55.22%) due to non-renewable resource depletion, see Table 5.

Table 5 shows that the principal source of imputed environmental costs in Indonesia were energy and mineral resource depletion, for which the BPS already has good statistics. However, the table and figure also illustrate the major contribution of environmental degradation costs from air pollutants, for which the BPS has less elaborated statistics.

Table 6 shows the top 10 sectors with the highest Total Environmental Cost/Value-Added Ratio in Indonesia in 2010. The table shows that six sectors have total environmental costs that are larger than their value-added (VA): Sea and coastal water transport; Recycling of waste and scrap; Manufacture of basic iron and steel and ferro-alloys and first products thereof & Re-processing of secondary steel into new steel; Mining of coal and lignite, extraction of peat; Extraction of crude petroleum and services related to crude oil extraction, excluding surveying; and Inland water transport. The ratios of environmental cost to value-added across these seven sectors range from 1.53 for Sea and coastal water transport to 1.09 for inland water transport. The fact that total environmental costs exceed value-added implies that if the national accounts included the external costs of air pollution and the depletion of natural resources, these sectors would create a negative value-added.

Table 6 also shows that of the ten sectors with the highest ratio of total environmental cost to VA, four are in the extractive sector: extraction of natural gas and services related to natural gas extraction, excluding surveying; extraction of crude oil and services related to crude oil extraction, excluding surveying; mining of coal and lignite; extraction of peat; and mining of precious metal ores and concentrates. The first two of these four sectors occupy the first and second position, with ratios of 24.32 and 11.12, respectively.

Estimating environmental costs allows us to make adjustments to the GDP. Such an adjusted GDP is commonly known as "Eco-Domestic Product" (EDP), where EDP is defined as a GDP that includes elements of degradation of natural resources and the environment (Li and Lang, 2010). Subtracting the value of the environmental costs from Net Domestic Product (NDP) yielded an EDP of Rp. 4678.54 trillion. The environmental costs constituted 16.36% of the Net Domestic Product or 13.33% of the Gross Domestic Product, see Fig. 2.

### 4.2. Environmental degradation cost by type of air pollutant

As indicated, environmental damage costs due to air emissions are an important part of the total damage costs in Indonesia. In Tables 7 and 8, we present the value of environmental degradation cost by sector and by type of air pollutant. The profile helps to identify the sectors and pollutants with the highest value in environmental degradation costs, which can be considered a priority for inventorying improved data on emissions for the Indonesian situation. Such data also will allow calculating a more accurate Green GDP by, for instance, identifying the priority sectors whose data must be obtained by the BPS or related official institutions, such as the ministry of the environment and forestry.

As was already shown in Table 5, the total environmental costs related to air emissions in 2010 for Indonesia were about 348.35 trillion rupiahs or 5.07% of the total GDP. Table 6 shows the ten sectors with the highest environmental degradation cost value in Indonesia. Based on Table 4, these ten sectors contributed about 73.11% of Indonesia's total environmental degradation costs in 2010. The electricity sector was the sector with the highest costs of

**Table 5**  
Breakdown of environmental costs by type of natural assets (Rp trillion).

| Components   | Environmental Costs (Rp trillion) | Percentage    |
|--|-----------------------------------|---------------|
| <b>1. Environmental degradation costs (air pollutants)</b> | <b>348.35</b>                     | <b>38.07</b>  |
| <b>2. Destruction of Ecosystem (forest)</b>                | <b>61.43</b>                      | <b>6.71</b>   |
| - Net depletion/excess felling of wood                     | 33.09                             | 3.62          |
| - Loss of eco-services Value of tropical forest            | 28.35                             | 3.10          |
| <b>3. Non-renewable resources (Energy and minerals)</b>    | <b>505.33</b>                     | <b>55.22</b>  |
| <b>Environmental costs</b>                                 | <b>915.11</b>                     | <b>100.00</b> |

Source: Author's calculation

**Table 6**  
Top 10 sectors with total environmental cost (tTEC)/value-added (VA) ratio.

| No. Sector   | Total Environmental Costs (Rp trillion) | Value-Added (Rp trillion) | TEC/VA      |
|--|---|---------------------------|-------------|
| 1 Extraction of natural gas and services related to natural gas extraction, exc. surveying   | 128.49                                  | 5.28                      | 24.32       |
| 2 Extraction of crude petroleum and services related to crude oil extraction, exc. surveying   | 196.20                                  | 17.64                     | 11.12       |
| 3 Electricity  | 47.86                                   | 19.59                     | 2.44        |
| 4 Meat animals n.e.c.  | 2.94                                    | 1.62                      | 1.82        |
| 5 Manufacturing of basic iron and steel and of ferro-alloys and first products thereof & re-processing of secondary steel into new steel | 35.85                                   | 24.80                     | 1.45        |
| 6 Mining of coal and lignite; extraction of peat   | 185.10                                  | 144.91                    | 1.28        |
| 7 Mining of lead, zinc and tin ores & other non-ferrous metal ores and concentrates  | 5.23                                    | 4.39                      | 1.19        |
| 8 Inland water transport   | 7.29                                    | 6.99                      | 1.04        |
| 9 Sea and coastal water transport  | 29.00                                   | 33.16                     | 0.87        |
| 10 Manufacture of cement, lime and plaster   | 17.85                                   | 28.81                     | 0.62        |
| <b>Other Sectors</b>   | <b>259.30</b>                           | <b>6396.49</b>            | <b>0.04</b> |
| <b>Total</b>   | <b>915.11</b>                           | <b>6683.68</b>            | <b>0.14</b> |

Source: Authors calculation

environmental degradation in the economy: about 47.86 trillion rupiah's, or 13.74% of the total value of environmental degradation costs.

The following priorities are the manufacture of basic iron and steel and of ferro-alloys and first products thereof, including re-processing of secondary steel into new steel (10.39%); mining of coal and lignite and extraction of peat (8.33%); Sea and coastal water transport (8.32%); Cultivation of paddy rice (7.38%). The remaining five of the ten highest contributors were accountable for 25.23% of the total environmental degradation costs in Indonesia for 2010.

Looking at pollutants, the ten types of air pollutants with the highest costs of environmental degradation in Indonesia are accountable for 326.41 trillion rupiahs or 93.70% of the total environmental degradation cost value (Table 5). SO<sub>x</sub> has the highest environmental degradation cost of about 74.56 trillion rupiahs or 21.40% of the total environmental degradation cost value, followed by NO<sub>x</sub> (16.44%), CO<sub>2</sub> (13.60%), and CH<sub>4</sub> (10.41%).

Tables 9 and 10 show a matrix of the top 10 sectors and pollutants in terms of environmental degradation cost value. The ten sectors and the ten types of pollutants are the sectors and types of pollutants that must be prioritized, both in terms of data availability, as well as in terms of industrial policy-making in the context of sustainable development. The ten sectors are as follows: Electricity; Sea and coastal water transport; Manufacture of rubber and plastic products; Pulp & Paper; Mining of coal and lignite; Extraction of peat; Manufacture of cement, lime and plaster; Other non-ferrous metal production; Petroleum Refinery; Manufacture of basic iron and steel and of ferro-alloys and first products thereof & Re-processing of secondary steel into new steel; and Chemical. The ten pollutants are SO<sub>x</sub>, NO<sub>x</sub>, CO<sub>2</sub>, CH<sub>4</sub>, NH<sub>3</sub>, TSP, Pb, PM10, PM2.5, and Nitrogen.

4.3. Loss of ecosystem services from deforestation

The environmental costs of the extraction of forest resources and the related ecosystem depletion consist of excess felling of timber above its natural growth, forests damage and conversions, but also include the loss of eco-services of forests due to economic activities.<sup>3</sup> In Indonesia, many economic activities involve the conversion of forest areas to commercial areas, such as estates and transmigration areas. Also, there is a large amount of forest damage due to both human activities and natural causes. This forest damage and the effects of conversion should not be neglected in estimating the environmental costs since they contribute to the reduction of forest products in the future. Table 11 provides an overview of the estimated results of the net depletion (excess felling) of timber resources. The value of environmental costs is equal to Rp. 61.43 trillion, almost half of which, Rp. 33.09 trillion, is due to net depletion (excess felling) of forest resources, calculated as growth

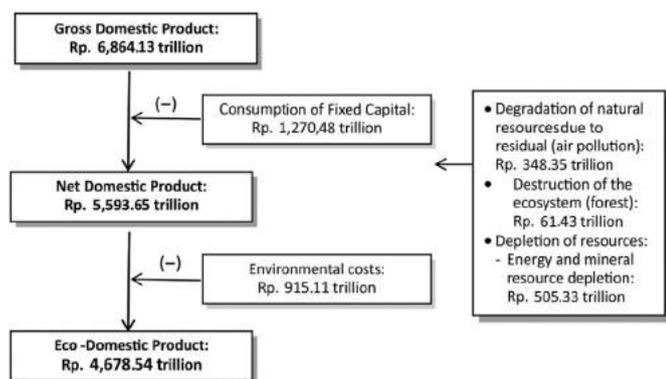


Fig. 2. The 2010 Indonesian eco domestic Product Source : Author's calculations.

<sup>3</sup> excess felling also known as depletion of forest resources.

**Table 7**  
Ten highest environmental degradation costs values by sectors.

| No | Sector  | Environmental Degradation Cost (Rp trillion) | Percentage  |
|----|---|--|-------------|
| 1  | Electricity   | 47.86  | 13.74       |
| 2  | Manufacture of basic iron and steel and ferro-alloys and first products thereof & Re-processing of secondary steel into new steel | 35.85  | 10.29       |
| 3  | Mining of coal and lignite; extraction of peat  | 29.02  | 8.33        |
| 4  | Sea and coastal water transport   | 29   | 8.32        |
| 5  | Cultivation of paddy rice   | 25.72  | 7.38        |
| 6  | Manufacture of rubber and plastic products  | 24.49  | 7.03        |
| 7  | Livestock and their results   | 18.43  | 5.29        |
| 8  | Manufacture of cement, lime, and plaster  | 17.85  | 5.12        |
| 9  | Fertilizer  | 13.75  | 3.95        |
| 10 | Construction  | 12.7   | 3.65        |
|    | Other sectors   | 93.69  | 26.89       |
|    | <b>Total</b>  | <b>348.35</b>                                | <b>100%</b> |

Source: Author's calculation

**Table 8**  
Ten air pollutants with the highest environmental degradation costs values.

| No | Pollutants              | Environmental Degradation Costs (Rp trillion) | Percentage  |
|----|-------------------------|---|-------------|
| 1  | SO <sub>x</sub>         | 74.56   | 21.40       |
| 2  | NO <sub>x</sub>         | 57.27   | 16.44       |
| 3  | CO <sub>2</sub>         | 47.39   | 13.60       |
| 4  | CH <sub>4</sub>         | 36.28   | 10.41       |
| 5  | NH <sub>3</sub>         | 30.50   | 8.75        |
| 6  | TSP                     | 20.69   | 5.94        |
| 7  | Pb                      | 18.03   | 5.18        |
| 8  | PM10                    | 17.01   | 4.88        |
| 9  | PM2.5                   | 14.86   | 4.27        |
| 10 | Nitrogen                | 9.83  | 2.82        |
|    | <b>Other pollutants</b> | <b>21.94</b>                                  | <b>6.30</b> |
|    | <b>Total</b>            | <b>348.35</b>                                 | <b>100%</b> |

Source: Author's calculation

minus felling, conversion, and damages. Meanwhile, the value of destruction of the ecosystem due to the loss of eco-services of tropical forests amounted to Rp. 28.35 trillion (calculation details provided in supplementary information).

**Table 9**  
Matrix of the top 10 sectors and pollutants contributing to environmental degradation costs in Indonesia (Rp trillion).

| No. | Sectors/Pollutants   | SO <sub>x</sub> | NO <sub>x</sub> | CO <sub>2</sub> | CH <sub>4</sub> | NH <sub>3</sub> | TSP           | Pb            | PM10          | PM2.5         | Nitrogen     | Total*)        |
|-----|--|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|---------------|---------------|---------------|--------------|----------------|
| 1   | Electricity  | 21,119          | 5,874           | 11,458          | 46              | 6               | 4,135         | 251           | 2,948         | 1,579         | -            | 47,416         |
| 2   | Manufacture of basic iron and steel and of ferro-alloys and first products thereof & Re-processing of secondary steel into new steel | 3,132           | 1,447           | 416             | 4               | 1               | 7,455         | 16,806        | 2,781         | 2,461         | -            | 34,503         |
| 3   | Mining of coal and lignite; extraction of peat   | 6,583           | 1,605           | 3,096           | 11,398          | 0               | 2,896         | 116           | 2,247         | 869           | -            | 28,810         |
| 4   | Sea and coastal water transport  | 8,343           | 8,352           | 1,749           | 6               | 15              | 667           | 11            | 1,209         | 1,662         | -            | 22,014         |
| 5   | Cultivation of paddy rice  | 5               | 102             | 14              | 16,849          | 5,628           | 6             | -             | 11            | 15            | 2,491        | 25,120         |
| 6   | Manufacture of rubber and plastic products   | 8,333           | 4,135           | 7,247           | 57              | 17              | 1,872         | 342           | 1,429         | 817           | -            | 24,250         |
| 7   | Livestock and their results  | 43              | 2,742           | 113             | 3,952           | 9,458           | 50            | 0             | 89            | 122           | 344          | 16,914         |
| 8   | Manufacture of cement, lime and plaster  | 4,741           | 2,970           | 3,666           | 1               | 1               | 1,743         | 127           | 2,276         | 2,258         | -            | 17,783         |
| 9   | Fertilizer   | 527             | 3,919           | 201             | 4               | 2,423           | 21            | 1             | 38            | 47            | 2,108        | 9,289          |
| 10  | Construction   | 126             | 5,934           | 4,602           | 18              | 178             | 1             | 53            | 590           | 724           | -            | 12,229         |
|     | <b>Other sectors</b>   | <b>21,604</b>   | <b>20,186</b>   | <b>14,828</b>   | <b>3,943</b>    | <b>12,770</b>   | <b>1,844</b>  | <b>328</b>    | <b>3,389</b>  | <b>4,304</b>  | <b>4,886</b> | <b>88,082</b>  |
|     | <b>Total *</b>   | <b>74,556</b>   | <b>57,266</b>   | <b>47,391</b>   | <b>36,278</b>   | <b>30,496</b>   | <b>20,693</b> | <b>18,034</b> | <b>17,007</b> | <b>14,859</b> | <b>9,830</b> | <b>326,409</b> |

Source: Author's calculation

Notes:

\*) Total value of top 10 sectors

| Colour  | Range       |
|---|-------------|
|  | >10,000     |
|  | 3,000-9,999 |
|  | 346-2,999   |
|  | <346        |

Most of the destruction resulted from forest fires, either caused by humans or by nature. Human-caused forest damage is the result of shifting cultivation practices, logging damage, or land clearing. Some of the forest fires were exacerbated by nature (wind, dry temperature, etc.). In this case, it was not possible to obtain a more detailed account of forest damage due to each of these causes.

#### 4.4. Depletion of natural resources

This study covers the depletion of non-renewable resources such as minerals and energy carriers. Table 12 shows the depletion value from energy and mineral resources: the depletion value from oil resources amounts to Rp. 190.40 trillion, the depletion value from natural gas is about Rp. 125.84 trillion, and coal depletion is equal to Rp. 156.09 trillion. Moreover, the depletion value from bauxite is equal to Rp. 1.36 trillion, followed by tin (Rp.5,01 trillion), gold (Rp. 25.30 trillion), silver (about Rp. 0.97 trillion), and nickel ore (Rp. 0.36 trillion). Environmental costs due to the depletion of energy and mineral resources in 2010 amounted to Rp 505.33 trillion. The largest contributors to the high value of environmental costs from the depletion of energy and mineral resources are oil,

**Table 10**  
Matrix of the top 10 sectors and pollutants contributing to environmental degradation costs in Indonesia (%)\*.

| Sectors/Pollutants   | SOx   | NOx   | CO2  | CH4  | NH3  | TSP  | Pb   | PM10 | PM2.5 | Nitrogen | Total |
|--|-------|-------|------|------|------|------|------|------|-------|----------|-------|
| 1 Electricity  | 6.06  | 1.69  | 3.29 | 0.01 | 0.00 | 1.19 | 0.07 | 0.85 | 0.45  | -        | 13.61 |
| 2 Manufacture of basic iron and steel and of ferro-alloys and first products thereof & Re-processing of secondary steel into new steel | 0.90  | 0.42  | 0.12 | 0.00 | 0.00 | 2.14 | 4.82 | 0.80 | 0.71  | -        | 9.90  |
| 3 Mining of coal and lignite; extraction of peat   | 1.89  | 0.46  | 0.89 | 3.27 | 0.00 | 0.83 | 0.03 | 0.64 | 0.25  | -        | 8.27  |
| 4 Sea and coastal water transport  | 2.39  | 2.40  | 0.50 | 0.00 | 0.00 | 0.19 | 0.00 | 0.35 | 0.48  | -        | 6.32  |
| 5 Cultivation of paddy rice  | 0.00  | 0.03  | 0.00 | 4.84 | 1.62 | 0.00 | -    | 0.00 | 0.00  | 0.71     | 7.21  |
| 6 Manufacture of rubber and plastic products   | 2.39  | 1.19  | 2.08 | 0.02 | 0.00 | 0.54 | 0.10 | 0.41 | 0.23  | -        | 6.96  |
| 7 Livestock and their results  | 0.01  | 0.79  | 0.03 | 1.13 | 2.72 | 0.01 | 0.00 | 0.03 | 0.04  | 0.10     | 4.86  |
| 8 Manufacture of cement, lime and plaster  | 1.36  | 0.85  | 1.05 | 0.00 | 0.00 | 0.50 | 0.04 | 0.65 | 0.65  | -        | 5.10  |
| 9 Unspecified activities   | 0.15  | 1.13  | 0.06 | 0.00 | 0.70 | 0.01 | 0.00 | 0.01 | 0.01  | 0.61     | 2.67  |
| 10 Construction  | 0.04  | 1.70  | 1.32 | 0.01 | 0.05 | 0.00 | 0.02 | 0.17 | 0.21  | -        | 3.51  |
| <b>Other sector</b>  | 6.20  | 5.79  | 4.26 | 1.13 | 3.67 | 0.53 | 0.09 | 0.97 | 1.24  | 1.40     | 25.29 |
| <b>Total</b>   | 15.20 | 10.64 | 9.35 | 9.28 | 5.09 | 5.41 | 5.08 | 3.91 | 3.03  | 1.42     | 68.42 |

Source: Author's calculation

Notes:

\*) Percentage value to total emission in the economy

\*\*) Total of top 10 sectors

| Colour | Range   |
|--------|---------|
| Red    | >4%     |
| Orange | 1%-3.9% |
| Yellow | < 1%    |
| Green  | <0.09%  |

**Table 11**  
Environmental cost from the depletion of forest resources, 2010.

| 1. Net depletion (excess felling)   |            |                               |                                    |
|---|------------|-------------------------------|------------------------------------|
| Description   | Teak wood  | Deep forest roundwood on Java | Deep forest roundwood outside Java |
| Growth (000 M3)*  | 4779.74    | 16,669.30                     | 26,957.10                          |
| Conversion and Damages (000 M3)   | 440.80     | 385.30                        | 248,573.60                         |
| Felling ((000 M3)   | 450.03     | 439.40                        | 53,550.90                          |
| Excess felling ((000 M3)  | -3888.91   | -15,844.60                    | 275,167.40                         |
| Unit rent Rp/cubic meter  | 190,137.50 | 13,381.80                     | 120,237.70                         |
| Excess felling in (Rp trillion)   | -0.74      | -0.21                         | 33.09                              |
| 2. Loss of Eco-services Value   |            |                               |                                    |
| Unit value \$2010/ha/year   |            |                               | 5568.45                            |
| Forest cover loss (ha)  |            |                               | 560,000.00                         |
| Loss of eco-services Value from the tropical forest (\$ million)            |            |                               | 3118.33                            |
| Loss of eco-services Value from the tropical forest (Rp trillion)           |            |                               | 28.35                              |
| Environmental Cost from depletion of Forest Resources (1 + 2) (Rp trillion) |            |                               | 61.43                              |

Notes: \*) Thousand cubic meters.

Source: Author's calculation

natural gas, and coal, which together contribute around 93% (see Table 12).

**5. Conclusions**

This paper reports on an initial effort to assess environmental costs for the purpose of priority setting and as an instrument for assimilating the most relevant environmental aspects into a framework of sustainable socio-economic development. Moreover, compared to other studies on environmental costs in Indonesia, our research provides the most detailed coverage of emissions type data for each economic sector. This study will be beneficial in supplementing Indonesia's existing Environmental-Economic Accounts, as official publications of the BPS Indonesia are still limited to measuring depreciation of natural resources, without including measurements of environmental costs due to environmental

**Table 12**  
Depletion of energy and mineral resources, 2010.

| Energy and Mineral Resources | Depletion (Rp trillion) | Percentage (%) |
|------------------------------|-------------------------|----------------|
| Oil                          | 190.40                  | 37.68          |
| Natural Gas                  | 125.84                  | 24.9           |
| Coal                         | 156.09                  | 30.89          |
| Bauxite                      | 1.36                    | 0.27           |
| Tin                          | 5.01                    | 0.99           |
| Gold                         | 25.30                   | 5.01           |
| Silver                       | 0.97                    | 0.19           |
| Nickel Ore                   | 0.36                    | 0.07           |
| Total                        | 505.33                  | 100%           |

Source: Author's calculation

degradation.

In order to answer the research questions, two main conclusions

can be drawn from our analysis of the environmental costs in Indonesia. Firstly, the environmental costs of environmental degradation, destruction of the ecosystem, and depletion of natural resources in Indonesia for 2010 amounted to Rp. 915.11 trillion, constituting 16.36% of the Net Domestic Product (NDP) or 13.33% of the conventional Gross Domestic Product (GDP). These results do not differ much from the results found in earlier studies, see Table 3.

Second, the environmental cost calculation indicates that natural resources are essential in the context of Indonesia's sustainable development. The environmental cost structure shows that the largest contributor to Indonesia's total environmental cost value is the depletion of natural resources from non-renewable resources (mineral and energy resources), which constitutes around 55.22% of the total environmental costs. The second contributor to Indonesia's environmental costs, amounting to 38.07%, is the cost of environmental degradation, which in this study was only from air pollution. In third place, the destruction of the ecosystem contributes to 6.71% of Indonesia's total value of environmental cost.

Based on the calculation results, it can be concluded that the BPS is on the right track by prioritizing the compilation and publication of the economic-environmental account, which includes regular energy, mineral, and forest resources accounts. However, the BPS publication on the forest resources account is still limited to timber resources. The BPS should consider a complete compilation and publication of this forest account, besides including the costs of loss of ecosystem services.

Third, we found that the value of environmental cost due to air pollution also constitutes a significant contribution to the total environmental costs value, as it is the second largest contributor to the total environmental costs value after non-renewable resources depletion. The cost of environmental degradation from air pollution alone, excluding water and waste pollution, amounts to Rp. 348.35 trillion or 38.07% of the total value of environmental costs, and to around 6.23% of the total NDP.

The BPS has not yet compiled and published a comprehensive economic-environmental account that includes the environmental costs due to environmental degradation. If the BPS plans to expand the scope of Indonesia's economic-environmental accounts by including data on environmental degradation costs due to air pollution, we recommend to prioritize at least the top ten sectors and polluters in terms of the amount of environmental degradation costs they generate in Indonesia. The ten sectors contributing the most to the costs of environmental degradation related to air pollution in Indonesia accounted for around 73.11%. These ten sectors comprise electricity; manufacture of basic iron and steel and of ferro-alloys and first products thereof & re-processing of secondary steel into new steel; mining of coal, lignite, and extraction of peat; sea and coastal water transport; cultivation of paddy rice; manufacture of rubber and plastic products; livestock and their result; manufacture of cement, lime, and plaster; fertilizer and construction. The ten most prominent air pollutants that together generate 93.70% of the cost of environmental degradation from air pollution are SOX, NOX, CO<sub>2</sub>, CH<sub>4</sub>, NH<sub>3</sub>, TSP, PB, PM<sub>10</sub>, PM<sub>2.5</sub> and Nitrogen.

This study's results can be used as a guide for policymakers in formulating environmentally sound economic development policies. However, there certainly is a need for a follow-up study aiming to overcome the limitations and weaknesses of this study, including those of the methods used in this study, but yet able to keep the technique simple, which is especially important for developing countries like Indonesia.

## CRediT authorship contribution statement

**Viktor Pirmana:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing. **Armida Salsiah Alisjahbana:** Supervision, Conceptualization, Methodology, Writing - review & editing. **Arief Anshory Yusuf:** Validation, Writing - review & editing. **Rutger Hoekstra:** Supervision, Writing - review & editing, Validation. **Arnold Tukker:** Supervision, Conceptualization, Methodology, Validation, Writing - review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jclepro.2020.124521>.

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## Appendix-B

### **Direct Cost which would have incurred (other than what has been incurred by M/s TEPS) in treating effluent so as to achieve the prescribed CETP outlet effluent norms during the reported period 28/4/2011 to 30/11/2019**

The CETP Tarapur received non-compliant effluent from polluting units and imparted treatment and discharged substandard effluent which exceeded limits in terms of various parameters such as COD, BOD, Suspended Solid, Ammonical Nitrogen, Phenols, etc. during the reported period 28/4/2011 to 30/11/2019. The same have been reported in detail in the report submitted by the committee. The subsequent paragraphs outlines additional cost (other than what has been incurred by M/s TEPS in treatment which though partially reduced pollutants but not achieving up to the prescribed CETP outlet discharge effluent standard) which would have been incurred in treatment of effluent by the CETP operator – M/s TEPS in meeting the prescribed CETP outlet effluent norms during the said reported period under reference viz. 28/4/2011 to 30/11/2019.

In effluent generated from chemical/Pharma/Textile/etc. industries, COD concentration is one of the major pollutant parameters and is among parameters of concern while imparting treatment. COD reduction requires focussed treatment which in turn also contribute to reduction of few other pollutants of concern (though not all). If a CETP treating effluent generated from chemical/Pharma/Textile/etc. industries meets the COD outlet effluent standard of 250 mg/l, it is most likelihood also expected to meet other parameters also (though always not necessarily true but a good assumption to simplify the complex treatment methods for several crucial parameters). Determination of COD in effluent is also easy to carry out and more accurate in terms of analysis results reliability. Therefore, multiparameter treatment cost of effluent generated from such industries may also be correlated with COD reduction cost.

The committee, therefore, obtained information such as average daily inlet effluent flow, average daily COD in CETP inlet & outlet Effluent and total expenditure incurred on CETP by 09 CETP operators in Maharashtra and Gujarat for the years under reference viz. 2011-2012 to 2019-20. CETP inlet effluent generators in these 09 CETPs are also chemical/Pharma/Textile/etc. to that of CETP Tarapur. CETP wise information on the same are given in Appendix. The total expenditure of the CETP operator as obtained from them includes expenditures towards effluent treatment & other associated costs such as Power & Fuel; Plant Chemicals; Lab Chemicals; Repairs & Maintenance (Building Repairing, Machinery Repairing, Repairs & Maintenance – Electrical, Repairs & Maintenance - Others); Drainage Cleaning; Solid/Hazardous Waste Handling, Transportation & Disposal; Stores & Spares; Salary & Wages; Labour Charges; Admin Expenses; Financial Cost, and; Legal & Professional Fees; and does not include effluent conveyance cost from member industries to CETP or CETP treated conveyance cost from CETP to the discharge outfall. Compiled data of the above and COD reduction cost thereto are given in Table 1.

The Table 1 reveals that some of the COD reduction cost of given CETP are not consistent during its period of 2011-12 to 2019-20. The COD reduction costs i.e. 68.4, 114.0, 131.1 and 91.4 during 2016-17 to 2019-20 in case of Dombivali CETP are not consistent with rest of its previous years costs. Similarly, COD reduction cost i.e. 50 and 51.1 during 2016-2017 and

2019-20 respectively for MMA CETP; COD reduction cost i.e. 115.6 during 2019-20 for Patalganga & Rasayani CETP, and; COD reduction cost 53.1 during 2019-20 for Lote-Parshuram CETP are also not consistent. Such inconsistencies are due to expenditure incurred on up-gradation / renovation / revamping of the CETP in case of Dombivali CETP and due to reduction in the inlet COD concentration, reduction in inlet Flow, etc. for the other mentioned CETPs. Removing such outliers, average COD reduction costs are presented in Table 2. Considering base year 2019-20 and applying inflation rate<sup>1</sup> corrections for the respective years, year wise average COD reduction has also been presented in the said Table 2.

The additional cost (other than what has been incurred in treatment which though partially reduced pollutants but not achieving up to the prescribed CETP outlet discharge effluent standard) which would have been incurred in treatment of effluent by the CETP operator – M/s TEPS in achieving the prescribed CETP outlet effluent norms during the said reported period under reference viz. 28/4/2011 to 30/11/2019 is given in Table 3 below.

**Table 3: Year wise additional COD Reduction Cost which were expected to be incurred**

| Year   | *Discharge in MLD (million litres per day) | *Breaching Standard, the value of COD in mg/l (above 250 mg/l) | *Load exceeding the standard in Kg/day | COD Reduction Rate (Rs/Kg) | *Days of Non-Compliance | Total Damage cost in Rs Crore (as per 2019) |
|--|--|--|--|----------------------------|-------------------------|---|
| 2011   | 25.24833                                   | 919.708  | 23223.351                              | 20.10                      | 284                     | 13.25                                       |
| 2012   | 25.23225                                   | 486.987  | 12287.775                              | 20.98                      | 366                     | 9.44  |
| 2013   | 25.09558                                   | 325.643  | 8172.2                                 | 23.30                      | 365                     | 6.95  |
| 2014   | 25.13208                                   | 298.059  | 7490.834                               | 21.36                      | 365                     | 5.84  |
| 2015   | 25.15908                                   | 596.535  | 15008.267                              | 22.07                      | 365                     | 12.09                                       |
| 2016   | 24.86041                                   | 577.072  | 14346.256                              | 16.84                      | 366                     | 8.84  |
| 2017   | 23.69925                                   | 509.722  | 12080.034                              | 19.29                      | 365                     | 8.50  |
| 2018   | 24.34892                                   | 916.472  | 22315.092                              | 17.60                      | 365                     | 14.34                                       |
| 2019   | 24.73018                                   | 685.079  | 16942.123                              | 16.52                      | 334                     | 9.35  |
| <b>Total COD reduction cost since 2011 (in Rs Crore)</b> |  |  |  |                            |                         | <b>88.60</b>                                |

*\*As reported in report of the committee submitted to the Hon'ble NGT in compliance with order dated 26.09.2019 read with 22.10.2019*

Thus, the additional COD reduction cost (other than what has been incurred in treatment which though partially reduced pollutants but not achieving up to the prescribed CETP outlet discharge effluent standard) which would have incurred in treatment of effluent by the CETP operator – M/s TEPS in achieving the prescribed CETP outlet effluent norms during the said reported period under reference viz. 28/4/2011 to 30/11/2019 is Rs. 88.60 Crores.

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<sup>1</sup> <https://www.statista.com/statistics/271322/inflation-rate-in-india/>

**Table 1: COD reduction costs of CETPs**

| Sl. No | Name of the CETP                                    | Average daily CETP inlet effluent flow (MLD) | COD Reduction Cost (In Rs./kg) |         |         |         |         |         |         |         |         |
|--------|---|--|--------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|        |   |  | 2011-12                        | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 |
| 1      | Badlapur CETP Association                           | 5.9 - 7.2                                    | -                              | -       | 6.6     | 10.1    | 13      | 13.4    | 12.3    | 11.5    | 14.5    |
| 2      | Dombivli Better Environment System Association      | 11.5 - 15.5                                  | 9                              | 8.5     | 9.8     | 15.8    | 13.5    | 15.7    | 12.2    | 8.7     | 13      |
| 3      | Dombivli Common Effluent Treatment Plant            | 0.375 - 1.5                                  | 18.5                           | 20.7    | 30.5    | 35.4    | 29.2    | 68.4    | 114     | 131.1   | 91.4    |
| 4      | MMA CETP Co-operative Society Ltd.                  | 5.4 - 7.1                                    | 23.5                           | 42.2    | 36.4    | 18      | 31      | 50      | 33.5    | 33.1    | 51.1    |
| 5      | Patalganga & Rasayani Industrie's Association CETP  | 5.7 - 6.7                                    | -                              | -       | -       | -       | -       | -       | 19.7    | 23.9    | 115.6   |
| 6      | Lote Parashuram Environment Protection Co-operative | 2.5 - 3.5                                    | 8.7                            | 23.6    | 11.8    | 10.2    | 11      | 16.5    | 19.7    | 22      | 53.1    |
| 7      | Taloja CETP Co-operative Society Ltd.               | 11.8 - 16.2                                  | -                              | -       | -       | -       | -       | -       | -       | 7.7     | 20.9    |
| 8      | CETP (Thane-Belapur) Association                    | 24.8 - 26.2                                  | 7.5                            | 6.7     | 7.7     | 10.6    | 11.8    | 9.9     | 8.2     | 9.9     | 14.9    |
| 9      | Vapi Green Enviro Tech. Ltd. CETP                   | 52.5 - 53.9                                  | 9.6                            | 11.2    | 13.5    | 12.7    | 13.8    | 15.6    | 15      | 16.3    | 19.3    |

**Table 2: Average COD reduction costs of CETPs**

| Sl. No.  | Name of the CETP                                    | Average daily CETP inlet effluent flow (MLD) | COD Reduction Cost (Rs./kg) |              |                 |                 |                 |              |                 |                |              |
|--|---|--|-----------------------------|--------------|-----------------|-----------------|-----------------|--------------|-----------------|----------------|--------------|
|  |   |  | 2011-12                     | 2012-13      | 2013-14         | 2014-15         | 2015-16         | 2016-17      | 2017-18         | 2018-19        | 2019-20      |
| 1  | Badlapur CETP Association                           | 5.9 - 7.2                                    | -                           | -            | 6.6             | 10.1            | 13              | 13.4         | 12.3            | 11.5           | 14.5         |
| 2  | Dombivli Better Environment System Association      | 11.5 - 15.5                                  | 9                           | 8.5          | 9.8             | 15.8            | 13.5            | 15.7         | 12.2            | 8.7            | 13           |
| 3  | Dombivli Common Effluent Treatment Plant            | 0.375 - 1.5                                  | 18.5                        | 20.7         | 30.5            | 35.4            | 29.2            |              |                 |                |              |
| 4  | MMA CETP Co-operative Society Ltd.                  | 5.4 - 7.1                                    | 23.5                        |              | 36.4            | 18              | 31              |              | 33.5            | 33.1           |              |
| 5  | Patalganga & Rasayani Industrie's Association CETP  | 5.7 - 6.7                                    | -                           | -            | -               | -               | -               | -            | 19.7            | 23.9           |              |
| 6  | Lote Parashuram Environment Protection Co-operative | 2.5 - 3.5                                    | 8.7                         | 23.6         | 11.8            | 10.2            | 11              | 16.5         | 19.7            | 22             |              |
| 7  | Taloja CETP Co-operative Society Ltd.               | 11.8 - 16.2                                  | -                           | -            | -               | -               | -               | -            | -               | 7.7            | 20.9         |
| 8  | CETP (Thane-Belapur) Association                    | 24.8 - 26.2                                  | 7.5                         | 6.7          | 7.7             | 10.6            | 11.8            | 9.9          | 8.2             | 9.9            | 14.9         |
| 9  | Vapi Green Enviro Tech. Ltd. CETP                   | 52.5 - 53.9                                  | 9.6                         | 11.2         | 13.5            | 12.7            | 13.8            | 15.6         | 15              | 16.3           | 19.3         |
| <b>Average cost (Rs./kg)</b>                               |   |  | <b>12.80</b>                | <b>14.14</b> | <b>16.61429</b> | <b>16.11429</b> | <b>17.61429</b> | <b>14.22</b> | <b>17.22857</b> | <b>16.6375</b> | <b>16.52</b> |
| <b>Average cost (Rs./kg) considering Base Year 2019-20</b> |   |  | <b>20.10</b>                | <b>20.98</b> | <b>23.30</b>    | <b>21.36</b>    | <b>22.07</b>    | <b>16.84</b> | <b>19.29</b>    | <b>17.60</b>   | <b>16.52</b> |

Item No. 03

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

(By Video Conferencing)

Original Application No. 64/2016 (WZ)  
(M.A. No. 01/2021, M.A. No. 02/2021, M.A. No. 03/2021,  
M.A. No. 04/2021, M.A. No. 05/2021,  
M.A. No. 06/2021 & M.A. No. 08/2021)

Akhil Bhartiya Mangela Samaj &amp; Ors.

Applicant(s)

Versus

Maharashtra Pollution Control Board &amp; Ors.

Respondent(s)

Date of hearing: 23.03.2021

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON  
HON'BLE MR. JUSTICE SHEO KUMAR SINGH, JUDICIAL MEMBER  
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

Applicant(s): Ms. Gayatri Singh, Senior Advocate with Ms. Meenaz Kakalia, Advocate.  
Dr. Sandip Todhi (in person) in M.A 03/2021 & M.A 04/2021

Respondent(s): Mr. Atmaram N.S. Nadkarni, Senior Advocate with Mr. Devashish Bharuka, Advocate for TIMA (Respondent No. 9).  
Mr. Sajan Poovayya, Senior Advocate with Mr. Amit Agashe, Advocate for TEPS (Respondent No. 3).  
Mr. Rahul Garg, Advocate for MoEF&CC.  
Mr. Aman Bhalla, Advocate for CPCB.  
Mr. Mukesh Verma, Advocate for MPCB.  
Mr. Raghunath Mahabal, Advocate.

**ORDER**

1. The issue for consideration is the remedial action against pollution by industries operating in Tarapur MIDC in Palghar District, Maharashtra.

2. The matter was last considered vide order dated 17.09.2020 in the light of reports dated 18.06.2020 and 27.07.2020 filed by the CPCB, in pursuance of earlier order dated 26.09.2019. Against the said order, Civil Appeal No. 3756 of 2020, *Tarapur Industrial Manufacturers Association*

*(TIMA) v. Akhil Bhartiya Mangela Samaj Parishad & Ors.* was preferred before the Hon'ble Supreme Court which was disposed of on 14.12.2020, permitting the appellants therein to file ground-wise objections to the report, with a copy to the applicant and the Monitoring Committee for response. There was further direction to deposit 30% of the compensation amount, stipulated in the order dated 17.09.2020. The industrial association, in whose favour the order was passed, is said to be comprising of 102 units out of which 92 units have paid the 30% of the amount. We are informed that the CETP operator also preferred similar appeal which is also governed by the said order dated 14.12.2020. In pursuance of the above, objections have been filed to the reports dated 18.06.2020 and 27.07.2020. However, no objections have been filed to the status report dated 11.01.2021, filed in pursuance of order dated 17.09.2020.

3. In view of the above, on suggestion of learned Counsel for the parties, we grant one-week time for filing any further objections by any aggrieved party, covered by the Supreme Court order. The joint Committee may file its response within one week thereafter. Any further objections, after the said response, may be filed within one week thereafter.

List for further consideration on 26.04.2021.

All other M.A.s will be taken up for consideration on the next date.

Adarsh Kumar Goel, CP

S.K. Singh, JM

Dr. Nagin Nanda, EM

March 23, 2021

Original Application No. 64/2016 (WZ)

(M.A. No. 01/2021, M.A. No. 02/2021, M.A. No. 03/2021,

M.A. No. 04/2021, M.A. No. 05/2021, M.A. No. 06/2021

& M.A. No. 08/2021)

AVT