

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

Principal Bench, New Delhi

In

Original Application No. 459/2018

In the Matter of: -

Rashmi Singh

Applicant

Vs.

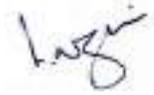
NTPC Limited & Ors.

Respondent(s)

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(Nazimuddin)

Scientist 'E'

Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar
Delhi-110032

Place: Delhi

Date: 24 July, 2020

**Report of the Committee appointed by Hon'ble National Green Tribunal in the matter
of Rashmi Singh Vs NTPC Limited &Ors (OA No. 459/2018) Vide order Dated
27.02.2020**

Date of Submission-15thJuly 2020

M/s NTPC Limited is located at village Sipat, Tehsil Masturi, District Bilaspur (Chhattisgarh) for generation of 2980 MW power in its Super Thermal Power Plant (STPP). The EC for stage I and Stage II was granted in year 1999 and 2004 respectively with subsequent amendment thereon. The applicant has challenged the compliance of EC conditions in its OA No 459/2018.

Hon'ble NGT (Principal Bench) vide order dated 27.02.2020 has directed the committee constituted in OA No 200/2018 Dukalu Ram &ors Vs Union of India vide order dated 14.02.2018 to consider the aspects raised by the applicant. The members of the committee are as under:

1. Dr. R. P. Mishra, Scientist-D, Central Pollution Control Board, RD, Bhopal
2. Dr. P. R. Sakhare, Scientist D, Ministry of Environment Forests & CC, RO, Nagpur
3. Dr. Saransh Mitter, Collector Bilaspur

The issues to be looked into by this committee include:-

1. Coal handling and its quality
2. Land area and its use
3. Fly ash utilization
4. Green belt development and its compliance
5. Ambient air quality monitoring
6. Compliance of zero liquid discharge
7. Court cases
8. Soil testing in villages around NTPC
9. Compliance of EC conditions
10. Installation of Flue Gas Desulphurisation (FGD)

Given the guidelines of Ministry of Home Affairs (MHA) regarding operation during the COVID 19 pandemic, it has been decided that a combined visit of committee would not be possible at this stage and to obtain ground level status through Regional Officer, CECB,

Bilaspur. The committee has collected and perused reports of NTPC Sipat, MoEF&CC Nagpur, CSIDC Raipur and CECB Bilaspur. The committee has also consulted the following reports and data to verify the issues raised by the applicant, which are annexed herewith:-

1. Compliance Report submitted by NTPC Sipat (**Annexure-01**)
2. EC compliance report of MoEF&CC, Regional Office, Nagpur dated 20.06.2019 (**Annexure-02**)
3. Report of Studies on terrestrial ecology and aquatic ecology by Guru Ghasidas University, Bilaspur (2015) (**Annexure-03**)
4. Fly ash data in public domain on website of Central Electricity Authority (CEA)(**Annexure-04**)
5. Soil analysis report submitted by Soil Testing Officer, Tilak Nagar, Bilaspur (**Annexure-05**)
6. Raipur declaration (2nd June 2017) on Fly ash by Hon'ble NGT (**Annexure-06**)
7. Report of Study on Impact of Coal Dust on Soil, Crop and Tree Species due to Open Wagon Coal Transportation conducted by Indira Gandhi Krishi Vishwavidyalaya BTC College Of Agriculture And Research Station Sarkanda, Bilaspur, Chhattisgarh (**Annexure-07**)
8. Environment (Protection) Amendment rules, 2020 notified in The Gazette of India on 21st May 2020 (**Annexure-08**)

Preliminary Findings-At the outset, we wish to note few constraints:-

- The period given by the Hon'ble NGT could not be utilized due to lock down in COVID 19 pandemic for field visit by the committee.
- Coming two months (July & August) is the monsoon season when the level of air pollution is the lowest and level of water pollution is also likely to be lowest.

1. COAL HANDLING AND ITS QUALITY

The process adopted by NTPC-Sipat for coal transportation in wet condition seems in accordance with the amendment in EC dated 9.10.2019. ***However covering of Railway wagon with tarpaulin or other means has been considered mandatory vide amendment made in Environmental (Protection) Rules, 1986 in rule 3, for sub rule (8) point 3(i). Copy of the Environment (Protection)***

Amendment rules, 2020 notified in The Gazette of India on 21st May 2020 is placed at Annexure-08.

NTPC Sipat shall also inform about progress made in R&D proposed by MoEF&CC vide its amendment letter dated 9.10.2019.

Coal linkage of NTPC Sipat Super Thermal Power Station is from Dipka mines of SECL located in district Korba of Chhattisgarh, as per fuel supply agreement of Coal India. Reports available on public domain indicate that the sulphur content in Indian coal varies as low as 0.1 % from mines in Jharkhand and 0.4 % from mines in Chhattisgarh to a national average of 0.55 %. NTPC Sipat in its reply submitted to the committee has also informed about conducting study of coal quality by Centre for energy studies, IIT Delhi in which sulphur content was endorsed to be within 0.4 percent. The report is also in the records of Hon'ble NGT. The observation of MoEF&CC, Regional Office, Nagpur is also in consonance with the EC condition of sulphur content of Dipka coal mine. Moreover NTPC Sipat has been directed to install FGD (Flue gas desulphurization) system to come up with the constraint of sulphur content in coal.

In compliance of applicant's observation about para 3 vi regarding study on heavy metals in coal and fly ash , NTPC Sipat has submitted copy of analysis report dated 29.05.2017 done by Indian Institute of Chemical Technology, Hyderabad which is placed at Annexure-09.

02 LAND AREA AND ITS USE

Total land area allocated to NTPC, Sipat for Stage I and Stage II comes to 4382.44 acres for construction of super thermal power plant and allied facilities. MoEF&CC in its report dated 20.06.2019 has shown satisfaction with the steps taken by NTPC Sipat STPP to restrict utilization for stage I & II to 4382.44 acres. The effort made by NTPC Sipat for diversion of 70 acre revenue land at Salar village has also been endorsed by MoEF&CC regional office, Nagpur and the said land has been notified by Government of Chhattisgarh on 8th May 2020. Copy of the notification is placed as **Annexure 10.**

03 FLY ASH UTILIZATION

NTPC Sipat STPP in its report submitted to committee has claimed for gradual increase in fly ash utilization since 2017-18 and achieved up to 49.54 % in 2018-19. In compliance of point 4(5) NTPC Sipat has got weighting of its design for ash dyke raising by IIT/NIT. It was informed by NTPC Sipat that ash dyke raising is in progress in lagoon #02 and further ash dyke raising will be taken in Lagoon # 01 and 03. The statement of the fly ash utilization has also been endorsed in the report of MoEF&CC, Regional Office, Nagpur for its use in various works like fly ash brick industries, cement industries and highway projects. Data submitted by NTPC Sipat is also in consonance with the report published by CEA.

Central Electricity Authority (CEA) is the agency for compilation of National data of fly ash generation and utilization under various heads. CEA publishes its annual report on fly ash generation and utilization and made available in public domain as link cea.nic.in/reports/others/thermal/tcd/flyash. As per the CEA reports Chhattisgarh is having maximum number of thermal power plants in India with annual utilization 77.12% of fly ash.

As per CEA report 2019-20 maximum utilization of fly ash in the country is in cement industry (28.05%) and number of cement plants in Chhattisgarh is limited. Use of fly ash in back filling /stowing of closed/abandoned/ running open cast and underground mine have large potential for utilization of fly ash, especially for pit head thermal power stations which otherwise have limited avenues for fly ash utilization. However its potential is yet to utilized (national utilization 4.62% only). The same recommendations were also endorsed in “Raipur Declaration 2017” organised by Hon’ble NGT, Central Branch on 02.06.2017. Recommendations made in Raipur Declaration are placed at **Annexure-06**. The use of fly ash filling within radius of 50 km of any thermal power plant as mandated in MoEF&CC notification of 3rd November 2009 to be ensured. In case of NTPC Sipat distance of Dipika coal mine is 40 km only and marry gold rail (MGR) facility is operational for transport of linkage coal. *As per Environment (Protection) Amendment rules, 2020 notified in The Gazette of India on 21st May 2020, amendment made in Environmental (Protection) Rules, 1986 in rule*

3, for sub rule (8) point 2(iv), Thermal Power Plants are permitted to dispose flyash in abandoned or working mines (to be facilitated by mine owner) with environmental safeguards. In Chhattisgarh use of fly ash generated in Jindal Steel Private Limited (CPP) and Jindal Power Limited is in practice in Gare Palma IV/1, Gare Palma IV/2 and Gare Palma IV/3 open cast mine of SECL in Raigarh with due permission of DGMS and MoEF&CC Environment clearance.

The efforts made by NTPC Sipat to follow up the issue of conversion of land use 70 acre revenue land and its notification in official gazette may be useful for inviting fly ash based industries near NTPC. This indicates intention of NTPC Sipat to their efforts for achieving 100% utilization in coming years.

04. GREEN BELT DEVELOPMENT AND ITS COMPLIANCE

As per EC condition NTPC Sipat was to develop green belt in 215 acres with plant density of 1500 -2000 trees per hectare. It was informed by NTPC Sipat in its report submitted to committee that so far 2,62,329 trees has been planted in more than 215 acres of land which is also endorsed by MoEF&CC Regional Office Nagpur in its report dated 20.06.2019 submitted in Hon'ble NGT. Hence same may be considered as complied.

05. AMBIENT AIR QUALITY MONITORING

As per inspection report submitted by Chhattisgarh Environment Conservation Board, NTPC Sipat STPP has installed online monitoring system in all stacks of stage I & II. The online monitoring system is also connected with server of CECB and CPCB for regular surveillance of performance of its pollution control devices. In addition to this three continuous ambient air quality monitoring stations are also installed by NTPC, Sipat which are connected with server of CECB and CPCB. Online data generated is being displayed by the NTPC Sipat on main gate for public information.

NTPC Sipat in its report submitted to committee has informed about operation of manually operated ambient air quality station at Sonthi Pahar for monitoring of

mandatory parameters including sulphur dioxide. The said station is bi-weekly operational by out sourced agency and reports are being submitted to CECB regularly.

The committee will visit the said station to verify its location and mode of operation with number of parameters being monitored and report to Hon'ble NGT.

05. COMPLIANCE OF ZERO LIQUID DISCHARGE

NTPC Sipat in its reply submitted to committee has claimed as ZLD plant for discharge from ash dykes. In compliance of point no 4 (4) of the order dated 27.02.2020 NTPC Sipat has installed AWRS (Ash Water Recycling System). The same has also been endorsed in reports submitted by MoEF&CC Regional Office Nagpur and CECB regional Office Bilaspur. The technology is capable to recycle the decanted water generated in ash dyke during transportation of thin ash slurry.

The basic nature of the TPP is air polluting however waste water generated from various section of the plant may be treated in ETP. The major sources of wastewater generation are cooling tower blow down, boiler blow down, ash pond overflow and condenser water. For treatment of wastewater, NTPC Sipat has provided 15000 KLD capacity ETP. Most of the treated water may be recycled in process and ash slurry preparation and remaining water can be used for horticulture and dust suppression inside the plant. In principle it is feasible to achieve zero discharge condition and most of the thermal power plants are in practice to achieve zero liquid discharge subject to regular and proper operation of ETP and AWRS. The operational performance of ETP and AWRS will be reported after visit of the committee.

06. COURT CASES

As per available information status of court cases are as under:-

1. Original case number 7893 of 2014 was filed by RO, CECB before CJM court, Bilaspur for violation of Air Act, 1981 and EPA 1986. NTPC Sipat filed

- a petition to quash the case before the CJM court and stay was granted by the High court, Chhattisgarh against the proceedings in CJM court on 17.01.2018.
2. OA No 195/2014 (CZ) was filed under section 14 & 15 of the NGT Act, for the violation of provision of forest (Conservation) Act 1980 before Hon'ble NGT, Central bench, Bhopal. The contentions raised are that NTPC Sipat has not complied with the mandatory conditions of Environmental Clearance/ Forest clearance. The OA was dismissed in favour of NTPC on 19.02.2019.
 3. Present matter OA No. 459/2018 (earlier OA No. 196/2014) on same contentions being heard by Hon'ble NGT Principal Bench.

07. SOIL TESTING IN VILLAGE AROUND NTPC

With reference to Hon'ble NGT observation and further directions to Collector, Bilaspur about soil testing of the agricultural land in villages Raliya, Hardadih, Raank, Bhilai, Kaudiya, Gatora and Sakhricali soil testing report conducted by Assistant Soil testing officer, Bilaspur has been received and placed at **Annexure-05**.

08. Installation of Flue Gas desulphurization (FGD)

In compliance of Ministry of Environment Forest & CC letter dated 7.12.2017, Central Pollution Control Board has issued direction to M/s Sipat Super Thermal Power Station, Bilaspur on 11.12.2017, under section 5 of the Environment (Protection) Act 1986, regarding compliance of emission limit notified vide notification No, S.O.3305 (E) dated 07.12.2015. M/s Sipat Super Thermal power Station was directed to:-

- Install/retrofit Electrostatic Precipitators (ESP) so as to comply PM emission limits immediately
- Install FGD in unit #01 and 02 by 31.12.2022 and Unit # 03, 04 & 05 by 31.12.2021 so as to comply SO₂ emission limit.
- Take immediate measure like installation of low NO_x burners, providing over fire burner (OFA) etc and achieve progressive reduction so as to comply NO_x emission limit by year 2022.

In the above context M/s Sipat Super Thermal Power Station, NTPC Ltd has informed in its reply submitted to Oversight committee that work order for FGD installation has been awarded for Stage-I unit (3x660MW). Completion schedule submitted by NTPC for unit #01 & 03 is November 2021 and for Unit # 02 is February 2022. Stage II (2x500 MW) units proposal for installation of FGD is under tendering stage. Copy of work order and pert chart plan is attached at **Annexure-11**.

It was also informed by NTPC, Sipat that civil work has been started as per schedule. Physical verification of progress made on ground will be completed by the committee and reported accordingly.

9. COMPLIANCE OF EC CONDITIONS

In compliance to the point no 11 of Hon'ble NGT order dated 27.02.2020 NTPC Sipat has submitted EC compliance with reference to "Partially Complied" and "Being Complied" status (**Annexure-01**). Perusal of the report concludes as under-

- (1) "Being complied" status in 12 conditions were applicable for required day to day regular monitoring and reporting to concerned authorities. At the time of compliance verification monitoring data generation by PP was found satisfactory so reported as being complied, hence may be considered as "complied".
- (2) Partially complied condition for Sulphur content may be accepted as complied based on the amendment made by MoEF&CC in EC.
- (3) Partially complied condition of restriction of land utilization and acquiring 70 acres of land is accepted as complied.
- (4) The committee agrees with statement of industry for study on radioactivity and heavy metal content in coal. Hence it may be treated as complied.
- (5) Partially complied condition for covering of coal with tarpaulin may not be accepted as complied in light of Environment (Protection) Amendment rules, 2020 notified in The Gazette of India on 21st May 2020.
- (6) The study conducted by Indira Gandhi Krishi Vishwavidyalaya BTC College of agriculture and research station sarkanda, Bilaspur has not reported any adverse effect on agricultural land and crop due to transport of coal by MGR

(**Annexure-07**). Hence accepted as complied.

- (7) Three conditions of Environmental clearance related with fly ash management are reported as partially complied. There are various options proposed for its utilization like plan to develop ash based industrial unit in 70 Acre land, supply to cement industry, highway project, agriculture use etc. The efforts made by NTPC Sipat seems satisfactory even though no time line can be achieved to ensure 100 % utilization as required for compliance of Fly ash utilization notification. Hence still Partially Complied.

In light of the above, we present a set of preliminary observation which are as under-

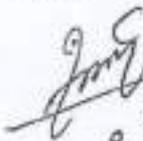
OBSERVATION:-

- 1) It is observed that all three conditions of EC regarding fly ash utilization is still as “partially complied”.
- 2) Study of heavy metal in coal and fly ash has been completed and analysis submitted by IICT Hyderabad has been submitted by NTPC Sipat. (**Annexure-09**)
- 3) The report of study conducted by Indira Gandhi Krishi Vishwavidyalaya BTC College of agriculture and research station Sarkanda, Bilaspur has been submitted. (**Annexure-07**)
- 4) The details of treatment system reported by NTPC Sipat and further endorsement by CECB indicate that industry is capable to maintain ZLD.
- 5) The coal analysis reports submitted by NTPC Sipat were found in consonance with data available on public domain and reveals to be as per EC condition. More over NTPC Sipat is in process of FGD installation.
- 6) EC compliance verification report of MoEF&CC has confirmed the compliance of Green belt development.
- 7) Perusal of reports submitted by NTPC Sipat and it endorsement by reports published by CEA (Central Electricity Authority) at national level concludes that figures filed by NTPC Sipat about generation and utilization of fly ash are reliable, but not complying the target.
- 8) The soil analysis report submitted through collector, Bilaspur has not indicated any adverse effect on fertility of soil in the villages in question. The report submitted is placed at **Annexure-05**.

- 9) As per report submitted by NTPC, Sipat work order for installation of FGD in Unit #01, 02 & 03 has been issued and pert chart for progress of work prepared. Copy of work order is attached at Annexure-11.

SUBMISSION

Given the guidelines of Ministry of Home Affairs (MHA) regarding operation during the COVID 19 pandemic, the committee could not visit the site and request for extension of time (two months) for site visit and to submit full report with recommendation as per direction issued by Hon'ble NGT in its order dated 27.02.2020.


 (Dr. P. S. Sakhare)
 Scientist 'D'
 MoEF&CC, RO, Nagpur
 13/07/2020


 (Dr. R. P. Mishra)
 Scientist 'D'
 CPCB, RD, Bhopal
 13/7/2020

(Dr. Saransh Mitter)
 Collector, Bilaspur
 Chhattisgarh

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 459/2018
Earlier 196/2014 (CZ)

Rashmi Singh Vs NTPC Ltd. & Ors

**SUBMISSIONS BY RESPONDENT No. 1 IN COMPLIANCE TO ORDER OF NGT
DATED 27-02-2020 PASSED BY HON'BLE TRIBUNAL.**

In compliance of the order of Hon'ble Tribunal, Principle Bench NGT at New Delhi, passed in the above matter on 27.02.2020, Respondent No. 1 hereby makes the following submissions :-

That the applicant has filed an affidavit before this Hon'ble tribunal on 27-02-2020 in reference to the status report submitted by the Regional Office, MoEF& CC Nagpur dated 20-06-2019 and stated non-compliance of the EC conditions in Para 3 of above said report. It is significant to note the Title of Para 3 of the Inspection report is - "Some of the EC conditions were observed to be complied partially by the PP". Therefore, Applicant's Claim of non-compliance of EC condition is prejudiced, wrong and denied. Para wise reply to the submissions made by Applicant is given here.

Para 1

The EC of Stage-1 (3 x 660 MW) issued on 22-02-1999 specifies for transportation of coal in closed wagon. NTPC Sipat had taken up this issue with MoEF& CC citing the constraints in transportation of coal in closed wagons. Accordingly, EAC (Thermal Power) had considered the submissions made by NTPC Sipat. In accordance with the recommendations made by EAC, the MoEF& CC has accorded permission for waving the condition of transportation of coal with tarpaulin covered wagons vide its EC



amendment letter dated 09-10-2019 subject to certain conditions. EC amendment dated 09-10-2019 is placed as Annexure-1. NTPC Sipat is abiding the conditions mentioned in the amendment letter i.e. water sprinkling at loading point , unloading point , midpoint & ½ km before entry point being done regularly and is therefore in total compliance with this EC condition.

Para 2

It is to be submitted that for setting up of ash based industries in 70 acre land, NTPC Sipat had approached the Chattisgarh Govt. After discussions and follow up, it was agreed that Chattisgarh State Industrial Development Corporation (CSIDC) shall proceed for a land which has been identified in Sajer Village, near NTPC Sipat, in Bilaspur district. On 24-05-2016 possession of the land had been given to CSIDC. Further, CSIDC has got approval for Land diversion from Agricultural to Industrial use. Land diversion from Agricultural to Industrial use needs notification in Gazette, which is expected soon. NTPC has been continuously following up with the Govt of CG for compliance of this condition. In light of the above stated facts, it is clear that NTPC Sipat has complied and executed its part of EC condition and therefore the contention of the Applicant that above EC condition is not being complied with, is totally false.

Para -3

In response to para 3, it is agreed that the total land acquired for the project is 4382.44 acres only. All the three ash dykes are well managed and there is no leakage from any of ash dyke. Ash dykes are designed and built with Ash Water Recirculation System (AWRS). Decanted water from Ash Pond is collected in overflow lagoon wherefrom water is pumped back into plant and reused in ash slurry process water. Toe drain water from all the three dykes are collected in



two sumps & from where it is pumped back into the over flow lagoon / ash dyke. Two Toe drain Recirculation Pump house are operational. With the above arrangement , it is ensured that all process water is reused and nothing goes out. Even after taking such care, the Applicant is alleging that 200 acres of land has got marshy due to leakage from Ash dams/dyke, which is totally false and baseless

It is to be further noted that there is no such revelation in any of the inspection report submitted either by CECB or MoEF& CC regional office Nagpur.

Para 4

It is to be submitted that over the years, ash utilisation percentage of NTPC Sipat improved from 18.63 % in 2017-18 to 49.54 % in 2018-19 and we expect 100 % ash utilisation by 2022 as per action plan submitted to CECB. NTPC Sipat is supplying ash to Cement Industries, Ash based Industries, NHAI Bilaspur - Patharapali highway projects, land reclamation and also in ash dyke embankment raising as a substitute for sand and earth.

Para 5

It is to be submitted that the analysis of study on heavy metals in coal and fly ash has already been furnished to MoEF& CC by NTPC Sipat vide half yearly reports. Heavy Metal content in fly ash and bottom ash has been carried out by IICT Hyderabad and last analysis report conducted on 29-05-2017 is placed as Annexure-2. Hence the contention of Applicant is absolutely false, vague and baseless.



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Para 6

The Study for impact on Forest, Crops etc was awarded to TCB College of Agriculture, Bilaspur. During study the three season samples had been collected and analysed. Study is completed and there is no adverse findings in report and hence therefore this condition has been complied with.

Para 7

It is to be submitted that Complaint case no. 7893 of 2014 was filed before CJM court at Bilaspur. The complaint has been challenged in the CG high court by NTPC Sipat for quashing the same. Stay has been granted by the High Court.

Petition No. OA No. 195/2014 (CZ) filed before Hon'ble NGT, Central Zone at Bhopal has been dismissed in favour of NTPC Sipat on 19-02-2019.

Present matter Original Application No. 459/2018 (earlier OA No. 196/2014) is being heard by Principle Bench of NGT at New Delhi.

Para 8

Financial data furnished by MoEF& CC, pertains to the Capital expenditure on Pollution control equipments like ESPs& ETPs under Environmental Management Plan (EMP). Details are available at (Annexure - 3). However intent of Applicant is not clear in stating that no breakup/item wise have been provided to ascertain the actual use.

Para 9

NTPC Sipat is Zero Liquid Discharge compliant Thermal Power Station. Ash dykes are designed and built with Ash Water Recirculation System(AWRS) for reclaiming process water. Decanted water from AWRS is collected in overflow lagoon wherefrom water is pumped back into plant and reused in ash slurry



process water. The drain water from all the three dykes are collected in two sumps. This collected water is pumped back into overflow lagoon/ ash dyke. There is no discharge of water from any of the ash dykes to outside. The allegation of Applicant is therefore false and misleading.

It is further submitted that water samples of decanted water from AWRS is taken at regular interval and monthly report are submitted to CECB.

Para 10

Coal linkage for NTPC Sipat Super Thermal Power Station is from Dipka mines of SECL. Accordingly, coal is sourced from Dipka mines (which falls in Korba District of Chhattisgarh State) as per fuel supply agreement. NTPC Sipat in its support had submitted a report of study which was carried out by Centre for Energy Studies, IIT Delhi. The Table-2 in the report indicates that sulphur content in Korba, Chhattisgarh region is 0.4 %. The report is available as Annexure RR-1/8 from page 53 to page 59 submitted on 18-01-2016 before Hon'ble Tribunal at Bhopal. Latest Sulphur content reports are also placed as **Annexure-4**.

Para-11

As per EC stage-I dated 22.02.1999(vii) a greenbelt of covering an area of 215 acre shall be developed with tree density of 1500 - 2000 Per Ha. NTPC Sipat has green belt area of more than 215 acre. Map Indicating green belt area is attached as **Annexure-5**

Para-12

Over the years, our ash utilization has improved from 18.63 % in 2017-18 to 49.54 % in 2018-19 and we expect to achieve 100 % ash utilization by 2022 as

per action plan submitted to CECEB. NTPC Sipat is supplying ash to Cement Industries, Ash based Industries, NHAI Bilaspur - Patharapali highway projects, land reclamation and also in ash dyke embankment raising as a substitute for sand and earth. In the light of this we strongly disagree and deny the allegation by Applicant that ash utilization figures submitted by NTPC Sipat are "blatant lie being spoken by the NTPC" and "ash is being discharged in the agricultural fields".

Ambient Air Quality including SO₂ is measured bi-weekly at SonthiPahar, Reserve Forest area. Presently, this work has been outsourced to an Agency M/S Netel India Ltd who is an MoEF & CC approved agency for such type of work. Monthly reports are submitted to CECEB. Measured values are well below prescribed limits. Latest Monthly report is attached as **Annexure-6**.

NTPC Sipat was based on Super Critical Thermal Power technology hence scope of employment was very limited. It was also considered that agriculture was the predominant occupation of the affected area and as per the Socio Economic Study, 80 % of the affected persons were farmers. Considering these facts, "Land for Land" was the Prime Rehabilitation measure included in the Rehabilitation Action Plan 2000 -RAP (as described in Chapter - II of the RAP), so that the Project Affected Person (PAPs) could purchase alternate land of their choice. In Accordance with the provision for "Land for Land" option of rehabilitation all PAPs have been provided compensation & also rehabilitation amount to facilitate them to buy alternate land. Further on purchase of alternate land the PAPs have also been provided the Land Registration & Development charges.

It may be mentioned here that the fact that NTPC has completed rehabilitation activities under the Rehabilitation Action Plan was also observed and recorded in the minutes of the meeting dated 03.11.2006.

Subsequently, based on the decisions of a tripartite meeting in 2008 it was agreed to provide employment on 626 posts from a Priority List of PAPs provided by District Administration following NTPC's recruitment Policy & Govt.'s Rule of Reservation as applicable. Based on the decisions of the tripartite meetings since 2008, NTPC Sipat has so far conducted recruitment on 427 posts out of which Offer of appointment has been issued in 395 cases while in another 32 cases Offer of appointment could not be issued due to family dispute/ lack of documents etc.

Delay in completing recruitment on remaining posts is attributed to the following facts:-

- a) Lack of Skill in the PAPs for the skilled/ technical posts- For this NTPC has taken measures like sponsoring over 240 candidates in the past for two year ITI . Similar measures are being taken for other skilled posts
- b) Out of the remaining posts, 154 are reserved for Scheduled Tribes (including backlog of ST). However, sufficient Scheduled Tribe candidates are not available in the Priority List provided by District Administration - for this guidance is sought from district administration on this issue which is awaited.

On resolution of the above two issues the recruitment on the remaining posts shall be completed. Intent of Applicant is not clear with respect to her submission in this regard as this has no bearing with respect to EC conditions.

NTPC Sipat is Zero Liquid Discharge compliant Thermal Power Station. Ash dykes are designed and built with Ash Water Recirculation System (AWRS) for reclaiming process water. Decanted water from AWRS is collected in overflow lagoon wherefrom water is pumped back into plant and reused in ash slurry



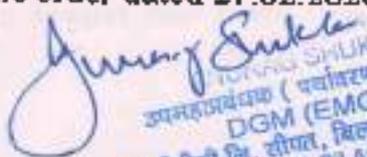
process water. The drain water from all the three dykes are collected in two sumps. This collected water is pumped backed into overflow lagoon/ ash dyke. There is no discharge of water from any of the ash dykes to outside. The allegation of Applicant is therefore false and misleading.

Coal linkage for NTPC Sipat Super Thermal Power Station is from Dipka mines of SECL. Accordingly, coal is sourced from Dipka mines (which falls in Korba District of Chhattisgarh State) as per fuel supply agreement. NTPC Sipat in its support had submitted a report of study which was carried out by Centre for Energy Studies, IIT Delhi. The Table-2 in the report indicates that sulphur content in Korba , Chhattisgarh region is 0.4 %. The report is available as Annexure RR-1/8 from page 53 to page 59 submitted on 18-01-2016 before Hon'ble Tribunal at Bhopal. Latest Sulphur content reports are also placed as Annexure-4.

Applicant's allegation regarding FGD progress is false and denied. The work order for FGD installation has been awarded for stage-I units (3 x 660 MW). Completion schedule for unit -1 & 3 is by Nov -2021 and for Unit -2 by Feb 2022. Copy of notification of award is attached as Annexure-7. For Stage- II (2 x 500 MW) units, proposal for installation of FGD is under tendering stage.

Real time values of Ambient Air Quality, Stack emission and treated effluent (which is used as process water) is available to CPCB as well CECB.

Submitted please for perusal of the Committee constituted on 14.02.2019 in O.A. No. 200/2018, Dukahu Ram & Ors. v. Union of India & Ors as directed by NGT at para 13 of the order dated 27.02.2020.


 ANURAG SHUKLA
 उपमहाप्रबंधक (पर्यावरण प्रबंधन)
 DGM (EMG)
 एनटीपीसी लि. सीपट, बिलासपुर (छ.प्र.)
 NTPC Ltd. SIPAT, BILASPUR (C.G.)

Page 8 of 8



J-13011/10/96-IA. II (T)
Government of India
Ministry of Environment, Forests and Climate Change

3rd Floor, Vayu Block,
 Indira Paryavaran Bhawan,
 Jor Bagh Road, Aliganj
 New Delhi-110003
 Dated: 09.10.2019.

To,

The GM&HOD (Environmental Engineering)
 M/s NTPC Limited
 Engineering Office Complex,
 NTPC Ltd, Plot No. A-8A, Sector-24
 Noida - 201301.

Tele: 01202416930; **Fac:** 0120 2410206; **E-mail:** environment.ntpc@gmail.com.

Sub: *3x660 MW (Stage-I) Sipat Super Thermal Power Project, Village Sipat, Tehsil Masturi at District Bilaspur, Chhattisgarh by M/s NTPC Ltd. - req. amendment in EC.*

Sir,

The undersigned is directed to refer to your online application no. IA/CG/THE/107493/2019 dated 14.6.2019 requested for amendment in the Ministry's permission dated 17.5.2018 regarding transportation of coal with open wagons instead of tarpaulin covered wagons.

2. It has been noted that EC was accorded by MoEF for 2000 MW (4x500) on 22.02.1999 and subsequent amendments/letters dated 14.01.2000, 30.04.2002 and 08.09.2014 for change of fuel composition, change in configuration (from 4x500 MW to 3x660 MW) and temporary permission for transportation of coal by open wagons for one year respectively. However, permission for transportation of coal by open wagons is accorded vide Ministry's letter dated 8.9.2014 for one year with the stipulation that within one year, NTPC shall come out with a plan of carrying coal in a cleaner way. Subsequently, Ministry vide letter dated 8.2.2017 issued temporary permission for one more year (till 31.1.2018) to transport coal in open wagons covering with tarpaulin cover. The Ministry vide letter dated 17.5.2018 permitted coal transportation in open wagons with a condition that wagons are to be covered with tarpaulin sheet/cloth.

3. It has been informed by you that the covering wagons requires manual process of covering and uncovering which is not feasible to transport the coal 9.82 million tonnes per annum using covered wagons. It takes about six persons each to cover and uncover two wagons at mine and power plant end respectively. The time required for covering is about 15 minutes while the same for uncovering is about 5 minutes. It has been informed that it takes an additional time of an hour for covering and uncovering work, which is not envisaged in the design of MGR system which leads to delay in supply of coal to power plant and disturbs the schedule of coal transportation in MGR route. The cycle time increases by nearly 2 hours which will reduce 4 rakes/day. The present capacity of 16-17 rakes/day (44,000 MT/day) will reduce down to 12-13 rakes/day (33,000 MT/day) which is far less than our daily coal consumption of 44,000 MT/day. Further, use of tarpaulin sheets shall lead to environmental hazard and generation of plastic wastes.

4. It has been informed that the additional infrastructure is required to be built to accommodate this activity such as working platform, lighting, labour rest rooms,

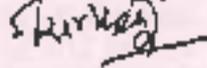
drinking water facility at loading and unloading end. There is a space constraint to construct this infrastructure. It has been informed that water sprinkling is being done at four points along the total stretch of 42 km viz. loading, unloading points, ½ km before entry, at 22km chainage point (mid-section) to ensure air pollution is not caused due to transportation and loading/unloading operations.

5. The proposal has been considered by the EAC (Thermal Power) in its 29th meeting held on 26.6.2019. In acceptance of the recommendations of the re-constituted Expert Appraisal Committee (Thermal Power) held on 26.6.2019 and in view of the information/clarification furnished by you, with respect to the above mentioned power project, the Ministry hereby accords the permission for waiving the condition of transportation of coal with tarpaulin covered wagons subject to following additional conditions:

- i. As proposed, the water sprinkling at four points viz. loading point, unloading points, ½ km before entry, at 22 km chainage point (Mid Section) shall be carried out to keep the coal wet and to control dust generation.
 - ii. NTPC being a large consumer of coal, should take up an R&D activity of developing a mechanical sliding of the cloth over wagon top which should be easily closed/opened with mechanical arrangement and should also not hamper loading operations. Once successful, this can be replicated in the country as best environmental practice to prevent air pollution from coal. This will also prevent oxidation.
6. All other conditions mentioned in this Ministry's letters of even no. dated 22.2.1999, 14.1.2000, 30.4.2002, 8.9.2014, 8.2.2017 and 17.5.2018 shall remain the same, as applicable.

This issues with the approval of the Competent Authority.

Yours Faithfully,


(Dr. S. Kerketta)
Director, IA.I

Copy to:-

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi 110001.
2. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi-110066.
3. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
4. The Deputy Director General of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (WC2), Ground Floor, East Wing, New Secretariat Building Civil Lines, Nagpur-440001.
5. The Member secretary, Chhattisgarh Pollution Control Board, Paryavas Bhawan, North Block Sector-19, Atal Nagar Dist- Raipur(C.G.)492002
6. The Principal Secretary, Department of Environment, Government of Chhattisgarh, Room No. 308, D.K.S. Bhawan, Mantralaya, Raipur, Chhattisgarh - 492001.
7. The District Collector, Bilaspur District, Govt. of Chhattisgarh, Bilaspur (C.G.)- 495001.
8. Guard file/Monitoring file.
9. Website of MoEF&CC.


Director, IA.I

BY SPEED POST



INDIAN INSTITUTE OF CHEMICAL
TECHNOLOGY
(Council of Scientific & Industrial Research)
HYDERABAD- 500007



Dr. K. Srinivas
Chief Scientist & Head
Analytical Chemistry Division

Phone No: (40-27191342
Fax No: +91-040-27193156
E-mail: sriniv@iiict.res.in

Ref: ACMS/NTPC/2017

Date: 29-05-2017

To:
Mr. Pankaj Sharma,
Dy. General Manager (EMG),
Sipat Super Thermal Power Station,
Ujjawal Nigan (P.O.),
SIPAT,
Ditaspur Dist.,
Chhattisgarh-495 555.

Ujjawal
26.06.17
- manager (EMG)

Dear Sir,

This is with your reference no : Sipat/Env./2017/1352 and letter dated 07-02-2017 regarding the analysis of Coal, Fly ash and Bottom ash samples and the report for the same is given below.

Analysis Report

S.No	Parameters	Coal Fired Unit#1	Coal Fired Unit#4	Fly Ash	Fly Ash Side Stage Unit #4	Bottom Ash Unit#1	Bottom Ash Unit#4
1	Al (% by mass)	2.35	1.52	3.38	9.78	6.34	6.55
2	As (µg/g)	13.89	7.26	25.60	30.53	26.70	18.92
3	Cd (µg/g)	0.27	0.14	0.79	0.53	0.21	0.19
4	Co (µg/g)	10.59	13.79	19.62	20.83	10.97	11.11
5	Cr (µg/g)	64.87	45.87	96.03	101.25	69.40	73.21
6	Cu (µg/g)	15.85	148.88	58.35	62.31	33.15	29.11
7	Fe (% by mass)	1.24	1.72	1.89	1.75	0.83	2.54
8	Mn (µg/g)	70.60	308.36	67.21	130.54	158.58	148.83
9	Hg (µg/g)	1.11	0.48	0.64	0.85	B.D	B.D
10	Ni (µg/g)	28.14	26.25	27.88	31.78	16.30	17.32
11	Pb (µg/g)	15.46	15.62	20.11	36.05	7.98	11.86
12	Zn (µg/g)	57.25	18.10	38.40	41.38	31.75	19.32

B.D: Below Detection Limit

Analyzed by

Scientist-in-Charge

for Director

1. This Certificate refers to sample(s) examined only.
2. These Results should not be used for commercial purpose (Advertisement).

Annexure - 3**Capital Expenditure on Environment Management Plan**

S/ No.	Pollution control Equipment/System	Capital Expenditure (Rupees In Crore)
1	ESP (Electro static precipitator)	490.7
2	STP(Sewarage treatment plant)	2.81
3	ETP (effluent treatment plant)	56.02
4	EQMS(Effluent quality monitoring system)	0.37
5	CEMS (Continuous Emission monitoring system)	0.303
6	AAQMS (Ambient air quality monitoring system)	1.04
7	AWRS (ash water recovery system)	10.31
8	Ash Dyke & toe drain pump house	175.79
	Total	737.343

CHEMISTRY COAL LAB
NTPC LTD-SIPAT

Ujjwainagar, Sipat
Bilaspur, Cg
PIN: 835 555



Certificate No: T-3241
NTPC-LQMS-44

E-mail id:
dileepmishra@ntpc.co.in

TEST-REPORT

1. Report No : CHEM/DPK/01-02
2. Issued To : CHEM/NTPC/MGR
3. Date of Issue : 29/02/2020

Laboratory Environmental Details

Temperature: 24°C

Relative Humidity: 38 %

S.No.	Sample Description	Unit of Measurement	Test Protocol	Test Results
1	Dipka Coal UL-25.01.2020	%	Sulphur Content ASTM D-4239-12	0.38
2	Dipka Coal UL-23.01.2020			0.40
3	Dipka Coal UL-01.02.2020			0.39
4	Dipka Coal UL-03.02.2020			0.40
5	Dipka Coal UL-22.02.2020			0.41
6	Dipka Coal UL-27.02.2020			0.41

(Handwritten signature)

डिलीप मिश्रा
DILEEP MISHRA
(एन टी सी लिमिटेड)
Sr. Manager (Chemistry)
एन टी सी लिमिटेड (बिलासपुर)
NTPC Ltd. SIPAT, Bilaspur (C.G.)

Terms & Conditions

Test report issued by NTPC is subject to following terms and conditions

1. Test results refer only to tested samples and applicable parameters.
2. Samples will be disposed after 15 days from the date of issue of test report unless otherwise specified.
3. This report is not to be reproduced or distributed wholly or in part, and cannot be used for any purpose and should not be used in any advertising media without the prior written permission of NTPC.
4. Analyze any discrepancy of content of this test certificate if required. Please contact our Office.

(Handwritten signature)

**CHEMISTRY COAL LAB
NTPC LTD-SIPAT**

Ujjwalnagar, Sipat
Bilaspur, Cg
PIN: 495 555



Certificate No: T-3241
NTPC-LQMS-44

E-mail id:
dileepmishra@ntpc.co.in

TEST-REPORT

1. Report No : CHEM/DPK/03
2. Issued To : CHEM/NTPC/MGR
3. Date of Issue : 13/03/2020

Laboratory Environmental Details

Temperature: 24^oC

Relative Humidity: 38 %

S.No.	Sample Description	Unit of Measurement	Test Protocol	Test Results
1	Dipka Coal UL-11.03.2020	%	Sulphur Content ASTM D-4239-12	0.41
2	Dipka Coal UL-12.05.2020			0.40

दिलीप मिश्रा
DR. DILEEP MISHRA
Sr. Manager (Chemistry)
NTPC Ltd., SIPAT, Bilaspur (C.G.)

Terms & Conditions

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A1(14/35)

2/3

CHEMISTRY COAL LAB
NTPC LTD-SIPAT

Ujjwainagar, Sipat
 Bilaspur, Cg
 PIN: 495 555



Certificate No: T-3241
 NTPC-LOMS-44

E-mail id:
dileepmishra@ntpc.co.in

TEST-REPORT

1. Report No : CHEM/DPK/08-09
 2. Issued To : CHEM/NTPC/MGR
 3. Date of Issue : 26/09/2019

Laboratory Environmental Details

Temperature: 24°C

Relative Humidity: 38%

S.No.	Sample Description	Unit of Measurement	Test Protocol	Test Results
1	Dipka Coal UL-19-08-2019	%	Sulphur Content ASTM D-4239-12	11.41
2	Dipka Coal UL-21-08-2019			0.38
3	Dipka Coal UL-22-08-2019			0.40
4	Dipka Coal UL-24-08-2019			0.41
5	Dipka Coal UL-19-09-2019			0.37
6	Dipka Coal UL-26-09-2019			0.40

(Handwritten signature)

एनटीपीसी लिमिटेड
DILEEP MISHRA
 (In Charge)
 In-charge (Chemistry)
 Ujjwainagar, Sipat, Bilaspur (Cg)
 NTPC Limited

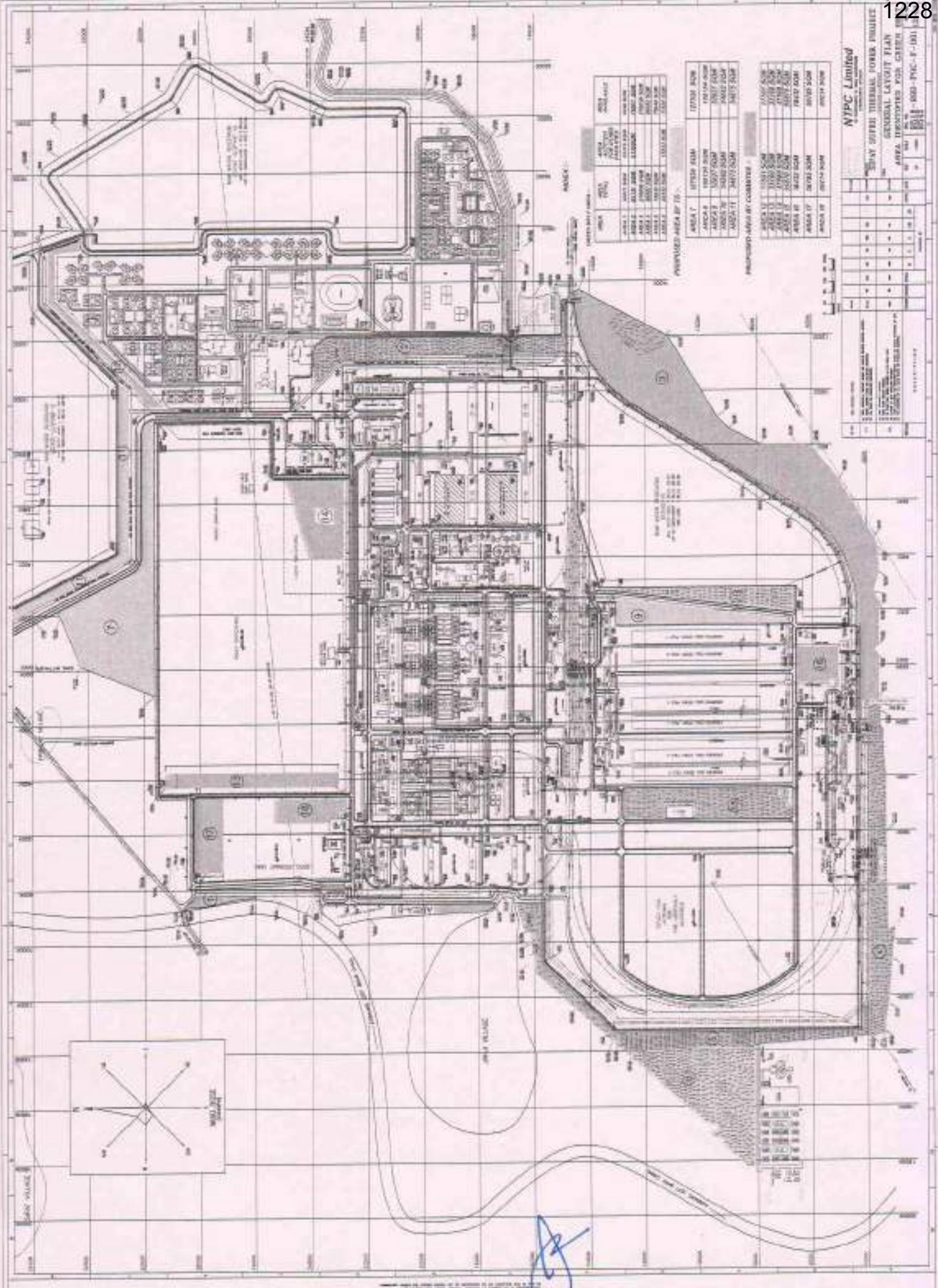
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Test report issued by NTPC Laboratories is subject to following terms and conditions

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2. Samples will be disposed after 15 days from the date of issue of test report unless otherwise specified.
3. This report is not to be reproduced or distributed without prior permission and cannot be used for any purpose and should not be used in any advertising media without the prior written permission of NTPC.
4. In case any rectification or comment of this test certificate is required, Please contact our Office.

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A1(15/35)



PROPOSED AREA BY TS

AREA	AREA NO.	AREA NAME	AREA NO.	AREA NAME
AREA 1	1001	1001	1001	1001
AREA 2	1002	1002	1002	1002
AREA 3	1003	1003	1003	1003
AREA 4	1004	1004	1004	1004
AREA 5	1005	1005	1005	1005
AREA 6	1006	1006	1006	1006
AREA 7	1007	1007	1007	1007
AREA 8	1008	1008	1008	1008
AREA 9	1009	1009	1009	1009
AREA 10	1010	1010	1010	1010
AREA 11	1011	1011	1011	1011
AREA 12	1012	1012	1012	1012
AREA 13	1013	1013	1013	1013
AREA 14	1014	1014	1014	1014
AREA 15	1015	1015	1015	1015

PROPOSED AREA BY COMBINED

AREA	AREA NO.	AREA NAME	AREA NO.	AREA NAME
AREA 1	1001	1001	1001	1001
AREA 2	1002	1002	1002	1002
AREA 3	1003	1003	1003	1003
AREA 4	1004	1004	1004	1004
AREA 5	1005	1005	1005	1005
AREA 6	1006	1006	1006	1006
AREA 7	1007	1007	1007	1007
AREA 8	1008	1008	1008	1008
AREA 9	1009	1009	1009	1009
AREA 10	1010	1010	1010	1010
AREA 11	1011	1011	1011	1011
AREA 12	1012	1012	1012	1012
AREA 13	1013	1013	1013	1013
AREA 14	1014	1014	1014	1014
AREA 15	1015	1015	1015	1015

PROPOSED AREA BY COMBINED

AREA	AREA NO.	AREA NAME	AREA NO.	AREA NAME
AREA 1	1001	1001	1001	1001
AREA 2	1002	1002	1002	1002
AREA 3	1003	1003	1003	1003
AREA 4	1004	1004	1004	1004
AREA 5	1005	1005	1005	1005
AREA 6	1006	1006	1006	1006
AREA 7	1007	1007	1007	1007
AREA 8	1008	1008	1008	1008
AREA 9	1009	1009	1009	1009
AREA 10	1010	1010	1010	1010
AREA 11	1011	1011	1011	1011
AREA 12	1012	1012	1012	1012
AREA 13	1013	1013	1013	1013
AREA 14	1014	1014	1014	1014
AREA 15	1015	1015	1015	1015

NTPC Limited

SHAY SIFRI THERMAL POWER PROJECT
 GENERAL LAYOUT PLAN
 AREA IDENTIFIED FOR GREEN

DATE: 15.08.2011
 SCALE: 1:1000
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

ENVIRONMENTAL MONITORING AT SONTHI PAHAR, SIPAT

NAME OF CLIENT : SIPAT SUPER THERMAL POWER PROJECT
NTPC LIMITED
UJJWAL NAGAR
SIPAT, DIST: BILASPUR
CHHATTISGARH; 495555

NAME OF CONTRACTOR : NETEL (INDIA) LIMITED
ENVIRONMENT MANAGEMENT SERVICES
W-408, RABALE-MDC
TTC INDUSTRIAL AREA, NAVIMUMBAI.

NATURE OF JOB : AMBIENT AIR QUALITY MONITORING AT SONTHI PAHAR RESERVE
FOREST AREA, SIPAT DIST. BILASPUR, CHHATTISGARH

LOA : NTPC/SSC-WR-II/9900185671, Dt:25.10.2019

DURATION OF PROJECT : 2 YEAR (24 MONTHS)

For NETEL (INDIA) LIMITED



D.SRINIVASA RAO
REGIONAL MANAGER - EMS

D. Srinivasa Rao
Regional Manager - EMS
Netel (India) Limited



Sipat Super Thermal Power Project
NTPC Ltd., Sipat-Bilaspur

INDEX

SR.	DESCRIPTION	PAGE NO
1	AMBIENT AIR QUALITY MONITORING AT BHARUADIH	3
2	RESULTS & DISCUSSION	4-5

SR.	DESCRIPTION	PAGE NO
EVALUATION GRAPH		
1	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , O ₃ , CO, HC	6


D. Srinivasa Rao
 Regional Manager - EMS
 NTPC (India) Limited


EIC
 Sipat Super Thermal Power Project
 NTPC Ltd., Sipat-Bilaspur

TABLE: 01 Ambient Air Quality Monitoring Data

LOCATION : BHARUADIH		Concentration of Pollutants							
		PM ₁₀	PM _{2.5}	SO ₂	NO _x	O ₃	CO	HC	
		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm	
PERMISSIBLE LIMITS		100	60	80	80	100	2.0	-	
DATE OF MONITORING	1st & 2nd FORTNIGHT	03-02-2020	53.0	31.8	20.3	24.1	20.0	0.573	0.518
		06-02-2020	50.0	20.3	19.8	21.8	19.0	0.581	0.526
		10-02-2020	52.5	18.4	20.8	23.7	18.0	0.577	0.522
		13-02-2020	38.1	12.5	22.4	25.7	19.0	0.560	0.509
		17-02-2020	50.7	28.0	20.3	22.2	18.0	0.556	0.520
		20-02-2020	61.0	39.1	20.7	23.8	20.0	0.539	0.508
		24-02-2020	56.4	23.8	19.4	21.0	19.0	0.544	0.517
		27-02-2020	48.6	22.7	18.4	23.5	17.0	0.536	0.514
	Minimum concentration		38.11	12.50	18.41	21.00	17.00	0.536	0.508
	Maximum concentration		61.00	39.11	22.38	25.70	20.00	0.581	0.526
Average		51.30	24.58	20.26	23.14	18.75	0.558	0.517	

D. Srinivasa Rao
Regional Manager - EMS
Neter (India) Limited


EIC
Sipat Super Thermal Power Project
NTPC Ltd., Sipat-Bilaspur

RESULTS & DISCUSSION ON OBSERVATIONS

Respirable Particulate Matter (PM₁₀)

- PM₁₀ concentrations at BHARUADIH were observed
- > Range 39.1 to 61.0 µg/m³, with the
 - > Mean value as 51.30 µg/m³ and the
 - > Limit: 100.0 µg/m³

Respirable Particulate Matter (PM_{2.5})

- PM_{2.5} concentrations at BHARUADIH were observed
- > Range 12.5 to 39.1 µg/m³,
 - > mean value as 24.6µg/m³ and the
 - > Limit: 60.0 µg/m³

Sulphur Dioxide (SO₂)

- SO₂ concentrations at BHARUADIH were observed
- > Range 18.4 to 22.4µg/m³,
 - > The mean value as 20.26µg/m³
 - > Limit: 80.0 µg/m³

Oxides of Nitrogen (NO_x)

- NO_x concentrations at BHARUADIH were observed
- > Range 21.0 to 25.7 µg/m³,
 - > Mean value as 23.14 µg/m³
 - > Limit: 80.0 µg/m³

Ozone (O₃)

- O₃ concentrations at BHARUADIH were observed
- > Range 17.00 to 21.00 µg/m³,
 - > Mean value as 18.75 µg/m³
 - > Limit: 100.0 µg/m³

D. Srinivasa Rao
Regional Manager - EMS
Notal (India) Limited


 EIQ
 Sipat Super Thermal Power Project
 NTPC Ltd., Sipat-Bilaspur

Carbon Monoxide (CO)

CO concentrations at **BHARUADIH** were observed

- Range 0.536 to 0.581 $\mu\text{g}/\text{m}^3$,
- Mean value as 0.558 $\mu\text{g}/\text{m}^3$
- Limit: 2.0 mg/m^3

Hydrocarbon as Methane (HC)

HC concentrations at **BHARUADIH** were observed

- Range 0.508 to 0.526 ppm,
- Mean value as 0.517 ppm
- Limit: No Limit Specified

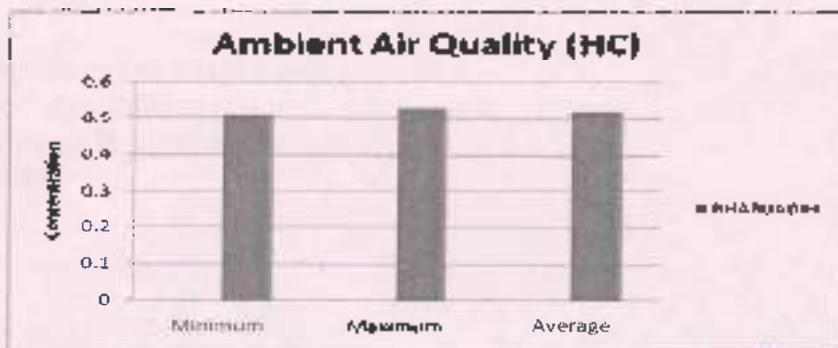
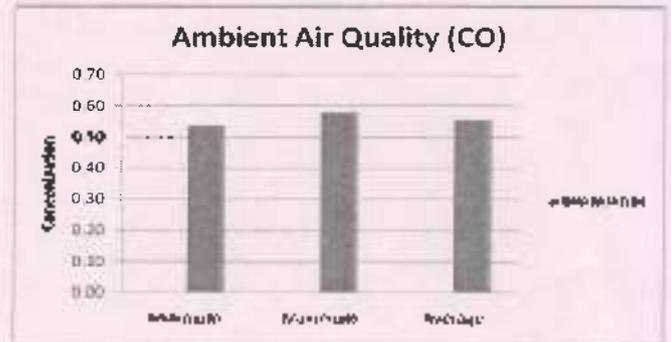
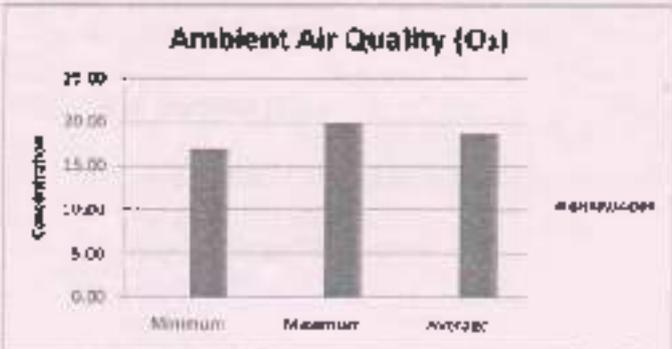
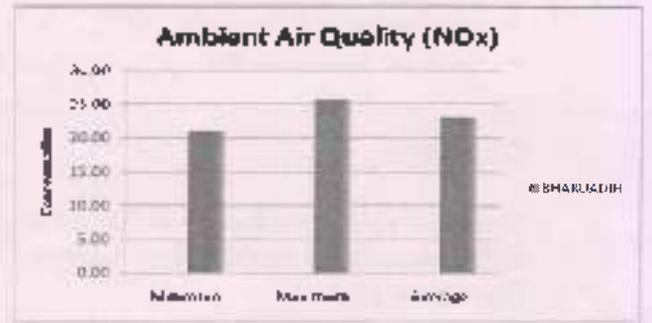
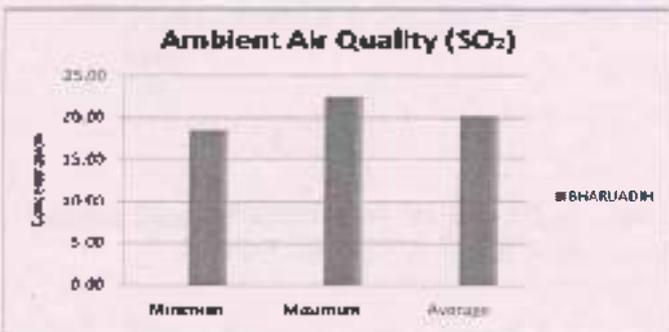
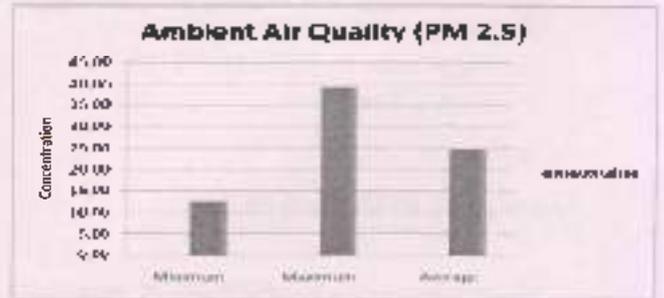
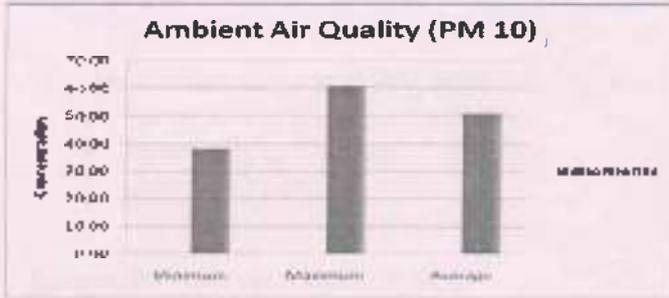
Conclusion:

The observed concentration of PM_{10} , $\text{PM}_{2.5}$, SO_2 , NO_x , O_3 , CO and HC were found to be within prescribed standards of Central Pollution Control Board (CPCB) for Rural & Residential area.

D. Srinivasa Rao
Regional Manager - EMS
Natal (India) Limited


EIC
Sipat Super Thermal Power Project
NTPC Ltd., Sipat-Bilaspur

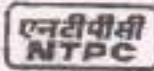
AMBIENT AIR QUALITY GRAPHS



D. Srinivasa Rao
Regional Manager - EMS
Netai (India) Limited

EIC
Sipat Super Thermal Power Project
NTPC Ltd., Sipat-Bilaspur

Annexure- 7



Ref. No.: CS-9518-109(2)-9-SC-NOA-6816

Date: 24.05.2019

M/s GE Power India Limited
Plot No.7, (HQP Building),
Sector-127, Noida-201301

Kind Attn.: Mr. Lalit Sankari, Executive-Business Operations

Sub.: Notification of Award (NOA) for Inland Transportation, Inland Insurance, Installation, Testing & Commissioning for Sipat Super Thermal Power Station Stage-I (3 x 690 MW) as per Common Bidding Document No. CS-0811-109(2)-9.

Dear Sir,

1.0 This has reference to the following:

- i) Our Invitation for Bids (IFB) No. 40087737 dated 31.08.2018 inviting Envelope-I (Techno-Commercial) Bids and IFB no. 40087818 for Envelope-II (Price) Bids.
- ii) Bidding Documents for the subject package downloaded by you from SRM portal comprising the following:

S. No.	Description of Bidding Documents
1	Section-I: Invitation for Bids (IFB)
2	Section-II : Instructions to Bidders (ITB)
3	Section-III : Bid Data Sheets (BDS)
4	Section-IV : General Conditions of Contract (GCC)
5	Section-V : Special Conditions of Contract (SCC)
6	Section-VI : Technical Specifications including Tender Drawings and Technical Data Sheets
7	Section-VII : Forms & Procedures (FP) consisting of Part-1 of 3, Part-2 of 3 and Part-3 of 3

- iii) Various Amendments/Clarifications/Errata issued to the Bidding Documents for the subject package as per details given below:

श्रीश सिंह / SHRISH SINGH
उप महाप्रबन्धक (सहायक सेवाएं)
Dy. General Manager (Contract Services)
एन टी सी लिमिटेड / NTPC Limited
SCE, A-8A, Sector-34, Noida-201301 (I.P.)

Page 1 of 6

एन टी सी लिमिटेड कार्यालय परिसर, एन टी सी - 2 व, सेक्टर 34, नोएडा (उ.प्र.), पिन-201301
 ENGINEERING OFFICE COMPLEX, Plot No. A-8A, Sector-34, Post Box No. 13, Noida (U.P.), Pin: 201301
 कॉर्पोरेट पहचान संख्या: 142010419750007966, वेबसाइट: www.npsc.co.in
 Corporate Identification Number: 142010419750007966, Website: www.npsc.co.in
 टैलफोन संख्या: +91-52-25111 (1-3 लाइनें), +91-52-25111 (5-लाइनें), फैक्स: +91-52-25111, +91-2911136
 Telephone No.: 5120-2410333 (10 Lines), 5120-2410119 (5-Lines), Fax: 9120-2410126, 9120-2410332
 कार्यालय पता: एन टी सी लि. सेक्टर 34, नोएडा, उत्तर प्रदेश, भारत।
 Office: NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road, New Delhi-110003

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BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
 Original Application No. 459/2018
 Earlier 196/2014 (CZ)
 Rashmi Singh Vs NTPC Ltd. & Ors

**SUBMISSIONS BY RESPONDENT No. 1 IN COMPLIANCE TO ORDER OF NGT
 DATED 27.02.2020 PASSED BY HON'BLE TRIBUNAL.**

In compliance of the order of Hon'ble Tribunal, Principle Bench NGT at New Delhi, passed in the above matter on 27.02.2020 & as directed in Para 11 of said order. Respondent No. 1 hereby submits compliance status of EC Conditions which were "Being Complied" & "Partial Complied" in status report submitted by the Regional Office -MOEF & CC, Nagpur dated 20.06.2019 :-

Sl No	EC Condition	Compliance Status as on 11.06.2019, MOEF & CC status report 20.06.2019	Present Status of Compliance as on 30.05.2020
1	Coal should be used @ 10 MT/year for Stage-I with sulphur content not exceeding 0.24%. The coal should be transported from Korba Coalfields by Captive MGR in closed wagons to avoid dust pollution.	Partially Complied MOEF vide letter J-13011/10/1996-IA.II (T) dated 08.09.2014 has permitted to use coal with sulphur content not exceeding 0.40 %. Revised condition is being complied. For Closed wagon transportation, matter has been put up before MOEF for exemption	Complied It is submitted that this revised condition is being complied with. It is submitted that this exemption has been granted by MoEF vide its Notification dated 09/10/2019 (Copy Enclosed)
2	As per the proposal submitted for Ash Utilization, it should be ensured that fly ash is used in cement industry, brick making and in raising the ash dyke etc. Efforts should also be made in the area of mine filling, land development and agriculture etc. For brick making, about 50 acres	Partially Complied In FY 2018-19, Ash utilization is 49.54%. Dry fly ash is being issued free of cost to fly ash brick manufacturers. Nearby cement industries are also getting fly ash from Sipat. Pond ash is being used in dyke raising. Pond ash being supplied	Partially Complied It is submitted that Ash utilization at NTPC Sipat is on an increasing trend & with it is likely to achieve 100% ash utilization by 2020-21. Dry fly ash is being issued free of cost to fly ash brick manufacturers. Near by Cement industries are getting fly ash free of cost from Sipat. Pond



<p>of land with all infrastructure facilities should be earmarked. Full fly ash utilization should be ensured at the end of 9th year from the date of commissioning of the project</p>	<p>to road projects for embankment filling, low lying area filling & area development in outside NTPC land. (Annexure-5)</p> <p>70 Acre Revenue land had been identified at Saler Village and which has got transferred to Deptt of Industries, Govt. of Chhattisgarh and then to Chhattisgarh State Industrial Development Corporation Limited (CSIDC). CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.</p>	<p>ash is being used in dyke raising embankment in NH road projects.</p> <p>NTPC -Sipat is doing sincere efforts to identify abandoned mine void for ash filling purpose. Govt land & low lying area being developed by filling with ash & top cover with good earth. To enhance dry fly ash utilization additional 4 number silos of capacity 6000 Ton with rail loading facility is under construction. However due to prevalent Pandemic Covid -19 condition & lockdown in country, ash utilization in all fronts is badly affected & due to which achieving 100% Ash Utilization target becomes extremely difficult in FY 2020-21.</p> <p>It is to be submitted that for setting up of ash based industries in 70 acre land, NTPC Sipat had approached the Chhattisgarh Govt. After discussions and follow up, it was agreed that Chhattisgarh State Industrial Development Corporation (CSIDC) shall proceed for a land which has been identified in Saler Village, near NTPC Sipat, in Bilaspur district. On 24-05-2016 possession of the land had been given to</p>
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			CSIDC. Further, CSIDC has got approval for Land diversion from Agricultural to Industrial use. Land diversion from Agricultural to Industrial use needs notification in Gazette, which is expected soon. NTPC has been continuously following up with the Govt of CG for compliance of this condition. In light of the above stated facts, it is clear that NTPC Sipat has complied and executed its part of EC condition.
3	Keeping in view the location of Sonthi Pahar Reserved Forest, additional Monitoring Station should be installed at the site to assess the ambient air quality. Monitoring should be initiated immediately to ascertain the project status and the scenario after commissioning of the project. A special study should be undertaken to ascertain impact of SO ₂ on the flora in the project impact zone particularly the forest patches	Being Complied Ambient Air Quality monitoring at Sonthi Pahar reserve forest is in progress. Value of SO _x are well within limit. Study on terrestrial ecology was conducted in 2002 & in 2015 & study concludes that effect of NTPC- Sipat on Eco system is negligible. (Annexure -A Table:III)	Complied It is submitted that this condition is of regular monitoring nature & therefore it was marked in report as " Being Complied".
4	Regular monitoring for SPM, SO ₂ , NO _x around the power plant may be carried out and records maintained. A Monitoring Station should be established near Sonthi Pahar forest in NE direction of the power plant	Being Complied Regular monitoring of AAQ is being carried out around the plant. Ambient air quality is being monitored near Sonthi Pahar forest area since inception of plant. (Annexure -A Table:III)	Complied It is submitted that this condition is of regular monitoring nature & therefore it was marked in report as " Being Complied".
5	Since maximum concentration for SO ₂ near Sonthi Pahar is likely to be close to permissible	Being Complied Continuous monitoring & analysis of ambient	Complied It is submitted that this condition is of regular

	levels for sensitive area. continuous monitoring and analysis of ambient air quality in the region should be undertaken during planning, construction and operational phase of the project.	air quality near Sonthi Pahar are being undertaken. Annexure -A Table:III)	monitoring nature & therefore it was marked in report as " Being Complied".
6	Utilization of land for Stages I & II of the project shall be restricted to 4382.44 acres, which is already in possession of the project authorities. 70 acres of additional land will be acquired by M/s. NTPC for ash based units.	Partially Complied The project proponent(PP) has taken all steps to restrict the land utilization for Stage-I and II of Sipat STPP to 4382.44 acres. 70 Acre Land has been identified at Saler village of Bilaspur Tehsil to develop ash based industries. Land has been transferred from Chattisgarh State Industries department to CSIDC and further modalities are being worked out by CSIDC. NTPC is pursuing the matter with CSIDC for early implementation.	Complied It is submitted that The project has taken all steps to restrict the land utilization for Stage-I and II of Sipat STPP to 4382.44 acres. It is to be submitted that for setting up of ash based industries in 70 acre land, NTPC Sipat had approached the Chattisgarh Govt. After discussions and follow up, it was agreed that Chattisgarh State Industrial Development Corporation (CSIDC) shall proceed for a land which has been identified in Saler Village, near NTPC Sipat, in Bilaspur district. On 24-05-2016 possession of the land had been given to CSIDC. Further, CSIDC has got approval for Land diversion from Agricultural to Industrial use. Land diversion from Agricultural to Industrial use needs notification in Gazette, which is expected soon. NTPC has been continuously following up with the Govt of CG for compliance of this condition. In light of the above stated facts, it is

			clear that NTPC Sipat has complied and executed its part of EC condition
7	Ash generated to the tune of 2.15 million tones per year shall be used in a phased manner as per the provisions of the Fly Ash Utilisation Notification of September, 1999 and its subsequent amendments. By the end of ninth year, full fly ash utilisation should be ensured. The cost of ash utilisation measures proposed in the total project cost should be intimated.	Partially Complied In FY 2018-19, Ash utilization is 49.54%. Dry fly ash is being issued free of cost to fly ash brick manufacturers. Nearby cement industries are also getting fly ash from Sipat. Pond ash is being used in dyke raising. Pond ash being supplied to road projects for embankment filling, low lying area filling & area development in outside NTPC land being done also.	Partially Complied It is submitted that Ash utilization at NTPC Sipat is on an increasing trend & with it is likely to achieve 100% ash utilization by 2020-21. Dry fly ash is being issued free of cost to fly ash brick manufacturers. Near by Cement industries are getting fly ash free of cost from Sipat. Pond ash is being used in dyke raising , embankment in NH road projects. NTPC -Sipat is doing sincere efforts to identify abandoned mine void for ash filling purpose. Govt land & low lying area being developed by filling with ash & top cover with good earth. To enhance dry fly ash utilization additional 4 number silos of capacity 6000 Ton with rail loading facility is under construction. However due to prevalent Pandemic Covid -19 condition & lockdown in country , ash utilization in all fronts is badly affected & due to which achieving 100% Ash Utilization target becomes extremely difficult in FY 2020-21.



8	<p>Details of the plan to develop ash utilizing industrial units in the 70 acre plot proposed by the project proponent should be worked out in consultation with the State Government and the draft plan in this regard should be submitted to MOEF within 6 months of environmental clearance. 70 acres of land will only be utilized for setting up ash based industries.</p>	<p>Partially Complied 70 Acre Revenue Land had been identified at Saler village & which has got transferred to Dept of Industries , Govt of Chattisgarh & then to CSIDC. CSIDC has sought approval from concerned authorities & the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.</p>	<p>Complied It is to be submitted that for setting up of ash based industries in 70 acre land, NTPC Sipat had approached the Chattisgarh Govt. After discussions and follow up, it was agreed that Chattisgarh State Industrial Development Corporation (CSIDC) shall proceed for a land which has been identified in Saler Village, near NTPC Sipat, in Bilaspur district. On 24-05-2016 possession of the land had been given to CSIDC. Further, CSIDC has got approval for Land diversion from Agricultural to Industrial use Land diversion from Agricultural to Industrial use needs notification in Gazette, which is expected soon. NTPC has been continuously following up with the Govt of CG for compliance of this condition. In light of the above stated facts, it is clear that NTPC Sipat has complied and executed its part of EC condition.</p>
9	<p>Regular monitoring of the air quality should be carried out in and around the power plant and records be maintained. Periodic six monthly reports should be submitted to this Ministry.</p>	<p>Being Complied AAQ is monitored continuously through on line analyzers installed in plant premises and monitoring outside the plant is manually.</p>	<p>Complied It is submitted that this condition is of regular monitoring nature & therefore it was marked in report as " Being Complied".</p>

		Reports are being sent to Ministry, CPCB and CECEB as well.	
10	<p>A long term study on radioactivity and heavy metals contents on coal to be used shall be carried out through a reputed institute.</p> <p>Thereafter mechanism for an in-built continuous monitoring of radioactivity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.</p>	<p>Partially Complied Study of radioactivity has been done by BARC Mumbai, and it is concluded that the radiation levels in and around the Sipat Super Thermal Power Station of NTPC Ltd., is comparable with the National average values. The naturally occurring radionuclide levels in groundwater / surface water / drinking water samples is observed well below the Atomic Energy Regulatory Board (AERB) and World Health Organization (WHO) prescribed limit / guideline values. The activity concentration of naturally occurring radio nuclides in soil, food matrices, flora and fauna is comparable to the national background levels. Study on heavy metals in coal and fly ash was completed through IICT Hyderabad.</p> <p>PP informed that there is no technology/instruments available for in built continuous monitoring of radioactivity & heavy metals in coal & fly ash (including bottom ash) .As & when technology/instruments is available then NTPC shall install the same.</p>	<p>Complied It is submitted that studies as directed have been completed and there is no adverse findings in report and hence therefore this condition has been complied with</p> <p>It is submitted that to the best of our knowledge , technology /instruments for continuous monitoring of radioactivity & heavy metals in coal & fly ash including bottom ash is not available in the country. Any breakthrough in this regard shall be taken up for implementation</p>

11	Monitoring of surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the ministry regularly. Further, monitoring point shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring of heavy metals in ground water shall be undertaken.	<p>Being Complied PP has adopted ZERO Discharge methodology in their plant & no water is being discharged from plant & dyke area. Regular monitoring of ground water quality in surrounding villages being done. Heavy metal monitoring also being done in regular intervals.</p> <p>There is no Surface water bodies in the vicinity of project. However, distant surface water bodies namely Leelagarh river & Kharang river water monitoring reports attached as (Annexure -A Table IV & Annexure :11)</p>	<p>Complied It is submitted that this condition is of regular monitoring nature & therefore it was marked in report as " Being Complied".</p>
12	Minimum required environmental flow suggested by the competent authority of the state Govt. shall be maintained in the channel/Rivers (as applicable) even in lean season.	<p>Being Complied Water is sourced from Hasdeo RBC. Drawing lesser quantity of water than the allocated quantity by state irrigation department. NTPC-Sipat has surrendered 27 MCM water against allocated quantity of 120 MCM as per water agreement with Central Ground Water resource department.</p>	<p>Complied It is submitted that this condition is of regular monitoring nature & therefore it was marked in report as " Being Complied".</p>
13	Fly ash shall not be used for agriculture purpose. No mine void filling will be undertaken as an option for ash utilization with out adequate lining of mine with suitable media such that no leachate shall takes place at any point of time. In case, the option of mine void filling is to be adopted, prior	<p>Being Complied PP informed that fly ash utilization will be complied after getting the identified mine and related approvals from concerned agencies.</p>	<p>Complied It is submitted that this condition is complied with.</p>



	<p>detail study of soil characteristics of the mine area shall be undertaken from an institute of repute and adequate clay lining shall be ascertained by the state pollution control board and implementation done in close co-ordination with the state pollution control board.</p>		
14	<p>CSR schemes should address Public hearing issues and shall be undertaken based on need base assessment in and around the villages with in 5 Km of the site and in constant consultation with the village panchayat and the district administration. As part of CSR prior identification of local employable youth and eventual employment in the project after imparting relevant training shall be also undertaken. Development of fodder farm, fruit bearing orchard, vocational training etc. can form a part of such programmes. Company shall provide separate budget for community development activities and income generating programmes. Vocational training programmes for possible self employment and jobs shall be important to identify villagers free of cost</p>	<p>Being Complied Under the CSR scheme, different activities are being carried out. PP has submitted the details in (Annexure - 12 (a,b))</p>	<p>Complied It is submitted that this condition is complied with.</p>
15	<p>The environment statement for each financial year ending 31st march in form-V as is mandated to be submitted by the project proponent to the concern state pollution control board as prescribed under the Environment (protection) rule, 1986, as amended subsequently, shall also to be put on the website of the company along with the status of compliance of Environmental clearance conditions and shall also be sent to the respective regional offices of the ministry by e mail.</p>	<p>Being Complied Environment statement for Fy2018-19 has been submitted on 09.05.2019 [Annexure-15]</p>	<p>Complied It is submitted that this condition is complied with. It is further submitted that Environment statement for Fy2019-20 has been submitted on 11.04.2020.</p>

16.	<p>Top surface of the coal wagons shall be completely covered with tarpaulin sheet/Cloth so that coal will not get exposed to atmosphere and becomes secondary emissions. This will avoid fugitive dust emissions during the transport. Water sprinkling shall be done on the top surface of coal at loading point before covering with tarpaulin sheet. Due safety procedures shall be followed so that the covered sheet doesn't open up and fly away during transport which will endanger safety of nearby people, agricultural fields, etc. Water sprinkling measures as proposed at loading and unloading point shall be continued. Progress report of implementation shall be submitted to this ministry and concerned Regional office as part of Compliance report.</p>	<p>Partially Complied PP informed that matter has been put up before MOEF & CC for exemption this condition. PP has made request to MOEF & CC New Delhi on 06.06.2019(Copy Enclosed)</p> <p>> Research Designs & Standards Organization (RDSO) is yet to come out with provision for covering Bogie Open Bottom Rapid Discharge (BOBR) wagons with tarpaulin sheet/ cloth.</p> <p>> Water Sprinkling on top surface of coal at loading point is being done on each wagon being loaded. Water sprinkling measures at loading , unloading & mid way point is continued as a regular practice.</p>	<p>Complied It is submitted that Top surface of the coal wagons covering with tarpaulin sheet condition exemption has been granted by MoEF vide letter no J-13011/10/1996-IA.II(T) dated 09.10.2019</p> <p>R&D activity of developing a mechanical sliding of the cloth cover wagon top which should be easily closed/opened with mechanical arrangement is being taken up with RDSO, a designer of our coal wagons. Any breakthrough in this regard, as and when intimated to us, will be taken up for implementation.</p> <p>Water sprinkling on top surface of coal at loading point is being done on each wagon being loaded. Water sprinkling measures at loading, unloading ,mid-way point & 1/2 km before entry is continued as a regular practice.</p>
17	<p>Dense avenue plantation shall be developed on either side of the track wherever habitations/agricultural lands exists in consultation with local forest department to minimize the dust and noise pollution.</p>	<p>Being Complied To provide green belt along railway track of MGR, a large scale tree plantation scheme has been adopted. Plantation of 22,975 plants along the MGR track has been</p>	<p>Complied It is submitted that To provide green belt along railway track of MGR, a large scale tree plantation scheme has been adopted. Plantation of 48919 plants along the MGR</p>

		completed on 30.09.2018 through CGRVVN Ltd. Bilaspur. (Annexure-17)	track has been completed on 30.04.2020 through CGRVVN Ltd. Bilaspur.
18	AAQ monitoring within 1 km on either side of track, close proximity to nearby habitation, shall be continued once in a quarter and the progress report shall be submitted.	Being Complied AAQ monitoring along MGR within 1 km at six locations by MOEF approved third party is being done. report attached till March - 2019 as Annexure-B. All average values are within limit of 24 hr average. (Annexure-B)	Complied It is submitted that this condition is of regular monitoring nature & therefore it was marked in report as "Being Complied".
19	Health survey study of the local people shall be carried out. The report should clearly bring out the impact on surrounding forests, agriculture/crop patterns, percentage of yield, public health due to open wagon coal transportation, etc	Partially Complied Complete report is available. It has been mentioned in the conclusion that "the prevalence of Chronic Obstructive Pulmonary Disease (COPD) found in our study is similar with the prevalence of COPD among non-coal dust exposure area in the country". > Study for impact on forest, crop etc started by TCB College of agriculture, Bilaspur in progress	Complied It is submitted that Complete report is available. It has been mentioned in the conclusion that "the prevalence of COPD found in our study is similar with the prevalence of COPD among non-coal dust exposure area in the country". It is submitted that Study for impact on forest, crop etc carried out by TCB College of agriculture, Bilaspur. Study is completed and there is no adverse findings in report
20	As stipulated by the earlier EAC on 31.03.2016, PP should study alternative methodologies/technologies being utilized including abroad, to prevent coal dust blow from moving open wagons carrying coal, if any. The results of this study should be submitted within one year.	Being Complied PP informed that they are exploring alternative technologies /methodologies carried out by RDSO, a designer of our coal wagons. Any breakthrough in this regard, as and when intimated to them, will	Complied It is submitted that R&D activity of developing a mechanical sliding of the cloth cover wagon top which should be easily closed/opened with mechanical arrangement is being taken up with RDSO, a



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		be taken up for implementation.	designer of our coal wagons. Any breakthrough in this regard, as and when intimated to us, will be taken up for implementation.
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Submitted please for perusal of the Committee constituted on 14.02.2019 in O.A. No. 200/2018, Dukalu Ram & Ors. V Union of India & Ors as directed by NGT at Para 11 of the order dated 27.02.2020.

Amvay Shukla

30/05/2020

संयोजक (सर्वोच्च अदालत)
आर.एस.एस.
 एनपीसी सि. वी.ए. सिस्टम (सी.)
 NTPCO-SIAT, BILASPUR (C.O.)



भारत सरकार
GOVERNMENT OF INDIA
 पर्यावरण, वन एवं जल वायु परिवर्तन मंत्रालय
**MINISTRY OF ENVIRONMENT, FOREST &
 CLIMATE CHANGE**

Regional Office (WCZ)
 Ground Floor, East Wing
 New Secretariat Building
 Civil Lines, Nagpur - 440001
 apccfcentral-ngp-
 mef@gov.in

F. No. CC-113/RON/2017-NGP/5423

Dated: 20th June, 2019

To,

The Registrar
 National Green Tribunal (NGT)
 Central Zonal Bench, State Commission Bhawan,
 B-35, Arera Hills, Bhopal - 462011
 (Madhya Pradesh)
 Email: rg.ngt@nic.in

Sub: A report on the status of compliance of conditions stipulated in the environmental clearances granted to M/s NTPC Limited for "2980 MW Super Thermal Power Plant (STPP)" located at Village Sipat, Tehsil Masturi, District Bilaspur (Chhattisgarh)- reg.

Ref: Hon'ble NGT letter No. FS/2019/114 dated 22.05.2019.

Sir,

I am directed to refer to the above subject and letter under reference wherein Hon'ble NGT, Central Zonal Bench, Bhopal in OA No. 196/2014 in the matter of Rashmi Singh Vs NTPC and 8 Ors vide letter No. D. No. F.S./2019/114 dated 22.05.2019 directed MOEF&CC Regional Office, Nagpur for site visit to monitor the status of compliance of conditions stipulated in the environment clearances granted vide letter No. J-13011/10/96-IA II (T) dated 22.02.1999 and J-13011/5/2002-IA II (T) dated 08.06.2004 to M/s NTPC Limited for "2980 MW Super Thermal Power Plant (STPP) located at Village Sipat, Tehsil Masturi, District Bilaspur (Chhattisgarh)".

2. In view of the same, it is to inform that a visit for the monitoring of compliance of conditions stipulated in the environment clearances has been conducted by Scientist of the Regional Office during 10th-11th June, 2019. As per the documents submitted by the project proponent during the monitoring, and also as informed during the site visit, the details are reported to be as under:-

- i. NOC for Stage-1 (4x500 MW) from MPPCB, Bhopal has been obtained vide letter No. 3574/TS/MPPCB/97 dated 05.03.1997

- ii. EC for Stage-I (2000 MW), from MoEF&CC, New Delhi has been obtained vide letter No. J.13011/10/96-IA.II (T) dated 22.02.1999
 - iii. Permission to Establish Stage-I (3x660 MW) from CECB, Raipur has been obtained vide letter No. 410/TS/CECB/2002 dated 11.02.2002
 - iv. EC amendment for change of unit size for stage-I (3x660 MW) from MoEF&CC New Delhi has been obtained vide letter No. J-13011/10/96-IA.II (T) dated 30.04.2002
 - v. Consent to Operate for obtaining EC Stage-II (2x500 MW), from CECB Raipur has been obtained vide letter No. 87/TS/CECB/2004 dated 06.01.2004
 - vi. EC for Stage-II (2x500 MW), MoEF&CC New Delhi has been obtained vide letter No. J-13011/5/2002-IA-II (T) dated 08.06.2004
 - vii. Stage-II Forest Clearance from MOEF&CC New Delhi has been obtained vide letter No. 8-115/2004-FC dated 30.06.2004
 - viii. Permission to Establish Stage-II (2x500MW) from CECB, Raipur has been obtained vide letter No. 5299/TS/CECB/2004 dated 31.12.2004
 - ix. Amendment in EC Stage-1(3x660 MW) from MOEF&CC New Delhi has been obtained vide letter No. J-13011/10/96-IA.II (T) dated 08.09.2014
 - x. Amendment in EC Stage-1(3x660 MW) from MOEF&CC New Delhi has been obtained vide letter No. J-13011/10/1996-IA.II (T) dated 08.02.2017
 - xi. Amendment in EC Stage-1(3x660 MW) from MOEF&CC New Delhi has been obtained vide letter No. J-13011/10/1996-IA.II (T) dated 17.05.2018
3. Some of the EC conditions were observed to be complied partially by the PP:

- i. **Stage-I Condition No. viii:** For closed wagon transportation, matter has been put up before MOEF for exemption.
- ii. **Stage-I Condition No. ix:** 70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.
- iii. **Stage-II Condition No. ii:** All steps has been taken to restrict the land utilization for Stage-I and Stage-II of Sipat STPP to 4382.44 acres. 70 Acre Revenue land had been identified at saler village and which has got transferred

to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.

- iv. **Stage-II Condition No. ix:** In Fy 2018-19, ash utilization at NTPC Sipat is 49.54%. Dry fly ash is being issued free of cost to local fly ash brick manufacturers. Nearby cement industries area also getting fly ash from Sipat. Pond ash is being used in dyke raising, road projects embankment filling, low lying area filling & area development outside NTPC land being done also.
- v. **Stage-II Condition No. xii:** 70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.
- vi. **Stage-I (Amendment) Condition No. iii:** Study on heavy metals in coal and fly ash was carried out through IICT Hyderabad. PP informed that as per PP's knowledge, there are no technology/instruments available for in-built continuous monitoring of radioactivity & heavy metals in coal & fly ash (including bottom ash). As and when technology/ instruments will be available to NTPC they will install the same.
- vii. **Stage-I (Amendment) Condition No. 5:** It has been mentioned in the conclusion that "the prevalence of Chronic Obstructive Pulmonary Disease (COPD) found in our study is similar with the prevalence of COPD among non-coal dust exposure area in the country". Study for impact on forest, crop etc started by TCB College of agriculture, Bilaspur is under progress.

4. The PP has also informed that there were three Court Cases against their project.

- i. Originally Complaint case (No. 7893 of 2014) was filed by RO, CECB before the CJM Court, Bilaspur for violation of Air Act, 1981 and EPA 1986. NTPC Sipat filed a petition to quash the original complaint filed before the CJM Court. Stay was granted by the High Court against the proceedings in CJM Court on 17.01.2018. Next date not fixed by the High Court.
- ii. The application was filed under sec. 14 & 15 of the NGT Act, for the violation of provisions of forest (Conservation) Act, 1980. The contentions raised are that NTPC Sipat has not complied with the mandatory conditions of Environmental Clearance/ Forest clearance. Application dismissed in favour of NTPC on 19.02.2019

- iii. The application was filed under sec. 14 & 15 of the NGT Act, for the violation of provisions of forest (Conservation) Act, 1980. The contentions raised are that NTPC Siapt has not complied with the mandatory conditions of Environmental Clearance. Last heard on 21.05.2019, wherein court has directed MOEF Regional office Nagpur to submit inspection report for EC compliance.

This issues with the approval of the Additional Director General (Central), Regional Office (West Central Zone), MoEF&CC, Nagpur

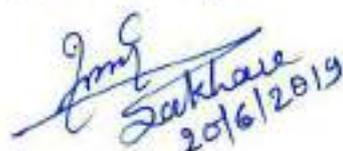
Encl: as above

Yours faithfully,


(Dr. P.R. Sakhare)
Scientist 'D'

Copy to:

- (i) Dr. S.K. Kerketta, Director/Scientist-F, IA Division (Thermal), MOEF&CC, Vayu Wing, 3rd Floor, Indira Paryavaran Bhawan, Aliganj, Jorbagh Road, New Delhi-110003 (Email: s.kerketta66@gov.in)
- (ii) Director RO HQ, MOEF&CC, IPB, 1st Floor Agni Wing, IPB, Jorbagh Road, ND-03. (Email: manoj.moefcc@gmail.com)
- (iii) The Member Secretary, Chhattisgarh Environment Conservation Board, Paryavas Bhawan, North Block, Sector-19, Atal Nagar, Naya Raipur, (Chhattisgarh)- 492002 (Email: hocecb@gmail.com)
- (iv) Director (Monitoring Cell), Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Aliganj, Jorbagh Road, New Delhi-110003 (Email: shruti.rai@nic.in)
- (v) Shri Anurag Shukla, DGM (Environment Management) M/s NTPC Limited, SIPAT Super Tehmal Power Station, PO Ujjawal Nagar, SIPAT District Bilaspur (Chhattisgarh)- 495555 Email: anuragshukla01@ntpc.co.in)
- (vi) Guard File.


(Dr. P.R. Sakhare)
Scientist 'D'

Monitoring the Implementation of Environmental Safeguards
Ministry of Environment, Forest & Climate Change
Regional Office (West Central Zone), Nagpur
Monitoring Report
Part – I
DATA SHEET (Stage#1 : 3x 660 MW)

1.	Project Type: River-valley / Mining / Industry /Thermal / Nuclear / Other (Specify)	Thermal Power Plant
2.	Name of the Project	NTPC-Sipat super Thermal Power Station
3.	Clearance Letter (s) / OM No. and date	No. J-13011/10/96-IA.II(T) Dated February 22, 1999
4.	Location a. District (s) b. State (s) c. Latitude d. Longitude	District : Bilaspur State: Chattisgarh Latitude: 22 ⁰⁶ 07'00" N to 22 ⁰⁸ 53.4" N Longitude: 82 ⁰¹⁶ ' 43" E to 82 ⁰¹⁸ 49.37" E
5.	Address for correspondence a. Address of concerned Project Chief Engineer (with Pin Code, Email & Telephone/ Telex/ Fax Numbers) : & Address of Executive Project Engineer / Manager (with pin code/fax numbers and email)	Chief General Manager, NTPC-Sipat Super Thermal Power Project, Post Office: Ujjwal Nagar, Sipat, Dist: Bilaspur - 495555 (C. G.) E Mail: rpadmakumar@ntpc.co.in Phone:07752246501 Fax: 07752246504 Email of AGM: pkdutta01@ntpc.co.in Email of DGM : anuragshukla01@ntpc.co.in
6.	Salient features a. Of the Project b. Of the Environmental Management Plan	Super critical Technology (Unit size 660 MW) 765 KV Switch yard High Efficiency ESP, ETP , AWRS , STP, CSSP, DE & DS system in CHP, DAES system & ash silo, ZLD main plant & ash dyke, Submerged Dyke design

7.	Break up of the Project area a. Submergence Area: Forest & Non Forest b. Others	4351.57 acre Nil 182.9acre in MGR																		
	a. Total Plot Area b. Built - Up Area (Including Road) c. Open Space available d. Green belt area	215 acre																		
8.	Break up of the Project affected population with enumeration of those losing houses/dwelling units only, agricultural land only, both dwelling units & both dwelling units & agricultural land & landless laborers/artisan a. SC, ST/Adivasis b. Others (Please indicate whether these figures are based on any scientific and systematic survey carried out or only provisional figures, if a survey carried out gives details and years of survey.)	PAP: 3765 SC: 773 ST:348 Others : 2643																		
9.	Financial Details a. Project costs as originally planned & subsequent revised estimates and the year of price reference. b. Allocations made for Environmental Management Plan with item wise & year wise breakup. c. Benefit Cost Ratio / Internal rate of Return and the year of assessment. d. Whether (c) includes the cost of Environmental Management as shown in the above. e. Actual expenditure incurred on the Project so far f. Actual expenditure incurred on the Environmental Management Plan so far	Project cost :Rs 8323.39 Crore Capital expenditure on Empis Rs 737.36 Crore <table border="1"> <thead> <tr> <th>Year</th> <th>Environment Management Expenditure Amount (In Lakh Rupees)</th> </tr> </thead> <tbody> <tr> <td>2011-12</td> <td>201.15</td> </tr> <tr> <td>2012-13</td> <td>279.52</td> </tr> <tr> <td>2013-14</td> <td>215</td> </tr> <tr> <td>2014-15</td> <td>229</td> </tr> <tr> <td>2015-16</td> <td>132</td> </tr> <tr> <td>2016-17</td> <td>281.2</td> </tr> <tr> <td>2017-18</td> <td>312.7</td> </tr> <tr> <td>2018-19</td> <td>166.74</td> </tr> </tbody> </table>	Year	Environment Management Expenditure Amount (In Lakh Rupees)	2011-12	201.15	2012-13	279.52	2013-14	215	2014-15	229	2015-16	132	2016-17	281.2	2017-18	312.7	2018-19	166.74
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10	<p>Forest land requirement</p> <p>a. The status of approval for diversion of Forestland for non-forestry use</p> <p>b. The Status of clearing felling</p> <p>c. The status of compensatory Afforestation programme in the light of actual field experience</p>	<p>Final or Stage-II Forest Clearance had been issued by Assistant Inspector General of Forest, MoEF, GOI vide Letter Ref F No. 8-115/2003-FC dated 30.06.2004.</p> <p>CA in 410 Ha land at Bilaspur and Janjgir Champa Circle has been completed</p>
11	<p>The status of clear felling in non-forest areas (such as submergence area of reservoir, Approach roads), if any with quantitative information</p>	<p>Nil</p>
12	<p>Status of construction</p> <p>a. Date of commencement (Actual and/or Planned)</p> <p>b. Date of completion (Actual and/or Planned)</p>	<p>Zero date of Unit 1,2 & 3 was from 01.04.2004.</p> <p>actual completion date U#1 01.10.2011</p> <p>U#2 Completion 25.05.2012</p> <p>U#3 Completion 01.08.12</p> <p>Delay of 26 /34/35 months of U1, 2&3 respectively due to delay in TG package works by M/S Power Machines - Russia.</p>
13	<p>Reasons for the delay if the project is yet to start</p>	<p>-----</p>
14	<p>Dates of site visits</p> <p>a. The dates on which the Project was monitored by Regional Office on previous occasions, if any</p> <p>b. Date of site visit for this monitoring Report</p> <p>c.</p>	<p>Regular visit being done by RO-CECB Bilaspur office. Last Visit was on 30.03.2019</p>
15	<p>Details of correspondence with project authorities for obtaining action plan / information on status of compliance to safeguards other than the routine letters for logistic support for site visit. (The monitoring report may obtain the details of all the letters issued so far but the later reports may cover only the letters issued subsequently)</p>	<p>1) EC Letter No. J.13011/10/96-IA.II(T) Dtd February 22, 1999.</p> <p>2) Amendment letter no No. J.13011/10/96-IA.II (T) April 30, 2002</p> <p>3) Amendment letter no No. J.13011/10/96-IA.II (T) Sept 08, 2014</p> <p>4) Amendment letter no No. J.13011/10/96-IA.II (T) Feb 02, 2017</p> <p>5) Amendment letter no No. J.13011/10/96-IA.II (T) May 17, 2018</p>

PART-II

Stage-I EC (No J-13011/10/96-IA II (T) dated 22.02.1999)

A report on the Status of Compliances of various conditions stipulated in Environment Clearance Stage-I vide letter No J-13011/10/96-IA II (T) dated 22.02.1999 granted for M/s NTPC Limited for " 2000 MW Super Thermal Power Plant (STPP)" located at Village Sipat, Tehsil Masturi, District Bilaspur (Chhattisgarh).

A monitoring report on the status of compliance of conditions stipulated in Environmental clearance is given as under:

Sl. No.	Conditions as per EC dated 22.02.1999	Compliance Status as on 11.06.2019
i)	All the conditions stipulated by the Madhya Pradesh State Pollution Control Board vide their letter No. 3574/TS/MPPCB/97 dated 5 th March 1997 should be strictly implemented.	Complied All the conditions of NOC stipulated by MPSPCB are being implemented and complied (Annexure-1)
ii)	Two stacks of height 275 m with two flues in each stack and continuous monitoring facility should be installed. Exit velocity should be maintained at 23.42 m/sec as the predictions have been based on the same.	Complied Two stacks of height 275 m with two flue (Unit-I & II of Stage-I) are installed in stack No 1 and one flue for Unit-III of Stage-I is installed in stack No 2. Online continuous monitoring facility has been installed in all the units (Annexure-2)
iii)	Electrostatic Precipitator having efficiency of not less than 99.8% should be installed and it should be ensured that particulate emission would not exceed the prescribed limit of 100 mg/Nm ³ . Adequate space for Flue Gas Desulphurization Plant should be provided in the plant layout for its installation if required in future.	Complied ESP higher than 99.9% efficiency are installed and particulate emission maintained within 50 mg/Nm ³ . Space for Flue gas desulphurization plant has been provided in the layout for installation. (Annexure-3(a,b))
iv)	Closed Circuit Cooling Device with Induced Draft should be provided and it should be ensure that only minimum water is drawn for	Complied Closed Circuit Cooling System with

	make-up purposes.	Induced draft cooling towers provided and minimum water is being drawn for makeup uses.															
v)	Noise level should be limited to 85 d(B)A and regular maintenance of equipments be undertaken.	Complied Individual equipments to monitor noise level has been designed with 85 dB (A) noise limits. Regular maintenance of equipment is being done. (Annexure - A Table:VII)															
vi)	For controlling fugitive dust, regular sprinkling of water in coal handling and other vulnerable areas of the plant should be provided.	Complied Arrangement for water sprinkling in vulnerable areas of the power plant including Coal Handling Area is being made to control fugitive dust.															
vii)	Afforestation should be undertaken covering area of 215 acres and the programme should be implemented in a phased manner. A norm of 1500-2000 trees per ha should be followed. The Afforestation plan should be submitted by 31 st March 1999.	Complied Afforestation has been undertaken over an area of 215 acres. PP has submitted updated plantation details which are as under: <table border="1"> <thead> <tr> <th>Plant ation in</th> <th>Reside ntial Colony</th> <th>Plant premises</th> <th>MGR track</th> <th>Ash Dyke</th> </tr> </thead> <tbody> <tr> <td>No of plants</td> <td>38859</td> <td>262329</td> <td>23918</td> <td>2315</td> </tr> <tr> <td>Area (acre)</td> <td>38.86</td> <td>262.33</td> <td>23.92</td> <td>2.32</td> </tr> </tbody> </table> (Annexure- 4(a,b))	Plant ation in	Reside ntial Colony	Plant premises	MGR track	Ash Dyke	No of plants	38859	262329	23918	2315	Area (acre)	38.86	262.33	23.92	2.32
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No of plants	38859	262329	23918	2315													
Area (acre)	38.86	262.33	23.92	2.32													
viii)	Coal should be used @ 10 MT/ year for Stage-I with sulphur content not exceeding 0.24%. The coal should be transported from Korba Coalfields by Captive MGR in closed wagons to avoid dust pollution.	Partially Complied MOEF vide letter J-13011/10/1996-IA.II (T) dated 08.09.2014 has permitted to use coal with sulphur content not exceeding 0.40 %. Revised condition is being complied. For closed wagon transportation, matter has been put up before MOEF for exemption.															

ix)	<p>As per the proposal submitted for Ash Utilization, it should be ensured that fly ash is used in cement industry, brick making and in raising the ash dyke etc.</p> <p>Efforts should also be made in the area of mine filling, land development and agriculture etc. For brick making, about 50 acres of land with all infrastructure facilities should be earmarked. Full fly ash utilization should be ensured at the end of 9th year from the date of commissioning of the project.</p>	<p>Partially complied</p> <p>In Fy 2018-19 Ash utilization is 49.54 %. Dry fly ash is being issued free of cost to fly ash brick manufacturers. Nearby Cement industries are also getting fly ash from Sipat. Pond ash is being used in dyke raising. Pond ash being supplied to road projects for embankment filling , low lying area filling & area development in outside NTPC land. (Annexure-5)</p> <p>70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.</p>
x)	<p>Ash Pond design should be on similar lines to the one adopted for Talcher Super Thermal Power Project, Orissa. In the non-operative lagoon, the layer of earth / bottom ash should be spread over the ash disposal area so that fugitive dust could be controlled. In addition, for dust suppression Sprinklers should also be provided. Special care should be taken to avoid any inconvenience to residents of Kaudia Village, which is near the ash disposal area.</p>	<p>Complied</p> <p>Ash disposal area is away from Kaudia village. There is no inconvenience to the residents of nearby villages.</p>
xi)	<p>Alignment of the water pipeline route and MGR for coal transportation should be so chosen as to avoid acquisition of forest land.</p>	<p>Complied</p> <p>PP has informed that they have chosen water pipeline route and MGR for coal transportation avoiding acquisition of forest land to the minimum possible. Final Stage-II Forest Clearance had been obtained vide Letter Ref F.No. 8-115/2003-FC dated 30.06.2004. (Annexure-6)</p>

xii)	Keeping in view the location of Sonthi Pahar Reserved Forest, additional Monitoring Station should be installed at the site to assess the ambient air quality. Monitoring should be initiated immediately to ascertain the project status and the scenario after commissioning of the project. A special study should be undertaken to ascertain impact of SO ₂ on the flora in the project impact zone particularly the forest patches.	<p>Being Complied</p> <p>Ambient Air Quality monitoring at Sonthi Pahar reserve forest is in progress. Value of SO_x are well within limit.</p> <p>Study on terrestrial ecology was conducted in 2002 & in 2015 & study concludes that effect of NTPC- Sipat on Eco system is negligible. (Annexure- A Table:III)</p>
xiii)	The impact on terrestrial ecology (flora and fauna) should be studied by properly estimating the number of trees to be felled in the project area and its impact on fauna. The felling of trees should be properly phased and project layout should be so designed as to ensure minimum felling.	<p>Complied</p> <p>Study of Impact on Terrestrial Ecology was done in 2002 by Indus Technical & Financial Consultant Ltd -Raipur & in 2015 by Guru Ghasidas Vishwavidyalaya-Bilaspur. The study has been completed & study concludes that effect of NTPC Sipat on Eco system is negligible.</p> <p>The layout of the project had been designed ensuring minimum felling of trees</p>
xiv)	Details of survey report on socio-economic impact of project affected families being carried out by Indian Institute of Technology, Kanpur should be submitted to the Ministry along with detailed rehabilitation plan by March, 1999. Option should be extended to the habitants of Kaudia Village for shifting to other suitable place, if they so desire. R&R should be undertaken in consultation with the State Government and affected population.	<p>Complied</p> <p>The detailed Socio-economic study conducted by IIT, Kanpur has been submitted to MOEF vide letter dated 24.08.2000.</p> <p>The rehabilitation plan prepared in consultation with the representatives of the affected families has also been submitted to MOEF vide letter date 24.08.2000 and concurred by MOEF.</p> <p>There is no resettlement case in NTPC Sipat.</p>

xv)	All effluents generated in various plant activities should be collected in the Central Effluent Treatment Plant and treated to ensure adherence to specified standards of discharge before its release in Lilagarh River. The concept of zero discharge should be adapted to a maximum possible extent.	<p>Complied</p> <p>The concept of zero discharge is being maintained through recycle and reuse of treated effluent.</p>
xvi)	Regular monitoring for SPM, SO ₂ , NO _x around the power plant may be carried out and records maintained. A Monitoring Station should be established near Sonthi Pahar forest in NE direction of the power plant	<p>Being Complied</p> <p>Regular monitoring of AAQ is being carried out around the plant. Ambient air quality is being monitored near Sonthi Pahar forest area since inception of plant. (Annexure-A Table: III)</p>
xvii)	Full cooperation should be extended to the Scientists / Officers from the Regional office of the Ministry at Bhopal / the CPCB / the SPCB who would be monitoring the compliance of environmental status. Complete set of impact assessment report and the Management Plans should be forwarded to the Regional Office for their use during monitoring.	<p>PP has consented to the condition.</p>

A monitoring report on the status of compliance of conditions stipulated in EC Amendment letter for Stage-I issued vide letter No. J-13011/10/96-IA.II (T) dated 30.04.2002 is given as under:

Sl. No.	Conditions as per EC amendment dated 30.04.2002	Compliance Status as on 11.06.2019
i	Use of coal from Dipika Mines should be limited to 9.82 MT for Stage-I with sulphur content not exceeding 0.36%.	Complied MOEF vide letter J-13011/10/1996-IA.II (T) dated 08.09.2014 has permitted to use coal with sulphur content not exceeding 0.40 %. Revised condition is being complied.
ii	Since maximum concentration for SO ₂ near Sonthi Pahar is likely to be close to permissible levels for sensitive area, continuous monitoring and analysis of AAQ in the region should be undertaken during planning, construction and operational phase of the project.	Being Complied Continuous monitoring and analysis of ambient air quality near Sonthi Pahar are being undertaken. (Annexure-A Table:III)
iii	In the event of 98 th percentile values for SO ₂ exceeding prescribed permissible limits for sensitive areas, NTPC should make provision for retrofitting of desulphurization unit for which space is to be provided in the project layout plan.	Complied Values of SO ₂ are within limit. Space for retrofitting of FGD has been provided in the layout. Installation of FGD shall be completed by Dec, 2022.
iv	Even though entire area of 4382.44 acres is proposed to be acquired for ultimate station capacity of 3000 MW, no work on Stage-II of the project with 660 MW units should be undertaken without environmental clearance.	Complied Environmental Clearance for Stage-II (2x500 MW) has been obtained from MOEF vide Letter No. J-13011/5/2002. IA-II (T) dated. 08.06.2004.
v	As lining of ash pond is not envisaged in the design of the project due to the soil profile of the region, no earth should be removed from the proposed ash disposal area for any project activity or construction of ash dyke.	Complied The condition has been relaxed vide letter no. J-13011/10/1996-IA-II (T) (Pt) Dt 20.07.2006 by MOEF&CC. (Annexure-7)

vi	All the conditions stipulated vide Ministry's letter of even number dated 22 nd February, 1999 should be strictly implemented.	PP has consented to condition.
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Monitoring the Implementation of Environmental Safeguards
Ministry of Environment, Forest & Climate Change
Regional Office (West Central Zone), Nagpur
Monitoring Report
Part – I
DATA SHEET (Stage -II 2X500 MW)

1.	Project Type: River-valley / Mining / Industry /Thermal / Nuclear / Other (Specify)	Thermal Power Plant
2.	Name of the Project	NTPC-Sipat super Thermal Power Station
3.	Clearance Letter (s) / OM No. and date	Letter No. J-13011/5/2002.IA-II (T) Dt. 8.6.2004
4.	Location a. District (s) b. State (s) c. Latitude d. Longitude	District : Bilaspur State: Chhattisgarh Latitude: 22 ⁰⁵ 07'00" N to 22 ⁰⁸ 53.4" N Longitude: 82 ⁰¹⁶ ' 43" E to 82 ⁰¹⁸ '49.37" E
5.	Address for correspondence a. Address of concerned Project Chief Engineer (with Pin Code, Email & Telephone/ Telex/ Fax Numbers) : & Address of Executive Project Engineer / Manager (with pin code/fax numbers and email)	Chief General Manager, NTPC-Sipat Super Thermal Power Project, Post Office: Ujjwal Nagar, Sipat, Dist: Bilaspur - 495555 (C. G.) E Mail: rpadmakumar@ntpc.co.in Phone:07752246501 Fax: 07752246504 Email of AGM: pkdutta01@ntpc.co.in Email of DGM : anuragshukla01@ntpc.co.in
6.	Salient features a. Of the Project b. Of the Environmental Management Plan	Sub critical Technology (Unit size 500 MW) High Efficiency ESP, ETP , AWRS , STP , ,CSSP, DE & DS system in CHP , DAES system & ash silo, ZLD main plant & ash dyke ,Submerged Dyke design

7.	Break up of the Project area a. Submergence Area: Forest & Non Forest b. Others	4351.57 acre Nil 182.9 acre in MGR																		
	a. Total Plot Area																			
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9.	Financial Details a. Project costs as originally planned & subsequent revised estimates and the year of price reference. b. Allocations made for Environmental Management Plan with item wise & year wise breakup. c. Benefit Cost Ratio / Internal rate of Return and the year of assessment. d. Whether (c) includes the cost of Environmental Management as shown in the above. e. Actual expenditure incurred on the Project so far f. Actual expenditure incurred on the Environmental Management Plan so far	Rs 4039.67 Crore Capital expenditure on Emp is Rs 165.4 Crore <table border="1"> <thead> <tr> <th>Year</th> <th>Environment Management Expenditure Amount (In Lakh)</th> </tr> </thead> <tbody> <tr> <td>2011-12</td> <td>201.15</td> </tr> <tr> <td>2012-13</td> <td>279.52</td> </tr> <tr> <td>2013-14</td> <td>215</td> </tr> <tr> <td>2014-15</td> <td>229</td> </tr> <tr> <td>2015-16</td> <td>132</td> </tr> <tr> <td>2016-17</td> <td>281.2</td> </tr> <tr> <td>2017-18</td> <td>312.7</td> </tr> <tr> <td>2018-19</td> <td>166.74</td> </tr> </tbody> </table>	Year	Environment Management Expenditure Amount (In Lakh)	2011-12	201.15	2012-13	279.52	2013-14	215	2014-15	229	2015-16	132	2016-17	281.2	2017-18	312.7	2018-19	166.74
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10	<p>Forest land requirement</p> <p>a. The status of approval for diversion of Forestland for non-forestry use</p> <p>b. The Status of clearing felling</p> <p>c. The status of compensatory Afforestation programme in the light of actual field experience</p>	<p>Final or Stage-II Forest Clearance had been issued by Assistant Inspector General of Forest, MoEF, GOI vide Letter Ref F.No. 8-115/2003-FC dated 30.06.2004.</p> <p>CA in 410 Ha land at Bilaspur and Janjgir Champa Circle has been completed</p>
11	<p>The status of clear felling in non-forest areas (such as submergence area of reservoir, Approach roads), if any with quantitative information</p>	<p>Nil</p>
12	<p>Status of construction</p> <p>a. Date of commencement (Actual and/or Planned)</p> <p>b. Date of completion (Actual and/or Planned)</p>	<p>Unit#4 Zero date of start was 01st Dec 2003 actual completion date 20.06.2008. There is delay of 06 months due to delay in work of TG/SG package by M/S Bhel.</p> <p>U#5 Zero date of start was 1st dec 2003 & actual Completion date 01.01.2009. There is delay of 6 months due to delay in work of SG-TG package by M/S Bhel.</p>
13	<p>Reasons for the delay if the project is yet to start</p>	<p>-----</p>
14	<p>Dates of site visits</p> <p>a. The dates on which the Project was monitored by Regional Office on previous occasions, if any</p> <p>b. Date of site visit for this monitoring Report</p>	<p>Regular visit being done by RO-CECB Bilaspur office. Last Visit was on 30.03.2019</p>
15	<p>Details of correspondence with project authorities for obtaining action plan / information on status of compliance to safeguards other than the routine letters for logistic support for site visit. (The monitoring report may obtain the details of all the letters issued so far but the later reports may cover only the letters issued subsequently)</p>	<p>1) EC Letter No. J-13011/5/2002.IA-II (T) Dt. 8.6.2004</p>

PART-II
Stage-II EC (No J-13011/5/2002-IA II (T) dated 08.06.2004)

A report on the Status of Compliances of various conditions stipulated in Environment Clearance for Stage-II vide letter No J-13011/5/2002-IA II (T) dated 08.06.2004 granted for M/s NTPC Limited for " 1000 MW Super Thermal Power Plant (STPP)" located at Village Sipat, Tehsil Masturi, District Bilaspur (Chhattisgarh).

A monitoring report on the status of compliance of conditions stipulated in Environmental clearance is given as under:

Sl. No	Conditions as per EC dated 08.06.2004	Compliance Status as on 11.06.2019
i	All conditions stipulated by Chhattisgarh Environment Conservation Board vide their letter no. 87/TS/CECB/2004 dated 06.01.2004 should be strictly implemented.	Complied All conditions stipulated by CECB vide their letter no. 87/TS/CECB/2004 dated 06.01.2004 are being implemented.
ii	Utilization of land for Stages I & II of the project shall be restricted to 4382.44 acres, which is already in possession of the project authorities. 70 acres of additional land will be acquired by M/s. NTPC for ash based units.	Partially Complied The project proponent (PP) has taken all steps to restrict the land utilization for Stage-I and Stage-II of Sipat STPP to 4382.44 acres. 70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of CG and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.
iii	A twin flue stack of 275 m height shall be provided with continuous on-line monitoring equipment, and the data collected should be analyzed and submitted regularly.	Complied A twin flue stack of 275 m height with continuous on-line monitoring equipment is provided. Online monitoring is in progress and data are being submitted. (Annexure-A) .

iv	High efficiency Electrostatic Precipitator (ESP) having efficiency of 99.8% should be installed to limit outlet SPM emission of 100 mg/Nm ³ .	Complied Outlet Particulate Matter emission is maintained less than 50 mg/Nm ³ by providing high efficiency (99.9%) ESP.(Annexure- 8)
v	Coal will be sourced from the nearby Deepika (Extension) mine block of Korba coalfields, located at a distance of about 40 km. The coal will be transported from the mine by captive MGR rakes. The annual requirement of coal will be 760 T/hr @ 100%PLF.	Complied. Coal is being sourced from the nearby Deepika (Extension) mine block of Korba coalfields, located at a distance of about 40 km. The coal is being transported from the mine by captive MGR rakes. The annual requirement of coal is 760 T/hr @ 100%PLF.
vi	Space should be provided for retrofitting of Flue Gas Desulphurization (FGD) Unit, if required in future.	Complied Space has been provided for retrofitting of flue Gas Desulphurization (FGD) unit, if required in future.
vii	Re-circulating type cooling water system with cooling towers shall be provided. Water requirement shall be met from the Right Bank Canal (RBC) of Hasdeo barrage.	Complied. Re-circulating type cooling water system with cooling towers has been provided. Water requirement is being met from RBC of Hasdeo barrage.
viii	Efforts shall be made to maximize the recycling/reuse of effluents. Parts of treated wastewater conforming to prescribed standards shall be used for greenbelt development.	Complied The effluent treatment schemes have been designed to optimize, recycle and reuse of all the treated wastewater.
ix	Ash generated to the tune of 2.15 million tonnes per year shall be used in a phased manner as per the provisions of the Fly Ash Utilisation Notification of September, 1999 and its subsequent amendments. By the end of ninth year, full fly ash utilisation should be ensured. The cost of ash utilisation measures proposed in the total project	Partially Complied In Fy 2018-19, ash utilization at NTPC Sipat is 49.54%. Dry fly ash is being issued free of cost to local fly ash brick manufacturers. Nearby cement

	cost should be intimated.	industries area also getting fly ash from Sipat. Pond ash is being used in dyke raising, road projects embankment filling, low lying area filling & area development outside NTPC land being done also.
X	<p>A study on utilisation of ash for soil enrichment be got done by Agricultural University with the terms of Reference approved by the Indian Council of Agricultural Research.</p> <p>(To be done within two months of grant of environmental clearance.)</p>	<p>Complied</p> <p>Agricultural related studies and applications have been carried out by fly ash mission, Technology Information, Forecasting and assessment Council (TIFAC).</p> <p>TIFAC is an autonomous institution under the Ministry Of Science and Technology, Govt of India. NTPC has actively participated in the Fly Ash Mission Technology Project. It is proposed to use the findings of the studies while considering utilization of fly ash from Sipat-II for agricultural related utilization.</p> <p>For recommendations to the farmers of the nearby villages of Sipat site, study on use of fly ash in Agriculture has been completed by TCB college of Agriculture, Bilaspur (Under Indira Gandhi Agriculture University, Raipur). Dates Please</p>
xi	Rainwater harvesting should be adopted and plan be submitted to MOEF after approval from Central Ground Water Board (CGWB) within three months of environmental clearance.	<p>Complied</p> <p>NOC received from Central Ground Water Authority, Ministry of Water Resources (Govt. of India) vide letter No 32-5/CGWA/RWH/OTH/08-905 dated 30.06.2008 due to shallow groundwater table in the Project Area.(Annexure-9)</p>

xii	Details of the plan to develop ash utilizing industrial units in the 70 acre plot proposed by the project proponent should be worked out in consultation with the State Government and the draft plan in this regard should be submitted to MOEF within 6 months of environmental clearance. 70 acres of land will only be utilized for setting up ash based industries.	Partially Complied 70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.
xiii	If any displacement/rehabilitation is involved while acquiring 70 acres of additional land for ash based units, R&R policy should be prepared. If the R & R policy of the State Govt. regulations is more stringent, the same will be followed. Issues such as affected families, self-employment etc. may be worked out in consultation with State Govt. and village development advisory committee and local people.	PP has consented to this Condition.
xiv	Ambient air quality data monitoring stations should be set up at the boundary of Sonthi Reserved forest before the commissioning of the project.	Complied Ambient air quality monitoring at Sonthi Pahar Reserve forest is continued since inception of the project.
xv	Water requirement for Stage II of the project should not exceed 3480 m ³ /hr with ash water recirculation system.	Complied PP has complied this condition since commissioning of stage-II plant.
xvi	Noise level should be limited to 75 Leq and regular maintenance of equipment is undertaken. For people working in the area of generator and other high noise area, earplug should be provided.	Complied PP has informed that regular maintenance of equipment is being undertaken for limiting the noise level to 75 Leq. at the plant boundary. Ear plug are provided to people working in the high noise area. (Annexure-A Table : VII)

xvii	A green belt covering a minimum area of 215 acres for the stages I&II of the project shall be developed. The green belt shall have a density of 1500-2000 trees per ha. Necessary financial provision shall be made in the budget for the purpose.	Complied Green belt has been developed over an area of approx. 262.33 acre. Further, PP has informed that so far 2,62,329 trees have been planted in the green belt area approx 262.33 acre considering tree density as 1000 tree/acre.
Xvii i	Continuous monitoring of ambient air quality shall be undertaken for a period of one year at the same locations where it was monitored for the EIA report subsequent to commencement of work for Stage I, and data furnished to the Ministry.	Complied. Continuous monitoring of AAQ is being undertaken for a period of one year at the same locations where it was monitored for the EIA report subsequent to commencement of work for Stage-I, and data furnished to the Ministry.
xix	For controlling fugitive dust, regular sprinkling of water in vulnerable areas of the plant should be ensured.	Complied System to control the Fugitive dust by sprinkling of water is in place.
xx	Regular monitoring of the air quality should be carried out in and around the power plant and records be maintained. Periodic six monthly reports should be submitted to this Ministry.	Being Complied AAQ is monitored continuously through on line analyzers installed in plant premises and monitoring outside the plant is manually. Reports are being sent to Ministry, CPCB and CECB as well.
xxi	The project proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which should be in the vernacular language of the locality concerned, informing that the project has been accorded environmental clearance and copies of clearance letters are available with the SPCB/Committee and may also be seen at Website of the MOEF&CC at http://envfor.nic.in	Complied Public was informed about environmental clearance through a press release. Advertisement also issued in two local news papers "Dainik Bhaskar" & "Navbharat" on 20.11.2003. (Annexure-10)

xxii	A separate environment monitoring cell with suitable qualified staff should be set up for implementation of the stipulated environmental safeguards.	<p>Complied</p> <p>A dedicated Environmental Management Group is working and same will be strengthened as per the requirements.</p>																		
xxiii	Half-yearly report on the status of implementation of the stipulated conditions and environmental safeguards should be submitted to this Ministry/Regional Office/CPCB/ SPCB.	<p>Complied.</p> <p>Reports are being sent regularly to Ministry/ Regional Office/CPCB and CECB on half yearly basis. Last half yearly compliance report for the period from 01.07.2018 to 31.12.2018 was sent on 15.02.2019.</p>																		
xxiv	Regional Office of the Ministry of Environment & Forests located at Bhopal will monitor the implementation of the stipulated conditions. Complete set of Environmental Impact Assessment Report and Environment Management plan should be forwarded to the Regional Office for their use during monitoring.	<p>Complied</p> <p>PP informed that reports are being submitted to MOEF & CC regional office Nagpur instead of Bhopal since 26.09.2016</p>																		
xxv	Separate funds should be allocated for implementation of environmental protection measures along with item-wise break-up. These cost should be included as part of the project cost. The funds earmarked for the environment protection measures should not be diverted for other purposes and year-wise expenditure should be submitted to the Ministry.	<p>Complied</p> <p>Separate funds have been allocated for implementation of environmental protection measures. The funds so allocated are not being diverted for other purposes. Details of expenditure are given here</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Amount (In Lakh)</th> </tr> </thead> <tbody> <tr> <td>2011-12</td> <td>201.15</td> </tr> <tr> <td>2012-13</td> <td>279.52</td> </tr> <tr> <td>2013-14</td> <td>215</td> </tr> <tr> <td>2014-15</td> <td>229</td> </tr> <tr> <td>2015-16</td> <td>132</td> </tr> <tr> <td>2016-17</td> <td>281.2</td> </tr> <tr> <td>2017-18</td> <td>312.7</td> </tr> <tr> <td>2018-19</td> <td>166.74</td> </tr> </tbody> </table>	Year	Amount (In Lakh)	2011-12	201.15	2012-13	279.52	2013-14	215	2014-15	229	2015-16	132	2016-17	281.2	2017-18	312.7	2018-19	166.74
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xxvi	Full cooperation should be extended to the Scientists/Officers from the Ministry/Regional Office of the Ministry at Bhopal/the CPCB/the SPCB who would be monitoring the compliance of environmental status.	PP has consented to condition.
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A report on the Status of Compliances of various conditions stipulated in Environment Clearance amendment for Stage-I vide letter No J-13011/10/1996-IA II (T) dated 08.09.2014 granted for M/s NTPC Limited for "1980 MW Super Thermal Power Plant (STPP)" located at Village Sipat, Tehsil Masturi, District Bilaspur (Chhattisgarh).

A monitoring report on the status of compliance of conditions stipulated in Environmental clearance amendment is given as under:

Sl. No.	Conditions as per EC amendment Dated 08.09.2014	Compliance Status as on 11.06.2019
i	The transportation of coal shall be by rail only.	Complied The transportation of coal is being carried out by rail only.
ii	Harnessing solar power within the premises of the plant particularly at available roof tops shall be undertaken and status of the implementation shall be submitted periodically to the regional office of the ministry	Complied NTPC Sipat has installed: <ul style="list-style-type: none"> ➤ 50 KW facility at Hospital roof ➤ Solar water geyser of 4 KL/day capacity at main plant canteen. ➤ Installation of 100KW SPV solar panel is under operation. ➤ Two solar water geysers of 500 Ltr/day capacities for Bio gas plant have been commissioned.
iii	A long term study on radioactivity and heavy metals contents on coal to be used shall be carried out through a reputed institute. Thereafter mechanism for an in-built continuous monitoring of radioactivity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.	Partially Complied Study of radioactivity has been done by BARC Mumbai, and it is concluded that the radiation levels in and around the Sipat Super Thermal Power Station of NTPC Ltd., is comparable with the National average values. The naturally occurring radionuclide levels in groundwater / surface water / drinking water samples is observed well below the Atomic Energy

		<p>Regulatory Board (AERB) and World Health Organization (WHO) prescribed limit / guideline values. The activity concentration of naturally occurring radionuclides in soil, food matrices, flora and fauna is comparable to the national background levels.</p> <p>Study on heavy metals in coal and fly ash was completed through IICT Hyderabad.</p> <p>PP informed that there is no technology/instruments available for in-built continuous monitoring of radioactivity & heavy metals in coal & fly ash (including bottom ash). As and when technology/ instruments will be available NTPC shall install the same.</p>
iv	Mercury emission shall also be monitored on periodic basis.	<p>Complied</p> <p>Mercury emissions are also being monitored on periodic basis. (Annexure-A Table II.)</p>
v	Fugitive emissions shall be controlled to prevent impact on agriculture or non agriculture land	<p>Complied</p> <p>There is no fugitive Emission.</p>
Vi	No ground water shall be extracted for use in operation of the power plant even in lean season. No water bodies including natural drainage system in the area shall be distributed due to activities associated with the setting up/operation of the power plant.	<p>Complied</p> <p>Water being taken from Right bank canal of Hasdeo river as per water agreement with Water resource department Govt of CG. No ground water is extracted for use in operation.</p>
Vii	Monitoring of surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the ministry regularly. Further, monitoring point shall be located between the plant and drainage in the	<p>Being Complied</p> <p>PP has adopted ZERO Discharge methodology in their plant & no water is being discharged from plant & dyke area.</p>

	direction of flow of ground water and records maintained. Monitoring of heavy metals in ground water shall be undertaken.	Regular monitoring of ground water quality in surrounding villages being done. Heavy metal monitoring also being carried out in regular intervals. There is no surface water bodies in the vicinity of project. However, distant Surface water bodies namely Leelagarh river and Kharang river, water monitoring reports is attached as (Annexure-A Table IV & Annexure:-11)
Viii	Minimum required environmental flow suggested by the competent authority of the state Govt. shall be maintained in the channel/Rivers (as applicable) even in lean season.	Being Complied. Water is sourced from Hasdeo RBC. Drawing lesser quantity of water than the allocated quantity by state irrigation department. NTPC Sipat has surrendered 27 MCM water against allocated quantity of 120 MCM as per water agreement with Central Ground Water resource department.
ix	Fly ash shall not be used for agriculture purpose. No mine void filling will be undertaken as an option for ash utilization with out adequate lining of mine with suitable media such that no leachate shall takes place at any point of time. In case, the option of mine void filling is to be adopted, prior detail study of soil characteristics of the mine area shall be undertaken from an institute of repute and adequate clay lining shall be ascertained by the state pollution control board and implementation done in close co-ordination with the state pollution control board.	Being Complied PP informed that the fly ash utilization will be complied after getting the identified mine and related approvals from concerned agencies.

X	Green belt shall also be developed around the ash pond over and above the green belt around the plant boundary.	<p>Complied</p> <p>Plantation around ash dyke has been taken up and 2315 plantation completed.</p> <p>Fugitive emission from ash dyke is being taken care by maintaining adequate water level in the ash pond and water sprinkling in dry patches including Ipoemia carnia plantation fugitive dust control in dry patches. (Annexure-16)</p>
Xi	CSR schemes should address Public hearing issues and shall be undertaken based on need base assessment in and around the villages with in 5 Km of the site and in constant consultation with the village panchayat and the district administration. As part of CSR prior identification of local employable youth and eventual employment in the project after imparting relevant training shall be also undertaken. Development of fodder farm, fruit bearing orchard, vocational training etc. can form a part of such programmes. Company shall provide separate budget for community development activities and income generating programmes. Vocational training programmes for possible self employment and jobs shall be important to identify villagers free of cost.	<p>Being Complied</p> <p>Under the CSR Scheme, different activities are being carried out. PP has submitted the details in (Annexure -12(a,b))</p>
Xii	For proper and periodic monitoring CSR activities, a CSR committee or a social audit committee or a suitable credible external agency shall be appointed. CSR activities shall also be evaluated by an independent external agency. This evaluation shall be both concurrent and final.	<p>Complied</p> <p>Under the CSR, need based assessment survey have been carried out. Social impact evaluation report & training data has been submitted. (Annexure-13(a,b,c))</p>

Xiii	An Environmental cell comprising of at least one expert in Environmental science/Engineering ,Ecology, occupational health and social science, shall be created preferably at the project site itself and shall be headed by an officer of appropriate superiority and qualification. It shall be ensured that the head of the cell shall directly report to the head of the plant, who would be accountable for implementation of environmental regulations and social impact improvement/mitigation measures.	Complied PP has well established Environmental lab is functional at NTPC Sipat.
Xiv	The project proponent shall formulate a well laid corporate environment policy and identify and designate responsible officers at all levels of its hierarchy for ensuring adherence to the policy and compliance with the conditions stipulated in this clearance letter and other applicable environmental laws and regulations.	Complied PP has formulated a well led Corporate Environment Policy. The details are given in (Annexure-14) .
Xv	The environment statement for each financial year ending 31 st march in form-V as is mandated to be submitted by the project proponent to the concern state pollution control board as prescribed under the Environment (protection) rule, 1986, as amended subsequently, shall also to be put on the website of the company along with the status of compliance of Environmental clearance conditions and shall also be sent to the respective regional offices of the ministry by e mail.	Being Complied Environment statement for FY: 2018-19 has been submitted on 09.05.2019 (Annexure-15)
4.	All other conditions mentioned in this ministry's letter of even no. dated 22.02.1999 and its amendment dated 30.04.2002 shall remain the same, as applicable.	PP has consented to the condition.

A report on the Status of Compliances of various conditions stipulated in Environment Clearance amendment for Stage-I vide letter No J-13011/10/1996-IA II (T) dated 17.05.2018 granted for M/s NTPC Limited for "1980 MW Super Thermal Power Plant (STPP)" located at Village Sipat, Tehsil Masturi, District Bilaspur (Chhattisgarh).

A monitoring report on the status of compliance of conditions stipulated in Environmental clearance amendment is given as under:

Sl. No.	Conditions as per EC amendment Dated 17.05.2018	Compliance Status as on 11.06.2019
1.	Top surface of the coal wagons shall be completely covered with tarpaulin sheet/Cloth so that coal will not get exposed to atmosphere and becomes secondary emissions. This will avoid fugitive dust emissions during the transport. Water sprinkling shall be done on the top surface of coal at loading point before covering with tarpaulin sheet. Due safety procedures shall be followed so that the covered sheet doesn't open up and fly away during transport which will endanger safety of nearby people, agricultural fields, etc. Water sprinkling measures as proposed at loading and unloading point shall be continued. Progress report of implementation shall be submitted to this ministry and concerned Regional office as part of Compliance report.	<p>Partially Complied</p> <p>PP informed that Matter has been put up before MOEF & CC for exemption this condition. PP has made request to MOEF&CC New Delhi on 06.06.2019 (copy enclosed).</p> <p>> Research Designs & Standards Organization (RDSO) is yet to come out with provision for covering Bogie Open Bottom Rapid discharge (BOBR) wagons with tarpaulin sheet/cloth.</p> <p>> Water sprinkling on top surface of coal at loading point is being done on each wagon being loaded. Water sprinkling measures at loading, unloading and mid-way point is continued as a regular practice..</p>
2.	Dense avenue plantation shall be developed on either side of the track wherever habitations/agricultural lands exists in consultation with local forest department to minimize the dust and noise pollution.	<p>Being Complied</p> <p>To provide green belt along railway track of MGR, a large scale tree plantation scheme has been adopted. Plantation of 22,975 plants along the MGR track has been completed on 30.09.2018 through Chhattisgarh Rajya Van Vikas Nigam (CGRVNV) Ltd. Bilaspur (Annexure-17)</p>

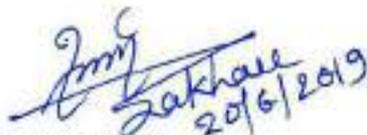
3.	AAQ monitoring within 1 km on either side of track, close proximity to nearby habitation, shall be continued once in a quarter and the progress report shall be submitted.	<p>Being Complied</p> <p>AAQ monitoring along MGR within 1 km at six locations by MoEF approved third party is being done, report attached till March-2019 as Annexure-B. All average values are with in limit of 24 hr average (Annexure-B)</p>
4.	Land use study shall be carried out by latest IRS satellite map on 500m either side along the rail line from loading point to unloading point.	<p>Complied</p> <p>Three season imagery data have been received by Soil & Land Use Survey of India (SLUSI) from NRSA. Final Report submitted on 25.06.2018. As per recommendation of the study, large scale plantation along MGR track has already been taken up.</p>
5.	Health survey study of the local people shall be carried out. The report should clearly bring out the impact on surrounding forests, agriculture/crop patterns, percentage of yield, public health due to open wagon coal transportation, etc.	<p>Partially complied</p> <p>Complete report is available. It has been mentioned in the conclusion that "the prevalence of Chronic Obstructive Pulmonary Disease (COPD) found in our study is similar with the prevalence of COPD among non-coal dust exposure area in the country".</p> <p>Study for impact on forest, crop etc started by TCB College of agriculture, Bilaspur in progress.</p>
6.	As stipulated by the earlier EAC on 31.03.2016, PP should study alternative methodologies/technologies being utilized including abroad, to prevent coal dust blow from moving open wagons carrying coal, if any. The results of this study should be submitted within one year.	<p>Being complied</p> <p>PP informed that they are exploring alternative technologies /methodology carried out by RDSO, a designer of our coal wagons. Any breakthrough in this regard, as and when intimated to them, will be taken up for implementation.</p>

Some of the EC conditions were observed to be complied partially by the PP:

- i. **Stage-I Condition No. viii:** For closed wagon transportation, matter has been put up before MOEF for exemption.
- ii. **Stage-I Condition No. ix:** 70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.
- iii. **Stage-II Condition No. ii:** All steps has been taken to restrict the land utilization for Stage-I and Stage-II of Sipat STPP to 4382.44 acres. 70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.
- iv. **Stage-II Condition No. ix:** In Fy 2018-19, ash utilization at NTPC Sipat is 49.54%. Dry fly ash is being issued free of cost to local fly ash brick manufacturers. Nearby cement industries area also getting fly ash from Sipat. Pond ash is being used in dyke raising, road projects embankment filling, low lying area filling & area development outside NTPC land being done also.
- v. **Stage-II Condition No. xii:** 70 Acre Revenue land had been identified at saler village and which has got transferred to Deptt of Industries, Govt of Chhattisgarh and then to CSIDC. CSIDC has sought approval from concerned authorities and the same is awaited. NTPC is pursuing the matter with CSIDC for early implementation.
- vi. **Stage-I (Amendment) Condition No. iii:** Study on heavy metals in coal and fly ash was carried out through IICT Hyderabad. PP informed that as per PP's knowledge, there are no technology/instruments available for in-built continuous monitoring of radioactivity & heavy metals in coal & fly ash (including bottom ash). As and when technology/ instruments will be available to NTPC they will install the same.
- vii. **Stage-I (Amendment) Condition No. 5:** It has been mentioned in the conclusion that "the prevalence of Chronic Obstructive Pulmonary Disease (COPD) found in our study is similar with the prevalence of COPD among non-coal dust exposure area in the country". Study for impact on forest, crop etc started by TCB College of agriculture, Bilaspur is under progress.

The PP has also informed that there were three Court Cases against their project. The details are as under:

- i. Originally Complaint case (No. 7893 of 2014) was filed by RO, CECB before the CJM Court, Bilaspur for violation of Air Act, 1981 and EPA 1986. NTPC Sipat filed a petition to quash the original complaint filed before the CJM Court. Stay was granted by the High Court against the proceedings in CJM Court on 17.01.2018. Next date not fixed by the High Court.
- ii. The application was filed under sec. 14 & 15 of the NGT Act, for the violation of provisions of forest (Conservation) Act, 1980. The contentions raised are that NTPC Sipat has not complied with the mandatory conditions of Environmental Clearance/ Forest clearance. Application dismissed in favour of NTPC on 19.02.2019
- iii. The application was filed under sec. 14 & 15 of the NGT Act, for the violation of provisions of forest (Conservation) Act, 1980. The contentions raised are that NTPC Sipat has not complied with the mandatory conditions of Environmental Clearance. Last heard on 21.05.2019, wherein court has directed MOEF Regional office Nagpur to submit inspection report for EC compliance.


 (Dr. P.R. Sakhare)
 Scientist 'D'

**“Studies on Terrestrial Ecology and Aquatic Ecology at
NTPC SIPAT STPP Area, Bilaspur (CG)”**

A report submitted to NTPC

in the partial fulfilment of

(Purchase order No. 4000116174-037-1019 dated 24.08.2013 of DGM (CS), NTPC)



Department of Botany

Guru Ghasidas Vishwavidyalaya

(A Central University)

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2015

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Acknowledgements

Help, co-operation and assistance have been obtained from a large number of individuals, villagers of Sipat, Government departments, local bodies, and representatives of NGOs. They have provided their valuable time and suggestions to members of the team to assist in ecological studies of NTPC, Sipat area. Their support in understanding the environmental and infrastructure problems of the study area have provided an essential input into this project report. It is rather difficult to thank them individually. We express our sincere thanks to all those people collectively.

In addition to the obvious critical support by the Environmental Management Group, NTPC Sipat in the preparation of this report was made possible through the enthusiastic support from Prof S K Chaturvedi, Dr Santosh Prajapati, Dr P. R Singh, Dr Naresh Agrawal.

We are also thankful to local residents of NTPC Sipat area whose daily observations of the environmental problems and efforts taken by EMG of NTPC Sipat for mitigation of these problems contributed to most of the exercises under this plant. We hope that the results of this plant report may help the EMG officials of NTPC Sipat in taking additional corrective measures.

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- Vegetables
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References

CHAPTER 9

CONCLUSION

Total 82 Villages have been selected from study area to investigate the impact of emission of NTPC power plant on terrestrial and aquatic ecology including water and soil quality of surrounding area. A detailed monitoring and investigation has been conducted by the team of University, Dept of Botany, Guru Ghasidas Vishwavidyalaya, Koni , Bilaspur.

Sipat is a small developing town approximately 22 kilometres from Bilaspur, the second largest city in the Indian state of Chhattisgarh. We have collected data from the revenue departments of Bilaspur and Janjgir to select our study area *i.e.*, 10 km radius around NTPC Sipat. In light of the monitoring of the terrestrial & aquatic ecology of the surrounding area of Total 3 Tehsil in this study area are Bilaspur tehsil 28 villages, Masturi tehsill 45 villages and Hilly forest area in Janjgir tehsil with only 8 villages. There are total 81 village and Hilly forest region were covered under the NTPC Sipat study area. This study was awarded to Department of Botany, Guru Ghashidas Central University Bilaspur (C.G.). The biomonitoring of this area has been carried out by the team of Department of Botany, Guru Ghashidas Central University, Bilaspur following prescribed TORs.

In present study, 340 species of flora belonging to 75 families from the study zones, 69 species of grass under 3 families, 190 species of herbs and shrubs under 41 families and 81 species of tree under 31 families were recorded from the study area.

The total 205 species of fauna belonging to 75 families were recorded from the study zones, 17 species of amphibians under 5 families, 20 species of birds under 13 families, 74 species of butterflies under 5 families, 25 species of dragonfly under 3 families, 9 species of insects under 6 families, 27 species of reptiles under 8 families and 33 species of mammals under 18 families were recorded from the study area.

In present study, the information collected on plant community from zone1 (Nargoda), Zone 2 (Parsahi), Zone 3 (Urtum) and Zone 4 (Kaudia) sub-urban area under NTPC Sipat were analyzed to determine different phyto-diversity index *i.e.*, frequency, relative frequency, density, relative density, abundance, relative abundance and important value index. The quantitative assessment of grassland floristic composition of villages namely, Nargoda, Parsahi, Urtum and Kaudia sub-urban was carried out. The density of grassland floristic

composition of Nargoda varied from 0.2 – 5.4. The population of *Cynodon dactylon* (L.) Pers. was found to be with highest density value (5.4) and important value index (IVI: 51.89). The density of grassland floristic composition of Parsahi varied from 0.8- 4. The population of *Commelina diffusa* L was found to be with highest density value (4) and important value index (IVI: 41.22). The density of grassland floristic composition of Urtum village varied from 0.4 – 10. The population of *Parthenium hysterophorus* L. was found to be with highest density value (10) and important value index (IVI: 81.44). The density of flora of Kaudia varied from 1 – 14.5. The population of *Cynodon dactylon* L. was found to be with highest density value (14.5) and important value index (IVI: 138.11). The biodiversity of the study area is rich when compared to national average.

In this study, it was observed that among the 30 villages, the pH of soil ranged from 4.7 – 7.7, Maximum pH was recorded in Bauradih village, whereas minimum was observed in Beltukeri village. Electrical Conductivity ranged from 0.02 – 0.80 $\mu\text{S}/\text{cm}$. Maximum electrical conductivity was recorded in Kaudiya village whereas minimum was in Bauradih village. Organic carbon from 0.3 – 0.8 (5%) Maximum Organic carbon was observed in Kaimadi village, whereas minimum was recorded in Karra village. Pottasium ranged from 39 – 194 (kg/ha). pH range from 5.5 to 7.0 is most suitable for the plant growth, and it may be concluded that pH is suitable for many crops and plant growth.

Heavy metal analysis of soil

In this present study, Al, Pb, Zn, As, Cu, Cr and Ni are investigated in 20 villages soil. Aluminium content of soil the lower value was village at Nargoda and the higher value was at village Chilhati. As content of soil the lower value was village at Parsada and the higher value was at village Raak. Cd content of soil the lower value was village at Sonadula and the higher value was at village Urtum. Co content of soil the lower value was village at Pondi and the higher value was at village Raak. Cr content of soil the lower value was village at Naugoi and the higher value was at village Piparsatti. Cu content of soil the lower value was village at Eramsahi and the higher value was at village Forest. Fe content of soil the lower value was village at Nargoda and the higher value was at village. Ni content of soil the lower value was village at Darrabhata and the higher value was at village Piparsatti. Pb content of soil the lower value was village at Eramsahi and the higher value was at village Raak. Zn content of soil the lower value was village at Pondi and the higher value was at village Bhilai

and Parsada. Overall, the limits were far below the permissible limits showing negligible impact of the nearby thermal power plant on agricultural soil in the studied area.

Aquatic Micropytic plants and Fauna

In this work 41 species of aquatic macrophytic plants were recorded from different pond of the study area. These species were belonging to 25 families and 31 species under 14 families of fishes were recorded from the Different pond of study area. Total 47 species of phytoplankton belongs to 4 families including Chlorophyceae, Bacillariophyceae, Cynophyceae and Euglenophyceae. were recorded from the study zones. 26 species under 14 families of Zooplankton were recorded from the Different pond of study area.

Primary Productivity of Phytoplanktons

The gross primary productivity fluctuated from 0.57 - 2.55gc/m³/d. Minimum primary productivity was recorded at sites Z2 and maximum at Z1. Maximum net primary productivity was recorded at Z3 and it ranged from 0.39 - 1.76 gc/m³/d. The community respiration of phytoplankton ranged between 0.24 and 2.09gc/m³/d. The high rate of oxygen consumption was at Z1 and was 81.96% of gross production. The net and gross productivity ratio ranged from 0.33 - 2.22. The ratio of net primary production to respiration (P/R ratio) was found to vary from 0.41 – 1.85, which shows that plants are growing in healthy environments. Primary productivity of phytoplanktons can be compared with any other healthy water system.

Physico-chemical Analysis of water

From the above experimentations it has been concluded that the pH value observed in different pond water samples generally ranged from 6.5 to 8.5 which in compliance of the water quality criteria given by CPCB, New Delhi for all the categories (i.e., A to E). However, water samples of Mohra Village, Parasahi village, Bima Talab showed comparatively higher values (above 9) indicating that the water from these ponds are not suitable for either drinking, bathing, propagation of wildlife and fisheries, and irrigation purposes. Based on the DO values measured at different ponds, it seems that most of them fell in the B or C category of water quality criteria indicating that water is safe for organized bathing and even drinking after conventional treatment.

From the above experimentation it was observed that among the 27 villages, water analysis was carried out, pH ranged from 6.50 – 9.69, Maximum pH was recorded in Mohara village, whereas minimum was observed in Kacchar village. Electrical Conductivity ranged from 118.7 – 206.6 $\mu\text{mhos/cm}$. Maximum electrical conductivity was recorded in the pond water of Pondi village whereas minimum was in pond water of Pipra village. TDS ranged from 165.5 – 254.8 ppm. Maximum TDS was observed in Beltukari village, whereas minimum was recorded in Nipaniya village. During this study temperature ranged from 20.9 – 33.8°C was observed. Maximum temperature was observed in pond water of Gataura village, whereas minimum was observed in pond water of Mohra village. From the above experimentation it has been observed that salinity ranged from 5.1 – 6.9 ppt. Maximum salinity was recorded in pond water of Raliya village, whereas minimum was recorded in pond water of Selar village. In this present investigation dissolved oxygen ranged from 4.72 – 6.13 mg/l. Maximum D.O. was recorded in pond water of Selar Village, whereas minimum was recorded in pond water of Raliya village.

Heavy metal analysis of water

Aluminium ranged from 0.006 - 0.151 mg/L. Minimum value 0.006 in village of Madhua and maximum Value 0.151 in village of Parsahi. As and Cd value is BDL for all sampling villages. From Parsada, Madhua, Kachhar, Changori, Parsahi, Mohara, Baima ,Khaira-Dagania, Matiyari, Bareli, Jhalmals, Nargoda, Gudi, Karra, Juhli, Karma, Kaudia, Janiji and Deori and maximum value in Farhada. Cobalt (Co) Over all 10 village of Co value is -0.001 (Constant) mg/l in Farhada Parsada, Madhua, Kachhar, Changori, Parsahi, Mohara, Baima ,Khaira-Dagania, Matiyari, Bareli, Jhalmala, Nargoda, Gudi, Karra, Juhli,Karma, Kaudia, Janiji and Deori. Chromium (Cr) ranged is also BDL of Jhalmala, Nargoda, Janiji and Deori and and Farhada. Cu the minimum value is BDL in village of Madhua and the maximum value 0.047 in village of Gudi. Iron (Fe) ranged from 0.001 – 0.316 mg/L. Minimum value 0.001 in village Karra and maximum Value 0.316 in village of parsahi. Ni the minimum value is BDL in village of Changori, Maduwa, Matiyari, Nargoda, Gudi, Karma, and Deori and maximum Value 0.003 in village of Parsada. Lead (Pb) value is BDL village in Baima and maximum Value 0.002 in village of Gudi. The minimum value of Znic (Zn) is BDL in village of Karma and maximum Value 0.005 in village of Parsada. Similar to those of soil, there was negligible or untraceable impact of the thermal power plant (NTPC, Sipat) in the water samples of the nearby areas.

Impacts

Impacts of NTPC STPP plant on ecosystem is almost negligible since there is:

- No removal or interference with prey of predatory animals;
- No direct wastewater discharges to receiving bodies;
- No noises disrupting breeding behavior or use of breeding grounds, resulting in shifts in population dynamics; and
- No removal of predatory animals resulting in increased prey populations that exceed the carrying capacity of the local environment.

There is significant siltation from run-off, but it is not altering the aquatic and terrestrial flora and fauna populations and hence population dynamics of dependent organisms.

Recommendations:

During the study period, it has been noticed that NTPC, Sipat is already practicing the recommendation of EIA. However, some suggestions are recommended for further improvement of environmental surroundings and biota of the study area.

- Establishment of some air samplers in the surrounding villages at fixed interval desirable already 4 samplers were established by NTPC.
- Periodical soil monitoring of selected villages in the 10 km periphery of NTPC STPP.
- Promote education & awareness among villagers and staff about ecosystem, biodiversity including rare, endangered and common species.
- Massive Afforestation programs with broad leaf trees and shrubs and plants with more dust holding capacity on vacant lands in the neighboring villages. Suggested plant species are -

- | | |
|--|---------------|
| • Adenantha pavonina L. | MIMOSACEAE |
| • Ailanthus excelsa (Mahaneem) | SIMAROUBACEAE |
| • Albizia saman Jacq. (Sirras) | MIMOSACEAE |
| • Annona reticulata L. (Ramaphal) | ANNONACEAE |
| • Annona squamosa L. (Seetaphal) | ANNONACEAE |
| • Artocarpus altilis (Z.) Fosb. | MORACEAE |
| • Artocarpus heterophyllus Lam. (Kathal) | MORACEAE |

• <i>Averrhoa bilimbi</i> L.	OXALIDACEAE
• <i>Azadirachta indica</i> A. Juss. (Neem)	MELIACEAE
• <i>Bahunia variegata</i> (Kachnaar)	FABACEAE
• <i>Caesalpinia bonduc</i> (L.) Roxb. (Kankarej)	CAESALPINIACEAE
• <i>Caesalpinia pulcherrima</i> (L.) Sw. (Lal patta)	CAESALPINIACEAE
• <i>Caesalpinia sappan</i> L. (Bakam)	CAESALPINIACEAE
• <i>Calophyllum inophyllum</i> L. (Sultani Champa)	CLUSIACEAE
• <i>Carica papaya</i> L. (Papita)	CARICACEAE
• <i>Cassia auriculata</i> L. (August)	CAESALPINIACEAE
• <i>Cassia fistula</i> L. (Amaltash)	CAESALPINIACEAE
• <i>Cassia surrattensis</i> Burm.f. (Pili Sanay)	CAESALPINIACEAE
• <i>Citrus aurantium</i> L. (Nimbu)	RUTACEAE
• <i>Clerodendrum inerme</i> L. (Lanjai)	VERBENACEAE
• <i>Cordia subcordata</i> Lam.	BORAGINACEAE
• <i>Delonix regia</i> Rafin. (Gulmohar)	CAESALPINIACEAE
• <i>Desmodium umbellatum</i> (L.) DC. (Sarivan)	FABACEAE
• <i>Erythrina orientalis</i> (L.) DC. (Pangar)	FABACEAE
• <i>Ficus benghalensis</i> L. (Bargad)	MORACEAE
• <i>Ficus benjamina</i> L. (Pookar)	MORACEAE
• <i>Hibiscus tiliaceus</i> L. (Bada jasoun)	MALVACEAE
• <i>Lawsonia inermis</i> L. (Mehndi)	LYTHRACEAE
• <i>Mangifera indica</i> L. (Aam)	ANACARDIACEAE
• <i>Manilkara zapota</i> (L.) van Royen.	SAPOTACEAE
• <i>Mimusops elengi</i> L. (Vakaouli)	SAPOTACEAE
• <i>Morinda citrifolia</i> L. (Noni)	RUBIACEAE
• <i>Moringa oleifera</i> Lam. (Sahjan)	MORINGACEAE
• <i>Morus alba</i> (Shahtoot)	MORACEAE
• <i>Murraya koenigii</i> (L.) Spreng. (Meethi neem)	RUTACEAE
• <i>Phyllanthus acidus</i> (L.) (Farfar revdi)	EUPHORBIACEAE
• <i>Phyllanthus emblica</i> L. (Amla)	EUPHORBIACEAE
• <i>Pithecellobium dulce</i> Roxb. (Jangle Jalebi)	MIMOSACEAE

• <i>Plumeria obtusa</i> L. (Deshi Champa)	APOCYNACEAE
• <i>Premna serratifolia</i> L. (Arni)	VERBENACEAE
• <i>Psidium guajava</i> L. (Amrood, Bihi)	MYRTACEAE
• <i>Pterocarpus indicus</i> Willd. (Chiroul)	FABACEAE
• <i>Ricinus communis</i> L. (Arandi)	EUPHORBIACEAE
• <i>Syzygium cumini</i> (L.) Skeel (Jamun)	MYRTACEAE
• <i>Tamarindus indica</i> L. (Imli)	CAESALPINIACEAE
• <i>Tectona grandis</i> L. (Sagoun. Teak)	VERBENACEAE
• <i>Terminalia catappa</i> L. (Deshi badam)	COMBRETACEAE
• <i>Thespesia populnea</i> L. (Paras Pipal)	MALVACEAE
• <i>Toona ciliata</i> (Toon)	MELIACEAE
• <i>Ziziphus mauritiana</i> Lam. (Ber)	RHAMNACEAE

Encourage the farmers for orchard development, wind shields and farm forestry by providing them saplings on subsidized rate. Encourage them for developing plant nursery.

The monitoring of required parameters to check the environmental impacts, frequency of their measurement, recording and reporting to related national authorities must be carried out strictly as required by the related national regulations under the legal framework.

From the study findings, it has been concluded that the Ecological impacts of the NTPC STTP project are minor and easily mitigable.

कार्यालय सहायक मिट्टी परीक्षण अधिकारी, तिलक नगर बिलासपुर (छ.ग.) (संशोधित)

क्रमांक/तकनीकी/2020-21/83

बिलारापुर, दिनांक 09/07/2020

प्रति,

क्षेत्रीय अधिकारी,
पर्यावरण संरक्षण मंडल
व्यापार विहार बिलासपुर (छ.ग.)

विषय: - मेसर्स एन.टी.पी.सी. सीपत के आसपास के सात गाँवों के मृदा नमूनों में उर्वरता परीक्षण के संबन्ध में।

संदर्भ:- श्री आर.पी. मिश्रा, वरिष्ठ वैज्ञानिक, केन्द्रीय प्रदूषण नियंत्रण बोर्ड भोपाल (म.प्र) से दुरभाष में हुई धर्चा अनुसार दिनांक 07/07/2020।

विषयगत श्री आर. पी. मिश्रा, वरिष्ठ वैज्ञानिक, केन्द्रीय प्रदूषण नियंत्रण बोर्ड भोपाल (म.प्र) द्वारा दुरभाष में चाही गई जानकारी के संबन्ध में एन.टी.पी.सी.सीपत के आसपास के गाँवों के मिट्टी नमूनों के विश्लेषण रिपोर्ट के आसत के आधार पर विवरण निम्नानुसार है।

1. ग्राम रलिया - ग्राम रलिया में नाइट्रोजन (N) की उपलब्धता सामान्य से लगभग 30 प्रतिशत कम है, जबकि स्फुर (P) की उपलब्धता मध्यम तथा पोटाश (K) की अधिक है। अन्य पोषक तत्वों में सल्फर, बोरान, आयरन, मैग्नीज, कॉपर, की उपलब्धता पर्याप्त है जबकि जिंक में आंशिक कमी परिलक्षित है।
2. ग्राम - हरदाडीह - ग्राम हरदाडीह में नाइट्रोजन की उपलब्धता सामान्य से लगभग 21 प्रतिशत कम है, जबकि स्फुर की उपलब्धता मध्यम तथा पोटाश की अधिक है। अन्य पोषक तत्व सल्फर, बोरान, आयरन, मैग्नीज, कॉपर, जिंक की उपलब्धता पर्याप्त है।
3. ग्राम - रांक - ग्राम रांक में नाइट्रोजन सामान्य से लगभग 38 प्रतिशत कम है जबकि स्फुर एवं पोटाश की उपलब्धता मध्यम है। अन्य सूक्ष्म पोषक तत्वों में मैग्नीज की उपलब्धता का सामान्य से लगभग 42 प्रतिशत कम है तथा शेष पोषक तत्व पर्याप्त है।
4. ग्राम - भिलाई - इस ग्राम में नाइट्रोजन की उपलब्धता सामान्य से लगभग 5 प्रतिशत कम है जबकि स्फुर की उपलब्धता मध्यम तथा पोटाश की अधिक है। इसी प्रकार सल्फर, बोरान, कॉपर, मैग्नीज, आयरन की उपलब्धता पर्याप्त है जबकि जिंक की आंशिक कमी है।

5. ग्राम - कोडिया - इस ग्राम में नाईट्रोजन की उपलब्धता समान्य से लगभग 30 प्रतिशत कम है जबकि सफूर की उपलब्धता मध्यम तथा पौटाश की उपलब्धता अधिक है। अन्य सूक्ष्म तत्वों में जिंक की उपलब्धता समान्य से लगभग 20 प्रतिशत कम है, जबकि शेष पोषक तत्व सैल्फर, बोरान, कॉपर, मैग्नीज, आयरन की उपलब्धता पर्याप्त है।

6. ग्राम - गतीरा - इस ग्राम में नाईट्रोजन की उपलब्धता समान्य से लगभग 23 प्रतिशत कम है, जबकि सफूर की उपलब्धता कुछ क्षेत्रों में समान्य से लगभग 5 प्रतिशत कम है। पौटाश की उपलब्धता अधिक है। अन्य सूक्ष्म तत्वों में जिंक की उपलब्धता समान्य से लगभग 3 प्रतिशत कम है तथा शेष पोषक तत्व सैल्फर, बोरान, कॉपर, मैग्नीज, आयरन की उपलब्धता पर्याप्त है।

उक्त सभी ग्रामों की मृदा लगभग अम्लीय है। तथा उक्त ग्रामों से लिये गये कुल 34 मिट्टी नमूनों के विश्लेषण में से 16 नमूनों में आर्गेनिक कार्बन की उपलब्धता कम एवं 18 में मध्यम है।

टीप- इस कार्यालय में मृदा विश्लेषण द्वारा मृदा में उपलब्ध पोषक तत्वों का परीक्षण किया जाता है। विस्तृत जानकारी के लिये कृषि विज्ञान केन्द्र के वैज्ञानिकों से संपर्क कर जानकारी प्राप्त करने की कृपा करेंगे।



सहायक मिट्टी परीक्षण अधिकारी,

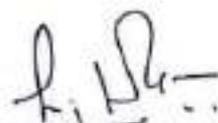
तिलक नगर बिलासपुर (छ.ग.)

क्रमांक/तकनीकी/2020-21 / 84

बिलासपुर दिनांक 09/08/2020

प्रतिलिपि-

1. कार्यालय कलेक्टर, जिला बिलासपुर की ओर सादर सूचनार्थ प्रेषित।
2. श्री आर. पी. मिश्रा, त्रिष्ट वैज्ञानिक, केंद्रीय प्रदूषण नियंत्रण बोर्ड, परिवेश नवन पर्यावरण कम्प्लेक्स E-5 अरेश कालोनी, भोपाल (म.प्र.) की ओर दुरगाण में हुई चर्चानुसार जानकारी प्रेषित।
3. उप संचालक कृषि बिलासपुर की ओर सादर सूचनार्थ प्रेषित।



सहायक मिट्टी परीक्षण अधिकारी

तिलक नगर बिलासपुर (छ.ग.)

कार्यालय कलेक्टर, जिला-बिलासपुर (छ.ग.)

क्रमांक 1437 /स.व.लि. / 2020
प्रति,

बिलासपुर, दिनांक : 29/6/20

डॉ. आर पी मिश्रा,
साईटिस्ट 'डी', लेबोरेटरी हेड,
केन्द्रीय प्रदूषण नियंत्रण बोर्ड,
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय)
रिजनल डायरेक्टोरेट (सेन्ट्रल),
शकर भवन तृतीय तल, नार्थ टी.टी. नगर,
भोपाल 462003

विषय - मेसर्स एन.टी.पी.सी. सीपत के आसपास के 07 गांवों के मृदा नमूनों में उर्वरता परीक्षण के संबंध में।

- संदर्भ- 1. माननीय नेशनल ग्रीन ट्रिब्यूनल, प्रिंसीपल बेंच, नई दिल्ली का प्रकरण क्रमांक 459/2018 रश्मि सिंह विरुद्ध मेसर्स एन.टी.पी.सी. सीपत के संबंध में पारित आदेश दिनांक 27.02.2020
2. इस कार्यालय का सहायक मिट्टी परीक्षण अधिकारी, तिलक नगर बिलासपुर को प्रेषित पत्र क्रमांक 2258 दिनांक 15.06.2020
3. कार्यालय, सहायक मिट्टी परीक्षण अधिकारी, तिलक नगर बिलासपुर (छ.ग.) का पत्र क्रमांक 58 दिनांक 22.06.2020

उपरोक्त विषयांतर्गत संदर्भ क्रमांक 01 में उल्लेखित प्रकरण क्रमांक 459/2018 रश्मि सिंह विरुद्ध मेसर्स एन.टी.पी.सी. सीपत के संबंध में पारित आदेश दिनांक 27.02.2020 के परिप्रेक्ष्य में मेसर्स एन.टी.पी.सी. सीपत के आसपास के 07 गांवों (रलिया, हरदाडीह, रांक, भिलाई, कौडिया, गतौरा, सुरखीपाली) के मृदा नमूनों का संग्रहण एवं परीक्षण कर जांच रिपोर्ट प्रस्तुत करने के संबंध में सहायक मिट्टी परीक्षण अधिकारी, तिलक नगर बिलासपुर को संदर्भित पत्र क्रमांक 02 प्रेषित किया गया। उक्त जानकारी संदर्भित पत्र क्रमांक 03 के माध्यम से इस कार्यालय को प्राप्त हुई है। ग्राम सुरखीपाली में खेती करने योग्य भूमि का अभाव होने के कारणवश उक्त ग्राम से मृदा नमूना एकत्र नहीं किये जाने की जानकारी संदर्भित पत्र क्रमांक 03 में उल्लेखित की गई है। उक्त जानकारी की जांच करने पश्चात् ग्राम सुरखीपाली को छोड़कर शेष 06 ग्रामों के मृदा नमूना विश्लेषण परिणाम की जानकारी आपकी ओर सादर सम्प्रेषित है।

संलग्न- उपरोक्तानुसार। (कुल पेज 1-36)



कलेक्टर

जिला-बिलासपुर (छ.ग.)



 Government of Karnataka
 Department of Agriculture
 Animal Husbandry and Fisheries
 Veterinary, Animal and Fisheries Sciences
 College of Veterinary and Animal Sciences
 Bidar
 Karnataka
 585 112

Report of Disease

Investigative Institute: _____

Case No: _____

Date: _____

Species: _____

Age: _____

Sex: _____

Site of Origin: _____

History: _____

Signs and Symptoms: _____

Diagnosis: _____

Treatment: _____

Remarks: _____

Sr. No.	Part	Findings	Remarks
1	General	7.20	
2	Head	0.40	
3	Neck	0.75	
4	Chest	1.00	
5	Abdomen	1.25	
6	Genitals	0.50	
7	Limbs	1.00	
8	Rectum	0.75	
9	Perineum	0.50	
10	Udder	1.00	
11	Teats	1.25	
12	Milk	0.50	

Sl. No.	Part	Findings	Remarks
1	General	7.20	
2	Head	0.40	
3	Neck	0.75	
4	Chest	1.00	
5	Abdomen	1.25	
6	Genitals	0.50	
7	Limbs	1.00	
8	Rectum	0.75	
9	Perineum	0.50	
10	Udder	1.00	
11	Teats	1.25	
12	Milk	0.50	

Signature: _____
 Name: _____
 Designation: _____



 Government of Karnataka
 Department of Agriculture
 Animal Husbandry and Fisheries
 Veterinary, Animal and Fisheries Sciences
 Bangalore
 560 075
 Karnataka Veterinary, Animal and Fisheries Sciences University
 Bidar
 585 112
 Karnataka Veterinary, Animal and Fisheries Sciences University
 Bidar
 585 112

Particulars		Amount
1
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Sl. No.	Description	Quantity	Rate	Amount
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Sl. No.	Description	Quantity	Rate	Amount
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Sl. No.	Description	Quantity	Rate	Amount
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K. B. ...
 Director of Veterinary and Animal Husbandry
 Government of Karnataka
 Bangalore

U.S. Department of Health & Human Services
Centers for Disease Control and Prevention
Division of Field Epidemiology



Case Report Form

Case Information

Name: _____
 Sex: _____
 Age: _____
 Date of Birth: _____
 Date of Onset: _____
 Date of Admission: _____
 Date of Discharge: _____
 Date of Death: _____

Case Classification

Case Type: _____
 Case Status: _____
 Case Category: _____
 Case Subcategory: _____

Case History

1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____
 7. _____
 8. _____
 9. _____
 10. _____

Case Summary

Case No: _____
 Date of Report: _____
 Report Type: _____
 Report Status: _____

No.	Date	Time	Location	Activity
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19				
20				



 Date: _____



 Government of Karnataka
 Department of Agriculture
 Animal Husbandry and Fisheries
 Veterinary, Animal and Fisheries Sciences
 Bangalore
 Date: _____
 No: _____


1	From	5.30		
2	to	0.05		
3	middle water (DC)	0.75%		
4	total water (DC)	122.50		
5	total water (DC)	13.44		
6	total water (DC)	422.00		
7	total water (DC)	23.75		
8	total water (DC)	0.97		
9	total water (DC)	5.00		
10	total water (DC)	5.25		
11	total water (DC)	1.50		
12	total water (DC)	1.10		

1	From	5.30		
2	to	0.05		
3	middle water (DC)	0.75%		
4	total water (DC)	122.50		
5	total water (DC)	13.44		
6	total water (DC)	422.00		
7	total water (DC)	23.75		
8	total water (DC)	0.97		
9	total water (DC)	5.00		
10	total water (DC)	5.25		
11	total water (DC)	1.50		
12	total water (DC)	1.10		

1	From	5.30		
2	to	0.05		
3	middle water (DC)	0.75%		
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7	total water (DC)	23.75		
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12	total water (DC)	1.10		

KARNATAKA
 Government of Karnataka
 Department of Agriculture
 Animal Husbandry and Fisheries
 Veterinary, Animal and Fisheries Sciences
 Bangalore
 Date: _____
 No: _____




Name of District	
State	Uttar Pradesh
District	Pratapgarh
Block	Pratapgarh
Gram Panchayat	Pratapgarh
Water Source	Well
Area (Hectare)	1.50
Number of Fishers	10
Production (kg)	1500
Value (Rs.)	150000

Sl. No.	Particulars	Quantity	Rate	Amount
1	1. Fish	1500 kg	100	150000
2	2. Fish	1500 kg	100	150000
3	3. Fish	1500 kg	100	150000
4	4. Fish	1500 kg	100	150000
5	5. Fish	1500 kg	100	150000
6	6. Fish	1500 kg	100	150000
7	7. Fish	1500 kg	100	150000
8	8. Fish	1500 kg	100	150000
9	9. Fish	1500 kg	100	150000
10	10. Fish	1500 kg	100	150000
11	11. Fish	1500 kg	100	150000
12	12. Fish	1500 kg	100	150000

Sl. No.	Name of Fish	Quantity	Rate	Amount
1	1. Fish	1500 kg	100	150000
2	2. Fish	1500 kg	100	150000
3	3. Fish	1500 kg	100	150000
4	4. Fish	1500 kg	100	150000
5	5. Fish	1500 kg	100	150000
6	6. Fish	1500 kg	100	150000
7	7. Fish	1500 kg	100	150000
8	8. Fish	1500 kg	100	150000
9	9. Fish	1500 kg	100	150000
10	10. Fish	1500 kg	100	150000
11	11. Fish	1500 kg	100	150000
12	12. Fish	1500 kg	100	150000

Signature and Stamp of the District Fisheries Officer, Pratapgarh.



ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ಕೃಷಿ ಮತ್ತು ಮೀನುಗಾರಿಕೆ
ಇಲಾಖೆ

ಕೃಷಿ ಮತ್ತು ಮೀನುಗಾರಿಕೆ ಇಲಾಖೆ		ಕೃಷಿ ಮತ್ತು ಮೀನುಗಾರಿಕೆ ಇಲಾಖೆ	
ಹೆಸರು	ಕೃಷಿ ಮತ್ತು ಮೀನುಗಾರಿಕೆ ಇಲಾಖೆ	ಹೆಸರು	ಕೃಷಿ ಮತ್ತು ಮೀನುಗಾರಿಕೆ ಇಲಾಖೆ
ವಿಳಾಸ	ಬೆಂಗಳೂರು	ವಿಳಾಸ	ಬೆಂಗಳೂರು
ತೆಳು	100001	ತೆಳು	100001
ಫೋನ್ ನಂ.	080-2222222	ಫೋನ್ ನಂ.	080-2222222
ಇಮೇಲ್	info@karnataka.gov.in	ಇಮೇಲ್	info@karnataka.gov.in

ಕ್ರ. ಸಂ.	ವಿವರಣೆ	ಮಾಪ	ಮಾಪ	ಮಾಪ
1	ಉದ್ದ	1.2%		
2	ತೂಕ	0.1%		
3	ಉದ್ದ ಮತ್ತು ತೂಕ	0.1%		
4	ಉದ್ದ ಮತ್ತು ತೂಕ	130.0		
5	ಉದ್ದ ಮತ್ತು ತೂಕ	14.2		
6	ಉದ್ದ ಮತ್ತು ತೂಕ	133.0		
7	ಉದ್ದ ಮತ್ತು ತೂಕ	21.9		
8	ಉದ್ದ ಮತ್ತು ತೂಕ	11.6		
9	ಉದ್ದ ಮತ್ತು ತೂಕ	5.2		
10	ಉದ್ದ ಮತ್ತು ತೂಕ	5.1		
11	ಉದ್ದ ಮತ್ತು ತೂಕ	10.8		
12	ಉದ್ದ ಮತ್ತು ತೂಕ	8.5		

ಕ್ರ. ಸಂ.	ವಿವರಣೆ	ಮಾಪ	ಮಾಪ	ಮಾಪ
1	ಉದ್ದ ಮತ್ತು ತೂಕ	4.00		
2	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
3	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
4	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
5	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
6	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
7	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
8	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
9	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
10	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
11	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		
12	ಉದ್ದ ಮತ್ತು ತೂಕ	1.00		

ಇವುಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ
ಇತರ ಯಾವುದೇ ಮಾಹಿತಿ
ಇಲ್ಲವೆಂದು ದೃಢೀಕರಿಸಲಾಗಿದೆ.

[Signature]



Sl. No.	Item Name	Quantity	Rate	Total
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Sl. No.	Item Name	Quantity	Rate	Total
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Sl. No.	Item Name	Quantity	Rate	Total
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Signature
Signature
Signature



Name of River	
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Sl. No.	Name of the river	Length (km)	Area (sq. km)	Discharge (cumecs)
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Sl. No.	Name of the river	Length (km)	Area (sq. km)	Discharge (cumecs)
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12

Signature
Date: ...



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 Bangalore
 560 075
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 Bidar
 Karnataka
 585 112

Sl. No.	Particulars	Amount
1	Part 1	6.15
2	Part 2	0.50
3	Part 3	11.20
4	Part 4	12.34
5	Part 5	54.70
6	Part 6	21.00
7	Part 7	0.10
8	Part 8	7.20
9	Part 9	11.50
10	Part 10	50.00
11	Part 11	11.50
12	Part 12	11.50
13	Part 13	11.50

Sl. No.	Particulars	Amount
1	Part 1	6.15
2	Part 2	0.50
3	Part 3	11.20
4	Part 4	12.34
5	Part 5	54.70
6	Part 6	21.00
7	Part 7	0.10
8	Part 8	7.20
9	Part 9	11.50
10	Part 10	50.00
11	Part 11	11.50
12	Part 12	11.50
13	Part 13	11.50

Sl. No.	Particulars	Amount
1	Part 1	6.15
2	Part 2	0.50
3	Part 3	11.20
4	Part 4	12.34
5	Part 5	54.70
6	Part 6	21.00
7	Part 7	0.10
8	Part 8	7.20
9	Part 9	11.50
10	Part 10	50.00
11	Part 11	11.50
12	Part 12	11.50
13	Part 13	11.50

square leg of wire amount
 Rs. 18
 square leg of wire amount
 Rs. 18



Details of Crop		Variety	
Crop	Wheat	Area	1000
Planting date	15/11/2018	Harvesting date	15/01/2019
Area (ha)	1000	Yield (kg/ha)	1000
Water source	Well	Inputs used	None
Soil type	Black	Weather	Normal
Other details	None		

Sl. No.	Particulars	Quantity	Rate	Total
1	Area (ha)	1000	1000	1000
2	Yield (kg/ha)	1000	1000	1000
3	Water used (liters)	1000	1000	1000
4	Fertilizer used (kg)	1000	1000	1000
5	Pesticide used (liters)	1000	1000	1000
6	Other inputs (liters)	1000	1000	1000
7	Harvesting cost (liters)	1000	1000	1000
8	Transport cost (liters)	1000	1000	1000
9	Marketing cost (liters)	1000	1000	1000
10	Net return (liters)	1000	1000	1000
11	Net profit (liters)	1000	1000	1000
12	Net loss (liters)	1000	1000	1000

Sl. No.	Particulars	Quantity	Rate	Total
1	Area (ha)	1000	1000	1000
2	Yield (kg/ha)	1000	1000	1000
3	Water used (liters)	1000	1000	1000
4	Fertilizer used (kg)	1000	1000	1000
5	Pesticide used (liters)	1000	1000	1000
6	Other inputs (liters)	1000	1000	1000
7	Harvesting cost (liters)	1000	1000	1000
8	Transport cost (liters)	1000	1000	1000
9	Marketing cost (liters)	1000	1000	1000
10	Net return (liters)	1000	1000	1000
11	Net profit (liters)	1000	1000	1000
12	Net loss (liters)	1000	1000	1000

Signature
 Date: 15/01/2019
 Place: [Blank]



<p>ಕರ್ನಾಟಕ ಸರ್ಕಾರ</p> <p>ಕೆ.ಆರ್.ಪೇಟೆ</p> <p>ಕೆ.ಆರ್.ಪೇಟೆ ತಾಲ್ಲೂಕು</p> <p>ಕೆ.ಆರ್.ಪೇಟೆ ಪಂಚಾಯತ್</p>	
<p>ಹೆಸರು: ಕೆ.ಆರ್.ಪೇಟೆ ಪಂಚಾಯತ್</p> <p>ತಾಲ್ಲೂಕು: ಕೆ.ಆರ್.ಪೇಟೆ</p> <p>ಜಿಲ್ಲೆ: ಕೆ.ಆರ್.ಪೇಟೆ</p>	<p>ಪ್ರಾ.ಸಂ. ಸಂಖ್ಯೆ: 22/111300/11/2019</p> <p>ದಿನಾಂಕ: 22/11/2019</p>

ಕ್ರ. ಸಂ.	ವಿವರಣೆ	ಮಾಪ	ಮಾಪ	ಮಾಪ
1	ಮೊದಲ	6.50		
2	2ನೇ	6.40		
3	3ನೇ	6.60		
4	4ನೇ	1.02		
5	5ನೇ	5.30		
6	6ನೇ	1.80		
7	7ನೇ	1.00		
8	8ನೇ	0.25		
9	9ನೇ	6.50		
10	10ನೇ	5.80		
11	11ನೇ	1.00		
12	12ನೇ	0.25		

<p>ಪ್ರಾ.ಸಂ. ಸಂಖ್ಯೆ: 22/111300/11/2019</p> <p>ದಿನಾಂಕ: 22/11/2019</p>	<p>ಪ್ರಾ.ಸಂ. ಸಂಖ್ಯೆ: 22/111300/11/2019</p> <p>ದಿನಾಂಕ: 22/11/2019</p>
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ಕ್ರ. ಸಂ.	ವಿವರಣೆ	ಮಾಪ	ಮಾಪ	ಮಾಪ
1	ಮೊದಲ	6.50		
2	2ನೇ	6.40		
3	3ನೇ	6.60		
4	4ನೇ	1.02		
5	5ನೇ	5.30		
6	6ನೇ	1.80		
7	7ನೇ	1.00		
8	8ನೇ	0.25		
9	9ನೇ	6.50		
10	10ನೇ	5.80		
11	11ನೇ	1.00		
12	12ನೇ	0.25		

ಅಧಿಕಾರಿ
 ಕೆ.ಆರ್.ಪೇಟೆ ಪಂಚಾಯತ್



Name of Person	
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12	...

Sl. No.	Name of the Person	Age	Sex	Religion	Marital Status	Education	Occupation	Income
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Sl. No.	Name of the Person	Age	Sex	Religion	Marital Status	Education	Occupation	Income
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Signature: *[Handwritten Signature]*
 Name: *[Handwritten Name]*



Particulars		Amount
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Sl. No.	Description	Rate	Quantity	Amount
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Handwritten signature and text:
 ಸರ್ಕಾರಿ ಹಣಕಾಸು ಇಲಾಖೆ
 ಸಹಾಯಕ ನಿರ್ದೇಶಕರು
 ಬೆಂಗಳೂರು

Sl. No.	Description	Rate	Quantity	Amount
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Particulars of Parties

Sl. No.	Name of Party	Address
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Sl. No.	Particulars	Quantity	Rate	Amount
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12

Sl. No.	Particulars	Quantity	Rate	Amount
1
2
3
4
5
6
7
8
9
10
11
12

Signature
 Signature of the Officer in Charge
 Date: ...



Name of Project	
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...

Sl. No.	Name of Project	Area	Cost	Year
1
2
3
4
5
6
7
8
9
10
11
12

Sl. No.	Name of Project	Area	Cost	Year
1
2
3
4
5
6
7
8
9
10
11
12

Signature
 Name and Designation



Name of Station	
Station	Chandrapur
Pin	431001
Station code	431001
Station name	Chandrapur
Station type	Sub-station
Station category	Sub-station
Station status	Active
Station code	431001
Station name	Chandrapur
Station type	Sub-station
Station category	Sub-station
Station status	Active
Station code	431001
Station name	Chandrapur
Station type	Sub-station
Station category	Sub-station
Station status	Active

Sl. No.	Category	Value	Unit	Remarks
1	Area	5.56	Ha	
2	Rate	1250	Per Ha	
3	Water charge (CC)	0.50	%	
4	Water charge (CC)	238.20	Per Ha	
5	Water charge (CC)	23.29	Per Ha	
6	Water charge (CC)	123.00	Per Ha	
7	Water charge (CC)	11.25	Per Ha	
8	Water charge (CC)	0.51	Per Ha	
9	Water charge (CC)	5.60	Per Ha	
10	Water charge (CC)	28.32	Per Ha	
11	Water charge (CC)	28.12	Per Ha	
12	Water charge (CC)	0.48	Per Ha	

Sl. No.	Name of Station	Area (Ha)	Rate (Per Ha)	Water Charge (CC)	Remarks
1	Chandrapur	5.56	1250	0.50	
				238.20	
				23.29	
				123.00	
				11.25	
				0.51	
				5.60	
				28.32	
				28.12	
				0.48	

Signature
 Name of the Station Officer
 Chandrapur



ಕ್ರ. ಸಂ.	ವಿವರಣೆ	ಮಾಪ	ಒಟ್ಟು
1	ಶೇಖರಣೆ	1000	1000
2	ಶೇಖರಣೆ	1000	1000
3	ಶೇಖರಣೆ	1000	1000
4	ಶೇಖರಣೆ	1000	1000
5	ಶೇಖರಣೆ	1000	1000
6	ಶೇಖರಣೆ	1000	1000
7	ಶೇಖರಣೆ	1000	1000
8	ಶೇಖರಣೆ	1000	1000
9	ಶೇಖರಣೆ	1000	1000
10	ಶೇಖರಣೆ	1000	1000
11	ಶೇಖರಣೆ	1000	1000
12	ಶೇಖರಣೆ	1000	1000

ಕ್ರ. ಸಂ.	ವಿವರಣೆ	ಮಾಪ	ಒಟ್ಟು
1	ಶೇಖರಣೆ	1000	1000
2	ಶೇಖರಣೆ	1000	1000
3	ಶೇಖರಣೆ	1000	1000
4	ಶೇಖರಣೆ	1000	1000
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10	ಶೇಖರಣೆ	1000	1000
11	ಶೇಖರಣೆ	1000	1000
12	ಶೇಖರಣೆ	1000	1000

ಕ್ರ. ಸಂ.	ವಿವರಣೆ	ಮಾಪ	ಒಟ್ಟು
1	ಶೇಖರಣೆ	1000	1000
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11	ಶೇಖರಣೆ	1000	1000
12	ಶೇಖರಣೆ	1000	1000

ಶೇಖರಣೆ
 ಸಹಾಯಕ ನಿರ್ದೇಶಕರು
 ಕರ್ನಾಟಕ ರಾಜ್ಯ ಸರ್ಕಾರ
 ಬೆಂಗಳೂರು

कोयला आधारित ताप विद्युत संयंत्रों से उत्पन्न फ्लाई एष के उपयोग के
संबंध में आयोजित कॉन्फ्रेंस का घोषणा पत्र

—0—

रायपुर डिक्लेरेषन – 02 जून 2017

माननीय नेशनल ग्रीन ट्रिब्यूनल, सेन्ट्रल जोनल बेंच, भोपाल के निर्देशानुसार तथा छत्तीसगढ़ शासन, आवास एवं पर्यावरण विभाग के मार्गदर्शन में छत्तीसगढ़ पर्यावरण संरक्षण मंडल द्वारा "कोयला आधारित ताप विद्युत संयंत्रों से उत्पन्न फ्लाई एष के उपयोगिता" पर एक दिवसीय कॉन्फ्रेंस का आयोजन किया गया। इस कॉन्फ्रेंस की :

- अध्यक्षता : माननीय न्यायमूर्ति श्री दलीप सिंह, न्यायिक सदस्य, माननीय नेशनल ग्रीन ट्रिब्यूनल, सेन्ट्रल जोनल बेंच, भोपाल
- मुख्य अतिथि : माननीय श्री राजेश मूणत, मंत्री, छत्तीसगढ़ शासन, आवास एवं पर्यावरण, परिवहन एवं लोक निर्माण विभाग
- विषिष्ट अतिथि : श्री एस.एस. गर्बियाल, विशेषज्ञ सदस्य, माननीय नेशनल ग्रीन ट्रिब्यूनल, सेन्ट्रल जोनल बेंच, भोपाल
श्री संजय शुक्ला, सचिव, आवास एवं पर्यावरण विभाग, छत्तीसगढ़ शासन
श्री ए.ए. मिश्रा, सदस्य सचिव, मध्य प्रदेश प्रदूषण नियंत्रण बोर्ड

उपस्थित प्रतिनिधि : छत्तीसगढ़, मध्यप्रदेश एवं राजस्थान राज्यों के ताप विद्युत संयंत्रों के प्रतिनिधि, साऊथ ईस्टर्न कोल फिल्ड्स के प्रतिनिधि, फ्लाई एष ब्रिक मेन्युफेक्चरर एसोसिएशन के सदस्य, तीनों राज्यों के राज्य प्रदूषण नियंत्रण बोर्ड के अधिकारी एवं अन्य गणमान्य प्रतिनिधि

कॉन्फ्रेंस में डिप्टी डायरेक्टर जनरल ऑफ माईस सेपटी, वेस्टर्न जोन, नागपुर, एकजीक्यूटिव डायरेक्टर, एन.टी.पी.सी., नई दिल्ली एवं एकजीक्यूटिव वाईस प्रेसिडेंट, मेसर्स जिंदल पॉवर लिमिटेड, नई दिल्ली द्वारा तकनीकी प्रस्तुतिकरण दिया गया।

कॉन्फ्रेंस में ताप विद्युत संयंत्रों से उत्पन्न फ्लाई एष के विभिन्न कार्यों में उपयोग की वर्तमान स्थिति, भारत सरकार के पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, नई दिल्ली द्वारा जारी अधिसूचना के प्रावधानों को लागू करने में आ रही समस्याओं, उसके निराकरण तथा राख के उपयोग में वृद्धि हेतु नये तकनीक एवं विकल्पों पर विस्तार से चर्चा की गई।

कॉन्फ्रेंस में हुई चर्चा उपरांत निष्कर्ष के आधार पर निम्नानुसार घोषणा पत्र जारी किया जाता है:-

1. ताप विद्युत संयंत्रों को पर्यावरणीय स्वीकृति जारी करते समय यह शर्त निर्दिष्ट की जावे कि उत्पन्न राख का उपयोग जिन-जिन कार्यों में सुनिश्चित किया जाना है, उसका चिन्हांकन कर एक्शन प्लान तैयार कर लिया जावे।
2. सक्षम प्राधिकारी यथा कोल मंत्रालय, भारत सरकार/इंडियन ब्यूरो ऑफ माईन्स द्वारा राख (फलाई एष एवं बॉटम एष) से माईन क्लोजर किये जाने हेतु स्टेण्डर्ड विकसित किया जावे। स्टेण्डर्ड विकसित होने के पश्चात् उत्खनन हेतु माईनिंग प्लान में इसका समावेश सुनिश्चित होने पर ही अनुमोदन की कार्यवाही की जावे।
3. कोल उत्खनन कम्पनियां ऐसे अनुपयुक्त (Economically Unviable) खदानों जिनमें काफी कम मात्रा में खनिज शेष है तथा उसमें उत्खनन वित्तीय दृष्टि से उपयुक्त नहीं है, उनका एक वर्ष के भीतर चिन्हांकन कर माईन क्लोजर प्लान बनाकर राख (फलाई एष एवं बॉटम एष) से भरने की प्रक्रिया प्रारंभ करना सुनिश्चित किया जावे।
4. डायरेक्टर जनरल ऑफ माईन्स सेप्टी द्वारा यह स्पष्टीकरण जारी किया जावे कि खादयानों (अंडर ग्राउंड एवं ओपन कास्ट) को राख (फलाई एष एवं बॉटम एष) से भरने हेतु उनसे पृथक से अनुमति की आवश्यकता नहीं है।
5. "पॉल्युटर्स पे प्रिंसिपल" के आधार पर राख (फलाई एष एवं बॉटम एष) के उपयोग को बढ़ावा देने हेतु एक "फलाई एष उपयोगिता कोष" की स्थापना राज्य शासन स्तर पर की जावे। इस कोष में राज्य में स्थित सभी ताप विद्युत संयंत्रों द्वारा उत्पादन क्षमता तथा उपयोग में लाये गये कोयले की मात्रा व गुणवत्ता के आधार पर प्रतिवर्ष अंशदान का प्रावधान रखा जावे। साथ ही जो संयंत्र अनियंत्रित रूप से फलाई एष का अपवहन (Disposal) करते हैं, उनके ऊपर अधिरोपित अर्थदंड भी इस कोष में जमा किया जा सकता है।
6. फलाई एष ब्रिक्स उत्पादकों एवं ताप विद्युत संयंत्रों द्वारा संयुक्त रूप से एक को-आपरेटिव सोसायटी बनाया जावे। यह को-आपरेटिव सोसायटी यह सुनिश्चित करेगी कि फलाई एष ब्रिक्स उत्पादकों को राख (फलाई एष एवं बॉटम एष) नियमित एवं आसानी से उपलब्ध होता रहे। "फलाई एष उपयोगिता कोष" से इन उत्पादकों को वित्तीय सहायता प्रदान किया जावे।

7. 500 मेगावाट एवं उससे अधिक क्षमता के ताप विद्युत संयंत्रों द्वारा फ्लाई एष का उपयोग सुनिश्चित करने हेतु परिसर में ही केप्टिव सीमेंट ग्राइंडिंग यूनिट, केप्टिव लाईटवेट एग्रीगेट मेन्युफेक्चरिंग प्लांट, एष बेस्ड प्रोडक्ट्स मेन्युफेक्चरिंग प्लांट, इको फ्रेंडली प्लांट आदि की स्थापना की जावे।
8. राख (फ्लाई एष एवं बॉटम एष) का उपयोग अन्य लाभकारी कार्यों में करने एवं इसके उपयोग में वृद्धि करने हेतु नये तकनीक एवं विकल्पों तथा कृषि कार्यों में उपयोग, लो कास्ट हाउसेस निर्माण में राख का उपयोग आदि में रिसर्च एवं डेव्हलपमेंट (R and D) को बढ़ावा दिया जावे।
9. एष बेस्ड प्रोडक्ट्स मेन्युफेक्चरिंग प्लांट्स की स्थापना एवं संचालन हेतु करों में वित्तीय छूट (Fiscal incentives) प्रदान करने हेतु केन्द्र सरकार एवं राज्य सरकार द्वारा आवश्यक पहल किया जावे।
10. ताप विद्युत संयंत्रों द्वारा "कार्पोरेट सोशल रिस्पॉसिबिलिटी" (सी.एस.आर.) मद में राषि का प्रावधान कर रोजगार के दृष्टिकोण से आसपास के ग्रामीण क्षेत्रों में फ्लाई एष ब्रिक प्लांट्स की स्थापना हेतु वित्तीय सहायता प्रदान किया जावे। साथ ही इन ग्रामीण क्षेत्रों में सस्ती दरों पर फ्लाई एष ब्रिक उपलब्ध कराने, ग्रामीण सड़क निर्माण हेतु पेव्हर ब्लॉक उपलब्ध कराने एवं तालाब में घाट निर्माण हेतु फ्लाई एष उत्पाद उपलब्ध कराना सुनिश्चित किया जावे।
11. जिस तरह विद्युत संयंत्रों तथा कोयला खदान में अनुबंध (Linkage) है, उसी प्रकार का अनुबंध फ्लाई एष का उपयोग करने वाले संयंत्र के साथ भी होना चाहिये। इसके अतिरिक्त रेलवे विभाग रिक्त रेक की वापसी के समय फ्लाई एष के परिवहन के लिए रियायती दरों पर रेक (Wagon) उपलब्ध कराया जावे। इस हेतु कार्यवाही सुनिश्चित की जाये।

कॉन्फ्रेन्स में यह निर्णय लिया गया कि उपरोक्त अनुषंसाओं को संबंधित प्राधिकारियों/संस्थाओं को कार्यवाही हेतु प्रेषित किया जावे।

**Conference on Utilization of Fly Ash by Coal Based Thermal
Power Plants**

(Raipur Declaration – 02 June 2017)

In pursuance of the direction of Hon'ble National Green Tribunal, Central Zonal Bench, Bhopal and under the guidance of Government of Chhattisgarh, Department of Housing and Environment, Chhattisgarh Environment Conservation Board organized a conference on "Utilization of Fly Ash by Coal Based Thermal Power Plant" at Raipur. The conference was:

- Presided by : Hon'ble Justice Shri Dalip Singh, Member Judicial
Hon'ble National Green Tribunal, Central Zonal Bench,
Bhopal
- Chief Guest : Shri Rajesh Munat, Hon'ble Minister, Govt. of Chhattisgarh
Ministries of Environment, Housing, PWD and Transport
- Dignitaries : Shri S.S. Garbiyal, Expert Member
Hon'ble National Green Tribunal, Central Zonal Bench,
Bhopal
Shri Sanjay Shukla, Secretary
Dept. of Housing and Environment, Govt. of Chhattisgarh
Shri A.A. Mishra, Member Secretary
Madhya Pradesh Pollution Control Board
- Delegates : Representatives of Thermal Power Plants of the State of
Rajasthan, Madhya Pradesh and Chhattisgarh
Representatives of South Eastern Coalfields Limited (SECL)
Members of Fly Ash Manufacturers Association
Officials of Pollution Control Boards and others.

Technical presentations were delivered by Deputy Director, General of Mines and Safety, Central Zone, Nagpur, Executive Director, NTPC, New Delhi and Executive Vice President, M/s Jindal Power Limited, New Delhi in the conference.

In the conference extensive discussions were held on issues related to present status of use of fly ash in various activities, challenges encountered in implementing the provisions of notification issued by MoEF&CC and its remedies, new techniques and the options to enhance the utilization of fly ash. Based on the conclusions attained after deliberations, following declaration is issued:

1. While issuing environmental clearance to Thermal Power Plants, a condition is to be incorporated regarding preparation and submission of an action plan indentifying various possible activities where fly ash can be utilized.
2. Competent authorities such as Ministry of Coal, Government of India/Indian Bureau of Mines shall develop standards for closure of mines using ash (fly ash and bottom ash). Upon development of the standards, approval of mining plan should be done only after ensuring incorporation of such standards in the mining plan.
3. Coal companies shall identify economically unviable coal mines within one year having meager quantity of mineral deposits and in which mining is uneconomical and shall ensure commencement of action for filling with ash (fly ash and bottom ash) after preparation of mine closure plan.
4. Director General, Mines and Safety shall issue clarification that no separate permission is required from the department for filling of ash (fly ash and bottom ash) in the mines (underground and opencast).
5. In order to enhance the utilization of ash (fly ash and bottom ash) State Government, on the basis of "Polluter's Pay Principle" shall create "Fly Ash Utilization Fund". All thermal power plants of the state shall contribute their amount in this fund on the basis of production capacity, quantity and quality of coal used by them. Additionally, fine imposed on thermal power plants for indiscriminate dumping of ash, shall also be deposited in this fund.
6. Fly ash brick manufacturers and thermal power plants together shall form Co-operative Society. This Co-operative Society shall ensure regular and easy availability of ash (fly ash and bottom ash) to fly ash product manufacturers. The financial support may be provided to these manufacturers from "Fly Ash Utilization Fund".

7. Thermal power plants having capacity greater than or equal to 500 MW shall establish Captive Cement Grinding Unit, Lightweight Aggregate Manufacturing Plant, Ash Based Products Manufacturing Plant, Eco Friendly Products Plant etc. in their plant premises to ensure use of fly ash.
8. In order to make use of ash (fly ash and bottom ash) in other beneficial activities and to enhance its utilization, new technique and alternatives, use in agriculture activities, construction of low cost housing projects etc. shall be explored and encouraged through Research and Development (R and D).
9. The Central and State Government shall take necessary initiatives by providing subsidy in taxes (Fiscal Incentives) for the establishment and operation of ash based products manufacturing plants.
10. Thermal power plants shall make provisions for suitable fund under the head of "Corporate Social Responsibility" (CSR) and in view of employment generation, financial support may be instituted for the establishment of fly ash brick plants in nearby village areas. Additionally, availability of fly ash bricks at cheaper rates in these village areas, use of paver blocks for construction of village roads and fly ash products for construction of lake bunds shall be ensured.
11. As there are linkages among power plants and coal mines, similar linkages shall also be ensured among power plants and plants using fly ash. Additionally, Department of Railway shall make available empty wagons during returns at subsidized rate for the transportation of fly ash. Necessary action shall be ensured in this regard.

It was decided in the conference that concerned authorities/agencies shall be informed about the above recommendations for necessary action at their end.

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FINAL REPORT OF NTPC FUNDED PROJECT (2018-19)

on

“Preliminary Studies on Impact of Coal Dust on Soil, Crop and Tree Species due to Open Wagon Coal Transportation”



By

**Dr. J. R. Patel, Dr. A.K. Awasthi, Ajeet Williams, Dr. Geet Sharma,
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(CHHATTISGARH)**

Final Report of NTPC Funded Project
on
***“Preliminary Studies on Impact of Coal Dust on Soil,
Crop and Tree Species due to Open Wagon Coal
Transportation”***



INDIRA GANDHI KRISHI VISHWAVIDYALAYA
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FOREWARD

Agricultural crops, soil, water, air, different herbs, shrubs, trees and forest vegetations are affecting due to various pollutants present in environment. Out of different pollutants, coal dust is one of them, which may be beneficial / harmful to agriculture sector. Information pertaining to the impact of coal dust on soil, crop and tree species due to open wagon coal transportation is not available at this juncture. Further, in view of the increasing dependence on coal fired power plants as energy source during coming decades, and the environmental problems related to this developmental activity, the present work was planned in Sipat industrial area situated in Bilaspur district of Chhattisgarh, which is transported coal by railway wagon from Dipika mines of South Eastern Coalfields to NTPC, Sipat, Bilaspur (C.G.).

The report presented in this publication is a result of hard work of the research team of the BTC CARS, Bilaspur. In this project report, a sincere attempt is made to cover the different issues related to coal transportation by Sipat plant through Merry Go Round rail track. However, there may be some imperfections and mistakes.

To better understanding and simplification of the results, project report is presented in 11 chapters' viz., abstract, introduction, basic information of coal transportation work, objectives of the study, selection of experimental area, methodology, results and discussion, summary, conclusions and suggestions for future.

I would like to express my appreciation to the scientists of the IGKV, BTCCARS, Bilaspur and Department of Soil Science & Agriculture Chemistry, COA; Raipur who actively participated in the project to complete the job, without their help this research work could not be possible. I wish to record my grateful thanks to Dr R. K. Bajpai, (Director of Research, IGKV, Raipur) and Dr. R.K.S. Tiwari (Dean, CARS, Bilaspur) for technical supports, timely guidance and suggestions in the investigation. I also thankful to Department of Environment Management of Super Thermal Power Station (NTPC Limited) Sipat (Bilaspur) for their cooperation throughout the project period.

Place --- **Bilaspur**
Dated ---

(JAGAT RAM PATEL)
PRINCIPAL INVESTIGATOR

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ABSTRACT

The study entitled “**Preliminary studies on impact of coal dust on soil, crop and tree species due to open wagon coal transportation**” were undertaken by the Indira Gandhi Agriculture University, Barrister Thakur Chhedilal College of Agriculture and Research Station , Sarkanda, Bilaspur (Chhattisgarh) during 2018-19 crop season.

Rice crop cultivated under the study area indicated that the plant height, number of panicles, number of filled grains as well as grain and straw yields showed significant variation under distances from 10 to 1500 m of Merry Go Round (MGR) rail line. The grain yield obtained in 10 m distance was significantly lower than the yield obtained under 500, 1000 and 1500 m which were at par with each other. Straw yield of rice was also followed similar trends of the grain yield. Distribution of light textured soil nearby railway track and moderate to heavy textured soil at 1000 m and 1500 m away from railway track might be reason of variation in the crop yield. However, results are based on preliminary study and only one season data. To draw any conclusion, research work needs further confirmation through multi-season experimentation.

The silt and sand content of the soil were more near Merry Go Round (MGR) railway line *i.e.*, at 10 m distance than far distance *i.e.*, control site (1500 m). Soil bulk density was observed more at closer site of the MGR line (10 m) while porosity percentage was low at that point. The available Nitrogen, phosphorus, potassium, sulphur, boron, iron, magnesium, copper and zinc contents were higher at closer site (10 m distance) as compare to the control site (1500 m distance). Similarly, the soil microbial biomass carbon and colony forming unit of bacteria, fungus and actinomycetes were higher at 10 m distance. The very labile and labile fractions of the carbon were also higher at 10 m site. The forest zone had more microbial population along with the organic carbon percentage, soil microbial biomass carbon, fractions of carbon (very labile, labile and less labile carbon) and available nitrogen than the other zones

while cropped zone had more micronutrients than the other zones of the Merry Go Round railway line. However, heavy metals contents (cadmium, chromium, cobalt, nickel, lead and arsenic) did not showed regular trend under the first year study. The soil parameter pH found under neutral condition. The content of organic matter, available potassium and available sulfur were recorded medium in category. But available N status was under low category. The available P content was low to medium status. Further, the available Iron and Manganese observed towards higher value.

A reconnaissance survey of the vegetation was carried out around the MGR Railway track and inventory with floristic composition of plants was prepared. The vegetation analysis was done at 16 sites located at varying distances from the point source of pollution in the prevailing wind direction with the help of quadrates. During the course of study period, there was no well marked change in the species composition. The atmospheric pollutants can affect both the stability and the productivity of plant ecosystem. The estimates clearly indicated that the resistant species have occupied more space at the polluted sites, whereas the relatively sensitive plants are more at the sites far away from the source of pollution. Such changes have influenced the stability of sensitive plant species in the herbaceous community. Although the present study is preliminary in nature and need more detailed and exhaustive studies are called for.

INTRODUCTION

Sipat Super Thermal Power Station (Rajiv Gandhi Super Thermal Power Station) is located about 20 km away from Bilaspur head quarter on Bilaspur to Balouda road at Sipat village in Bilaspur district of Chhattisgarh State. The power plant is one of the coal based power plant of National Thermal Power Corporation (NTPC) Limited (A Government of India Enterprises). The coal for the power plant is sourced from Dipika mines of South Eastern Coalfields Limited. Coal transportation through Merry Go Round (MGR) rail line of Sipat to Dipika was started on 31st January, 2009. The project has an installed capacity of 2980 Mega watt (MW) consisting of two stages, stage one which got commissioned later was of 3 units of 660 MW each involving super-critical boilers technology and stage two consisted of 2 units of 500 MW.

National Thermal Power Corporation (NTPC) Sipat



BASIC INFORMATION OF COAL TRANSPORTATION WORK

Some basic information relating to coal transportation through MGR rail line as obtained from NTPC staff is given in Table -3. 1 below:-

Table – 3.1: Details of train and wagon used for coal transportation from Dipika to Sipat.

S. No.	Parameter	Details
1	Train speed (range)	20 – 40 km hr ⁻¹
2	Train speed (average)	25 km hr ⁻¹
3	Train trips (day)	15 – 16
4	Train trips (average/day)	14 – 15
5	Total cars in train	58 wagons
6	Wagon capacity /car	60-70 MT
7	Actual loading (weight) in car	62- 63 MT
8	Train timing	24 hrs
9	Wagon type Sipat/Rail	BOBR/BOXN
10	Coal size in wagon	200 mm

OBJECTIVES OF THE STUDY

The present work was planned in Sipat industrial area around the Merry Go round rail line situated in Bilaspur district of Chhattisgarh, India, as per following specific objectives:

- 1 Enumeration of crop and cropping pattern, soil properties, forest vegetation and tree species present in the study area.
2. Evaluation of the quantity of coal deposition in soil and plants due to transportation of coal on quarterly basis after monsoon rain
- 3 Determination of the effects of pollutants on different tree species present at study area
- 4 Physico-chemical analysis of soil and major plants grown/available in the study area
5. To create awareness among the farming community about the effect of coal dust in agriculture and forest trees species by the brochure/ pamphlet/ Kisan Goshthi/Farmer's Scientist interaction and/or Kisan Mela.

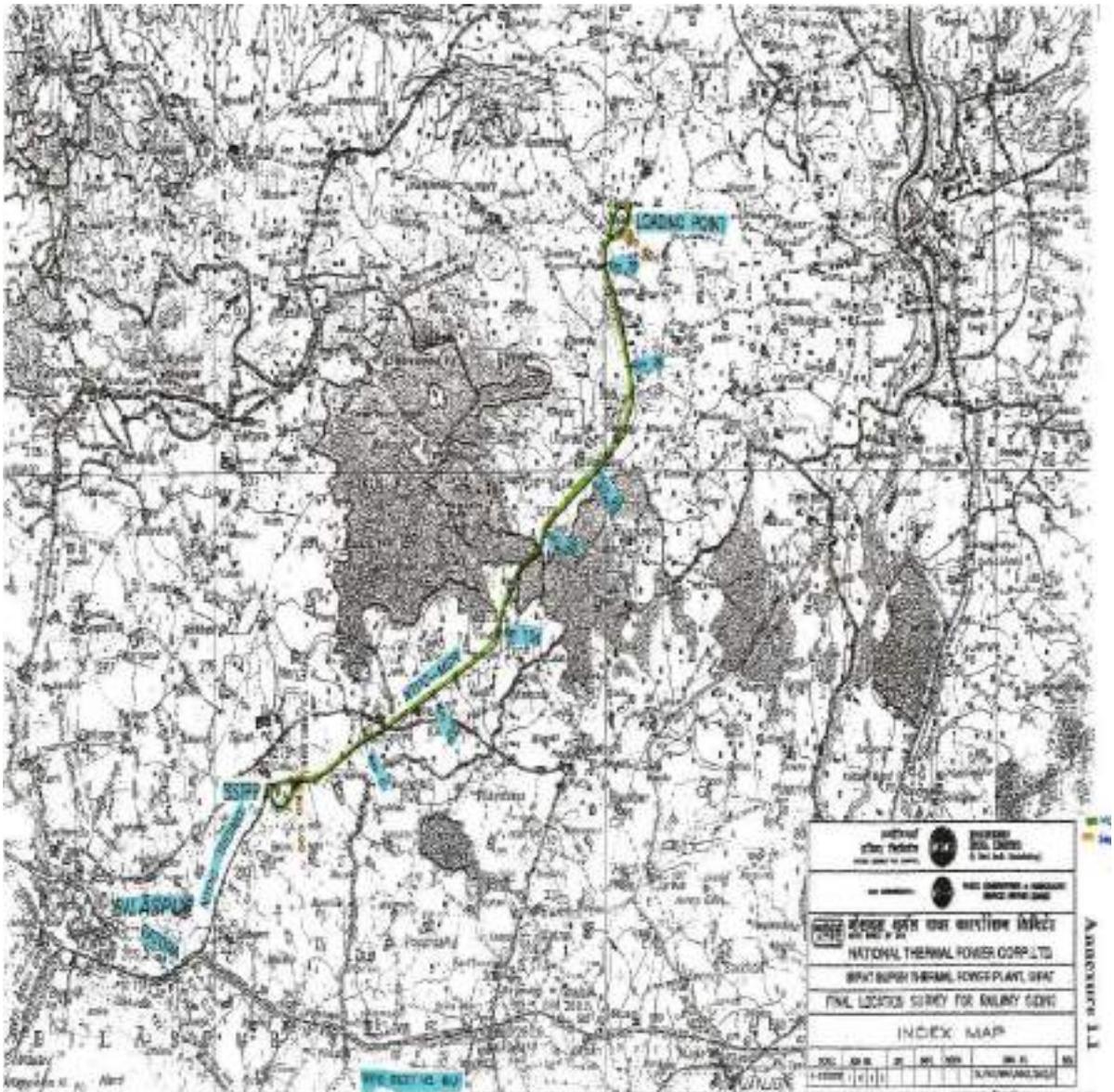
SELECTION OF EXPERIMENTAL AREA

On the basis of visual observation of 40 km long Merry Go Round (MGR) rail line from coal unloading point, Sipat to coal loading point, Dipika, three sites were selected for the purpose of study. The first point is named as crop area / zone which are situated in between 5 to 6 km away from SSPT, Sipat on MGR line. Area is only rice zone and covered Khanda & Parsahi villeges in right side while, villages Baniyadih & Juhali are situated in left side of MGR rail line. Second site is a reserved forest area / zone of village Nirtu spread over the both side of rail line in between Amanara (16 km) and Jhanga (21 km) villages. Newsa area (29 to 30 km) near village Renki (32 km) is the third spot, termed as mixed area / zone having fallow area & bushy plants in left side and fallow land as well as rice fields in right side of the MGR line.

Photograph of Study Site



MGR Rail Line SSPT, Sipat to Coal Loading Point Dipika



Sipat Topo - Sheet Map

COAL COMPOSITION

The coal sample analysis report obtained from CIMFR, Dhanbad provided by NTPC, Sipat indicated that coal ash contains 65.00, 26.80, 3.29, 1.90, 0.60, 0.63, 0.38, 0.31, 0.04 and 1.04 per cent oxide of silica, aluminum, ferrous, titanium, calcium, magnesium, phosphorus, sulphur, sodium and potassium, respectively. Report is given below:-



CENTRAL INSTITUTE OF MINING AND FUEL RESEARCH, BILASPUR UNIT
 27 Khuli Chowk, Murgel Road, P. Box-41, Bilaspur (C.E.) 495001
 दूरभाष : 07752-271453, 271581-87, 411328, फैक्स - 07752-271450

परिष्कार प्रमाणिका

Report No.15P/78(A)											
Method used: Proximat(ASTM-D7582), GCV(ASTM-D5868), HGI(ASTM-4133), TS(ASTM-D4239-05)&AFT(ASTM-D1973-03) Rigaku 25X Primea XRF											
Date of performance of the test : 01.10.2015 to 14.10.2015											
Measurement Uncertainty on 95% Confidence Limit											
Sampling procedure: Sampling not done by CIMFR Staff. VM± 0.2%, Ash± 0.2%, CI±0.0001%, S±0.13%											
Statement of analysis in respect of 01 coal sample received on 18.08.2015 from ST-084/HT-08-10°C (H/heat°C)											
The AGM/Chemistry, NTPC/Sipat, Dist. Bilaspur(C.E.) (for dry basis)											
Vide letter to C&M/Chem.2015-18/NIL Dated: 19.09.15											
Sl. no.	CIMFR No.	Party	Wt. In gms	Size	On 60% RH & 43oC						
		Sample No.		Passing	Moist %	Ash %	VM %	FC %	GCV kcal/kg	HGI	
1	502	STAGEH FEEDER COAL-30.07.2015	4850	6mm	6.45	20.23	27.58	35.74	4995	60	
Ash Fusion Temperature											
					DT(°C)	ST(°C)	HT(°C)	FT(°C)			
					1425	>1450	>1450	>1450			
Ash Analysis											
					SiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	TiO ₂ %	CaO %	MgO %	P ₂ O ₅ %
					65.00	26.80	3.29	1.90	0.60	0.63	0.38
					SO ₃ %	Na ₂ O %	K ₂ O %				
					0.31	0.04	1.04				
Note: Results of Ultimate Analysis will be communicated as soon as possible.											
F.N : 1) This is only a test report and results relate only to the items tested											
2) The report shall not be reproduced except in full without the approval of the lab.											
										 Officer-in-Charge CIMFR Bilaspur Unit.	

METHODOLOGY

(A) Experimental Crop Cultivation:

Study was conducted at crop area / zone during kharif season of 2018 under Randomized Block Design with five replications nearby Merry Go Round railway line of 40.00 km length from Sipat to Dipika. Both sides of rail line, 03 sub stations were marked at 0 m (near rail line, 10 m away), 500 m and 1000 m distance as treatment area and beyond 1000 m area was treated as control zone (1500 m) for crop cultivation.

Rice variety Indira Rajeshwari (IGKVR-1) a medium duration (125 days) was taken as test crop in the crop zone/ area of Merry go round rail line of Sipat to Dipika. Variety is a high yielder (46.96 – 51.88 q ha⁻¹), which is suitable for irrigated as well as rainfed areas of medium to heavy soils (Dorsa and Kanhar) of Chhattisgarh. Crop was fertilized @ 80:50:30 kg ha⁻¹ nitrogen: phosphorus pentoxide: potassium oxide, respectively. A seed rate of 70 kg ha⁻¹ was used. The details of kharif rice cultivation are given in table -7.1 and 7.2 as below:

Table – 7.1: Details of farmers under NTPC Sipat project in Bilaspur district (Kharif-2018).

S N	Farmers Name (Mr / Smt)	Father / Husband Name (Mr / Smt)	Village	Post	District	Aadhar No	Mobile No
Right hand side of MGR rail line - Sipat to Dipika (0, 500,1000 and 1500 meter distance ,respectively)							
1	Shyamlata	Arjun Lal Patanwar	Usalapur	Dhania	Bilaspur	716357075995	8889850738
2	Sant Ram	Kaleshwar	Parsahi	Dhania	Bilaspur	759000291807	7610685671
3	Nageshwari Patel (Ashok Patanwar)	Dampat Lal Patel	Raj Kishore Nagar	Lingiyadih	Bilaspur	323953995526	9926159487
4	Bihanu Singh (Ram lal)	Jhanglu Singh	Parsahi	Dhania	Bilaspur	720925224683	9753817678
Left hand side of MGR rail line - Sipat to Dipika (0, 500,1000 and 1500 meter distance respectively)							
1	Raghwendra Kashyap	Gangaram Kashyap	Baniyadih	Dhania	Bilaspur	531453200448	9753360564
2	Manohar Singh (Rameshwar)	Tijram	Baniyadih	Dhania	Bilaspur	560907145443	8223853518
3	Ramadhar Vishwakarma	Meluram Vishwakarma	Baniyadih	Dhania	Bilaspur	841739986553	9685886911
4	Daduram Neti (Hejpal / Gajpal)	Ghansay Neti	Juhli	Sonthi	Bilaspur	917157702697	9753408616

Table – 7.2: Details of farmers fields under NTPC Sipat project in Bilaspur district (Kharif-2018).

S. N.	Name (Mr / Smt)	Name Father/ Husband (Mr / Smt)	Village/Pat H No/ Revenue area	Field - Khasara No.	Field area (Decimal)	Date of Nursery	Date of transplanting
Right hand side of MGR rail line - Sipat to Dipika (0, 500,1000 and 1500 meter distance respectively)							
1	Shyاملata	Arjun Lal Patanwar	Khanda / 06/ Sipat	286/2	50.0	16.06.2018	10.08.2018
2	Sant Ram	Kaleshwar	Parsahi/ Sipat	69	90.0	03.07.2018	07.08.2018
3	Nageshwari Patel (Ashok Patanwar)	Dampat Lal Patel	Parsahi/ 00014 / Sipat	75/2	50.0	04.07.2018	09.08.2018
4	Bihanu Singh (Ram lal)	Jhangu Singh	Parsahi/ 36 / Sipat	282/21	15.0	30.06.2018	10.08.2018
Left hand side of MGR rail line - Sipat to Dipika (0, 500,1000 and 1500 meter distance respectively)							
1	Raghwendra Kashyap	Gangaram Kashyap	Baniyadih	588/2	40.0	02.07.2018	29.07.2018
2	Manohar Singh (Rameshwar)	Tijram	Baniyadih/14 / Sipat	101 & 102	40.0	24.06.2018	25.07.2018
3	Ramadhara Vishwakarma	Meluram Vishwakarma	Baniyadih/14 / Sipat	416	15.0	01.07.2018	04.08.2018
4	Daduram Neti (Hejpal/Gajpal)	Ghansay Neti	Juhli/ 21 / Sipat	1151/2	50.0	26.06.2018	03.08.2018
Total					350.0 Decimals (3.50 Acres) or 1.40 Hectares		

(B) Soil Properties in Study Area

Soil samples were collected from the study area (crop zone / area, forest zone / area and mixed fallow land / zone on transportation MGR rail line) and analysis were undertaken for its physicochemical (soil texture, bulk density, particle density, porosity percentage, soil pH, electrical conductivity, organic carbon percentage, available nutrients viz., N, P, K, S, Fe, Mn, Cu, Zn, B as well as heavy metals viz., Cd, Cr, Co, Ni, Pb and As as well as biological population of bacteria, actinomycetes and fungi; soil microbial biomass carbon and carbon fractions *i.e.*, very labile, labile, less labile and non-labile properties at Soil Science laboratory, BTCCARS, Bilaspur (CG) and Department of Soil Science & Agriculture Chemistry, IGKV, College of Agriculture, Raipur (CG). Data were statistically analyzed under three factors

Factorial Randomized Block Design with three replications. Twenty four combinations of treatments were considered under study as 03 locations (crop zone / area, forest zone / area and mixed fallow land / zone), 02 directions (left and right side of MGR line) and 04 distances (0, 500, 1000 and 1500 m) in width from 10 m away of rail line for soil analysis. Soil samples were taken around the studied area (railway line) before sowing of rice crop at crop zone, forest zone and mixed zone, termed as initial soil sample and after the harvest of crop in respective areas, termed as final soil sample for study purposes. Some laboratory equipments used during the course of investigation are given below:-



pH meter for soil analysis



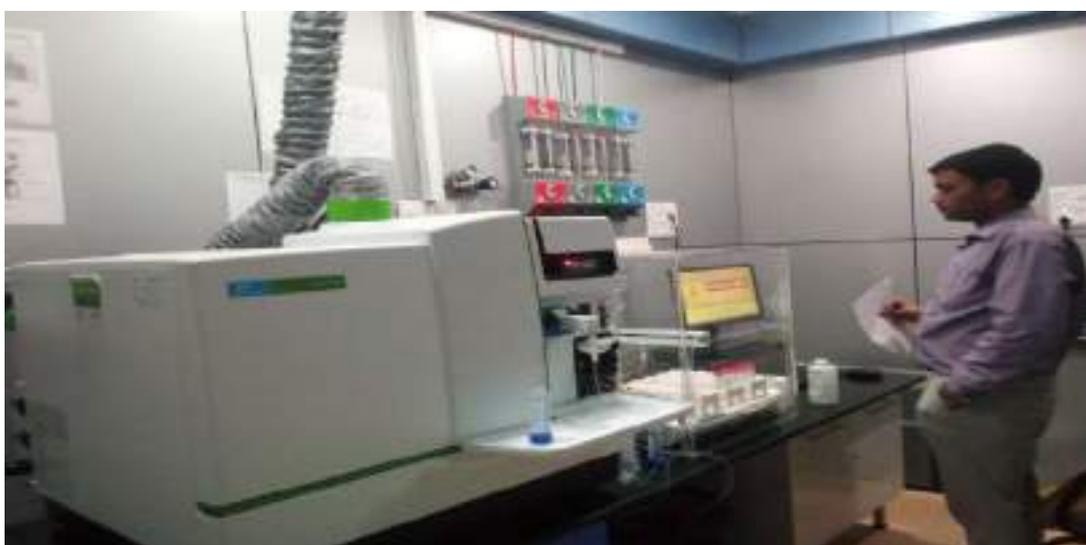
EC meter for analysis of electrical conductivity in soil



Digestion of soil for heavy metal analysis by microwave digestion system



Analysis of heavy metal in soil by inductively coupled plasma optical emission spectroscopy



Inductively coupled plasma mass spectroscopy for heavy metal analysis



Soil available phosphorus determination by spectrophotometer



Soil available Nitrogen determination in Nitrogen Distillation Unit



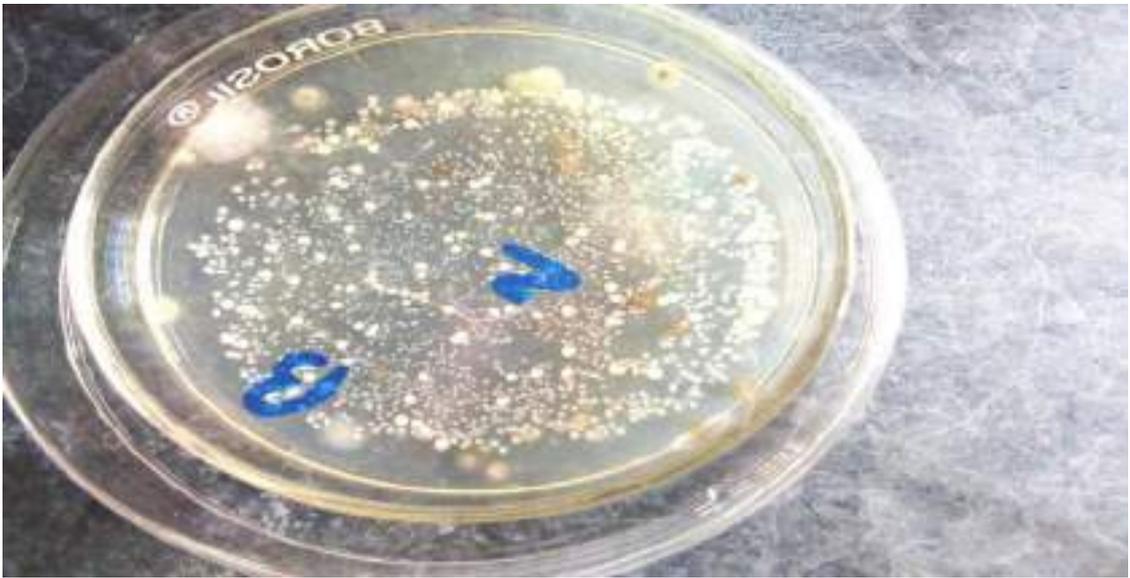
Soil available potassium determination by flame photometer



Digestion vessels for the analysis of heavy metals in soil



Microwave digestion system



Bacterial colonies in plate



Serial dilution and inoculation of the soil sample for microbial growth



Analysis of micronutrient by Atomic absorption spectroscopy

(c) Forest Vegetation and Tree Species:

A reconnaissance survey of the vegetation was carried out around the MGR and inventory with floristic composition of plants present was prepared. The vegetation analysis was done at twenty four sites located at varying distances from the point source of pollution in the prevailing wind direction with the help of quadrates. At each site, the quadrates were laid out randomly and the presence and absence of species in each quadrate were noted. In view of determination of the effects of pollutants on different tree species present at study area, sampling stations were established in three locations in both the side of MGR at four distances. Thus, there were twenty four grid points at a distance of 0, 500, 1000 and 1500 m from the centre in each direction. Except at the centre, in each grid point vegetation survey was conducted by quadrate method. At the centre, survey was conducted in the area between 0 to 25 m in each direction. Morphology of leaves was studied to assess the foliar damage due to pollution.

RESULTS AND DISCUSSION

The results obtained on various parameters of crop, soil and forest vegetation during the course of investigation entitled “**Preliminary studies on impact of coal dust on soil, crop and tree species due to open wagon coal transportation**” are presented objective wise in this chapter :-

Objective 1. Enumeration of Crop and Cropping Pattern, Soil Properties, Forest Vegetation and Tree Species Present in the Study Area

(A) Crop and Cropping Pattern:

Chhattisgarh state is known as rice bowl where paddy, maize, pigeonpea, blackgram, greengram, soybean, til, ramtil, groundnut, sunflower, kodon, kutki, ragi etc. crops are grown during monsoon season depending on soil type, soil situation, climatic zone and irrigation facility. Similarly, availability of irrigation water, condition of soil moisture, suitability of crop & variety, facility of animal protection etc., in some part of state winter cropping (rice, wheat, gram, lentil, linseed, pea, lakhdi safflower, sunflower etc.) are also practiced.

Site selected for study areas *i.e.*, in crop zone and mixed area, only rice is grown during kharif season under mono cropping system due to rain fed area and cultivation of long duration paddy varieties (more than 130 days). Lack of sufficient canal irrigation water and problems of stray animals in the selected area, in general rabi cropping is not practiced and economical.

Table – 8.1: Preliminary study on rice crop in farmer’s field under NTPC project study, Sipat (Kharif-2018).

Tr No	Treatment detail	Number of Hills (m ⁻²)	Plant height (cm)	Number of total tillers (m ⁻²)	Number of panicles (m ⁻²)	Length of panicle (cm)	Number of total grains (panicle ⁻¹)	Number of filled grains (panicle ⁻¹)	Test weight (g)	Grain yield (q ha ⁻¹)	Straw yield (q ha ⁻¹)
A	Side from railway track										
1	Right Side	34.0	118.30	137.30	124.25	22.99	170.65	136.20	28.18	40.015	43.335
2	Left Side	32.6	116.95	138.75	125.75	23.64	172.50	135.25	28.11	41.185	44.270
	CD (5 %)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
B	Distance from railway track										
1	0 m	32.5	108.50	131.60	111.70	22.53	162.50	120.60	27.99	36.860	38.630
2	500 m	32.8	115.80	136.70	126.90	23.24	168.50	137.90	28.09	40.960	44.600
3	1000 m	33.7	120.40	139.70	128.80	23.49	174.70	140.40	28.26	41.960	45.710
4	1500 m	34.2	125.80	144.10	132.60	24.00	180.60	144.00	28.26	42.620	46.270
	C D (5 %)	NS	8.99	NS	10.93	NS	NS	11.30	NS	3.65	3.74
	C V (%)	12.77	8.35	9.88	9.55	10.19	9.62	9.10	1.40	9.82	9.34

Results:

Study on rice crop under the study area indicated that all the rice parameters (number of hills, plant height, number of total tillers, number of panicles, length of panicle, number of total grains, number of filled grains, test weight, grain yield and straw yield) did not reached to the level of significance under left and right sides /directions of Merry Go Round rail line (Table – 8.1).

The plant height, number of panicles, number of filled grains as well as grain and straw yields showed significant variation under distances from 0 m to 1500 m of Merry Go Round rail line (Table – 8.1). Plant height observed value at 0 m distance was significantly lower as compared to 1000 and 1500 m distance, however, with no significant difference with 500 m distance. Recorded values of panicles and filled grains under 500, 1000 and 1500 m distances are statistically at par but higher than 0 m distance. The grain yield obtained in 0 m distance was significantly lower than the yield obtained under 500, 1000 and 1500 m which were at par with each other. Straw yield of rice was also followed similar trends of grain yield. Rest of the rice characters *i.e.* number of hills, number of total tillers, length of panicle, number of grains and test weight did not show any significant differences.

Distribution of light textured soil nearby railway track and moderate to heavy textured soil at 1000 m and 1500 m away from railway track (table – 8.2) might be reason of variation in the crop yield. In general yield of a crop is depends on number of factors in production system. Out of them, sowing method, time of sowing, variety, plant population, plant protection, plant physiological activities, soil type and its fertility, water and fertilizer management, deposition of pollutants *i. e.*, coal on plant surface etc are main factors. These factors may be also attributed in the present study. However, results are based on preliminary study and only one season data. To draw any conclusion, research work needs further confirmation through multi-season experimentation.

Survey on Insect-Pest and Disease:

The survey on insect pests and diseases in the farmers' rice crop as a major kharif crop in the selected study area, denoted their population / incidence below economic injury level (stem borer < 5 %, leaf folder < 1 - 2 freshly damaged leaf / plant, white backed plant hopper <10 - 20 insects / plant etc and bacterial leaf blast < 5 % disease severity) . Hence, indicated no significant effect on the rice yield.

Photographs of Experimental Rice field







(B) Soil type of the area

Texture of the soil

Soil textural classifications of different locations are given in table - 8.2. In crop zone of location - 1, the silty clay and clay soil were found in right side and left side of the railway track, respectively. In forest zone (location - 2), sandy clay loam to silty clay soil was observed in right side and sandy clay loam to clay soil in left side. However, mixed zone (location - 3) had sandy clay, sandy loam and sandy clay loam in right side and sandy clay, sandy clay loam and sandy loam soil were found in left side of the MGR rail track.

Table – 8.2: The textural classification of soil of the study sites of MGR rail track.

Treatments	Direction	Distance	Relative percentage of soil particles			Textural class
			Sand	Silt	Clay	
Location- 1 (cultivated / crop land)	Right side from railway track (Khanda and Parsahi)	0 m	33.44	20.8	45.76	Silty Clay soil
		500 m	26.4	13.8	59.8	
		1000 m	24.52	31.08	44.4	
		1500 m	39.24	21.7	39.06	
	Left side from railway track (Baniyadih and Juhali)	0 m	47.68	17.44	34.88	Clay Soil
		500 m	31.20	30.10	38.70	
		1000 m	23.84	31.36	44.80	
		1500 m	35.04	18.56	46.40	
Location -2 (forest land)	Right side Nirtu forest	0 m	62.92	12.36	24.72	Sandy Clay Loam
		500 m	57.32	12.80	29.87	
		1000 m	33.40	26.64	39.96	Silty Clay Soil
		1500 m	52.61	17.23	30.15	Sandy Clay Soil
	Left side Nirtu forest	0 m	65.85	08.53	25.60	Sandy Clay loam
		500 m	32.16	29.68	38.16	Clay Soil
		1000 m	47.92	17.36	34.72	
		1500 m	53.44	16.92	29.62	Sandy clay loam

Location -3 (mixed land)	Right side Newasa area	0 m	57.00	12.90	30.10	Sandy clay Soil
		500 m	66.08	8.48	25.44	
		1000 m	68.16	11.94	19.90	Sandy loam Soil
		1500 m	57.20	17.12	25.68	Sandy Clay Loam
	Left side Newasa area	0 m	71.16	8.24	20.60	Sandy Clay Soil
		500 m	59.00	16.40	24.60	Sandy Clay Loam
		1000 m	58.52	12.44	29.03	
		1500 m	71.24	12.31	16.43	Sandy Loam Soil





(c) Forest Vegetation and Tree Species:

There was no well marked change in the species composition. In general, the number of individuals and species increased with increasing distance from source. Table – 8.3 to 8.6 show the plant species at different study sites during rainy and winter seasons, respectively. The plant species like, *Cassia tora*, *Cynodon dactylon* and *Dichanthium annulatum* were more dominant in the close of the source. On the other hand dominant plant species e.g. *Achyranthes aspera*, *Convolvulus pluricaulis*, *Desmodium triflorum* etc. were more or less uniformly distributed. However, *Paspalidum flavidum*, *Phyllanthus simplex*, *Rungia repens* etc, were more dominant at distant places.

Diversity of the each species was more in rainy season which is quite natural. It is observed that the resistant species have occupied more space, whereas the relatively sensitive plants are more at the sites far away from the source. The successful survival of a species in the areas may be due to adequate biomass formation and their suitable structure, ability to survive and reproduce under the stress condition. The sensitive plants have been show impaired growth under polluted environment, leading to injury and death of the tissues. The absence of sensitive species in the area, results in decreased diversity and richness of species.

Table – 8.3: Trees at different sites of MGR track [Presence (+) and absence (-)]

Plant Species	Location - 1								Location - 2								Location - 3							
	Right Side				Left Side				Right Side				Left Side				Right Side				Left Side			
	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m
<i>Acacia nilotica</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Aegle marmelos</i>	+	+	+	+	-	-	+	+	+	-	+	+	-	-	+	+	-	+	+	+	-	-	+	+
<i>Ailanthus excels</i>	+	+	-	+	-	-	+	+	+	-	-	+	+	+	+	+	+	+	-	+	-	-	+	+
<i>Artocarpus heterophyllus</i>	-	-	+	+	-	-	+	+	+	-	+	+	+	-	+	+	-	-	+	+	-	-	+	+
<i>Azadirachta indica</i>	+	+	-	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Boswellia serrata</i>	-	-	-	-	-	-	-	-	-	-	+	+	-	-	+	+	-	-	-	+	-	-	-	+
<i>Butea monosperma</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Diospyros malnoxylon</i>	-	-	-	+	-	-	-	+	-	-	+	+	-	-	+	+	-	-	-	+	-	-	-	+
<i>Emblica officinalis</i>	-	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Ficus bengalensis</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Ficus religiosa</i>	-	+	-	+	-	+	+	+	-	-	+	+	-	+	+	+	-	+	-	+	-	+	+	+
<i>Hardwickia binata</i>	-	-	-	-	-	-	-	-	-	-	+	+	-	+	+	+	-	-	-	+	-	-	-	+
<i>Lagerstroemia parviflora</i>	-	-	-	-	-	-	+	+	-	+	+	+	-	+	+	+	-	-	-	+	-	-	+	+
<i>Madhuca indica</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Mangifera indica</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pongamia pinnata</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Syzygium cuminii</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Shorea robusta</i>	-	-	-	-	-	-	-	-	-	+	+	+	-	+	+	+	-	-	+	+	-	-	+	+
<i>Tamarindus indica</i>	+	-	-	+	+	-	+	+	-	-	-	+	+	-	+	+	+	-	-	+	+	-	+	+
<i>Terminalia arjuna</i>	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>T. tomentosa</i>	-	-	-	+	-	-	+	+	-	+	+	+	-	+	+	+	-	-	+	+	-	-	+	+

Table – 8.4: Shrubs at different sites of MGR track [Presence (+) and absence (-)]

Plant Species	Location - 1								Location - 2								Location - 3								
	Right Side				Left Side				Right Side				Left Side				Right Side				Left Side				
	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	
<i>Abutilon indicum</i>	-	-	-	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	
<i>Argemone maxicana</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Cassia occidentalis</i>	+	+	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	-	+	+
<i>Croton bonplandianum</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Crotalaria sericea</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	
<i>C. retusa</i>	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	
<i>Calotropis procera</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>C. gigantia</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Clitoria amuna</i>	-	+	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	
<i>Datura metal</i>	+	+	+	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	
<i>Euphorbia nerifolia</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	
<i>Ipomoea carnea</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	
<i>Lantana camara</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Nyctanthes arbortristis</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	
<i>Sida rhombifolia</i>	+	+	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
<i>Solanum xanthocarpum</i>	+	-	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	
<i>Smilex macrophylla</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	
<i>Tabernamontina coronaria</i>	-	+	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	
<i>Tephrosia purpurea</i>	+	-	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	
<i>Xanthium strumarium</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Xanthium spinubesia</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	

Table – 8.5: Herbs at different sites of MGR track [Presence (+) and absence (-)]

Plant Species	Location – 1								Location – 2								Location – 3							
	Right Side				Left Side				Right Side				Left Side				Right Side				Left Side			
	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 M	1500 m
<i>Achyranthes aspera</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ageratum conyzoides</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Amaranthus spinosus</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Alternanthera sessilis</i>	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+
<i>Atylosia scarabaeioides</i>	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+
<i>Boerhaavia diffusa</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Blumea mollis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Cassia tora</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Celosia argentea</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Convolvulus pluricaulis</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Commelina benghalensis</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Cleome viscosa</i>	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
<i>Crotalaria linifolia</i>	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-
<i>Cyperus rotundus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Desmodium triflorum</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eclipta alba</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Euphorbia hirta</i>	+	-	-	+	+	-	+	+	+	-	+	+	+	-	-	+	+	-	-	+	+	-	-	+
<i>Evolvulus alsinoides</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>E. nummularis</i>	-	+	+	+	-	+	-	+	-	+	-	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Echinops echinatus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Fimbristylis cypera</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Indigofera linifolia</i>	+	-	+	+	+	-	-	+	+	-	-	+	+	-	+	+	+	-	+	+	+	-	+	+
<i>Phyllanthus simplex</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Polygonum glabrum</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Phaseolus spp.</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Rungia elegans</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Rungia repens</i>	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Scoparia dulcis</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+

<i>Setaria glauca</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Sida cordata</i>	-	+	+	+	-	+	-	+	-	+	-	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Sida cordifolia</i>	-	+	-	-	-	+	+	-	-	+	+	-	-	+	-	-	-	+	-	-	-	+	-	-
<i>Typha angustata</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Tridax procumbens</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Trichodesma spp.</i>	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-

Table – 8.6: Grasses at different sites of MGR track [Presence (+) and absence (-)]

Plant Species	Location – 1								Location – 2								Location – 3							
	Right Side				Left Side				Right Side				Left Side				Right Side				Left Side			
	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m	0 m	500 m	1000 m	1500 m
<i>Apluda mutica</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+
<i>Anthranxon ciliaris</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Bothriochloa pertusa</i>	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+
<i>Chrysopogon fulvus</i>	-	-	+	+	-	-	+	+	-	-	-	+	-	-	-	+	-	-	+	-	-	-	+	+
<i>Cynodon dactylon</i>	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	-	+
<i>Dactyloctenium aegyptiacum</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Desmostachya bipinnatum</i>	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+
<i>Digitaria sanguinalis</i>	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	-	+
<i>Dicanthum annulatum</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eragrostis unioloides</i>	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Echinochloa colonum</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Eragrostis tenella</i>	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	+	-	+	-	+	+
<i>E. viscosa</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>E. ciliaris</i>	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+
<i>Heteropogon antheperoides</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Paspalidium flavidum</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>Saccharum munja</i>	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	+	-	+	-	+	+
<i>Saccharum spontaneum</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Setaria tometosa</i>	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+
<i>S. glauca</i>	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	+	-	-	-	+	+

Objective 2. Evaluation of the Quantity of Coal Deposition in Soil and Plants due to Transportation of Coal on Quarterly Basis after Monsoon Rain

The studies pertaining to objective 2 will be conducted in the forthcoming year.

Objective 3. Determination of the Effects of Pollutants on Different Tree Species Present at Study Area

From the survey carried out, it has been observed that under pollution, defoliation takes place, which is reflected from the physiological observations on plants. Plants in the north and south direction of MGR are affected. There is a reduction in number of species at the nearest point of the railway tract. A reduction is observed in the south and north direction. With the increase of the distance from the central point there is an increase in the number of species. The ground vegetation which are growing outside of the zone are *Achyranthes aspera*, *Cassia tora*, *Croton bonplandianum*, *Echinops echinatus*, *Indigofera linifolia*, *Parthenium hysterophorus*, *Scoparia dulcis*, *Solanum surattense*, *Cynodon dactylon*, *Dactyloctenium aegyptiacum*, *Eragrostis tenella*, *Saccharum munja*, *Dicanthium annulatum*, *Setaria glauca*, etc. However, these species are rarely found at the nearest point of the railway tract particularly in the north and south directions. Ground vegetation (herbs and grasses) and shrubs seem to be sensitive to pollution as compared to trees, the herbs and grasses being more affected. The leaves with different injury symptoms (Table – 8.9) indicate that pollutants are present in the area throughout the year although in the rainy season their concentrations are comparatively lower.

Herbal species are the susceptible while already established woody species are able to cope up with the pollution although they show some visible injury under stress. It has been observed that *Acacia nilotica*, *Aegle marmelos*, *Alianthus excelsa*, *Azadirachta indica*, *Butea monosperma*, *Ficus bengalensis*, *Ficus religiosa*, *Pongamia pinnata*, *Syzygium cuminii* are more resistant to dust as compared to others. These trees may provide a natural sink for air and dust pollution and may be planted on large scale.

Although the present study is preliminary in nature, and need more detailed and exhaustive studies are called for.

Table – 8.7: Observation data of plants in study area (H = High, M = Moderate, IR = Inconsistent Response).

S. No.	Plant Species	Location – 1						Location - 2						Location – 3					
		Right Side			Left Side			Right Side			Left Side			Right Side			Left Side		
		0 m	500 m	1000 m	0 m	500 m	1000 m	0 m	500 m	1000 m	0 m	500 m	1000 m	0 m	500 m	1000 m	0 m	500 m	1000 M
1.	<i>Acacia nilotica</i>	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
2.	<i>Aegle marmelos</i>	M	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
3.	<i>Alianthus excelsa</i>	M	M	IR	M	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
4.	<i>Artocarpus heterophyllus</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
5.	<i>Azadirachta indica</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
6.	<i>Butea monosperma</i>	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
7.	<i>Diospyros melanoxylon</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
8.	<i>Emblica officinalis</i>	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
9.	<i>Ficus bengalensis</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
10.	<i>Ficus religiosa</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
11.	<i>Hardwickia binata</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
12.	<i>Lagerstroemia parviflora</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
13.	<i>Madhuca indica</i>	M	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
14.	<i>Mangifera indica</i>	M	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
15.	<i>Pongmia pinnata</i>	M	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
16.	<i>Syzygium cumini</i> IR	M	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
17.	<i>Shorea robusta</i>	M	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR	H	M	IR
18.	<i>Tamarindus indica</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
19.	<i>Tectona grandis</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
20.	<i>Terminalia arjuna</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR
21.	<i>Terminalia tomentosa</i>	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR	M	M	IR

Table – 8.8: Number of species at various distances from the MGR track.

Direction	Distance	Tree	Shrubs	Herbs	Grasses	Total
Location – 1 Right Side	0 m	11	12	12	11	46
	500 m	13	18	25	10	66
	1000 m	11	18	29	16	74
	1500 m	17	19	28	18	82
Location – 1 Left Side	0 m	9	12	13	11	45
	500 m	11	15	26	10	62
	1000 m	17	18	28	16	79
	1500 m	18	19	28	19	84
Location – 2 Right Side	0 m	11	12	12	11	46
	500 m	13	15	25	10	63
	1000 m	18	18	29	15	70
	1500 m	21	19	28	19	77
Location – 2 Left Side	0 m	11	12	12	11	46
	500 m	16	15	26	10	67
	1000 m	21	18	29	15	83
	1500 m	21	19	28	20	88
Location – 3 Right Side	0 m	10	12	12	11	45
	500 m	13	15	26	10	64
	1000 m	14	18	29	19	80
	1500 m	21	19	28	15	83
Location – 3 Left Side	0 m	9	12	12	11	44
	500 m	11	15	26	10	62
	1000 m	18	18	29	19	84
	1500 m	21	19	28	20	88

Table – 8.9: Leaf injury symptoms of different tree species.

S. No.	Botanical Name	Tree Form	Injury Symptoms	Colour of injured tissue
1.	<i>Acacia nilotica</i>	T	MN	Light yellow
2.	<i>Aegle marmelos</i>	T	F	Brown to tan
3.	<i>Alianthus excels</i>	T	MC & IC	Yellow
4.	<i>Artocarpus heterophyllus</i>	T	TB	Brown to tan
5.	<i>Azadirachta indica</i>	T	MC	Light yellow
6.	<i>Butea monosperma</i>	ST/T	MN & MC	Brown to tan
7.	<i>Diospyros melanoxylon</i>	ST/T	MN, MC & IC	Brown to tan
8.	<i>Emblica officinalis</i>	T	MC & IC	Yellow
9.	<i>Ficus bengalensis</i>	T	MC	Light yellow
10.	<i>Ficus religiosa</i>	T	MC	Light yellow
11.	<i>Hardwickia binata</i>	T	MC	Light yellow
12.	<i>Lagerstroemia parviflora</i>	ST/T	F	Brown
13.	<i>Madhuca indica</i>	T	MN, MC & IC	Brown to tan
14.	<i>Mangifera indica</i>	T	MN, TB & IN	Dark brown
15.	<i>Pongmia pinnata</i>	T	MN	Light yellow
16.	<i>Syzygium cuminii</i>	ST/T	N & TB	Brown to tan
17.	<i>Shorea robusta</i>	T	MN & TB	Brown to tan
18.	<i>Tamarindus indica</i>	T	MN	Light yellow
19.	<i>Tectona grandis</i>	T	MN	Yellow
20.	<i>Terminalia arjuna</i>	T	F	Brown to tan
21.	<i>Terminalia tomentosa</i>	T	MC & IC	Yellow

T = Tree ST = Small Tree MN = Marginal necrosis MC = Marginal chlorosis
 TB = Tip burn IC = Interveinal chlorosis F = Flecking IN = Interveinal necrosis

Objective 4. Physico-Chemical Analysis of Soil and Major Plants Grown/ Available in the Study Area

The changes in important soil physical, chemical and biological properties around merry Go Round railway line are summarized as bellow;-

1. Bulk density (ρ_b) of the soil

The bulk density of soil in respect of three locations and both directions did not show any significant differences under study. Table 8.10 showed that he maximum bulk density was recorded at 10 m site (1.40 Mg/m^3) of the MGR railway track and lowest at 1500 m site (1.28 Mg/m^3). The bulk density of the closer site (10 m) was higher as compare to 500 m (1.37 Mg/m^3), 1000 m (1.32 Mg/m^3) and 1500 m site (1.28 Mg/m^3). The bulk density of the soil was more at closer site and it gradually decreases with increase in distance. The sand and silt contents were higher at 10 m site which might increase bulk density of soil. This may be due to the more minute dust particles as well as the numbers of pores which were higher (table 8.10) in control site (1500 m) of the study area and it might increase the volume of the soil as well as surface area of the soil too.

2. Particle density (ρ_s) of the soil

Soil parameter, the particle density did not show any significant differences in respect of locations and directions in study area (table – 8.10). The maximum particle density was recorded at 10 m site from the railway track and minimum at 1500 m distance (table 8.10). The particle density of the closer site (10 m) was higher (2.60 Mg/m^3) as compare to 500 m (2.51 Mg/m^3), 1000 m (2.42 Mg/m^3) and 1500 m site (2.34 Mg/m^3). The particle density of the soil was lowest at control site (1500 m) and it gradually increases towards the closer site (10 m).

3. Porosity (f) percentage of the soil

The Porosity percentage of the soil did not reach to the level of significance under locations and directions of MGR track. The maximum porosity percentage (49.68 %) was recorded at 1500 m site which was higher than the 10 m (40.09 %), 500 m (44.90 %) and 1000 m distance (47.16 %). The result (table – 8.10) showed that the nearby (10 m) soil of the MGR railway line had minimum porosity percentage and it gradually increases with the distance increases from the railway track. These gradual increases in soil porosity percentage towards control site may be due to the more minute pollutants in soil which increases the volume of the soil and thus the pores content of the soil due to their minute size as well as the clay content of the soil which were higher at 1000 m and 1500 m site.

Table - 8.10: Bulk density, particle density and porosity percentage of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Bulk density (Mg/m ³)	Particle density (Mg/m ³)	Porosity Percentage
A. Location at railway track				
1	Crop zone	1.35	2.49	46.13
2	Forest zone	1.31	2.46	46.60
3	Mixed zone	1.36	2.44	43.64
	CD (5 %)	NS	NS	NS
B. Side from railway track				
1	Right Side	1.33	2.44	46.21
2	Left side	1.35	2.49	44.71
	CD (5 %)	NS	NS	NS
C. Distance from railway track				
1	10 m	1.40	2.60	40.09
2	500 m	1.37	2.51	44.90
3	1000 m	1.32	2.42	47.16
4	1500 m	1.28	2.34	49.68
	CD (5 %)	0.082	0.12	3.9

4. Soil pH

The soil pH did not reach to the level of significance under locations and directions of MGR track in both initial and final soil samples. In initial soil sample, the soil pH at 1500 m site (6.73) was significantly higher than the 10 m (6.63), 1000 m (6.56) and 500 m site (6.28) and while in case of the final soil sample, maximum soil pH was recorded at 1500 m site (6.63) which was significantly higher than the 1000 m (6.55), 500 m (6.42) and 10 m site (6.38). The soil pH of the control site (1500 m) was slightly higher as compare to the other distances from the track. The decrease in soil pH towards MGR line of the study area might be due to organic matter which was higher at 10 m distance and thus the soil pH was lower than the other distance of the research area. However, the pH of the soil of study area is neutral in condition (Ranges from 6.5-7.0).

5. Electrical conductivity (EC) of soil

The EC of the soil did not show any significant differences in respect of locations (both soil samples) and directions (initial soil sample). Results shown in table 8.11 revealed that the electrical conductivity of the closer site (10 m) soils was higher compare to control site (1500 m). The four distances (10 , 500 , 1000 and 1500 m) shows non-significant results in initial soil sample while in case of the final soil sample the EC of the 10 m site (0.22 dS/m) was significantly higher than the 500 m (0.19 dS/m), 1000 m (0.18 dS/m) and 1500 m site (0.17dS/m). The gradual increase in the EC of the soil towards the railway line may be due to the increase in the many heavy metals (table 8.15 & 16) and micronutrient (table 8.13 & 14) content of soil which may associate with the particles of the pollutant.

6. Soil organic carbon (OC)

The percentage of the organic carbon was more at forest zone (0.72% in initial and 0.74 % in final soil sample) and minimum at mixed zone (0.61 % in initial soil) and in crop zone (0.64 % in final soil). The left side has more organic carbon (0.65% in initial and 0.70% in final soil sample) than right side (0.69 % in initial and 0.69 % in final soil).The organic carbon percentage (table 8.11) of the closer site (10 m and 500 m) soils was higher than the control site (1500 m). The very labile and labile carbon fraction of the soil was reduced at far site (table 8.18) which might be reason for decrease in organic carbon percentage with distance in study area. However the O C value of soil is under medium category.

Table - 8.11: Soil pH, electrical conductivity and organic carbon percentage of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	pH		Electrical conductivity (dS/m)		Organic carbon (%)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	6.76	6.44	0.118	0.18	0.68	0.64
2	Forest zone	6.40	6.56	0.112	0.20	0.72	0.74
3	Mixed zone	6.50	6.49	0.115	0.19	0.61	0.71
	CD (5 %)	NS	NS	NS	NS	0.017	0.023

B. Side from railway track							
1	Right Side	6.56	6.48	0.128	0.20	0.656	0.7
2	Left side	6.54	6.51	0.102	0.18	0.692	0.69
	CD (5 %)	NS	NS	NS	0.01	0.014	NS
C. Distance from railway track							
1	10 m	6.63	6.38	0.126	0.22	0.73	0.76
2	500 m	6.28	6.42	0.101	0.19	0.68	0.71
3	1000 m	6.56	6.55	0.106	0.18	0.66	0.67
4	1500 m	6.73	6.63	0.127	0.17	0.60	0.63
	CD (5 %)	0.055	0.114	NS	0.014	0.02	0.027

7. Available soil nitrogen (N)

The maximum available nitrogen content was recorded in forest zone (158.4 kg ha⁻¹ in initial and 152.61 kg ha⁻¹ in final soil sample) which were significantly higher than the crop zone (132.9 kg ha⁻¹ in initial and 130.35 kg ha⁻¹ in final soil sample) and mixed zone (120.5 kg ha⁻¹ in initial and 119.65 kg ha⁻¹ in final soil sample). The left side (139.7 kg ha⁻¹ in initial soil and 133.19 kg ha⁻¹ in final soil sample) had more available nitrogen than the right side (134.8 kg ha⁻¹ in initial soil and 135.21 kg ha⁻¹ in final soil sample).

The available nitrogen content in the closer site (10 m and 500 m) was higher as shown in table 8.12. Initial soil sample had 165.6 kg ha⁻¹ available nitrogen at 10 meter site which was significantly higher than the other sites 500 m (150.7 kg ha⁻¹), 1000 m (124.4 kg ha⁻¹) and control *i.e.*, 1500 m (108.4 kg ha⁻¹) while in case of the final soil sample, maximum available nitrogen (167.92 kg ha⁻¹) was recorded at closer site (10 m) which was significantly higher than the 500 m (140.96 kg ha⁻¹), 1000 m (122.78 kg ha⁻¹) and 1500 m site (105.16 kg ha⁻¹). The increase in available nitrogen status of the soil towards the MGR railway line may be due to increase in organic carbon content (table 8.11) as well as the labile carbon fraction (table 8.18) of the soil. Available N status of soil is low in category.

8. Available soil phosphorus (P)

The high available phosphorus was recorded at mixed zone (14.1 kg ha⁻¹ in initial soil) which was higher than the cropped zone (12.6 kg ha⁻¹ in initial soil) and minimum at forest zone (10.4 kg ha⁻¹ in initial soil). The available P content in soil was found no significant in different zones in final soil sample. In respect of sides, left side (12.2 kg ha⁻¹ in initial soil and 13.55 kg

ha⁻¹ in final soil sample) of the studied area had more available phosphorus than the right side (12.6 kg ha⁻¹ in initial soil and 13.34 kg ha⁻¹ in final soil sample).

Data shown in table 8.12 revealed that the closure site to railway track (10 m) has higher (14.1 kg ha⁻¹) available phosphorus content than the far sites 500 m (11.4 kg ha⁻¹), 1000 m (11.5 kg ha⁻¹) and 1500 m (12.6 kg ha⁻¹) in initial soil sample. Similarly, in final soil sample, the available phosphorus recorded was significantly higher at 10 m (15.33 kg ha⁻¹) as compared to 500 m site (13.66 kg ha⁻¹), 1000 m (12.48 kg ha⁻¹) and 1500 m (12.31 kg ha⁻¹).

The phosphorus status of the final soil sample was more than the initial sample; it may be due to the transformation of the fixed phosphorus into available phosphorus by the soil microbes. However the available P content in soil is found low to medium in range.

9. Available soil potassium (K)

Cropped zone had high available potassium status (262.5 kg ha⁻¹ in initial soil and 264.92 kg ha⁻¹ in final soil sample) which was significantly higher than forest zone (204.2 kg ha⁻¹ in initial soil and 206.91 kg ha⁻¹ in final soil sample) and mixed zone (218.5 kg ha⁻¹ in initial soil and 218.19 kg ha⁻¹ in final soil sample). Significantly lower available potassium was recorded at left side (226.4 kg ha⁻¹ in initial soil and 223.32 kg ha⁻¹ in final soil sample) than the right side (230.3 kg ha⁻¹ in initial soil sample and 236.70 kg ha⁻¹ in final soil sample).

Table 8.12 depicts that the available potassium content of the experimental site decreased with increase in distance from the railway line and increase from initial to final soil sample. The maximum available potassium (249.8 kg ha⁻¹) was recorded in closer site (10 m) which was significantly higher than the 500 m (234 kg ha⁻¹), 1000 m (222.8 kg ha⁻¹) and 1500 m site (207 kg ha⁻¹) in initial soil sample while in case of the final soil sample, maximum available potassium (257.55 kg ha⁻¹) was found at 10 m which was significantly higher than the 500 m (239.45 kg ha⁻¹), 1000 m (223.90 kg ha⁻¹) and control *i. e.*, 1500 m site (199.12 kg ha⁻¹).

The available potassium content was increased from initial to final soil sample might be due to the transformation of fixed potassium into available form by microbial activity. The available K content in soil was found under medium category.

Table - 8.12: Available nitrogen, phosphorus and potassium contents of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Nitrogen (kg ha ⁻¹)		Phosphorus (kg ha ⁻¹)		Potassium (kg ha ⁻¹)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	132.9	130.35	12.6	13.42	262.5	264.92
2	Forest zone	158.4	152.61	10.4	13.10	204.2	206.91
3	Mixed zone	120.5	119.65	14.1	13.82	218.5	218.19
	CD (5 %)	7.5	10.52	0.72	NS	0.95	11.65
B. Side from railway track							
1	Right Side	134.8	135.21	12.6	13.34	230.3	236.70
2	Left side	139.7	133.19	12.2	13.55	226.4	223.32
	CD (5 %)	6.12	NS	0.59	NS	0.78	9.51
C. Distance from railway track							
1	10 m	165.6	167.92	14.1	15.33	249.8	257.55
2	500 m	150.7	140.96	11.4	13.66	234.0	239.45
3	1000 m	124.4	122.78	11.5	12.48	222.8	223.90
4	1500 m	108.4	105.16	12.6	12.31	207	199.12
	CD (5 %)	8.66	12.14	0.83	0.8	1.1	13.45

10. Available soil sulphur (S)

The available sulphur content in different zones as well as both directions *i.e.*, left and right side of the studied area shows non-significant result. However, data recorded in final sample from various zones had significant effect. Crop (26.29 kg ha⁻¹) and forest (26.04 kg ha⁻¹) zone are statistically at par and crop zone is significantly better than the mixed zone (24.69 kg ha⁻¹).

The available sulphur content in soil presented in table 8.13 showed decreasing orders *i.e.*, maximum sulphur was recorded at closer site to railway track (10 m) while minimum at control site (1500 m). Initial soil sample reveals that the maximum available sulphur (28.6 kg ha⁻¹) was recorded at 10 m of the MGR railway track which was significantly higher than the 500 m (25.41 kg ha⁻¹), 1000 m (23.21 kg ha⁻¹) and 1500 m site (21.74 kg ha⁻¹) while in case of the final

soil sample, the maximum available sulphur (29.75 kg ha^{-1}) was recorded at 10 m site which was significantly higher than the 500 m (26.81 kg ha^{-1}), 1000 m (23.69 kg ha^{-1}) and 1500 m site (22.44 kg/ha). The available S recorded under medium category.

11. Available soil boron (B)

The boron content in soil was found non-significant in different locations in both initial and final soil sample. However, the significant result was found in boron content in respect of directions (initial and final soil sample). The more available boron content was analyzed at right side (0.65 ppm in initial soil and 0.55 ppm in final soil sample) than the left side (0.53 ppm in initial soil and 0.52 ppm in final soil sample). Table 8.13 depicts that the maximum boron content (0.72 ppm) was recorded in 10 m site which was significantly higher than the 500 m (0.63 ppm), 1000 m (0.54 ppm) and 1500 m site (0.47 ppm) in initial soil sample. Similar trend was recorded for final soil sample.

12. Available soil iron (Fe)

The cropped zone (24.39 ppm in initial soil and 24.25 ppm in final soil sample) had more available iron content which was higher than the mixed zone (23.10 ppm in initial soil and 23 ppm in final soil sample) and minimum iron status was recorded in forest zone (21.71 ppm in initial soil and 23.65 ppm in final soil sample). The iron content of the left side (23.7 ppm in initial soil sample and 23.08 ppm in final soil sample) was more than the right side (22.5 ppm in initial soil sample and 24.18 ppm in final sample) of the studied area. As depicted in table 8.13 that the maximum iron content (23.7 ppm) in initial soil was obtained at 1000 m site which was found at par with 10 m (23.6) while in case of the final soil sample, the maximum iron concentration (28.37 ppm) was recorded at 10 m site which was significantly higher than the 500 m site (24.68 ppm), 1000 m (21.20 ppm) and control site *i. e.*, 1500 m (20.27 ppm). The observe value of DTPA extractable Fe is towards higher value (more than 4.5 ppm).

Table - 8.13: Available S, B and Fe content of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Available sulphur (kg ha ⁻¹)		Available boron (ppm)		Available iron (ppm)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	25.20	26.29	0.60	0.55	24.39	24.25
2	Forest zone	25.1	26.04	0.59	0.52	21.71	23.65
3	Mixed zone	23.92	24.69	0.58	0.54	23.10	22.99
	CD (5 %)	NS	1.40	NS	NS	0.29	0.87
B. Side from railway track							
1	Right Side	24.99	26.07	0.65	0.55	22.5	24.18
2	Left side	24.49	25.27	0.53	0.52	23.7	23.08
	CD (5 %)	NS	NS	0.033	0.028	0.24	0.71
C. Distance from railway track							
1	10 m	28.6	29.75	0.72	0.69	23.6	28.37
2	500 m	25.41	26.81	0.63	0.57	23.3	24.68
3	1000 m	23.21	23.69	0.54	0.49	23.7	21.20
4	1500 m	21.74	22.44	0.47	0.40	21.7	20.27
	CD (5 %)	1.53	1.62	0.047	0.04	0.33	1.01

13. Available soil manganese (Mn)

The maximum available manganese status was recorded at cropped zone (18.1 ppm in initial soil and 18.60 ppm in final soil sample) which was significantly higher than the forest zone (16.3 ppm in initial soil and 17.03 ppm in final soil sample) and mixed zone (17.2 ppm in initial soil sample and 16.41 ppm in final soil sample). The left side (17.8 ppm in initial soil and 17.80 ppm in final soil sample) of the studied area had significantly more manganese content than the right side (16.60 ppm in initial soil and 16.90 ppm in final soil sample). The higher manganese concentration (table - 8.14) was recorded in 10 m and 1000 m sites of railway line which were significantly higher than the 500 m (17.4 ppm) and 1500 m site (16.1 ppm) in initial soil sample while in case of the final soil sample, high manganese concentration (20.29 ppm) was recorded at 10 m site followed by 500 m (17.78 ppm), 1000 m (17.11 ppm) and least at 1500 m site (14.22 ppm). The observe value of DTPA extractable Mn is towards higher value (more than 3.5 ppm).

14. Available soil copper (Cu)

The non-significant results were recorded with reference to available copper between the directions and different locations. Result (table 8.14) revealed that the available copper status was more at closer site (10 m) of the railway track. The maximum concentration (3.13 ppm) was recorded at 10 m site followed by 500 m (2.97 ppm), 1000 m (2.99 ppm) and control site (2.96 ppm) in initial soil sample while in case of final soil sample, maximum available Cu was recorded at 10 m site (3.16 ppm) which was significantly higher than the 500 m (3.01), 1000 m (2.88 ppm) and 1500 m (2.79 ppm).

15. Available soil zinc (Zn)

The maximum available zinc was recorded at cropped zone (0.77 ppm in initial soil and 0.62 ppm in final soil sample) which was significantly higher than the forest zone (0.53 ppm in initial soil and 0.66 ppm in final soil sample) and mixed zone (0.48 ppm in initial soil sample and 0.58 ppm in final soil sample). Further, significantly more available zinc was recorded at left side (0.65 ppm in initial soil sample and 0.64 ppm in final soil sample) than the right side (0.53 ppm in initial soil sample and 0.64 ppm in final soil sample) of the studied area. Table 8.14 depicts that the high concentration of available zinc (0.78 ppm) was recorded at closer point (10 m) which was significantly higher than the 500 m (0.49), 1000 m (0.56 ppm) and 1500 m site (0.54 ppm) in initial soil sample while in case of the final soil sample, the maximum zinc concentration (0.75 ppm) was recorded at 10 m site which was significantly higher than the 500 m (0.69 ppm), 1000 m (0.62 ppm) and 1500 m site (0.42 ppm). The suitable range of Zn; if less than 0.6 ppm indicates insufficient and more than 0.6 ppm refers sufficient available content in soil.

The available micronutrient concentration (B, Fe, Mn, Cu and Zn) of the soil increases towards the railway track might be due to the more microbial population (table 8.17).

Table - 8.14: Available Mn, Cu and Zn content of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Available manganese (ppm)		Available copper (ppm)		Available zinc (ppm)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	18.1	18.60	3.18	3.00	0.77	0.62
2	Forest zone	16.3	17.03	3.20	2.96	0.53	0.66
3	Mixed zone	17.2	16.41	2.68	2.93	0.48	0.58
	CD (5 %)	0.17	0.789	NS	NS	0.013	0.047
B. Side from railway track							
1	Right Side	16.6	16.90	3.09	2.96	0.53	0.60
2	Left side	17.8	17.80	2.94	2.96	0.65	0.64
	CD (5 %)	0.14	0.644	NS	NS	0.011	0.038
C. Distance from railway track							
1	10 m	17.6	20.29	3.13	3.16	0.78	0.75
2	500 m	17.4	17.78	2.97	3.01	0.49	0.69
3	1000 m	17.6	17.11	2.99	2.88	0.56	0.62
4	1500 m	16.1	14.22	2.96	2.79	0.54	0.42
	CD (5 %)	0.20	0.911	0.011	0.13	0.015	0.054

16. Heavy metals Cadmium (Cd), Cobalt (Co) and Chromium (Cr) content

The heavy metal Cd, Co and Cr contents are given in table 8.15. In initial soil sample, the maximum cadmium concentration (2.04 ppm) was recorded at forest zone followed by mixed zone (1.54 ppm) and minimum at crop zone (1.44 ppm). However, directions did not reach to the level of significance. Results revealed that in initial soil sample, site 10 m (1.82 ppm) and 1000 m (1.82 ppm) recorded maximum cadmium content and are significantly higher than the 500 m (1.37 ppm) and 1500 m (1.68 ppm) sites while in case of the final soil sample, it was found non-significant.

The cobalt content in soil did not show any significant results with any factor. However, the forest zone had maximum cobalt (37.32 ppm) followed by mixed zone (35.50 ppm) and crop zone (34.60 ppm) in final soil sample.

The maximum chromium concentration was recorded at forest zone (36.72 ppm in initial soil and 38.67 ppm in final soil sample) and minimum at crop zone (30.67 ppm in initial soil and 34.58 ppm in final soil sample). The mixed zone recorded 33.76 ppm in initial soil and 36.73 ppm in final soil sample. Further, concentration of left side (35.08 ppm in initial soil sample and 35.73 ppm in final soil sample) was significantly higher than the right side (32.36 ppm in initial soil and 37.59 ppm in final soil sample). In final soil sample, the maximum chromium concentration (38.31 ppm) was recorded at closer site (10 m) of the MGR railway line which was significantly higher than the 500 m (34.93 ppm) and 1500 m (35.80 ppm) but at par with 1000 m site (37.60 ppm).

Table - 8.15: Cadmium, Cobalt and Chromium content of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Cadmium (ppm)		Cobalt (ppm)		Chromium (ppm)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	1.44	1.80	32.12	34.60	30.67	34.58
2	Forest zone	2.04	1.95	34.41	37.32	36.72	38.67
3	Mixed zone	1.54	1.87	32.34	35.50	33.76	36.73
	CD (5 %)	0.176	NS	NS	2.16	2.35	2.25
B. Side from railway track							
1	Right Side	1.61	1.82	32.13	35.65	32.36	37.59
2	Left side	1.74	1.92	33.78	35.96	35.08	35.73
	CD (5 %)	NS	NS	NS	NS	1.92	1.84
C. Distance from railway track							
1	10 m	1.82	1.96	33.08	37.00	34.54	38.31
2	500 m	1.37	1.85	33.58	35.69	32.78	34.93
3	1000 m	1.82	1.87	31.38	35.60	34.11	37.60
4	1500 m	1.68	1.80	33.79	34.94	33.44	35.80
	CD (5 %)	0.203	NS	NS	NS	NS	2.60

17. Heavy metals Lead (Pb), Nickel (Ni) and Arsenic (As)

In initial soil sample, maximum lead content (7.35 ppm) was recorded under forest zone and minimum at crop zone (5.86 ppm). However, mixed zone (6.16 ppm) and crop zone are statistically at par. The left side (6.73 ppm) had higher lead content compared to right side (6.18 ppm) in initial soil sample of the studied area. Further, the lead content in soil showed no significant results in respect of distances in initial soil under study. However, in case of final soil sample, all three factors were showed non-significant results.

Nickel content at different locations and sides were found non-significant. Content of this metal in soil showed erratic pattern in respect of different distances *i.e.*, maximum was found at 1000 m (35.08 ppm) followed by 1500 m (34.43 ppm) and lowest at 500 m distance (31.51 ppm) in initial soil and in final soil, maximum was at 1500 m distance (36.27 ppm) and minimum at 500 m distance (32.01 ppm).

The arsenic content in initial as well as final soil samples were found non-significant for all three factors under study.

In general, the heavy metal contents were increased from initial to final soil sample.

Table - 8.16: Heavy metals (Pb, Ni and As) content of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Lead (ppm)		Nickel (ppm)		Arsenic (ppm)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	5.86	6.83	33.20	34.29	1.87	1.92
2	Forest zone	7.35	7.40	33.22	34.58	1.90	1.94
3	Mixed zone	6.16	7.37	33.38	35.27	1.88	1.93
	CD (5 %)	0.57	NS	NS	NS	NS	NS
B. Side from railway track							
1	Right Side	6.18	7.14	31.90	34.51	1.94	1.97
2	Left side	6.73	7.26	34.63	34.92	1.83	1.89
	CD (5 %)	0.47	NS	1.88	NS	NS	NS
C. Distance from railway track							
1	10 m	6.87	7.68	32.06	35.05	1.95	2.02
2	500 m	6.57	6.67	31.51	32.01	1.81	1.82
3	1000 m	6.02	7.33	35.08	35.53	1.86	1.89
4	1500 m	6.36	7.11	34.43	36.27	1.91	1.98
	CD (5 %)	NS	NS	2.66	2.68	NS	NS

18. Soil microbial population (colony forming unit/ CFU) of Bacteria, Actinomycetes and Fungus

The highest CFU of bacteria per gram of soil was recorded at forest zone (156.5×10^6 cfu/g in initial soil and 160.5×10^6 cfu/g in final soil sample) which was significantly higher than the mixed zone (66.5×10^6 cfu/g in initial soil and 160.5×10^6 cfu/g in final soil sample) and cropped zone (137.1×10^6 cfu/g in initial soil and 135.37×10^6 cfu/g in final soil sample). Colony farming unit of right side (128.66×10^6 cfu/g in initial soil sample and 128.83×10^6 cfu/g in final soil sample) was higher than the left side (111.7×10^6 cfu/g in initial soil and 116.11×10^6 cfu/g in final soil sample). The maximum colony farming unit of bacteria (144.9×10^6) was found at closer site (10 m) which was significantly higher than the other sites *viz.*, 500 m (127.6×10^6), 1000 m (113×10^6) and 1500 m (93×10^6) sites in initial sample while in final soil sample, maximum bacterial CFU (135.55×10^6) was recorded at closer site (10 m) which was significantly higher than 500 m (124×10^6), 1000 m (121×10^6 cfu/g of soil) and 1500 m site (107.77×10^6) as shown in table 8.17.

The highest CFU of actinomycetes were recorded at forest zone (36.29×10^4 cfu/g in initial soil and 40.25×10^4 cfu/g in final soil sample) which was significantly higher than the crop zone (32.63×10^4 cfu/g in initial soil and 35.41×10^4 cfu/g in final soil sample) and mixed zone (15.58×10^4 cfu/g in initial soil and 15.87×10^4 cfu/g in final soil sample). Further, colony farming unit of right side (29.83×10^4 cfu/g in initial soil sample and 32.52×10^4 cfu/g in final soil sample) was significantly higher than the left side (26.50×10^4 cfu/g in initial soil and 28.5×10^4 cfu/g in final soil sample). Table 8.17 depicted highest CFU of actinomycetes (40.11×10^4) at closer site (10 m) which was significantly higher than 500 m (34×10^4), 1000 m (23.22×10^4) and control site *i.e.*, 1500 m (14.94×10^4) in initial soil sample while in case of final soil sample, the highest CFU of actinomycetes per gram of soil (36.55×10^4) were recorded at 10 m distance from MGR railway track which was significantly higher than the 500 m (32.22×10^4), 1000 m (30.38×10^4) and control site (22.88×10^4).

The highest CFU of fungus were recorded at forest zone (10.4×10^2 cfu/g in initial soil and 12.08×10^2 cfu/g in final soil sample) which was significantly higher than the crop zone (10×10^2 cfu/g in initial soil and 10.92×10^2 cfu/g in final soil sample) and mixed zone (9×10^2 cfu/g in initial soil and 9.5×10^2 cfu/g in final soil sample). The colony farming unit of right side (10.3×10^2 cfu/g in initial soil sample and 11.64×10^2 cfu/g in final soil sample) was higher than the left side (9.3×10^2 cfu/g in initial soil and 10×10^2 cfu/g in final soil sample). As shown in table 8.17, the maximum fungal CFU (11.5×10^2) was recorded at closer site which was

significantly higher than the 500 m (11.1×10^2), 1000 m (9.2×10^2) and control site (7.3×10^2) in initial soil sample while in case of the final soil sample, the highest fungal colony forming unit was 14.25×10^2 at 10 m site and it was significantly higher than the 500 m (12.14×10^2), 1000 m (9.86×10^2) and control site (7.08×10^2).

The CFU of the microbes were increases towards the railway line may be due to the more organic carbon percentage (table-8.11) as well as the very labile and labile fraction of the carbon (table-8.18) and metal contents (table-15 & 16).

Table - 8.17: Microbial population of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Bacteria (CFU $\times 10^6$ per g soil)		Actinomycetes (CFU $\times 10^4$ per g soil)		Fungi (CFU $\times 10^2$ per g soil)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	137.1	135.37	32.63	35.41	10	10.92
2	Forest zone	156.5	160.5	36.29	40.25	10.4	12.08
3	Mixed zone	66.5	71.29	15.58	15.87	9	9.50
	CD (5 %)	5.6	7.71	2.17	3.16	0.66	0.80
B. Side from railway track							
1	Right Side	128.4	128.66	29.83	32.52	10.3	11.64
2	Left side	111.7	116.11	26.50	28.5	9.3	10.03
	CD (5 %)	4.5	6.3	1.77	2.58	0.54	0.65
C. Distance from railway track							
1	10 m	144.9	135.55	40.11	36.55	11.5	14.25
2	500 m	127.6	124.44	34.28	32.22	11.1	12.14
3	1000 m	113.8	121.77	23.33	30.38	9.2	9.86
4	1500 m	93.8	107.77	14.94	22.88	7.3	7.08
	CD (5 %)	6.4	8.9	2.51	3.65	0.76	0.92

19. Soil microbial biomass carbon (SMBC)

The soil microbial biomass carbon acts as the transformation agent of the organic matter in the soil. As such, the biomass is a both source and sink of the carbon, nitrogen and phosphorus contained in the organic matter. The maximum soil microbial biomass carbon was recorded at

forest zone ($171.62 \mu\text{g g}^{-1}$ in initial soil and $186.13 \mu\text{g g}^{-1}$ in final soil sample) and minimum at mixed zone ($148.93 \mu\text{g g}^{-1}$ in initial soil sample and $159.77 \mu\text{g g}^{-1}$ in final soil sample). The right side ($164.53 \mu\text{g g}^{-1}$ in initial soil sample and $171.73 \mu\text{g g}^{-1}$ in final soil sample) area of the MGR railway had more SMBC than left side ($160.38 \mu\text{g g}^{-1}$ in initial soil sample and $169.87 \mu\text{g g}^{-1}$ in final soil sample). Table 8.18 depicts that the initial soil sample had maximum SMBC ($184.49 \mu\text{g g}^{-1}$) at 10 m site which was significantly higher than 500 m ($167.84 \mu\text{g g}^{-1}$), 1000 m ($153.05 \mu\text{g g}^{-1}$) and 1500 m site ($144.45 \mu\text{g g}^{-1}$) while in case of final soil sample, highest SMBC ($193.47 \mu\text{g g}^{-1}$) was recorded at closer site (10 m) from railway track which was significantly higher than the all other sites of the experimental area i.e. $176.42 \mu\text{g g}^{-1}$ at 500 m, $163.85 \mu\text{g g}^{-1}$ at 1000 m and $149 \mu\text{g g}^{-1}$ at control site (1500 m).

The soil organic carbon has positively correlation with the soil microbial biomass carbon. The microbial biomass carbon of the study area gradual decreases towards the control site (1500 m) might be due to the decrease in the organic carbon percentage (table – 8.11) as well as the decrease in labile fraction of the carbon (table – 8.18).

20. Very Labile and Labile carbon fractions

The maximum very labile fraction of carbon was recorded at forest zone (6.60g kg^{-1} in initial soil sample and 6.84g kg^{-1} in final soil sample) and minimum at mixed zone (6.16g kg^{-1} in initial soil sample and 6.49g kg^{-1} in final soil sample). In respect of directions, left side (6.35g kg^{-1} in initial soil sample and 6.83g kg^{-1} in final soil sample) had more very labile carbon fraction than the right side (6.53g kg^{-1} in initial soil sample and 6.53g kg^{-1} in final soil sample). Table 8.18 depicts that the very labile fraction of the carbon recorded maximum (6.86g Kg^{-1}) at closer site followed by 500 m (6.70g kg^{-1}), 1000 m (6.30g kg^{-1}) and control site (5.92g kg^{-1}) in initial soil sample while in case of the final soil sample, maximum very labile carbon fraction (7.25g kg^{-1}) was found at 10 m site followed by 500 m (6.76g kg^{-1}), 1000 m (6.41g kg^{-1}) and control site (5.92g kg^{-1}).

The maximum labile fraction of carbon was recorded at forest zone (0.053g kg^{-1} in initial soil sample and 0.61g kg^{-1} in final soil sample) which was significantly higher than the crop zone (0.46g kg^{-1} in initial soil and 0.040g kg^{-1} in final soil sample) and mixed zone (0.51g kg^{-1} in initial soil sample and 0.61g kg^{-1} in final soil sample). Left side (0.50g kg^{-1} in initial soil sample and 0.55g kg^{-1} in final soil sample) had more labile carbon fraction than the right side (0.50g kg^{-1} in initial soil sample and 0.52g kg^{-1} in final soil sample). In initial soil sample, highest (0.58g kg^{-1}) labile fraction of carbon was recorded at nearby site (10 m) of the experimental area which was significantly higher than the 500 m site (0.51g kg^{-1}), 1000 m site

(0.47 g kg⁻¹) and control site (0.43 g kg⁻¹) while in case of final soil sample, highest labile fraction of carbon (0.66 g kg⁻¹) was recorded at 10 m site followed by 500 m site (0.56g kg⁻¹), 1000 m site (0.49 g kg⁻¹) and control site (0.44 g kg⁻¹).

Table - 8.18: Soil microbial biomass carbon (SMBC) and very labile as well as labile carbon status of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Soil microbial biomass carbon (µg/g)		Very labile C (g kg ⁻¹)		Labile C (g kg ⁻¹)	
		Initial	Final	Initial	Final	Initial	Final
A. Location at railway track							
1	Crop zone	166.82	166.50	6.57	6.55	0.46	0.40
2	Forest zone	171.62	186.13	6.60	6.84	0.53	0.61
3	Mixed zone	148.93	159.77	6.16	6.49	0.51	0.61
	CD (5 %)	7.742	8.342	0.251	NS	0.027	0.038
B. Side from railway track							
1	Right Side	164.53	171.73	6.53	6.53	0.50	0.52
2	Left side	160.38	169.87	6.35	6.83	0.50	0.55
	CD (5 %)	NS	NS	NS	NS	NS	0.031
C. Distance from railway track							
1	10 m	184.49	193.47	6.86	7.25	0.58	0.66
2	500 m	167.84	176.42	6.70	6.76	0.51	0.56
3	1000 m	153.05	163.85	6.30	6.41	0.47	0.49
4	1500 m	144.45	149.47	5.92	6.09	0.43	0.44
	CD (5 %)	8.940	9.632	0.289	0.43	0.031	0.044

21. Less Labile and non labile carbon fractions

The maximum less labile fraction of carbon was recorded at forest zone (0.43g kg⁻¹ in initial soil sample and 0.45g kg⁻¹ in final soil sample) which was statistically at par with crop zone (0.042g kg⁻¹ in initial soil and 0.40g kg⁻¹ in final soil sample) and mixed zone (0.44g kg⁻¹ in initial soil sample and 0.45g kg⁻¹ in final soil sample). The right side (0.43g kg⁻¹ in initial soil sample and 0.44g kg⁻¹ in final soil sample) had less labile carbon fraction than the left side (0.43g kg⁻¹ in initial soil sample and 0.43g kg⁻¹ in final soil sample).The highest less labile carbon fraction (0.46 g kg⁻¹) was recorded at 500 m site which was significantly higher than the 1000 m (0.42 g kg⁻¹) and control site (0.38 g kg⁻¹) but at par with 10 m site in initial soil sample

while in final soil, maximum less labile fraction (0.49 g kg^{-1}) was recorded at 10 m site followed by 500 m (0.46 g kg^{-1}), 1000 m (0.42 g kg^{-1}) and control site *i. e.*, 1500 m (0.36 g kg^{-1}).

The higher non labile fraction of carbon was recorded at forest zone (2.29 g kg^{-1} in initial soil sample and 2.18 g kg^{-1} in final soil sample) which was higher than the cropped zone (2.22 g kg^{-1} in initial soil and 2.17 g kg^{-1} in final soil sample) and mixed zone (2.06 g kg^{-1} in initial soil sample and 2.05 g kg^{-1} in final soil sample). In respect to directions, right side (2.18 g kg^{-1} in initial soil sample and 2.15 g kg^{-1} in final soil sample) had more non labile carbon fraction than the left side (2.20 g kg^{-1} in initial soil sample and 2.11 g kg^{-1} in final soil sample). Table 8.19 depicts that maximum non labile carbon fraction (2.32 g kg^{-1}) was recorded at 1500 m site and was significantly higher than the 10 m (2.03 g kg^{-1}), 500 m (2.16 g kg^{-1}) and 1000 m site (2.26 g kg^{-1}) in initial soil sample while in final soil sample, maximum non labile fraction (2.27 g kg^{-1}) was recorded at 1500 m site followed by 1000 m (2.20 g kg^{-1}), 500 m (2.09 g kg^{-1}) and 10 m site (1.97 g kg^{-1}).

The different fractions of carbon were increased from initial soil sample to final soil sample. This may be due to increase in organic carbon percentage (table – 8.11).

Table - 8.19: Less labile and non labile carbon status of the soil under different zones, sides and distances of studied area

Tr. No.	Treatment detail	Less labile Carbon (g kg^{-1})		Non-labile Carbon (g kg^{-1})	
		Initial	Final	Initial	Final
A. Location at railway track					
1	Crop zone	0.42	0.40	2.22	2.17
2	Forest zone	0.43	0.45	2.29	2.18
3	Mixed zone	0.44	0.45	2.06	2.05
	CD (5 %)	NS	0.027	0.12	NS
B. Side from railway track					
1	Right Side	0.43	0.44	2.18	2.15
2	Left side	0.43	0.43	2.20	2.11
	CD (5 %)	NS	NS	NS	NS
C. Distance from railway track					
1	10 m	0.45	0.49	2.03	1.97
2	500 m	0.46	0.46	2.16	2.09
3	1000 m	0.42	0.42	2.26	2.20
4	1500 m	0.38	0.36	2.32	2.27
	CD (5 %)	0.030	0.032	0.138	0.158

The chemical analysis of major plants grown/available in the study area will be under taken.

Objective 5. The Work under Objective IV Regarding Creation of Awareness Among the Farming Community about the Effect of Coal Dust in Agriculture and Forest Trees Species by the Brochure/ Pamphlet/ Conduction of Kisan Goshthi/Farmer's Scientist Interaction and or Kisan Mela .

The proposed work under above objective will be started before the end of the project.

SUMMARY

The investigation entitled “**Preliminary studies on impact of coal dust on soil, crop and tree species due to open wagon coal transportation**” was carried out in 2018-19 season.

Rice cultivation study was conducted at crop area / zone during kharif season of 2018 under Randomized Block Design with five replications nearby Merry Go Round railway line of 40.00 km length from Sipat to Dipika. Both sides of rail line, 03 sub stations were marked at 0 m (near rail line, 10 m away), 500 m and 1000 m distance as treatment area and beyond 1000 m area was treated as control zone (1500 m) for crop cultivation. Crop variety Indira Rajeshwari was taken as test crop as per the packages of practices.

The soil samples were taken before sowing and after harvest of the rice crop. There was three locations of the experiment where the soil samples were collected *i.e.*, cropped land, forest land and mixed land (cultivated and uncultivated land) along their left and right directions with four different distances (10 m, 500 m, 1000 m and 1500 m) from the Merry Go Round railway line. The experiment was laid out in a factorial randomized block design with three factors and three replications. The initial (before sowing) and final (after harvesting) soil samples were analyzed for its textural classes, bulk density, particle density, porosity percentage, available nutrients (N, P, K, S, Fe, Mn, Cu, Zn and B), heavy metal status (Cd, Cr, Co, Ni, Pb and As), microbial population (CFU of bacteria, fungus and actinomycetes), soil microbial biomass carbon and different fractions of the carbon (very labile, labile, less labile and non-labile carbon) under different locations, directions and distances of the studied area.

The salient findings of the present investigation are summarized under the following heads:-

(1) Rice crop yield at crop zone in relation to directions and distances from MGR railway line

The grain (42.62 q ha^{-1}) and straw (46.27 q ha^{-1}) yields of rice was highest at 1500 m site which was significantly higher than the 10 m site (36.86 and 38.63 q ha^{-1} , respectively) of the studied area.

(2) Physical, chemical and biological properties of soil in relation to locations, directions and distances from the MGR railway line

The bulk density of the control site (1500 m) was significantly lower than the closer site (10 m) site. The maximum particle density was recorded at closer site which was significantly higher than control site. The maximum porosity percentage was recorded at control site which was significantly higher than the nearby site of the studied area.

The pH of the control site was significantly higher than the 10 m site. The EC of the studied area was found non linear pattern. Organic carbon percentage was significantly high in forest zone than other zones. Significantly maximum organic carbon was recorded at 10 m site and minimum at control site.

Significantly higher available nitrogen was recorded in forest zone and minimum in mixed zone. The significantly maximum available N was recorded at 10 m site and minimum at control site. Available phosphorus was higher in mixed zone in initial soil and lower in forest zone while left side had more available P than the right side. Significant maximum available P was recorded at 10 m site and minimum at control site. The maximum available potassium was recorded in cropped zone and minimum in forest zone. Right side had significantly more available K than left side. The maximum available K was found at 10 m site and minimum at control site of the studied area with significant difference.

Maximum available sulphur was recorded at crop zone and minimum in mixed area at final sample. The available S was maximum in 10 m site of the studied area with significant variations. The right side has significantly more available boron content than the left side. The available boron was maximum at 10 m site of the studied area and minimum at control site with significant differences. The available iron (Fe) status was significantly higher in cropped zone and minimum in forest zone in initial soil sample while the left side had more available Fe than the right side. The available manganese status in soil was found maximum in crop zone and minimum in mixed land with significant result while left side had more available Mn content than the right side with significant variations. The maximum available Mn was recorded at 10 m site and minimum at control site of the studied area with significant result. The maximum available zinc was found higher in cropped zone and lower in mixed zone in initial soil sample with significant differences while the left side had higher nutrient status than the right side with significant result. The Zn and Cu content in soil is gradually decreasing with increase in distance.

The cadmium content was higher in forest zone and lower in cropped zone in initial soil sample. The erratic pattern was recorded with distance. The cobalt content of the forest zone was found more and cropped zone has less. The chromium content was maximum in forest zone and minimum in cropped zone with significant result. Maximum Cr was recorded in 10 m site and minimum at 500 m site. The maximum lead content was recorded in forest zone and minimum in cropped area while left side had more Pb content than the right side in initial soil sample. The maximum Ni concentration was recorded at 1000 m site and minimum at 500 m site of the studied area.

The maximum colony farming unit of bacteria, fungi and actinomycetes were recorded at closer site (10 m) while minimum at 1500 m site with significant variations. The colony farming unit of the bacteria, fungi and actinomycetes were significantly higher in forest zone than the mixed zone. Right side area recorded more microbial population than the left side. Soil microbial biomass carbon at 10 m site was significantly higher than the control site (1500 m). Further, right side had more SMBC than the left side. The significantly higher soil microbial biomass carbon was recorded at forest zone than the mixed zone of the studied area.

The soil parameter pH found under neutral condition. The content of organic matter, available potassium and available sulfur were recorded medium in category. But available N status was under low category. The available P content was low to medium status. Further, the available Iron and Manganese observed towards higher value.

(3) Carbon fractions of soil in relation to locations, directions and distances from the MGR railway line

Very labile, labile, less labile and non-labile carbon fraction was recorded maximum at forest zone and minimum at mixed zone except less labile carbon which has minimum concentration in cropped zone. All the fractions of the carbon (very labile, labile and less labile except non labile) were maximum at 10 m site and they were significantly higher than control site (1500 m) while non-labile carbon was maximum in control site and minimum in 10 m site of the studied area. Very labile, labile and non-labile carbon was higher at left side area and minimum at right side while less labile was higher at right side and low at left side.

(4) Changes in vegetation

The fallout of SPM from railway wagons in the area has caused changes in the stability of the sensitive community of the vegetation present in the area. The diversity of plant community depends on both the number of species present in a population and on their evenness. The numbers of individuals were not evenly distributed at all the study sites. The resistant species were present in higher number at the sites receiving pollution load. The inverse of evenness is the concentration of individuals. At the distant places, most of the constituent species shared the numbers more or less equally, resulting in low dominance value.

CONCLUSIONS

On the basis of one year study of the project, the following conclusions could be drawn:-

- Grain and straw yield of rice was more at far distance (1500 m) from Marry Go Round railway line.
- Cropped zone of the studied area contains more particle density, soil pH, available potassium, available boron, available micronutrients viz., iron, manganese, copper, zinc and less electrical conductivity, organic carbon percentage, available sulphur, heavy metals (cadmium, cobalt, chromium, lead, nickel and arsenic) and less labile carbon.
- Forest zone had more porosity percentage, electrical conductivity, organic carbon, available nitrogen, available sulphur, microbial population (bacteria, actinomycetes and fungi), heavy metals (cadmium, cobalt, chromium, lead, arsenic, soil microbial biomass carbon, carbon fractions (very labile, labile, less labile and non-labile) and less bulk density, soil pH, available phosphorus, available potassium, available boron, available iron and available manganese.
- Mixed zone had more bulk density, available phosphorus, nickel and contains less porosity percentage, particle density, available nitrogen, available copper, available zinc and microbial population (bacteria, actinomycetes, fungi), soil microbial biomass carbon, very labile carbon, labile carbon and non-labile carbon fraction.
- Left side of the studied area contains more bulk density, particle density, organic carbon, available nitrogen, phosphorus, potassium, iron, manganese, zinc, heavy metals viz., cadmium, cobalt, chromium, lead and nickel, very labile, labile and non-labile carbon. However, right side contains more electrical conductivity, available sulphur, available

boron, available copper, microbial population (bacteria, actinomycetes and fungi), arsenic, soil microbial biomass carbon and less labile carbon.

- The closer site of the studied area (10 m site) had more bulk density, particle density, electrical conductivity, organic carbon percentage, available nitrogen, phosphorus, potassium, sulphur, available micronutrients (iron, manganese, copper, zinc, boron), microbial population (bacteria, actinomycetes and fungi), heavy metals (cadmium, cobalt, chromium, lead, arsenic), soil microbial biomass carbon, very labile carbon, labile carbon and less labile carbon while less porosity percentage and non-labile carbon. Control site (1500 m site) had more porosity percentage, soil pH and non-labile carbon.
- The atmospheric pollutants can affect both the stability and the productivity of plant ecosystem. The study indicated that the resistant species have occupied more space at the polluted sites, whereas the relatively sensitive plants are more at the sites far away from the emission source.
- The absence of few species from certain sites indicated existence of pollution.
- The fallout SPM in the area has caused changes which influenced the stability of sensitive plant species in the herbaceous community.

SUGGESTIONS FOR FUTURE STUDIES

The following thrust areas of research work could be made on the basis of present study for planning and appropriate formulation of technology by the students, scientists and decision as well as policy makers:-

- The effects of pollutants on crop and plant physiological aspects may be studied
- Coal dust deposition by the transportation line of the coal from loading to unloading point needs to be evaluated around the Merry Go Round railway track
- Long term effect of coal dust on different crops, physicochemical and biological properties as well as carbon fractions and nutrient dynamics of soils and local vegetation in relation to local climatic features need to be studied
- Effects of wind direction and their velocity in relation to coal dust transportation need to be studied.
- Suitable and efficient plantation work (green belt) to be undertaken both sides of Merry Go Round rail line to minimize the pollution.
- Proper covering and water sprinkling over coal transporting cars can minimize the blowing of dust in the transporting areas.

Annexure-I
PROJECT SANCTION LETTER



NTPC Limited

(A Government of India Enterprise)

Sipat Super Thermal Power Project

PO Ujwal Nagar

District Bilaspur

Chhattisgarh-495555, India

Telephone No. : 07752-246552 Fax No. : 07752-246507

Service Purchase Order

CIN No. : L40101DL1975GD1007566

GST No. : 122AAACNG265D4Z5

Purchase Order No. : 8200223754-037-1019 **Date** : 07.03.2018 **(version : 0)**

To
Comptroller, Indira Gandhi Krishi Vishwavidyalaya
Krishak Nagar
Raipur
Chhattisgarh
India - 492006

Vendor Code : 1081799

Subject : Preliminary studies on Impact of coal dust on soil, crop and tree species due to Open Wagon Coal Transportation.
NIT NO. : Dated
Your Offer No. :
Your Reference :

Dear Sir,

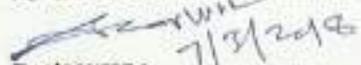
This has reference to our above mentioned NIT. Your offer and subsequent discussions. We are pleased to accept your offer opened on and confirm having awarded on you the work of Preliminary studies on Impact of coal dust on soil, crop and tree species due to Open Wagon Coal Transportation, of total value INR 935,000.00 (Rupee NINE LAKH THIRTY-FIVE THOUSAND ONLY) mentioned in the scope of works, special terms & conditions, Bill of quantities etc.

The duration of the service period shall be from 10.03.2018 to 30.06.2019. Though the duration of contract shall remain same, the actual date of commencement of the contract shall be as per the direction of EIC.

This service purchase order along with its annexure is being issued to you in duplicate. We request you to return the duplicate copy of this service purchase order, duly signed on each page by your authorised signatory in token of your unequivocal acknowledgment of the same within 15 days from the date of this service purchase order. If no communication is received within 15 days of receipt of Purchase Order, it will be treated that order has been accepted in entirety.

We thank you for the interest shown by you in our project and the cooperation extended to us. We expect to receive your continued cooperation in future also.

Thanking You,
For & on behalf of NTPC Limited


Enclosures : 7/3/2018

श्री. डी. नरवार
S D GANWAR
आवर पर्यावरण (पर्यावरण प्रबन्धन)
AGM (Environment Management)
एनटीपीसी लिमिटेड बीएस, बिलासपुर (छ.प्र.)
NTPC Limited, SIPAT, BILASPUR (C.G.)

Annexure-II

EXPENDITURE STATEMENT OF THE PROJECT

INDIRA GANDHI KRISHI VISHWAVIDYALAYA, KRISHAK NAGAR, RAIPUR (CG) LC/AUC
 UTILIZATION/AUDIT UTILIZATION CERTIFICATE FOR THE YEAR 2018-19

NAME OF THE SCHEME: NTPC
 Preliminary studies on impact of coal dust on soil crop and tree species due to open wagon coal transportation

Opening balance for the year brought over from the previous year 2017-18	Remittances by the council during the year 2018-19 (allocation in Rs)	Councils share of receipt realized from the scheme during the year 2018-19	Actual expenditure for year 2018-19	Councils share of sanctioned grant for the year 2018-19	Councils share of expenditure incurred and entitled during 2018-19 (in Rs)	Closing balance at the end of year 2018-19
-	7,85,000	-	7,80,845	-	7,80,845	4,155
-	1,50,000	-	1,49,965	-	1,49,965	35
Total	9,35,000	-	9,30,810	-	9,30,810	4,190

Expenditure incurred by- BTCCARS Bilaspur (C.G.)

Grant released vide No.1..Entt. No./Comp/Bud./NTPC/47/2018-19/699 Raipur Dated-31/05/2018

CERTIFIED THAT

The grant has been utilized for the purpose for which it was made by the council. The excess expenditure incurred over and above the sanctioned ceiling of one more sanctioned heads of expenditure has been met by re-appropriation of saving under remaining heads. The explanation for the expenditure not covered by re-appropriation has been furnished in the attached pro-forma for the issue of covering sanction by council.

(Signature)
 6.7.19
 Director
 College of Agriculture & Research
 Station, G.K.V. Saranpur, Bilaspur (C.G.)

Annexure-III

UNIVERSITY ALLOTMENT ORDER

Dr. J.R. Patil / Dr. A.K. Awasthi
By J. Lee
Acct (Main)

20/06/18
DEAN
05/06/18



INDIRA GANDHI KRISHI VISHWAVIDYALAYA
KRISHAK NAGAR, RAIPUR - 492012 (C.G.)

No./Compt/Bud/NTPC/47/2018-19/99 Date: 31/05/2018

UNIVERSITY ALLOTMENT ORDER

Financial Year	2018-19	Allocation Date	01/06/2018
System Gen. Allotment No.	CARS-ESP/GOINTPC/2018-19/271	Allocation Type	Allotment 100%
Authority	BCO, Raipur		
DOO (to which budget Allotted)	Dean, TCB CARS, B/raipur		
Funding Source	GOI		
Funding Agency	NTPC		
Type of Funding	Research		
Scheme	Professory Studies on Impact of coal dust on soil, crop and tree species due to open wagon coal transportation		
Installation No.	1		

On approval of HVC, allotment for the financial year 2018-19 under budget head NTPC Trials is being issued as per details given below:

Sr.No.	Object Head	Description of Allotted Budget		Allotted Amt
		Detail Head	Installments	
1	Recurring	Recurring	1	75000.00
2	Non-Recurring	Non-Recurring	1	15000.00
Total				90000.00

Approved by the Hon'ble Vice-Chancellor, ICRV, Raipur

BCO, Raipur

No./Compt/Bud/NTPC/47/2018-19/99 Date: 30/06/2018

Copy to:

- 1 P.A. to Hon'ble Vice-Chancellor, ICRV, Raipur
- 1 Thakur Chhabil Baramba College of Agriculture & Research Station, Baramba

BCO, Raipur



Received on
06/06/2018
Bramba

Annexure – IV**LIST OF INVESTIGATORS, THEIR POSITION AND ADDRESSES RELATED****TO PROJECT ENTITLED****“PRELIMINARY STUDIES ON IMPACT OF COAL DUST ON SOIL, CROP AND TREE SPECIES DUE TO OPEN WAGON
COAL TRANSPORTATION”**

S.N.	Name	Post	Position in the project	Address	Contact	E Mail Id
1	Dr. Jagat Ram Patel	Principal Scientist (Agronomy)	Principal Investigator	BTCCARS Bilaspur	9425555387	jrpatel_fodder@rediffmail.com
2	Dr. A. K. Awasthi	Professor (Entomology)	Co-Principal Investigator	BTCCARS Bilaspur	8770161473	alok8011@rediffmail.com
3	Dr. (Smt.) Y. Sao	Assistant Professor (Soil Science)	Co-Principal Investigator	BTCCARS Bilaspur	9907448440	yush27ag_guj@yahoo.co.in
4	Sh. A. Williams	Scientist (Forestry)	Co-Principal Investigator	BTCCARS Bilaspur	9827189258	ajeetwilliams@yahoo.com
5	Dr. Geet Sharma	Scientist (Agronomy)	Co-Principal Investigator	BTCCARS Bilaspur	8319986364	geetsharma@hotmail.co.in
6	Sh. P. K. Keshry	Scientist (Soil Science)	Co-Principal Investigator	BTCCARS Bilaspur	7587230211	pk_keshry@rediffmail.com
7	Dr. N.K. Chaure	Principal Scientist (Agricultural Statistics)	Co-Principal Investigator	BTCCARS, Bilaspur	8770749079	nkchaure@ gmail.com

Annexure – V
Overview of MGR





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भारत का राजपत्र

The Gazette of India

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असाधारण
EXTRAORDINARY
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PART II—Section 3—Sub-section (ii)

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PUBLISHED BY AUTHORITY

सं. 1400]

नई दिल्ली, बृहस्पतिवार, मई 21, 2020/वैशाख 31, 1942

No. 1400]

NEW DELHI, THURSDAY, MAY 21, 2020/VAISAKHA 31, 1942

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 21 मई, 2020

का.आ. 1561(अ).—जबकि केन्द्रीय सरकार ने पर्यावरण (संरक्षण) नियमावली, 1986 के नियम 5 के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3, धारा 6 और धारा 25 के तहत अपनी शक्तियों का प्रयोग करते हुए, ऐश सामग्री (ऐश कंटेंट) को 34% तक की सीमा सहित कोयले का उपयोग करने के लिए ताप विद्युत संयंत्रों की कतिपय श्रेणियों को अधिदेशित करते हुए भारत के राजपत्र, असाधारण में सा.का.नि. 02 (अ), तारीख 2 जनवरी, 2014 द्वारा पर्यावरण (संरक्षण) नियमावली, 1986 के नियम 3 के उपनियम 8 का संशोधन प्रकाशित किया।

और जबकि सा.का.नि. 02 (अ), तारीख 2 जनवरी, 2014 द्वारा उक्त अधिसूचना द्वारा निम्नलिखित समय-सीमा तक कच्चे अथवा मिश्रित अथवा लाभकारी कोयले (बेनिफिसिएटिड कोल), जिसमें ऐश सामग्री चौंतीस प्रतिशत (34%) से अधिक ना हो, का उपयोग करने के लिए त्रैमासिक आधार पर कोयला आधारित ताप विद्युत संयंत्रों को अधिदेशित किया गया है :

क्रम सं.	विद्युत संयंत्र की श्रेणी	गर्तमुख(पिट-हैड)/कोयला खान से ताप विद्युत संयंत्र के अवस्थान की दूरी	समय-सीमा
(क)	एकल ताप विद्युत संयंत्र (किसी भी क्षमता के) और कैटिप्व ताप विद्युत संयंत्र (100 मेगावाट और अधिक क्षमता सहित)	गर्तमुख विद्युत संयंत्रों को छोड़कर गर्तमुख से दूरी पर ध्यान दिए बिना शहरी क्षेत्रों,या परिस्थितिकीय रूप से संवेदनशील क्षेत्रों या अत्यधिक प्रदूषित क्षेत्रों में अवस्थित	2 जून, 2014 से प्रभावी।
(ख)		1000 किमी से अधिक दूर	2 जून, 2014 से प्रभावी।
(ग)		750-1000 किमी के बीच	1 जनवरी, 2015 से प्रभावी।
(घ)		500-749 किमी के बीच	5 जून, 2016 से प्रभावी।

और जबकि, केंद्रीय सरकार ने पर्यावरण (संरक्षण) नियमावली के नियम 5 के उप-नियम (3) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 के अधीन अपनी शक्तियों का प्रयोग करते हुए भारत के राजपत्र, असाधारण में स.का.आ. 3305 (अ), तारीख 7 दिसंबर, 2015 और सा.का.नि.593 (अ), तारीख 28 जून, 2018 द्वारा विद्युत उत्पादन की क्षमता और विद्युत संयंत्र की संस्थापना की तारीख और समय-बद्ध रीति से प्राप्त किए जाने के आधार पर ताप विद्युत संयंत्रों की विभिन्न श्रेणियों के लिए उत्सर्जन मानकों और विनिर्दिष्ट जल उपभोग को प्रकाशित किया था।

और जबकि, पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ने विद्युत मंत्रालय द्वारा दिनांक 13 अक्टूबर, 2017 को प्रस्तुत की गई यथा संशोधित योजना के अनुसार विभिन्न ताप विद्युत संयंत्रों को वर्ष 2022 तक प्रदूषण नियंत्रण उपकरण संस्थापित करने के लिए पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 5 के तहत निर्देश जारी करने के लिए केंद्रीय प्रदूषण नियंत्रण बोर्ड को दिनांक 7 दिसंबर, 2017 के फा.सं. क्यू-15017/40/2007-सीपीडब्ल्यू द्वारा निदेश दिए।

और जबकि, विद्युत मंत्रालय ने अन्य बातों के साथ-साथ यह अभ्यावेदन किया है कि प्रदूषण नियंत्रण प्रौद्योगिकियों के उन्नत होने के साथ ही ताप विद्युत संयंत्र दहन प्रक्रिया से उत्पन्न फ्लाई-ऐश का पता लगाने में बेहतर उपकरणों से सुसज्जित हुए हैं और बिना धुला कोयला अधिक कुशलता और मितव्ययता से प्रयोग किया जा सकता है; ताप विद्युत संयंत्रों को राख अवयवों की विभिन्न किस्मों के साथ कोयले के लिए डिजाइन किया गया है और इनमें सूखी राख (ड्राई ऐश) निकालने, उसका रखरखाव करने और राख के उपयोग के लिए आपूर्ति प्रणालियों को उपलब्ध कराया गया है; धुले कोयले के उपयोग से बिजली उत्पादन महंगा हो जाता है; ताप विद्युत संयंत्रों में उत्पन्न फ्लाई-ऐश सीमेंट निर्माण, ईंटें बनाने, सड़क बिछाने, खनन के उपरांत रिक्त हुए स्थलों और निचले क्षेत्रों को भरने के लिए बैक-फिल सामग्री जैसे कई लाभकारी उपयोगों के लिए प्रयोग की जा रही है; औसतन ऐश की मात्रा 34% तक बनाए रखने की आवश्यकता उद्योगों को कोयले का आयात करने के लिए प्रेरित करती है जिससे विदेशी मुद्रा इत्यादि का बहिर्वाह (आऊटफ्लो) होता है।

और जबकि, कोयला मंत्रालय ने अन्य बातों के साथ-साथ अभ्यावेदन किया है कि कोयला खानों वर्षों से कच्चे कोयले की गुणवत्ता, आकार और बाहरी सामग्री में सुधार के लिए निरंतर कड़े प्रयास कर रही हैं जिससे सभी संबंधित उपकरणों की टूट-फूट में उल्लेखनीय कमी आई है, कोयला धुलाई प्रक्रिया में कई प्रकार का रखरखाव होता है और कोयला खानों से धुलाई-स्थलों (वाशरीज़) तक कोयले की बड़ी मात्रा को सड़क द्वारा ले जाने और फिर आगे

विद्युत संयंत्रों तक ले जाने के लिए रेल साइडिंग तक ले जाने से बचना; धुलाई की प्रक्रिया केवल कोयले को धुले हुए कोयले और वाशरी अवशिष्ट में बॉटती है जबकि खनित कोयले की राख की मात्रा वही रहती है; निम्न श्रेणी कोयला वाशरी अवशिष्ट कई छोटे उपयोगकर्ता उद्योगों में, अधिक प्रदूषण आदि सृजित करते हैं।

और जबकि, कोयला मंत्रालय और विद्युत मंत्रालय ने इसलिए अनुरोध किया है कि दिनांक 2 जनवरी, 2014 की अधिसूचना पर पुनः विचार द्वारा, विद्युत संयंत्रों को धुले हुए कोयले के प्रयोग के लिए अधिदेशित करने पर गौर किया जाना अपेक्षित है जिससे पर्यावरण पर प्रतिकूल प्रभाव डाले बिना कोयले की लंबी दूरी की धुलाई के लिए बिजली के उत्पादन में आसानी होगी।

और जबकि, नीति आयोग ने अपनी रिपोर्ट में वाशरीज़, कोयला खनन, परिवहन और विद्युत संयंत्रों में कोयले की खपत की दृष्टि से इस विषय का विश्लेषण करने के बाद अन्य बातों के साथ-साथ संक्षिप्त में यह अभ्यावेदन किया है कि समीपवर्ती उद्योगों में वाशरी अवशिष्ट का इस्तेमाल अधिक प्रदूषण पैदा करता है; चूंकि वाशरी अवशिष्ट अनेक छोटे उद्योगों में वितरित होते हैं, इसलिए विद्युत संयंत्र पर उत्पन्न प्रदूषण की तुलना में अनेक स्थलों पर उत्पन्न प्रदूषण को नियंत्रित करना अधिक कठिन होता है; धुलाई प्रक्रिया में उत्पन्न राख (ऐश) कोयला कणों के साथ-साथ पानी को भी प्रदूषित करती है और इसका लाभकारी उपयोग नहीं किया जा सकता, कोयला धुलाई प्रक्रिया में पानी का अधिक प्रयोग होता है, अपशिष्ट सृजन होता है; वाशरी अवशिष्ट के निपटान का पर्यावरण पर प्रतिकूल प्रभाव होता है क्योंकि इसमें बड़ी मात्रा में निम्न श्रेणी कोयला अवशिष्ट, तरल अपशिष्ट प्रवाह, कोयला भण्डारण, कोयला मिट्टी का रखरखाव, अपवाह और उड़ने वाली धूल का रखरखाव और निपटान करना होता है, कोयला धुलाई का स्थलाकृति, जल निकास स्वरूप और गुणवत्ता, जल निकायों, बड़े पैमाने पर प्रतिवेशी वायु गुणवत्ता पर भी प्रतिकूल प्रभाव पड़ता है; धुलाई प्रक्रिया से विद्युत उत्पादन की लागत में भी वृद्धि होती है जिसका कोई पर्यावरणीय लाभ इत्यादि भी नहीं होता।

और जबकि, नीति आयोग ने इसलिए सिफारिश की है कि पर्यावरणीय और प्रदूषण मानकों का निर्धारण करना और उन्हें लागू करना विवेकपूर्ण होगा, जिन्हें कोयले में ऐश की मात्रा प्रतिबंधित किए जाने के बजाए, परिवहन दूरी के आधार पर विद्युत उत्पादकों के साथ जोड़ा जाना चाहिए।

और जबकि, पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ऊर्जा मंत्रालय, कोयला मंत्रालय के अभ्यावेदनों, नीति आयोग और कई हितधारकों की रिपोर्ट पर विवेचन करने तथा सावधानीपूर्वक विचार करने के बाद एवं जनहित में निम्नलिखित निष्कर्ष पर पहुंचा है—

- i) खनित कोयले में ऐश सामग्री की मात्रा समान रहती है। वाशरी से ऐश सामग्री दो स्थानों (वाशरी और विद्युत संयंत्र) में विभाजित हो जाती है जबकि बिना धुला कोयला विद्युत संयंत्र में प्रयोग किया जाता है, ऐश सामग्री का निपटान केवल एक स्थान अर्थात् विद्युत संयंत्र में किया जाता है;
- ii) ताप विद्युत संयंत्र प्रदूषण नियंत्रण, ऐश प्रबंधन के लिए तकनीकी रूप से सुसज्जित होते हैं क्योंकि उनमें फ्लाइ-ऐश का निराकरण करने के लिए उच्च क्षमता वाले उपकरण होते हैं, ड्राई ऐश निष्क्रमण और हैंडलिंग सिस्टम, ऐश उपयोग के लिए सप्लाय सिस्टम और फ्लू गैसों को तितर-बितर करने के लिए बड़े टाल (स्टैक) होते हैं;
- iii) पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ने उत्सर्जन मानक अधिसूचित किए हैं जिनमें क्रमशः ताप विद्युत संयंत्रों को समयबद्ध रीति से इन मानकों का पालन करने के लिए अधिदेशित किया गया है;

और जबकि, फ्लाई ऐश प्रबंधन और विभिन्न स्तरों पर बिना धुले कोयले के संसाधन के दौरान उत्पन्न अन्य संबंधित पर्यावरणीय पहलुओं सहित बिना धुले कोयले की हैंडलिंग के लिए यथासंभव उत्कृष्ट कार्यवाही को अपनाता समयोचित है।

और जबकि, कोयला मंत्रालय ने अभ्यावेदन किया है कि मौजूदा अप्रत्याशित कोविड-19 महामारी और इसके फलस्वरूप देश में ऊर्जा उत्पादन के लिए कोयला क्षेत्र की मांग को प्रोत्साहित कर घरेलू कोयले के उपयोग की तत्काल आवश्यकता को देखते हुए यह वांछनीय है कि तत्काल अधिसूचना जारी की जाए।

अब, इसलिए, केंद्रीय सरकार पर्यावरण (संरक्षण) नियमावली, 1986 के नियम 5 के उपनियम (4) के साथ पठित पर्यावरण संरक्षण अधिनियम, 1986 (1986 का 29) की धारा 3, धारा 6 और धारा 25 के तहत अपनी शक्तियों का प्रयोग करते हुए, उक्त नियमावली के नियम 5 के उपनियम (3) के भाग (अ) के तहत सूचना देने की अनिवार्यता को हटा देने के उपरांत जनहित में पर्यावरण (संरक्षण) नियमावली, 1986 को आगे संशोधित करते हुए एतद्वारा निम्नलिखित नियम बनाती है, अर्थात्:

1. (1) इन नियमों को पर्यावरण (संरक्षण) संशोधन नियमावली, 2020 कहा जाएगा।
- (2) ये सरकारी गजट में प्रकाशित होने की तारीख से लागू होंगे।
2. पर्यावरण (संरक्षण) नियमावली, 1986 में, नियम 3 में, उपनियम (8) के लिए निम्नलिखित उपनियम प्रतिस्थापित होगा, अर्थात् :-

“(8) ताप विद्युत संयंत्रों को, ऐश सामग्री अथवा दूरी संबंधी अनुबंधों के बिना, निम्नलिखित शर्तों के अध्याधीन कोयले के प्रयोग की अनुमति होगी:

(1) उत्सर्जन मानदण्डों के लिए प्रौद्योगिकीय समाधान निर्धारित करना:

- i. वर्तमान अधिसूचनाओं और केंद्रीय प्रदूषण नियंत्रण बोर्ड द्वारा समय-समय पर जारी अनुदेशों के अनुसार विविक्त सामग्री के लिए विनिर्दिष्ट मानदंडों का अनुपालन करना।
- ii. वाशरी के मामले में मिडलिंग और अवशिष्टों का एफबीसी(तरलीकृत तल दहन) प्रौद्योगिकी आधारित विद्युत संयंत्रों में उपयोग किया जाए। एफबीसी संयंत्रों में मिडलिंग और अवशिष्टों के लिए वाशरी में संयोजन (लिकेज) होना चाहिए।

2. ऐश पॉन्ड का प्रबंधन:

- i. ताप विद्युत संयंत्र धुले हुए कोयले से बिना धुले हुए कोयले पर स्विच करने के कारण फ्लाई-ऐश पॉन्ड(मौजूदा विद्युत उत्पादन क्षमता) की अतिरिक्त क्षमता की पात्रता प्राप्त किए बिना, समय-समय पर जारी की गई अधिसूचनाओं में यथा-अधिसूचित शर्तों का पालन करें।
- ii. ऐश प्रबंधन के लिए जल की खपत को अनुकूल करने हेतु समुचित प्रौद्योगिकी समाधान लागू हों;
- iii. यदि आवश्यक हो तो फ्लाई-ऐश का अधिकतम उपयोग सुनिश्चित करने के लिए स्थल विशिष्ट स्थितियों के आधार पर ऐश का पृथक्करण इलैक्ट्रो-स्टैटिक अवक्षेपक (प्रेसीपिटेटर) स्तर पर किया जाए।
- iv. ताप विद्युत संयंत्र उपर्युक्त 2(i) के अध्याधीन, छोड़ी हुई अथवा चालू खानों (वर्किंग माइन्स) में (खान मालिकों द्वारा सुविधाजनक बनाया जाए) पर्यावरणीय सुरक्षा उपायों के साथ फ्लाई-ऐश का निपटान करें।

3. परिवहन:

- i. ढके हुए रेलवे वैगन (तिरपाल अथवा किसी अन्य माध्यम से ढके हुए रेलवे वैगन) और/अथवा खान-क्षेत्र से परे ढके हुए वाहक (कन्वेयर) द्वारा ही कोयले का परिवहन किया जाए। तथापि, जब तक रेल परिवहन/वाहक इन्फ्रास्ट्रक्चर उपलब्ध नहीं हो जाता, सड़क परिवहन ट्रकों द्वारा किया जाए जो तिरपाल अथवा किसी अन्य माध्यम से ढके हुए हों।
 - ii. ताप विद्युत संयंत्र द्वारा सुनिश्चित किया जाए कि
 - (क) रेल अथवा कन्वेयर द्वारा परिवहन के लिए विद्युत संयंत्र में अथवा इसके समीप रेल साइडिंग सुविधा अथवा कन्वेयर सुविधा स्थापित हो; और
 - (ख) यदि रेल अथवा कन्वेयर सुविधा की अनुपलब्धता के कारण परिवहन न हो पाए, तो यह सुनिश्चित किया जाए कि संबंधित खान के डिलीवरी स्थान से कोयले का परिवहन ढके हुए ट्रकों (तिरपाल अथवा किसी अन्य माध्यम द्वारा), अथवा किसी अन्य यंत्रिकृत बंद ट्रक से सड़क द्वारा हो।
- (4) इसे वित्तीय वर्ष 2020-21 और उसके बाद के लिए संबंधित परियोजनाओं हेतु संगत पर्यावरणीय स्वीकृति की अतिरिक्त शर्तें भी समझा जाएगा। मौजूदा पर्यावरणीय स्वीकृतियों को संशोधित किया जाएगा ताकि संगत क्षेत्रों के लिए उपरोक्त शर्तों को प्रवर्तनशील बनाया जा सके। तदनुसार संबंधित राज्य प्रदूषण नियंत्रण बोर्ड द्वारा प्रचालन की अनुमति जारी की जाएगी।

[फा.सं. 13014/01/2020-आईए-1(टी)]

गीता मेनन, संयुक्त सचिव

टिप्पण—मूल नियम भारत के राजपत्र में सं.का.आ. 844(अ), तारीख 19 नवंबर 1986 द्वारा प्रकाशित किए गए थे और पश्चातवर्ती संशोधन सं.का.आ. 82(अ), तारीख 16 फरवरी, 1987; का.आ. 64(अ), तारीख 18 जनवरी, 1988; सा.का.नि. 931(अ), तारीख 27 अक्टूबर, 1989; का.आ. 23(अ), तारीख 16 जनवरी, 1991; सा.का.नि. 95(अ), तारीख 12 फरवरी, 1992; सा.का.नि. 329(अ), तारीख 13 मार्च, 1992; सा.का.नि. 562(अ), तारीख 27 मई, 1992; सा.का.नि. 884(अ), तारीख 20 नवंबर, 1992; सा.का.नि. 386 (अ), तारीख 22 अप्रैल, 1993; सा.का.नि. 422 (अ), तारीख 19 मई, 1993; सा.का.नि. 801 (अ), तारीख 31 दिसंबर, 1993; सा.का.नि. 320 (अ), तारीख 16 मार्च, 1994; सा.का.नि. 560 (अ), तारीख 19 सितंबर, 1997; सा.का.नि. 378 (अ), तारीख 30 जून, 1998; सा.का.नि. 07 (अ), तारीख 22 दिसंबर, 1998; सा.का.नि. 407 (अ), तारीख 31 मई, 2001; सा.का.नि. 826 (अ), तारीख 16 नवंबर, 2009; सा.का.नि. 513 (अ), तारीख 28 जून, 2012; सा.का.नि. 02 (अ), तारीख 02 जनवरी, 2014; का.आ. 3305 (अ), तारीख 07 दिसंबर, 2015; सा.का.नि. 593 (अ), तारीख 28 जून, 2018; और का.आ. 236 (अ), तारीख 16 जनवरी, 2020 द्वारा किए गए।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 21st May, 2020

S.O. 1561(E).—Whereas the Central Government had, in exercise of its powers under Section 3, Section 6 and Section 25 of Environment (Protection) Act, 1986 (29 of 1986) read with rule 5 of Environment (Protection) Rules, 1986, published draft rules further to amend sub-rule (8) of rule 3 of Environment (Protection) Rules, 1986, in the Gazette of India, Extraordinary, *vide* number G.S.R. 02(E), dated the

2nd January, 2014 mandating certain categories of thermal power plants to use coal with ash content restricted to 34%.

And whereas, the said Notification *vide* number G.S.R. 02(E) dated the 2nd January, 2014, mandated coal based thermal power plants to use raw or blended or beneficiated coal with ash content not exceeding thirty-four percent (34%), on quarterly basis, by the time lines given below:

Sl. No.	Category of Power Plant	Distance of location of Thermal Power Plant from pit-head/coal mine	Time lines
(a)	Stand-alone Thermal Power Plants (any capacity), and Captive Thermal Power Plants (with capacity of 100 MW and above)	Located in urban areas, or ecologically sensitive areas or critically polluted areas, irrespective of distance from pit-head, except pit-head power plants.	With effect from 2 nd June, 2014.
(b)		beyond 1000 km	With effect from 2 nd June, 2014.
(c)		between 750-1000 km	With effect from 1 st January, 2015.
(d)		between 500-749 km	With effect from 5 th June, 2016.

And whereas, the Central Government had, in exercise of its powers under sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) read with sub-rule (3) of rule 5 of the Environment (Protection) Rules, in the Gazette of India, Extraordinary, *vide* number S.O. 3305 (E), dated the 7th December, 2015 and G.S.R. 593 (E), dated the 28th June, 2018 published the emission standards and specific water consumption for various category of thermal power plants, based on capacity of power generation and date of installation of power plant and to be achieved in time bound manner.

And whereas, the Ministry of Environment, Forest and Climate Change directed the Central Pollution Control Board *vide* F.No.Q-15017/40/2007-CPW dated the 7th December, 2017 to issue Directions under Section 5 of Environment (Protection) Act, 1986, to various Thermal Power Plants to install pollution control equipment as per the revised plan submitted by the Ministry of Power dated the 13th October, 2017 by 2022.

And whereas, the Ministry of Power has, *inter alia*, represented that with advancement in pollution control technologies, thermal power plants are better equipped to capture fly-ash generated in combustion process and unwashed coal can be used more efficiently and economically; thermal power plants are designed for coal with wide variety of ash content and are equipped with dry ash evacuation, handling and supply systems for ash utilisation; using washed coal makes power generation costlier; fly ash generated in thermal power plants is being used in several beneficial uses like cement manufacturing, brick making, road laying, back-fill material for reclamation of mine voids and low lying areas; requirement of maintaining average ash content to 34% prompts industries to undertake import of coal, resulting in outflow of foreign exchange etc.

And Whereas, the Ministry of Coal has, *inter alia*, represented that the coal mines are constantly striving to improve raw coal in terms of quality, size and extraneous material over the years which has considerably reduced wear and tear of all related equipment, coal washing process involves multiple handling and avoidable road transportation of huge quantities of coal from coal mines to washeries and then to rail sidings for onward transport to power plants; the washing process only divides the coal into washed coal and washery rejects while the ash content of mined coal remains the same; use of low grade coal washery rejects, in the multiple small user industries, generates more pollution etc.

And Whereas, the Ministry of Coal and Ministry of Power have, therefore, represented that the mandating power plants to use washed coal requires to be revisited by reconsidering the notification dated the 2nd January, 2014 which will help ease power generation for long distance haulage of coal without adverse impact on the environment.

And Whereas, the NITI Aayog, in its report after analysing the issue from the perspective of washeries, Coal mining, transportation and consumption of coal at power plants has, *inter alia*, summed up that use of washery rejects in nearby industries generates more pollution; since washery rejects are distributed in number of smaller industries, the pollution control at numerous points is more difficult than controlling the

pollution at power plant end; Ash generated in the washing process pollutes water along with coal particles and cannot be gainfully utilised; Coal washing process involves increased water use, effluent generation; Disposal of washery rejects has negative environmental impact as it has to handle and dispose huge quantity of low grade coal washery rejects, liquid effluent streams, coal storage, handling coal dust, runoff and fugitive dust; Coal washing also adversely impacts topography, water drainage pattern and quality, water bodies, surrounding air quality at large scale; Washing process increases the cost of power generation with no commensurate environmental advantages etc.

And Whereas, NITI Aayog has, therefore, recommended that it may be prudent to determine and enforce the environmental and pollution norms, to be complied with by the power generators, rather than restricting the ash content in coal, based on distance of transportation.

And Whereas, the Ministry of Environment, Forest and Climate Change, after deliberating the representations from Ministry of Power, Ministry of Coal, report of NITI Aayog and various stakeholders and after careful considerations & in larger public interest, arrived at the following:

- (i) The extent of ash content in mined coal remains the same. With washeries, the ash content gets divided at two places (washeries and the power plant), whereas if unwashed coal is used in power plant, the ash content is handled at only one place viz. the power plant;
- (ii) Thermal power plants are technologically equipped to address pollution control, ash management as they have high efficiency equipment to capture fly ash, dry ash evacuation and handling systems, ash supply systems for ash utilisation and tall stacks for wider dispersal of flue gases;
- (iii) The Ministry of Environment, Forest and Climate Change has notified emission norms, mandating respective thermal power plants to adhere to such norms in a time bound manner;

And Whereas, it is expedient to adopt best possible framework towards handling of unwashed coal including management of fly ash and other associated environmental aspects arising out of processing of unwashed coal at different stages.

And Whereas, the Ministry of Coal has represented that in view of the existing unprecedented COVID-19 pandemic and the resultant immediate requirement of utilization of domestic coal by stimulating coal sector demand for power generation in the country, it is desirable to issue the notification at the earliest.

Now, therefore, in exercise of the powers conferred by Section 3, Section 6 and Section 25 of the Environment Protection Act, 1986 (29 of 1986) read with sub-rule (4) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government, after having dispensed with the requirement of notice under clause (a) of sub-rule (3) of rule 5 of the said rules, in public interest, hereby makes the following rules to further amend the Environment (Protection) Rules, 1986, namely :-

1. (1) These rules may be called the Environment (Protection) Amendment Rules, 2020
(2) They shall come into force on the date of their publication in the Official Gazette.
2. In the Environment (Protection) Rules, 1986, in rule 3, for sub-rule (8), the following sub-rule shall be substituted, namely :-

“(8) Use of coal by Thermal Power Plants, without stipulations as regards ash content or distance, shall be permitted subject to following conditions:

- (1) **Setting Up Technology Solution for emission norms:**
 - (i) Compliance of specified emission norms for Particulate Matter, as per extant notifications and instructions of Central Pollution Control Board, issued from time to time.
 - (ii) In case of washeries, Middling and rejects to be utilized in FBC (Fluidised Bed Combustion) technology based thermal power plants. Washery to have linkage for middling and rejects in Fluidised Bed Combustion plants.
- (2) **Management of Ash Ponds:**
 - (i) The thermal powers plants shall comply with conditions, as notified in the Fly Ash notification issued from time to time, without being entitled to additional capacity of fly ash pond (for existing power generation capacity) on ground of switching from washed coal to unwashed coal.
 - (ii) Appropriate Technology solutions shall be applied to optimise water consumption for Ash management;

- (iii) The segregation of ash may be done at the Electro-Static Precipitator stage, if required, based on site specific conditions, to ensure maximum utilization of fly ash;
- (iv) Subject to 2(i) above, the thermal power plants to dispose flyash in abandoned or working mines (to be facilitated by mine owner) with environmental safeguards.

(3) **Transportation:**

- (i) Coal transportation may be undertaken by covered Railway wagon (railway wagons covered by tarpaulin or other means) and/or covered conveyer beyond the mine area. However, till such time enabling Rail transport/conveyer infrastructure is not available, road transportation may be undertaken in trucks, covered by tarpaulin or other means.
- (ii) It shall be ensured by the thermal power plant that
 - a. Rail siding facility or conveyor facility is set up at or near the power plant, for transportation by rail or conveyor; and
 - b. If transportation by rail or conveyor facility is not available, ensure that the coal is transported out from the Delivery Point of the respective mine in covered trucks (by tarpaulin or other means), or any mechanized closed trucks by road.
- (4) This shall also be deemed to be additional conditions of the relevant Environmental Clearances for respective projects for financial year 2020-21 and onwards. The existing Environmental Clearances shall stand modified so as to make the above conditions operative for relevant sectors. The Consent to Operate shall be issued by respective State Pollution Control Boards accordingly.”

[F.No.13014/01/2020-IA.I(T)]

GEETA MENON, Jt. Secy.

Note:-The principal rules were published in the Gazette of India *vide* number S.O. 844(E), dated the 19th November, 1986 and subsequently amended *vide* numbers S.O. 82(E), dated 16th February, 1987; S.O. 64(E), dated 18th January, 1988; G.S.R. 931(E), dated 27th October, 1989; S.O. 23(E), dated 16th January, 1991; G.S.R. 95(E), dated 12th February, 1992; G.S.R. 329(E), dated 13th March, 1992; G.S.R. 562(E), dated 27th May, 1992; G.S.R. 884(E), dated 20th November, 1992; G.S.R. 386(E), dated 22nd April, 1993; G.S.R. 422(E), dated 19th May, 1993; G.S.R. 801(E), dated 31st December, 1993; G.S.R. 320(E), dated 16th March, 1994; G.S.R. 560(E), dated 19th September, 1997; G.S.R. 378(E), dated 30th June, 1998; G.S.R. 7(E), dated 22nd December, 1998; G.S.R. 407(E), dated 31st May, 2001; G.S.R. 826(E), dated 16th November, 2009; G.S.R. 513(E), dated 28th June, 2012; G.S.R. 02(E) dated 2nd January, 2014; S.O. 3305 (E), dated 7th December, 2015; G.S.R. 593(E), dated 28th June, 2018 and S.O. 236 (E), dated 16th January, 2020.



INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
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HYDERABAD- 500007



Dr.R.Srinivas
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E-mail: srini@iict.res.in

Ref: ACMS/NTPC/2017

Date: 29-05-2017

To:
Mr.Pankaj Sharma,
Dy .General Manager (EMG),
Sipat Super Thermal Power Station,
Ujjawal Nagar(P.O),
SIPAT,
Bilaspur Distt,
Chhattisgarh-495 555.

Ujjawal
06.06.17
- manager (EMG)

Dear Sir,

This is with your reference no :Sipat/Envt./2017/1352 and letter dated 07-02-2017 regarding the analysis of Coal, Fly ash and Bottom ash samples and the report for the same is given below.

Analysis Report

S.No	Parameters	Coal Fried Unit#1	Coal Fried Unit#4	Fly Ash	Fly Ash Silo Stage Unit #4	Bottom Ash Unit#1	Bottom Ash Unit#4
1	Al (% by mass)	2.35	1.52	3.38	9.78	6.34	6.55
2	As (µg/g)	13.89	7.26	25.60	30.33	26.70	18.92
3	Cd(µg/g)	0.27	0.14	0.79	0.53	0.21	0.19
4	Co(µg/g)	10.59	13.79	19.62	20.83	10.97	11.11
5	Cr(µg/g)	64.87	45.87	96.03	101.25	69.40	73.21
6	Cu(µg/g)	15.85	148.88	58.35	62.31	33.15	29.11
7	Fe (% by mass)	1.24	1.72	1.89	1.75	0.83	2.54
8	Mn(µg/g)	70.60	308.36	67.21	139.54	158.58	148.83
9	Hg(µg/g)	1.11	0.48	0.64	0.85	B.D	B.D
10	Ni(µg/g)	28.14	26.25	27.88	31.78	16.30	17.32
11	Pb(µg/g)	15.46	15.62	20.11	36.05	7.98	11.86
12	Zn(µg/g)	57.25	18.10	38.40	41.38	31.75	19.32

B.D: Below Detection Limit

[Signature]
Analyzed by

[Signature]
Scientist-in-Charge

[Signature]
for Director

1. This Certificate refers to sample(s) examined only.
2. These Results should not be used for commercial purpose (Advertisement).

“बिजनेस पोस्ट के अन्तर्गत डाक शुल्क के नगद भुगतान (बिना डाक टिकट) के प्रेषण हेतु अनुमत. क्रमांक जी. 2-22-छत्तीसगढ़ गजट/38 सि. से. भिलाई, दिनांक 30-5-2001.”



पंजीयन क्रमांक
“छत्तीसगढ़/दुर्ग/09/2013-2015.”

छत्तीसगढ़ राजपत्र

प्राधिकार से प्रकाशित

क्रमांक 19]

रायपुर, शुक्रवार, दिनांक 8 मई 2020—वैशाख 18, शक 1942

विषय—सूची

भाग 1.—(1) राज्य शासन के आदेश, (2) विभाग प्रमुखों के आदेश, (3) उच्च न्यायालय के आदेश और अधिसूचनाएं, (4) राज्य शासन के संकल्प, (5) भारत शासन के आदेश और अधिसूचनाएं, (6) निर्वाचन आयोग, भारत की अधिसूचनाएं, (7) लोक-भाषा परिशिष्ट.

भाग 2.—स्थानीय निकाय की अधिसूचनाएं.

भाग 3.—(1) विज्ञापन और विविध सूचनाएं, (2) सांख्यिकीय सूचनाएं.

भाग 4.—(क) (1) छत्तीसगढ़ विधेयक, (2) प्रवर समिति के प्रतिवेदन, (3) संसद में पुरःस्थापित विधेयक, (ख) (1) अध्यादेश, (2) छत्तीसगढ़ अधिनियम, (3) संसद् के अधिनियम, (ग) (1) प्रारूप नियम, (2) अंतिम नियम.

भाग १

राज्य शासन के आदेश

सामान्य प्रशासन विभाग

मंत्रालय, महानदी भवन, नवा रायपुर, अटल नगर

नवा रायपुर, अटल नगर दिनांक 2 मार्च 2020

क्रमांक ई 1-02/2020/एक-2.—राज्य शासन एतद्वारा विभागीय आदेश दिनांक 12-12-2019 द्वारा श्री टामन सिंह सोनवानी, भा.प्र.से. (2004) को अधिसमय वेतनमान में पदोन्नत कर सचिव, मुख्यमंत्री के पद पर पदस्थ करते हुए सचिव, विमानन विभाग, संचालक, विमानन, संचालक, कृषि तथा आयुक्त गन्ना का अतिरिक्त प्रभार सौंपा गया है. उक्तादेश में आंशिक संशोधन करते हुए संचालक, कृषि के अतिरिक्त प्रभार के स्थान पर आयुक्त, कृषि का अतिरिक्त प्रभार प्रदान करता है.

शेष प्रभार यथावत् रहेंगे.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
कमलप्रोत सिंह, सचिव.

वन विभाग

मंत्रालय, महानदी भवन, नवा रायपुर, अटल नगर, जिला-रायपुर

नवा रायपुर, अटल नगर दिनांक 20 फरवरी 2020

संशोधन

क्रमांक एफ 01-73/2001/10-भा.व.से.—विभागीय समसंख्यक आदेश दिनांक 14-02-2020 के सरल क्रमांक-2 के कॉलम-4 में उल्लेखित श्री जे.ए.सी.एस. राव (1987), भारतीय वन सेवा अधिकारी की सेवानिवृत्ति तिथि 31-07-2021 के स्थान पर दिनांक 30-06-2021 पढ़ा जाए.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
भोस्कर विलास संदिपान, संयुक्त सचिव.

गृह (पुलिस) विभाग

मंत्रालय, महानदी भवन, नवा रायपुर, अटल नगर

नवा रायपुर, अटल नगर दिनांक 14 जनवरी 2020

क्रमांक एफ 3-28/2019/गृह-दो.—दण्ड प्रक्रिया संहिता, 1973 (1973 का 2) की धारा 2 के खण्ड (ध) द्वारा प्रदत्त शक्तियों को प्रयोग में लाते हुए, राज्य सरकार, जनसुविधा तथा प्रशासनिक दृष्टि से एतद्वारा, पूर्व अधिसूचना में आंशिक संशोधन करते हुए, नीचे दी गई सारणी के कॉलम (3) में उल्लेखित पुलिस थाना, जिसकी प्रविष्टियां तत्स्थानी कॉलम (4) तथा (5) में उल्लेखित हैं, को कॉलम (2) में उल्लेखित पुलिस थाना के स्थानीय क्षेत्राधिकार के रूप में अधिसूचित करती है :—

सारणी

स. क्र.	उस पुलिस थाना/चौकी तहसील/ जिला के नाम जिसमें स्थानीय क्षेत्र सम्मिलित किया जाना है.	उप पुलिस थाना/चौकी तहसील/ जिला के नाम जिसमें स्थानीय क्षेत्र अपवर्जित किया जाना है.	प्रस्तावित ग्रामों के नाम	पटवारी हल्का नम्बर
(1)	(2)	(3)	(4)	(5)

जिला—बस्तर

01.	पुलिस थाना-मालेवाही,	चौकी-ककनार, पुलिस थाना-मारडूम,	मालेवाही	01
02.	तहसील-लोहणडीगुड़ा, जिला-बस्तर.	तहसील-लोहणडीगुड़ा, जिला-बस्तर.	बोदली	01
03.			कहचेनार	01
04.			एरपुण्ड	01
05.			टेटम	01
06.			पाउल	01
07.			पुसपाल 'ब'	01
08.			सालेपाल	01
09.			हराकोडेर	01
10.			पिच्चीकोडेर	01
11.			अमलीधार	02
12.			कोड़नार	02

No. F 3-28/2019/Home-2.—In exercise of the powers conferred by sub-clause (s) of Section 2 of the Code of Criminal Procedure, 1973 (No. 2 of 1974), the State Government, in view of public convenience and administrative reasons hereby, notifies, by making partial amendment in the previous notification, the police station mentioned in column (3) having corresponding entire mentioned in column (4) and (5) as local jurisdiction of Police Station mentioned in column (2) in the table below :—

S. No.	Name of Police Station/ Tehsil/District in which the local area has to be included	Name of Police Station/ Tehsil/District from which the local area has to be excluded	Name of the proposed villages	Patwari Halka Number
(1)	(2)	(3)	(4)	(5)
District—Bastar				
01.	Police Station-Malewahi	Out Post-Kaknaar	Malewahi	01
02.	Tehsil-Lohandiguda	Police Station-Mardum	Bodali	01
03.	District-Bastar.	Tehsil-Lohandiguda,	Kahchenar	01
04.		District-Bastar.	Arpund	01
05.			Tetam	01
06.			Paul	01
07.			Puspal 'B'	01
08.			Salepal	01
09.			Harrakodar	01
10.			Pichchikoder	01
12.			Amlidhar	02
13.			Kodenar	02

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
मुकुन्द गजभिये, उप-सचिव.

योजना, आर्थिक एवं सांख्यिकी विभाग
मंत्रालय, महानदी भवन, नवा रायपुर, अटल नगर, रायपुर

नवा रायपुर, अटल नगर दिनांक 7 जनवरी 2020

क्रमांक एफ 1-10/2014/23.—इस विभाग के आदेश क्रमांक 26/2001/यो.आ.सां/23, दिनांक 10 जनवरी, 2001 एवं विभागीय समसंख्यक आदेश दिनांक 04-10-2014 को अधिक्रमित करते हुये, राज्य शासन एतद्द्वारा, “राज्य योजना आयोग, छत्तीसगढ़” का निम्नानुसार पुनर्गठन करते हुए दायित्व निर्धारित करता है :—

1. संरचना :—

1.	अध्यक्ष	माननीय मुख्यमंत्रीजी
2.	पूर्ण कालिक उपाध्यक्ष (1)	राज्य शासन द्वारा मनोनीत
3.	पदेन सदस्य (4)	राज्य मंत्रिपरिषद् से मान. मुख्यमंत्रीजी द्वारा मनोनीत 3 सदस्य एवं माननीय योजना मंत्रीजी.
4.	पूर्णकालीन सदस्य (1)	राज्य शासन द्वारा मनोनीत
5.	अशासकीय सदस्य (3)	कृषि, उद्योग, शिक्षा, स्वास्थ्य, सामाजिक क्षेत्र, अर्थशास्त्र से अधिकतम 03 लब्ध प्रतिष्ठित व्यक्ति. (राज्य शासन द्वारा मनोनीत).

- | | | |
|----|-----------------------|--|
| 6. | अंशकालीन सदस्य (2) | अधिकतम 2 सदस्य. राज्य के प्रमुख विश्वविद्यालयों, शोध संस्थानों एवं अन्य प्रासंगिक संस्थाओं से पदेन सदस्य के रूप में. (एक वर्ष के चक्रीय आधार पर) राज्य शासन द्वारा मनोनीत. |
| 7. | स्थायी आमंत्रित | 1. मुख्य सचिव,
2. भारसाधक सचिव, वित्त/योजना आर्थिक एवं सांख्यिकी/पंचायत एवं ग्रामीण विकास/नगरीय प्रशासन एवं विकास/कृषि विज्ञान एवं किसान कल्याण तथा जैव प्रौद्योगिकी/आदिम जाति तथा अनुसूचित जाति विकास विभाग. |
| 8. | पूर्णकालिक सदस्य सचिव | शासन द्वारा पदस्थ सचिव स्तरीय अधिकारी. |

2. आयोग के दायित्व :—

- (1) राज्य के आर्थिक एवं मानव संसाधनों का मूल्यांकन कर उनके सर्वाधिक प्रभावी उपयोग एवं राज्य के समस्त क्षेत्रों के संतुलित विकास के उपाय सुझाना.
- (2) सतत् संपोषणीय विकास (SDG) तथा “जन घोषणा पत्र” के उद्देश्यों एवं “इंटर-जनरेशनल इक्विटी” के सिद्धांत को केन्द्र में रखकर योजना निर्माण के संदर्भ में विभागों को सुझाव देना.
- (3) विकेन्द्रीकृत योजना (Decentralized Planning) निर्माण, समीक्षा एवं इन योजनाओं के आधार पर संसाधन वितरण की प्राथमिकता निर्धारित करने के लिए राज्य शासन को समय-समय पर सुझाव देना.
- (4) शासन द्वारा संचालित योजनाओं एवं कार्यक्रमों की प्रगति की आवश्यकतानुसार समीक्षा एवं मूल्यांकन (Evaluation) करना तथा उनमें सुधार के संबंध में शासन को सुझाव देना.
- (5) विभिन्न सेक्टरों में राज्य के विकास के लिये उपयोगी निदानात्मक/विश्लेषणात्मक अध्ययन प्रायोजित करना एवं राष्ट्रीय तथा अंतर्राष्ट्रीय स्तर पर सफल पाई गई नीतियों व Best Practices का अध्ययन कर राज्य में लागू किये जाने के संदर्भ में राय देना.
- (6) नवाचारों का अध्ययन कर प्रोत्साहित करने हेतु शासन को सुझाव देना.
- (7) शासन एवं शासनेतर विषयों पर राष्ट्रीय एवं वैश्विक स्तर पर अपनायी जा रही नीतियों का अध्ययन करना व राज्य के लिये नीति नेतृत्व (Policy Lead) प्रदान करते हुये Think Tank के रूप में कार्य करना.
- (8) समय-समय पर माननीय मुख्यमंत्री जी एवं अध्यक्ष, राज्य योजना आयोग द्वारा प्रदत्त अन्य कार्यों को संपादित करना.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
आशीष कुमार भट्ट, सचिव.

आवास एवं पर्यावरण विभाग
मंत्रालय, महानदी भवन, नवा रायपुर, अटल नगर

नवा रायपुर, अटल नगर दिनांक 3 फरवरी 2020

क्रमांक एफ 7-39/2017/32.—छत्तीसगढ़ नगर तथा ग्राम निवेश अधिनियम, 1973 (क्रमांक 23 सन् 1973) की धारा 13 की उपधारा (2) के खण्ड (क) द्वारा प्रदत्त शक्तियों को प्रयोग में लाते हुए, राज्य शासन एतद्वारा इस विभाग की समसंख्यक अधिसूचना दिनांक 08-01-2018 द्वारा गठित सोनहत निवेश क्षेत्र में अनुसूची-एक में दिये गये ग्राम जोगिया, कछाड़ी, भगवतपुर, नौगाई, खड़गांव खुर्द, परिहत,

रजपुरी, पलाडीडांड, बड़वार, पत्थरगवां, मंझगवां खुर्द, तंजारा, मेण्ड्रा, सोनारी, छिंगुरा को शामिल करते हुए पुनर्गठित सोनहत निवेश क्षेत्र की सीमाएं अनुसूची-दो निर्धारित की जाती है :-

अनुसूची-एक

सोनहत निवेश क्षेत्र में शामिल ग्राम

ग्राम :— जोगिया, कछाड़ी, भगवतपुर, नौगाई, खड़गवां खुर्द, परिहत, रजपुरी, पलाडीडांड, बड़वार, पत्थरगवां, मंझगवां खुर्द, तंजारा, मेण्ड्रा, सोनारी, छिंगुरा.

अनुसूची-दो

सोनहत निवेश क्षेत्र की पुनर्गठित सीमाएं

- उत्तर में** : ग्राम जामटीकरा, रजौली, पोंडी, परीहत, रजपुरी, अमहर, भुईहारीपारा, सोनहत, मेण्ड्रा, भगवतपुर, मंझगवां खुर्द, कछाड़ी, जोगिया एवं पलाडीडांड ग्रामों की उत्तरी सीमा तक.
- पूर्व में** : ग्राम पलाडीडांड, तंजारा, पत्थरगवां, बसवाही, मधौरा, नौगाई एवं बड़वार ग्रामों की पूर्वी सीमा तक.
- दक्षिण में** : ग्राम बड़वार, नौगाई, कटगोडी, कुशमहा, पुसला, काचरडांड, बिरौरीडांड, केवराबहरा, चकडांड एवं भट्ठीपारा ग्रामों की दक्षिणी सीमा तक.
- पश्चिम में** : ग्राम भट्ठीपारा, रजौली, भैंसवार एवं जामटीकरा ग्रामों की पश्चिमी सीमा तक.

नवा रायपुर, अटल नगर, दिनांक 4 फरवरी 2020

क्रमांक एफ 7-16/2019/32.—छत्तीसगढ़ नगर तथा ग्राम निवेश अधिनियम, 1973 की धारा 17-क (1) के अंतर्गत थानखम्हरिया निवेश क्षेत्र जिला बेमेतरा की विकास योजना तैयार करने हेतु समिति का गठन इस विभाग की समसंख्यक अधिसूचना दिनांक 28-08-2019 द्वारा किया गया है. उक्त आदेश के उपधारा (ड) में उल्लेखित “जनपद पंचायत बेमेतरा, जिला बेमेतरा” के स्थान पर “जनपद पंचायत साजा” पढ़ा जावे.

नवा रायपुर, अटल नगर, दिनांक 11 फरवरी 2020

क्रमांक एफ 7-20/2017/32.—राज्य शासन एतद्वारा छत्तीसगढ़ नगर तथा ग्राम निवेश अधिनियम, 1973 (क्र. 23 सन् 1973) की धारा 23-क (1) एवं (2) के अंतर्गत इस विभाग की समसंख्यक सूचना दिनांक 28-05-2019 द्वारा सीपत विकास योजना 2031 में लोक प्रयोजनार्थ निम्नानुसार भूमि का उपांतरण प्रस्तावित करते हुये दो प्रमुख दैनिक स्थानीय समाचार पत्रों में एक दिन प्रकाशित की गई थी :-

सीपत विकास योजना 2031 में उपांतरण

क्र.	ग्राम का नाम	खसरा क्र.	रकबा (एकड़ में)	विकास योजना में अंगीकृत प्रस्ताव	अधिनियम की धारा 23-क (1) एवं (2) के तहत उपांतरण
(1)	(2)	(3)	(4)	(5)	(6)
1.	सेलर प.ह.नं. 11/15	1297	95.028 एकड़	कृषि	औद्योगिक (एम.आर.-17, 18 मानचित्र में दर्शित 18 मीटर मार्ग छोड़कर)

- उक्त उपांतरण उद्योग विभाग को औद्योगिक प्रयोजन हेतु हैं.
- सूचना में उल्लेखित निश्चित समयावधि में कोई आपत्ति/सुझाव प्राप्त नहीं हुआ है.
- अतः राज्य शासन एतद्वारा सीपत विकास योजना 2031 में उपरोक्त उपांतरण की पुष्टि करता है. उक्त उपांतरण सीपत विकास योजना 2031 का अंगीकृत भाग होगा.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
भोसकर विलास संदिपान, संयुक्त सचिव.

राजस्व विभाग

कार्यालय, कलेक्टर, जिला जांजगीर-चांपा (छत्तीसगढ़), एवं पदेन उप-सचिव, छत्तीसगढ़ शासन, राजस्व एवं आपदा प्रबंधन विभाग

जांजगीर, दिनांक 23 अप्रैल 2020

क्रमांक 4140/अ-82/20.—चूंकि राज्य शासन को यह प्रतीत होता है कि इससे संलग्न अनुसूची के खाने (1) से (4) में वर्णित भूमि की अनुसूची के खाने (6) में उसके सामने दिये गये सार्वजनिक प्रयोजन के लिये आवश्यकता है अथवा आवश्यकता पड़ने की संभावना है. अतः भूमि अर्जन, पुनर्वासन और पुनर्व्यवस्थापन में उचित प्रतिकर और पारदर्शिता का अधिकार अधिनियम, 2013 (जिसे एतद् पश्चात् अधिनियम 2013 कहा जायेगा) की धारा 11 की उप-धारा (1) के उपबंधों के अनुसार सभी संबंधित व्यक्तियों को इसके द्वारा इस आशय की सूचना दी जाती है कि राज्य शासन एतद्वारा अनुसूची के खाने (5) में उल्लेखित प्राधिकारी को उक्त भूमि के संबंध में धारा 12 के अंतर्गत दी गयी शक्तियों का प्रयोग करने के लिए प्राधिकृत करता है :-

अनुसूची

भूमि का वर्णन		धारा 12 के द्वारा प्राधिकृत अधिकारी		सार्वजनिक प्रयोजन का वर्णन
जिला	तहसील	नगर/ग्राम	लगभग क्षेत्रफल (हेक्टेयर में)	
(1)	(2)	(3)	(4)	(5)
जांजगीर-चांपा	मालखरौदा	परसा प.ह.नं. 09	1.250	कार्यपालन अभियंता, लोक निर्माण विभाग चांपा संभाग, चांपा जिला-जांजगीर-चांपा.
				पोता परसा फगुरम मार्ग निर्माण हेतु.

भूमि का नक्शा (प्लान) का निरीक्षण संबंधित अनुविभागीय अधिकारी (रा.), सक्ती के कार्यालय में किया जा सकता है.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
जे. पी. पाठक, कलेक्टर एवं पदेन उप-सचिव.

कार्यालय, कलेक्टर, जिला उत्तर बस्तर कांकेर (छत्तीसगढ़), एवं पदेन उप-सचिव, छत्तीसगढ़ शासन,
राजस्व एवं आपदा प्रबंधन विभाग

कांकेर, दिनांक 13 फरवरी 2020

संशोधित

क्रमांक/16/अ-82/2016-17.— चूंकि राज्य शासन को यह प्रतीत होता है कि इससे संलग्न अनुसूची के खाने (1) से (4) में वर्णित भूमि की अनुसूची के खाने (6) में उसके सामने दिये गये सार्वजनिक प्रयोजन के लिये आवश्यकता है अथवा आवश्यकता पड़ने की संभावना है. अतः भूमि अर्जन, पुनर्वासन और पुनर्व्यवस्थापन में उचित प्रतिकर और पारदर्शिता का अधिकार अधिनियम, 2013 (जिसे एतद् पश्चात् अधिनियम 2013 कहा जायेगा) की धारा 11 की उप-धारा (1) के उपबंधों के अनुसार सभी संबंधित व्यक्तियों को इसके द्वारा इस आशय की सूचना दी जाती है कि राज्य शासन एतद्द्वारा अनुसूची के खाने (5) में उल्लेखित प्राधिकारी को उक्त भूमि के संबंध में धारा 12 के अंतर्गत दी गयी शक्तियों का प्रयोग करने के लिए प्राधिकृत करता है :—

अनुसूची

भूमि का वर्णन				धारा 12 के द्वारा	सार्वजनिक प्रयोजन
जिला	तहसील	नगर/ग्राम	लगभग क्षेत्रफल (हेक्टेयर में)	प्राधिकृत अधिकारी	का वर्णन
(1)	(2)	(3)	(4)	(5)	(6)
उत्तर बस्तर कांकेर	चारामा	शाहवाड़ा प.ह.नं. 31	1.89	कार्यपालन अभियंता, लोक निर्माण विभाग, सेतु निर्माण संभाग, जगदलपुर.	तारसगांव - शाहवाड़ा मार्ग के कि.मी. 5/6 में महानदी पर सेतु निर्माण कार्य के पहुंच मार्ग निर्माण कार्य हेतु.

भूमि का नक्शा (प्लान) का निरीक्षण अनुविभागीय अधिकारी (रा)/भू-अर्जन अधिकारी, चारामा जिला उत्तर बस्तर कांकेर के कार्यालय में किया जा सकता है.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
के. एल. चौहान, कलेक्टर एवं पदेन उप-सचिव.

कार्यालय, कलेक्टर, जिला रायगढ़, छत्तीसगढ़ एवं
पदेन उप सचिव, छत्तीसगढ़ शासन, राजस्व एवं
आपदा प्रबंधन विभाग

रायगढ़, दिनांक 12 फरवरी 2020

भू-अर्जन प्रकरण क्रमांक 19/अ-82/2016-17.— चूंकि राज्य शासन को इस बात का समाधान हो गया है कि नीचे दी गई अनुसूची के पद (1) में वर्णित भूमि की अनुसूची के पद (2) में उल्लेखित सार्वजनिक प्रयोजन के लिए आवश्यकता है. अतः भूमि अर्जन, पुनर्वासन और पुनर्व्यवस्थापन में उचित प्रतिकर और पारदर्शिता का अधिकार अधिनियम, 2013 (जिसे एतद् पश्चात् अधिनियम, 2013 कहा जायेगा) की धारा 19 के अन्तर्गत इसके द्वारा यह घोषित किया जाता है कि उक्त भूमि की उक्त प्रयोजन के लिए आवश्यकता है :—

अनुसूची

- (1) भूमि का वर्णन—
(क) जिला-रायगढ़
(ख) तहसील-सारंगढ़
(ग) नगर/ग्राम-छुहीपाली
(घ) लगभग क्षेत्रफल-3.433 हेक्टेयर

खसरा नम्बर	रकबा (हेक्टेयर में)
(1)	(2)
387	0.010
103/1	0.085
117/3	0.032

(1)	(2)	(1)	(2)
205/1	0.061	223/1	0.057
128/2	0.028	232	0.049
204	0.041	277/1क	0.004
214/2	0.016	921/3	0.073
235, 237/2	0.016	280/1	0.041
278/1	0.053	375, 371/2	0.121
279/1	0.069	943/1	0.049
351/2	0.065	977/1	0.089
919/4, 921/2	0.008	1185/1	0.008
973/1	0.049	386/2	0.041
1182/1	0.101	120	0.049
1188	0.008	118/2	0.073
113	0.008	124	0.012
117/1	0.089	127	0.057
277/2	0.049	973/2	0.097
1187	0.065	214/1	0.004
190/2	0.008	233, 234/2	0.105
203/2	0.069	277/1ख	0.045
215/1	0.020	278/3	0.008
236/1ख	0.138	351/1	0.121
278/2	0.097	390/1, 390/2	0.041
12/1	0.032	943/2	0.032
388	0.024	977/5	0.024
390/3	0.105	286/4	0.057
972/2	0.065		
1182/2	0.008	योग	74 3.433
1191	0.142		
103/2	0.016	(2) सार्वजनिक प्रयोजन जिसके लिए आवश्यकता है-खुण्डी नाला	
118/1	0.061	व्यपवर्तन योजना के तहत नहर निर्माण हेतु.	
122	0.008		
125, 126/1	0.020	(3) भूमि का नक्शा (प्लान) अनुविभागीय अधिकारी (रा.), सारंगढ़	
155/2	0.028	के कार्यालय में देखा जा सकता है.	
205/2	0.008		
215/2	0.041		
236/3	0.065		
349/2	0.012		
279/2	0.073		
347, 348/2क	0.061	रायगढ़, दिनांक 12 फरवरी 2020	
394	0.040		
975	0.057		
1183	0.008		
97/1घ	0.053		
117/2	0.016		
200, 202	0.008		
123	0.020		
125/2	0.004		
231	0.016		

अनुसूची		अनुसूची	
(1) भूमि का वर्णन-		(1) भूमि का वर्णन-	
(क) जिला-रायगढ़		(क) जिला-रायगढ़	
(ख) तहसील-सारंगढ़		(ख) तहसील-सारंगढ़	
(ग) नगर/ग्राम-सिरौली		(ग) नगर/ग्राम-डौकीजोर	
(घ) लगभग क्षेत्रफल-0.612 हेक्टेयर		(घ) लगभग क्षेत्रफल-0.465 हेक्टेयर	
खसरा नम्बर	रकबा (हेक्टेयर में)	खसरा नम्बर	रकबा (हेक्टेयर में)
(1)	(2)	(1)	(2)
215/2	0.081	145/3	0.020
282	0.032	16	0.037
190/1	0.008	111/3	0.008
183, 193/2ग	0.016	13/1क, 14/1	0.020
206, 207, 306/1, 218/1/5	0.053	3, 4/1	0.041
217/2	0.041	5/1, 6/3क	0.024
200/2	0.117	145/1	0.016
184/2क	0.045	110/1	0.012
182/2ख, 194/2ख	0.016	121/4	0.004
178	0.020	13/1ख, 14/2	0.008
216/1	0.024	111/1	0.024
192/4ख	0.004	112/2क	0.008
183, 193/2ख	0.012	145/2	0.008
183/1क, 193/1क	0.024	118/5क	0.036
216/5	0.062	13/1ग, 14/3	0.008
216/3	0.012	130, 147, 148, 149/1	0.018
183, 193/2क	0.017	5/1, 6/3ग	0.032
183/1ख, 193/1ख	0.028	146/2क	0.008
योग	18	146/4क	0.008
	0.612	122, 123, 127/2	0.069
		5/1, 6/1घ	0.032
		5/1, 6/1ख	0.024
		योग	22
			0.465

(2) सार्वजनिक प्रयोजन जिसके लिए आवश्यकता है-खुण्डी नाला व्यपवर्तन योजना के तहत नहर निर्माण हेतु.

(3) भूमि का नक्शा (प्लान) अनुविभागीय अधिकारी (रा.), सारंगढ़ के कार्यालय में देखा जा सकता है.

रायगढ़, दिनांक 12 फरवरी 2020

भू-अर्जन प्रकरण क्रमांक 21/अ-82/2016-17.— चूंकि राज्य शासन को इस बात का समाधान हो गया है कि नीचे दी गई अनुसूची के पद (1) में वर्णित भूमि की अनुसूची के पद (2) में उल्लेखित सार्वजनिक प्रयोजन के लिए आवश्यकता है. अतः भूमि अर्जन, पुनर्वासन और पुनर्व्यवस्थापन में उचित प्रतिकर और पारदर्शिता का अधिकार अधिनियम, 2013 (जिसे एतद् पश्चात् अधिनियम, 2013 कहा जायेगा) की धारा 19 के अन्तर्गत इसके द्वारा यह घोषित किया जाता है कि उक्त भूमि की उक्त प्रयोजन के लिए आवश्यकता है :—

(2) सार्वजनिक प्रयोजन जिसके लिए आवश्यकता है-खुण्डी नाला व्यपवर्तन योजना के तहत नहर निर्माण हेतु.

(3) भूमि का नक्शा (प्लान) अनुविभागीय अधिकारी (रा.), सारंगढ़ के कार्यालय में देखा जा सकता है.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
यशवंत कुमार, कलेक्टर एवं पदेन उप-सचिव.

कार्यालय, कलेक्टर, जिला जांजगीर-चांपा, छत्तीसगढ़ एवं पदेन उप सचिव, छत्तीसगढ़ शासन, राजस्व एवं आपदा प्रबंधन विभाग	खसरा नम्बर	रकबा (हेक्टेयर में)
	(1)	(2)
जांजगीर, दिनांक 3 मार्च 2020	330/2	0.073
क्रमांक/3049/अ-82/2019-20.—चूंकि राज्य शासन को इस बात का समाधान हो गया है कि नीचे दी गई अनुसूची के पद (1) में वर्णित भूमि की अनुसूची के पद (2) में उल्लेखित सार्वजनिक प्रयोजन के लिए आवश्यकता है. अतः भूमि अर्जन, पुनर्वासन और पुनर्व्यवस्थापन में उचित प्रतिकर और पारदर्शिता का अधिकार अधिनियम, 2013 (जिसे एतद् पश्चात् अधिनियम, 2013 कहा जायेगा) की धारा 19 के अन्तर्गत इसके द्वारा यह घोषित किया जाता है कि उक्त भूमि की उक्त प्रयोजन के लिए आवश्यकता है :—	412/1-2	0.036
	323/2	0.081
योग	03	0.190

अनुसूची

(1) भूमि का वर्णन-

- (क) जिला-जांजगीर-चांपा
- (ख) तहसील-जैजैपुर
- (ग) नगर/ग्राम-मल्दाकला, प.ह.नं. 23
- (घ) लगभग क्षेत्रफल-0.190 हेक्टेयर

(2) सार्वजनिक प्रयोजन जिसके लिए आवश्यकता है-घिवरा माइनर
नहर निर्माण हेतु.

(3) भूमि का नक्शा (प्लान) का निरीक्षण अनुविभागीय अधिकारी
(रा.), सक्ती के कार्यालय में किया जा सकता है.

छत्तीसगढ़ के राज्यपाल के नाम से तथा आदेशानुसार,
जे. पी. पाठक, कलेक्टर एवं पदेन उप-सचिव.

विभाग प्रमुखों के आदेश

कार्यालय, प्रबंध संचालक, छ.ग. राज्य कृषि विपणन (मण्डी) बोर्ड
बीज भवन, जी.ई.रोड, तेलीबांधा, रायपुर

रायपुर, दिनांक 23 जनवरी 2020

क्रमांक/बी-4/1/32(2)/भा.अधि./2019-20/6579.—कार्यालयीन आदेश क्रमांक/बी-4/1/32(2)/भा.अधि./2019-20/2933 दिनांक
07-08-2019 द्वारा श्री जितेन्द्र कुमार कुर्रे, डिप्टी कलेक्टर एवं अनुविभागीय अधिकारी (राज.), कुरूद जिला धमतरी को कृषि उपज मंडी
समिति कुरूद जिला धमतरी का भारसाधक अधिकारी नियुक्त किया गया था.

कलेक्टर, जिला धमतरी का ज्ञापन क्रमांक/10634-35/वित्त-1/2019 धमतरी दिनांक 20-12-2019 द्वारा श्री जितेन्द्र कुमार कुर्रे,
अनुविभागीय अधिकारी (राजस्व) एवं भारसाधक अधिकारी कृषि उपज मंडी समिति कुरूद का स्थानांतरण हो जाने के कारण उनके स्थान पर
श्री चम्पूराम साहू, वरिष्ठ कृषि विस्तार अधिकारी, कुरूद को कृषि उपज मंडी समिति कुरूद जिला धमतरी का भारसाधक अधिकारी नियुक्त करने
का प्रस्ताव दिया गया है.

अतः छत्तीसगढ़ कृषि उपज मण्डी अधिनियम 1972 (क्रमांक 24 सन् 1973) की धारा 57 की उपधारा (1) के खण्ड (ख) में प्रदत्त
शक्तियों का प्रयोग करते हुए, एतद्द्वारा, श्री जितेन्द्र कुमार कुर्रे, डिप्टी कलेक्टर एवं अनुविभागीय अधिकारी (राज.) के स्थान पर श्री चम्पूराम
साहू, वरिष्ठ कृषि विस्तार अधिकारी, कुरूद को उनके कार्यभार ग्रहण दिनांक से कृषि उपज मंडी समिति कुरूद जिला धमतरी का भारसाधक
अधिकारी नियुक्त किया जाता है.

अभिनव अग्रवाल,
प्रबंध संचालक.

कार्यालय, कलेक्टर (श्रम), जिला बिलासपुर

बिलासपुर, दिनांक 4 मार्च 2020

क्रमांक/श्रम/बंधुआश्रम/2020/528.—बन्धित श्रम पद्धति उत्सादन अधिनियम 1976 की धारा 13(1) के द्वारा प्रदत्त शक्तियों के अनुसार बिलासपुर जिले में बंधुआ श्रमिकों की निगरानी हेतु जिला स्तरीय सतर्कता समिति के पुनर्गठन का आदेश प्रसारित किया जाता है. धारा 13(2) (ख), (ग) एवं (ङ) के अनुसार जिला दण्डाधिकारी की अध्यक्षता में इस सतर्कता समिति के लिए निम्नानुसार सदस्य समिति के अध्यक्ष के द्वारा नामनिर्देशित किए जाते हैं. क्रमांक 3 में उल्लेखित सदस्य धारा 13(2) (घ) अनुसार राज्य शासन द्वारा नामनिर्देशित पदेन सदस्य होंगे. अध्यक्ष की अनुपस्थिति में समिति की अध्यक्षता मुख्य कार्यपालन अधिकारी, जिला पंचायत, जिला बिलासपुर के द्वारा की जाएगी.

1. धारा 13(2)(ख) अनुसार अनुसूचित जाति एवं अनुसूचित जनजाति से 3 सदस्य—
 - (i) श्री पंचराम सूर्यवंशी
 - (ii) श्री दामोदर कांत
 - (iii) श्री विभोर सिंह
2. धारा 13(2) (ग) अनुसार 2 सामाजिक सदस्य—
 - (iv) डॉ. गिरधर शर्मा, पत्रकार
 - (v) श्री अभयनारायण राय, समाजसेवी
3. धारा 13(2)(घ) अनुसार राज्य शासन द्वारा नामनिर्देशित 3 सदस्य —
 - (vi) पुलिस अधीक्षक, जिला बिलासपुर (पदेन)—श्री प्रशांत अग्रवाल, आई.पी.एस.
 - (vii) मुख्य कार्यपालन अधिकारी, जिला पंचायत (पदेन)—श्री रितेश अग्रवाल, आई.ए.एस.
 - (viii) सहायक आयुक्त, आदिवासी विकास (पदेन)—श्री सी.एल.जायसवाल
4. धारा 13(2) (ङ) के अनुसार जिले में वित्तीय संस्थाओं के प्रतिनिधि—
 - (ix) जिला लीड बैंक के प्रबंधक (पदेन) - श्री अजय दुबे
5. जिला सतर्कता समिति के संयोजक—
 - (x) जिले में पदस्थ सहायक श्रमायुक्त (पदेन) - श्रीमती ज्योति शर्मा (प्रभारी स.श्र.आ.)

हस्ता./-
कलेक्टर एवं जिला दंडाधिकारी,

उच्च न्यायालय के आदेश और अधिसूचनाएं

HIGH COURT OF CHHATTISGARH, BILASPUR

Bilaspur, the 6th December 2019

No. 1397/Confdl./2019/II-3-1/2019.—The following Senior Civil Judge, as specified in Column No. (2) of the table below is hereby transferred from the place shown in Column No. (3) to the place shown in Column No. (4) in the Revenue District mentioned in Column No. (5) and is posted in the capacity as mentioned in column No. (6) from the date he assumes charge of his office.

TABLE

Sl. No.	Name & presently posted as	From	To	Revenue District	Posted as
(1)	(2)	(3)	(4)	(5)	(6)
1.	Shri Sameer Kujur, Addl. Judge to the Court of I Civil Judge Class-I, Kawardha at Pandariya.	Pandariya	Pratappur	Surajpur	Civil Judge Class-I

Bilaspur, the 6th December 2019

No. 1399/Confdl./2019/II-3-1/2019.—The following Civil Judge Class-II, as specified in Column No. (2) of the table below, is hereby transferred from the place shown in Column No. (3) to the place shown in Column No. (4) in the Revenue District mentioned in Column No. (5) and is posted in the capacity as mentioned in column No. (6) from the date he assumes charge of his office :—

TABLE

Sl. No. (1)	Name & presently posted as (2)	From (3)	To (4)	Revenue District (5)	Posted as (6)
1.	Shri Avinash Kumar Dubey, VI Civil Judge Class-II.	Raipur	Pandariya	Kabirdham (Kawardha)	Civil Judge Class-II

Bilaspur, the 6th December 2019

No. 1401/Confdl./2019/I-8-2/2010 (Part-III).—The following Senior Civil Judge, as specified in Column No. (2) of the table below, is hereby transferred from the place shown in Column No. (3) to the place shown in Column No. (4) having jurisdiction of the areas mentioned in Column No. (5) and is posted in the capacity as mentioned in column No. (6) from the date he assumes charge of his office :—

TABLE

Sl. No. (1)	Name & presently posted as (2)	From (3)	To (4)	Jurisdiction of the Court (5)	Posted as (6)
1.	Shri Om Prakash Sahu, Civil Judge Class-I.	Pratappur	Raipur	Revenue District Raipur, Raipur Municipal Council Area, Birgaon Municipal Council Area and Dharsiva Block of Raipur.	Labour Judge, Labour Court No.-1. He is also assigned the additional charge of Labour Court No.2, Raipur having jurisdiction over the rest of the Revenue District Raipur and Gariaband except the jurisdiction of Labour Court No.-1, Raipur.

By order of the High Court,
NEELAM CHAND SANKHLA, Registrar General.



एन टी पी सी लिमिटेड
(विद्युत संचालन एवं विकास)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
अंतर्राष्ट्रीय कार्यालय / Corporate Office

Ref. No.: CS-9518-109(2)-9-FC-NOA-6815

Date: 24.05.2019

M/s GE Power India Limited
Plot No.7, IHDP Building,
Sector-127, Noida-201301

Kind Attn.: Mr. Lalit Sankarni, Executive-Business Operations

Sub.: Notification of Award (NOA) for Ex-works Supply (India) for Flue Gas Desulphurisation (FGD) System Package for Sipat Super Thermal Power Station Stage-I (3 x 660 MW) as per Common Bidding Document No. CS-0011-109(2)-9.

Dear Sir,

1.0 This has reference to the following:

- Our Invitation for Bids (IFB) No. 40087737 dated 31.08.2018 inviting Envelope-I (Techno-Commercial) Bids and IFB no. 40087818 for Envelope-II (Price) Bids.
- Bidding Documents for the subject package downloaded by you from SRM portal comprising the following:

S. No.	Description of Bidding Documents
1	Section-I : Invitation for Bids (IFB)
2	Section-II : Instructions to Bidders (ITB)
3	Section-III : Bid Data Sheets (BDS)
4	Section-IV : General Conditions of Contract (GCC)
5	Section- V : Special Conditions of Contract (SCC)
6	Section-VI : Technical Specifications including Tender Drawings and Technical Data Sheets
7	Section-VII : Forms & Procedures (FP) consisting of Part-1 of 3, Part-2 of 3 and Part-3 of 3

- Various Amendments/Clarifications/Errata Issued to the Bidding Documents for the subject package as per details given below:

श्रीश सिंह / SHRISHI SINGH
उप महाप्रबंधक (सहायक कार्यालय)
Dy. General Manager (Contract Services)
एन टी पी सी लिमिटेड / NTPC Limited
BCC, A-88, Sector-28, NOIDA-201301 (N.P.)



अतिपरिचर्य कार्यालय परिसर, एस्टेट नं. ४-८ ए. सेक्टर २४, भारत सरकार भवन (१), नोएडा (उ.प्र.), पिन: २०१३०१
ENGINEERING OFFICE COMPLEX, Plot No. 4-8A, Sector-24, Post Box No. 13, NOIDA (U.P.), Pin: 201301
सौकरिक सहायक कार्यालय परिसर, एस्टेट नं. ४-८ ए. सेक्टर २४, भारत सरकार भवन (१), नोएडा, पिन: २०१३०१
Corporate Identification Number : L10101DL1625C0001968, Website: www.ntpc.com
दूरभाष नं.: ०१२०-२४१०३३ (१० लीन), ०१२०-२४१०१६ (९ लीन), फैक्स: ०१२०-२४१०३६, ०१२०-२४१०१७
Telephone No. 0120-241033 (10 Lines), 0120-241016 (9 Lines), Fax: 0120-241036, 0120-241017
संविदा कार्यालय - एन टी पी सी, अंतर्राष्ट्रीय कार्यालय परिसर, एस्टेट नं. ४-८ ए. सेक्टर २४, नोएडा, उ.प्र. - २०१३०१
Regd. Office: NTPC Bhawan, SCOPE Complex, 7 Institutional Area, Lodhi Road, New Delhi-110003

Page 1 of 5



List of Clarifications			
Commercial Clarifications			
S. No.	Description	Ref. no.	Issuance/ Uploading Date
1	Clarification no. 1 (Commercial) to Bidding Documents	CS-0011-109(2)-9-CLRF.01 (Comm)	03.10.2018
2	Clarification no. 2 (Commercial) to Bidding Documents	CS-0011-109(2)-9-CLRF.02 (Comm.)	24.10.2018
Technical Clarifications			
S. No.	Description	Ref. no.	Issuance Date
1	Clarification no. 1 (Technical)	CS-0011-109(2)-9-CLRF-01(TECH)	26.10.2018
2	Clarification no. 2 (Technical)	CS-0011-109(2)-9-CLRF-02(TECH)	19.11.2018
3	Clarification no. 3 (Technical)	CS-0011-109(2)-9-CLRF-03(TECH)	28.11.2018
List of Amendments			
S. No.	Description	Ref. no.	Issuance Date
1	Amendment no. 1 to Bidding Documents consisting of : (i) Amendment No. 01 to Section VII	CS-0011-109(2)-9-AMDT 01	19.09.2018
2	Amendment no. 2 to Bidding Documents consisting of : (i) Amendment No. 01 to BDS (Section-III) (ii) Amendment No. 01 to SGC (Section-V) (iii) Amendment No. 02 to Section VII	CS-0011-109(2)-9-AMDT-02	03.10.2018
3	Amendment no. 3 to Bidding Documents consisting of : (i) Amendment No. 01 to Technical Specification (Section-VI)	CS-0011-109(2)-9-AMDT-03	26.10.2018
4	Amendment no. 4 to Bidding Documents consisting of :	CS-0011-109(2)-9-AMDT-04	27.10.2018



Page 2 of 5
 इंजीनियरिंग ऑफिस कॉम्प्लेक्स, एस्कॉ एम. ए. - ८ ए, सेक्टर 24, नोएडा (उ.प्र.), पिन: 201301
 ENGINEERING OFFICE COMPLEX, Plot No. A-8A, Sector 24, Post Box No. 13, NOIDA (U.P.), Pin: 201301
 कॉर्पोरेट कार्यालय: एम. ए. - ८ ए, सेक्टर 24, नोएडा, उत्तर प्रदेश, भारत. वेबसाइट: www.ntpc.co.in
 Corporate Identification Number: L49101DL19750G007800, Website: www.ntpc.co.in
 दूरभाष नं.: +91-79-264222 (10 लाइनें), +91-261-411 (10 लाइनें), फैक्स: +91-79-264222, +91-261-41137
 Telephone No.: 0120-241033 (10 Lines), 0120-24101 (10 Lines), Fax: 0120-24101 30, 0120-2410137
 पंजीकृत कार्यालय: एन टी पी सी लिमिटेड, अंतरिम कार्यालय, 7 इंडस्ट्रियल एरिया, एस्कॉ एम. ए. - ८ ए, सेक्टर 24, नोएडा (उ.प्र.)
 Regd. Office: NTPC Bhawan, SCOPE Complex, 7 Industrial Area, E-8A Sector 24, NOIDA-201301 (U.P.)

अंतरिम कार्यालय / Corporate Office
 एन टी पी सी लिमिटेड (Contract Services)
 Dy. General Manager (Contract Services)
 एन टी पी सी लिमिटेड / NTPC Limited
 EOC, A-8A, Sector-24, NOIDA-201301 (U.P.)

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Special tools & tackles and Mandatory Spares, etc. covered under Flue Gas Desulphurisation (FGD) System Package for Sipat Super Thermal Power Station Stage-I (3 x 660 MW), as per Bidding Document and its Amendments/ Clarifications/ Errata read in conjunction with agreed Minutes of Meeting, as referred to in para 1.0 above (hereinafter referred to as the 'First Contract').

- 3.0 We have also issued Notification of Award to you vide our NOA no. **CS-9518-109(2)-9-SC-NOA-5816** dated **24.06.2019** for the work of providing all services i.e. Transportation from manufacturer's works/ place of dispatch to site (both in India), transit insurance, delivery at site, receipt, unloading, handling, storage, in-plant transportation, taking delivery of employer supplied equipment from site stores, comprehensive all risk insurance, installation, supervision, pre-commissioning, testing, commissioning and performance testing of all Equipment/systems and materials, and all other services leading to successful 'completion of facilities' and handing over to Employer of the Equipment/ Materials including Mandatory Spares etc. (hereinafter referred to as the 'Second Contract') covered under Flue Gas Desulphurization (FGD) System Package for Sipat Super Thermal Power Station Stage-I (3 x 660 MW), as per Bidding Document and its Amendments/ Clarifications/ Errata read in conjunction with agreed Minutes of Meeting, as referred to in para 1.0 above.

- 3.1 You shall also be fully responsible for the works to be executed under the 'Second Contract' and it is expressly understood and agreed by you that any breach under the 'Second Contract' shall automatically be deemed as a breach of this 'First Contract' and vice-versa and any such breach or occurrence or default giving us a right to terminate the 'Second Contract' and/or recover damages there under, shall give us an absolute right to terminate this Contract and/or recover damages under this 'First Contract' as well and vice-versa. However, such breach or default or occurrence in the 'Second Contract' shall not automatically relieve you of any of your responsibilities/obligations under this 'First Contract'. It is also expressly understood and agreed by you that the equipment/ materials to be supplied by you under 'First Contract' when installed and commissioned under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

4.0 CONTRACT PRICE

- 4.1 The total Contract Price for the entire scope of work covered under this NOA shall be ₹ **426,13,20,859/-** (INR Four Hundred and Twenty Six Crore, Thirteen Lakh, Twenty Thousand, Eight Hundred and Fifty Nine only) as per the following break up:



अभियंता/ऑफिस कार्यालय परिसर, एनटीपीसी बिल्डिंग नं. 4 ए, सेक्टर 24, नोएडा (उ.प्र.), पिन: 201304
CONSULTING OFFICE COMPLEX, Plot No. A-24, Sector-24, Plot Box No. 11, NOIDA (U.P.), Pin: 201304
 कार्यालय परिसर: एन.टी.पी.सी. बिल्डिंग नं. 4 ए, सेक्टर 24, नोएडा, उ.प्र., पिन: 201304, वेबसाइट: www.nptc.co.in
 Corporate Identification Number: 640102L1075G0H01000, Website: www.nptc.co.in
 टेलीफोन नं.: +91-11-26111 (10 लाइनें), +91-11-26112 (10 लाइनें), फैक्स: +91-11-26113, +91-11-26114
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 ईमेल/ऑफिस: एन.टी.पी.सी. लिमिटेड, एनपीसी कॉम्प्लेक्स, 4 ए, सेक्टर 24, नोएडा, उ.प्र., पिन: 201304
 Regd. Office: NTPC Bhawan, SCOPE Complex, 4 Institutional Area, Sector 24, New Delhi-110003

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श्रीराम शिखर / SHRI RAM SIKHAR
 उपायुक्त महाप्रबन्धक (ऑपरेशनल सर्विसेस)
 Dy. General Manager (Operational Services)
 एन टी पी सी लिमिटेड / NTPC Limited
 FOC A-24, Sector-24, NOIDA-201304 (U.P.)

Appendix-A
Page 1 of 2

MINUTES OF POST BID DISCUSSIONS (COMMERCIAL) HELD BETWEEN NTPC LIMITED (NTPC) AND GE POWER INDIA LIMITED (GEPIL) ON 26.12.2018 FOR FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE UNDER LOT-2 (AS PER COMMON BIDDING DOCUMENT NO. CS-9011-108(2)-9.

PRESENT

NTPC

GEPIL

Mr. Naveen Jain, GM (CS-4& P&S)
Mr. V. N. Jain, GM (Fin.)
Mr. P K Singh, AGM (CS-1)
Mr. Binay Malik, AGM (CS-3)
Mrs Priyanka Kumari, Sr. Manager (CS-1)

Mr. Lali Sankarni, Executive (Business Operations)
Mr. Roshan Singh, Lead Manager (Sales)

With reference to GEPIL Envelope-1 (Techno-Commercial) Bid Ref No. QFEC5132662 dated 3rd December 2018 submitted online for Flue Gas Desulphurization (FGD) System Package for Lot-2 Projects; discussions were held between GEPIL and NTPC at NTPC EOC, NOIDA, wherein the following have been agreed to with respect to Projects under FGD Lot-2:

- 1.0 GEPIL confirmed that all Deviations/ Exceptions/Variations, if any, explicit or implicit contained in their proposal with respect to NTPC's bidding documents including its Amendments/Clarifications/Errata shall stand withdrawn. Further, GEPIL confirmed that they would execute the work strictly as per the provisions of the Bidding Documents including its Amendments/ Clarifications/Errata in case of award.
- 2.0 GEPIL in Attachment 4 has stated that the facilities viz. all plant and equipment to be supplied and installed and services to be carried out under the flue gas desulphurisation package for TALCHER, SIMHADRI, SIMHADRI Projects. However, during the discussion GEPIL confirmed that the facilities offered are eligible facilities and conform to the Bidding Documents for TALCHER, SIMHADRI, SIPAT Projects.
- 3.0 GEPIL confirmed that any additional Special Maintenance Tools & Tackles, other than those indicated by them at Attachment-4A, required for the equipment supplied under this package shall be furnished by them at no extra cost to NTPC, in case of award.
- 4.0 GEPIL submitted details with regard to Erection Tools & Plant and Safety Equipments & Safety Personal Protective Equipments (as required in Attachment-10). Further, GEPIL confirmed that they will deploy the quantity and type of tools and equipment as per the requirement of NTPC and agreed to bring more equipment, if so warranted, in the opinion of the Project Manager. Further, with regards to Safety issues including bringing the minimum suggestive Safety Equipments & Safety Personal Protective Equipments to site, separate Minutes of meeting are being finalized by GEPIL with Safety department of NTPC.
- 5.0 GEPIL submitted a list of Commissioning/Start-up Spares (Attachment-11) and further confirmed that they shall ensure the availability of the required quantity of Commissioning spares, in line with the Bidding Documents, without any additional cost before start-up/initial operation.
- 6.0 With reference to Attachment-16, GEPIL has confirmed that they will submit the value of all indices for Price Adjustment as per Appendix-2 Section VII book 3 of 3 of bidding document during the signing of Contract agreement.

Priyanka

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MINUTES OF POST BID DISCUSSIONS (COMMERCIAL) HELD BETWEEN NTPC LIMITED (NTPC) AND GE POWER INDIA LIMITED (GEPIL) ON 26.12.2013 FOR FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE UNDER LOT-2 (AS PER COMMON BIDDING DOCUMENT NO. CS-0011-1002)-4.

- 7.0 With regards to the Work Schedule, GEPIL confirmed that they shall strictly adhere to the Work Schedule specified in the BDS and comply to the requirements stipulated in the Bidding Documents in this regard.
- 8.0 GEPIL has confirmed that they have carried out a comprehensive assessment of the capacity and capability of M/s General Electric Company, USA Associate/Collaborator/QFGDM for packages under FGD LOT-2 and confirmed that M/s General Electric Company, USA have sufficient capacity and capability to execute the scope of work as per the provisions of the Bidding Documents.
- 9.0 It was agreed by GEPIL that these discussions with them on their Techno-Commercial offer shall not be construed by GEPIL that they have been considered qualified and eligible for calling/opening of their price bid and award.

(NTPC)

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(GEPIL)

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Page 1 of 3

ANNEXURE - 17

MINUTES OF POST BID TECHNICAL DISCUSSIONS BETWEEN NTPC LIMITED & GE POWER INDIA LTD. IN RESPECT OF TECHNO COMMERCIAL BID PROPOSAL FOR FLUE GAS DESULPHURIZATION SYSTEM PACKAGE FOR LOT-2 PROJECTS AT ENGG. OFFICE COMPLEX, NTPC, NOIDA ON 19.12.2018

Participants:

NTPC LIMITED	GE POWER INDIA LTD.
Udayan Kumar GM (PE-Mech/SG)	Lalit Sankrani Executive Business Operations
Deepak AGM (PE-Mech/SG)	Naresh Sharma Manager (Commercial Proposal)
P.K.Gupta AGM(PE-Mech/SG)	Prashant Sapkal Lead Project Engineer
P. K. Behera DGM (PE-Mech/WS)	Sunil Sahu Manager (Commercial Proposal)
Pramod Chandra Nath DGM (PE-Mech/Piping)	Hiren Nariyelwala Manager (Sales)
Prabhat Ranjan Deen Sr. Manager (PE-Mech/Layout)	Roshan Singh Manager (Sales)
Md Suhel Khan Sr. Manager (PE-Mech/SG)	
Sujeet Kumar Sr. Manager (PE-Mech/MH)	
Anuj Kumar Shahi Sr. Manager (PE-Mech/PU)	
Raj Seth Sr. Manager (PE-C&I)	
Kuntal Bhuiyan Manager (PE-Electrical)	
Abuzar Ahmed Manager (PE-Civil)	
Adarsh Agarwal Manager (PE-Mech/SG)	

FGD System Package for Lot-2 Projects covers seven (7) projects and GE have furnished bids for three (3) projects namely Sipat STPS Stage-I (3x660 MW), Talcher Stage-I&II (2X500 MW+4X500 MW) and Simhadri Stage-I & II (2X500MW+2X500 MW). Further, GE has declared to be interested in taking award of only two (2) projects as per Attachment-1A. Based on the discussion between NTPC and GE on submitted bids for three (3) nos. of projects, following agreements were reached.

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1. Compliance to Tender Documents:
GE confirmed that all deviations, variations, exceptions and clarifications with respect to the NTPC specification contained in their bid proposal, implicit or explicit, except those specifically agreed herein, stand unconditionally withdrawn without any cost implications to NTPC. GE further confirmed that all work shall be performed by them in total conformity with the Technical Specification, Bid Document No. CS-0011-109(2)-9 including its amendments/clarifications issued by NTPC from time to time for FGD System Package for Lot-2 Projects.
2. FGD System Layout:
With regard to Project wise Layouts for FGD system, NTPC pointed out that, some of the equipment/facilities indicated in bidder's layout are outside the specified area for FGD in GLP included in tender document. GE stated that the layouts submitted in the bid are indicative and final layout showing arrangement of equipment shall be finalised during detailed engineering. Further, GE confirmed that final layout shall be such that all equipment for FGD system shall be located within the identified space in GLP as included in technical specification.
Further, the layout shall be prepared such that the noise levels of equipment covered under this contract shall not exceed the ambient noise standards specified by CPCB (i.e. 55 dBA in day time and 45 dBA in night time) in nearby residential areas such as Township etc.
3. Provenness Criteria:
GE has indicated name of the sub-vendors in the bid. GE confirmed that complete provenness data along with end user certificates as per Sub-section I-A, Part-A, Section-VI of the bidding documents to establish the provenness of the systems, equipment, auxiliaries and bought out items shall be submitted to NTPC for review and approval, in case of award, within time schedule as indicated in bidding documents along with Deed of Joint Undertaking (DJU), if required, before placement of order on the sub-vendor.
4. Technical Data Sheet
NTPC stated that GE has not furnished most of the data in the Bid Data Sheet and has indicated 'During Detailed Engineering' at many places. GE has also indicated "Refer attached Curves" in the bid data sheet which are not attached. GE agreed to furnish the complete data sheet including missing data, which could not be finalised and given at the bidding stage, within four weeks after award of contract in case of award.
5. Special Maintenance Tools & Tackles:
GE has furnished the list of special maintenance tools and tackles in Attachment-4A. NTPC asked GE to furnish the justification for the completeness of the list. GE stated that the items covered under the list are exhaustive and are as per their practice adopted in earlier projects. However, in case any additional maintenance tools and tackles are required at a later stage, same shall be supplied to NTPC without any additional cost implication.
6. Performance Guarantee & Demonstration Parameters:
GE has indicated demonstration parameters in Attachment-9B for various guaranteed parameters. GE stated that the guaranteed figures for Booster fan head, Wet Ball Mill capacity and Vacuum Belt filter capacity are indicative value. GE agreed that in case any change during detailed engineering (w.r.t. the guaranteed figures) in line with technical specification requirement, the same will be considered for parameters.

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GE has informed that vacuum belt filter capacity indicated in attachment-98 for Sipat project is 69.5 T/hr which is on dry basis and confirmed that the corresponding value with 10% moisture (wet basis) shall be 77.2 T/hr. Accordingly vacuum belt filter capacity will be demonstrated.

7. Specific Confirmations:

GE made following specific confirmations with regard to their proposal to emphasize their commitment/focus on issues.

- i. GE confirmed that mandatory spares shall be included and supplied in line with the specification requirements.
- ii. GE confirmed that number of flue in the stack, Stack height and its location shall be in line with the specification requirements.
- iii. GE confirmed that terminal points shall be in line with the specification requirements.
- iv. GE confirmed that erection strategy for FGD System of the awarded project shall be furnished by them after award.
- v. GE confirmed that the duct lining from absorber outlet to chimney shall be in line with specification and not flake glass lining which was inadvertently declared in data sheet.
- vi. GE confirmed that the max purge flow rate to waste water treatment system shall not be more than 12 m³/hr for 660 MW Unit and 10 m³/hr for 500 MW unit averaged over a 24 hour period.

Dr. M. S. Khan
19/12/2018
Md. Subul Khan (NTPC)

✓

J. K. Sharma
(NTPC)
Sunil Kumar Singh
Chakraborty
Hiren J. Wariyelu
(Hiren J. Wariyelu)

✓

**MINUTES OF MEETING OF POST BID DISCUSSIONS HELD AT NTPC EOC OFFICE, ON
19/12/2018 BETWEEN NTPC LTD AND M/s GE POWER INDIA LTD. REGARDING QA&I
ISSUES FOR FGD SYSTEM PKG. FOR LOT-2 PROJECTS (7 PROJECTS)
BID DOCUMENT NO. CS-0011-109 (2)-9**

Present:

M/s NTPC Ltd.		M/s GE POWER
K K Chattopadhyay, (GM/QA)	S K. Lal, AGM(QA)	Suryya Nath Choudhury, HOD/Quality ECS
Sankar Bajaj, AGM(QA)	Mukesh Kashyap -DGM(QA)	Abhimanyu Sharma, Manager-Tendering
B C Roy, AGM(QA)	S. N. Tripathy -DGM(QA)	Roshan Singh, Manager- Sales
K J Rao, AGM(QA)	M Khaliquzzama, DGM (QA)	
Alok Srivastav, AGM(QA)	Manan Sharma, Sr Manager (QA)	
Nishikh Agarwal, AGM(QA)	Ankush Birla, Manager (QA)	

Following was discussed and agreed:

1.0 Deviation in Bid:

M/s GE POWER confirmed that there are no deviations in the bid w.r.t QA&I requirements of the tender. M/s GE POWER shall comply with the QA&I requirements, as contained in the bid documents.

2.0 Sub-Contractors/ Sub-Vendors/ Sub-Suppliers:

In exercise of provisions of Cl. 19.1 of GCC (General Conditions of Contract), NTPC-QA will control the Items/Systems as listed below, for the purpose of acceptance of their suppliers:

SN.	Item/system	SN.	Item/system
1	Booster Fans	15	FGD Tie Transformer(100 MVA 220/34.5kV)
2	Slurry Recirculation Pumps	16	Auxiliary Oil Filled Transformers
3	Oxidation Blowers	17	Switchyard 220KV Equipment(220kv Circuit Breakers, 220 kv Instrument Transformers, 220kv Disconnectors, 220kv Surge Arrestors)
4	Wet Limestone Grinding Mills	18	Control & Protection (for Switchyard)
5	Slurry Pumps	19	Control & Instrumentation(C&I) Equipments / Systems
6	Agitators	20	RO based Desalination Plant Equipment/Systems for FGD
7	Vacuum Belt Filters	21	Water Pre-treatment Equipment/Systems for FGD
8	Limestone Sampling System	22	Oil Free compressor(HVAC)
9	Agency for civil works	23	Gear Box for Limestone/Gypsum handling system
10	Design agency for civil & steel structural works	24	Fluid Coupling for Limestone/Gypsum handling system
11	HT motor- booster fan motor	25	Crusher for Limestone/Gypsum handling system
12	LT Switchgear	26	Conveyor belt for Limestone/Gypsum handling system
13	33KV/11KV/6.6KV/3.3KV Switchgears	27	Analyzers for FGD
14	Numerical relays & Net working	28	Control Systems for FGD

Jaganmohan
NTPC

The process of vendor approval of the above items shall be as under:

i) In case the item is also covered under Sub QR list, the proposed vendors for the same shall be accepted by QA after acceptance of the vendor by NTPC Engg. For these items, M/s GE POWER will submit the relevant vendor details of the proposed vendors for sub QR clearance to NTPC PE.

ii) For the item not covered under Sub QR but has been listed in above table, NTPC approved vendors shall only be employed by the main contractor. A list of proposed vendors for such items have been placed at Annex-I to this MOM. List of NTPC approved vendors against similar package/item has shared with the main contractor to enable him to consider the same, if he so wishes. However, the main contractor has specifically advised to carry out his own due diligence before consider the sub vendor previously known to NTPC. List of sub vendors placed at Annex I has been drawn with 'A' identified against such vendors previously known to NTPC. M/s GE POWER agreed to comply with the NTPC approval conditions, if any, for vendors identified with 'A' in this list. For vendor proposals where status of proposal is in "DR" category (details required, as NTPC does not have any past experience with them) in the above mentioned list, M/s GE POWER agreed to furnish the following details of such proposals, in NTPC Formats (copies handed over), in time bound manner, so as not to impede the progress of the Project/ Works -

- i. Duly Filled Main supplier Evaluation Report.
- ii. Duly Filled Sub-Supplier Questionnaire.
- iii. Factory Registration Certificate.
- iv. Overall Organization Chart with Manpower details (Design, Manufacturing, Quality etc.)
- v. Supply reference list of the Sub-Supplier indicating similar product supply order reference no., customer name, rating of product, date /year of supply, date / year of commissioning.
- vi. List of Manufacturing Equipment available with sub vendor.
- vii. List of Testing Equipment available with sub vendor.
- viii. Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any.
- ix. Details of Outsourced Manufacturing Processes, if any.
- x. Quality control exercised during receipt, In-process & final inspection.

M/s GE POWER will furnish the required details, as detailed out above, of the proposed Manufacturer/ Sub-Vendor, along with their own detailed recommendations, in the NTPC-formats (copies handed over). NTPC informed that proposals/ details shall be received only up to 3 months prior to ordering date of the concerned item (L-2 Network/ BOI Schedule), for NTPC review and assessment. M/s GE POWER will accordingly plan the submissions.

It is understood that in terms of provisions of Cl. 19.1 of GCC (General Conditions of Contract), in case M/s GE POWER opts for additional Vendor proposals, over & above the agreed list herein, may be given by M/s GE POWER, in sufficient time, so as not to impede the progress of the work. Accordingly, all such proposals along with required details (as given above), shall be received only up to 3 months prior to ordering date of the concerned item/ Scheduled start of the Manufacture of Self Manufactured Item, for NTPC review and assessment.

iii) In case the item is not covered under Sub QR and list of items at sl. No. 2.0 above, the vendors proposed for the same shall be accepted based on Main Contractor's certification regarding past experience with the vendor for supply of similar items. The certification to be submitted to NTPC, before placing the order on the vendor. In case, proposed vendors for such items are not having past experience with Main Contractor, these vendors shall be assessed by the Main Contractor for their capability, and the assessment report shall be submitted to NTPC for reference & record, before placing order on the vendor.

iv) During detailed engineering, NTPC QA will review list of all items to be used for completion of FGD system pkg. Based on its review, NTPC will decide the inspection categorization of all items. There will be 3 inspection categories of items -

- a) CAT-I: For these items the Quality Plans are approved by NTPC and the final acceptance will be after physical inspection witness by NTPC.



Page 2 of 3







- b) CAT-II: For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP.
- c) CAT-III: For these items Main Contractor approves the Quality Plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main contractor.

It is clearly understood that NTPC reserves the right to conduct Surveillance Inspection/ Audit of the material, which are identified in Cat-IV/ Cat-III, to verify the effectiveness of Quality System of M/s GE POWER and conformance of the offered lot, to the applicable Standards/ requirements. It is agreed that M/s GE POWER will submit the copies of unpriced Purchase Order (as provided in GTR) of the orders placed on vendors for the items other than those listed in table at Sl. No. 2.0 above, to NTPC for the purpose of surveillance audit, if desired by NTPC, prior to issue of Dispatch Clearance of the concerned Item.

3.0 The schedule of submission and approval of QP shall be finalized within three weeks of effective date as per LOI/NOA of the contract. The schedule shall be dovetailed with L2 network in such a manner the QP is approved at least 6 weeks prior to scheduled start of manufacturing of the respective item and FQP is approved at least three months before scheduled start of field activity.

4.0 M/s GE POWER confirmed that they shall deploy appropriate Batching Plant for producing Concrete, which will be having digitized recording system. This plant shall be calibrated with NPL traceable weights. The plant shall have the facility of delivering the output on recorder, giving separate details of the various constituents (cement, aggregate, water, admixtures, fly ash etc.) in each batch of concrete being produced.

5.0 M/s GE POWER confirmed that for Schedule-I/ Schedule-II supplies, orders shall be placed suitably on approved Sub-Vendors' manufacturing location (Foreign/ Indigenous), keeping the Contractual requirements in view.

6.0 M/s GE POWER confirmed that the QA Documentation Package shall include copy of approved Data Sheets/ Drawings & QP, along with all Material Test Certificate (MTCs), CIIPs, Material Dispatch Clearance Certificate (MDCCs) for all items. The same shall be reviewed by M/s GE POWER for its completeness and only thereafter it shall be submitted to NTPC.

7.0 M/s GE POWER confirmed that requisite storage facilities for the equipment/materials shall be established by M/s GE POWER at site prior to receipt of equipment/material at site, after allotment of land by NTPC. For this purpose, requisite storage plan and schedule for the same shall be agreed between M/s GE POWER and NTPC site within 3 months of effective date as per LOI/NOA.

8.0 M/s GE POWER confirmed that similar to supply portion of the work, the non-conformities observed during field erection activities shall also be dispositioned according to NTPC's NCR dispositioning system in the prescribed format of NTPC.

9.0 A QA&I coordination procedure has been mutually agreed upon and has been placed as an annexure to this MOM.


(NTPC)


(GE POWER)

(SURYAN CHANDRAN)
GE - POWER

**QA CO-ORDINATION PROCEDURE for
FGD SYSTEM PKG. OF LOT-2 PROJECTS (7 PROJECTS)**

1. **PURPOSE:**

This document specifies procedure to be adopted for the coordination of QA&I activities relating to FGD System pkg. of Lot-2 projects (7 projects) to satisfy the QA&I requirements laid down in contract.

2. **SCOPE:**

This document specifies procedure of:

- Vendor Approval
- Quality Plan - Bought-out items/Manufacturing items approval/finalization.
- Field Quality Plan approval/finalization.
- Inspection/Testing of equipments/items.
- Dispositioning of Non-conformities.
- Dispatch clearance of equipments/items.
- QA documentation Package
- Quality audit & surveillance.

3. **DEFINITIONS:**

- 3.1 **NTPC Inspector:** Means NTPC's Own Inspector/duly authorized third party inspection agency.
- 3.2 **Resident Inspector:** Means NTPC's own inspector posted in the country of origin of the equipment or manufacturing works. NTPC Inspectors at Regional Inspection Offices near the works of GE POWER and at other Regional Inspection Offices are considered as resident inspectors.

4. **PROCEDURE:**

4.1 **CO ORDINATORS AND CORRESPONDANCE**

- 4.1.1 Overall QA coordinator of GE POWER for this contract shall be informed within four week's of LOI / effective date of contract.

4.2 **VENDOR APPROVAL**

- 4.2.1 List of items requiring vendor approval is identified and enclosed with LOA. The List contains, the vendors as proposed by GE POWER, and acceptable vendors to NTPC are marked with "A" as APPROVED. Vendors not known to NTPC for which details are required to be submitted by GE POWER as per agreement are marked 'DR'. Other information regarding vendor approval is as per agreed MOM.
- 4.2.2 GE POWER shall submit the complete vendor details for "DR" Category vendors (in NTPC prescribed format) as per MOM.
- 4.2.3 Upon receipt of complete vendor details, NTPC shall review and respond expeditiously.
- 4.2.4 Monthly progress report of vendor approval for vendors identified in 'DR' category shall be furnished by GE POWER overall coordinator.

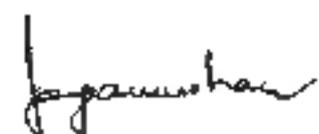
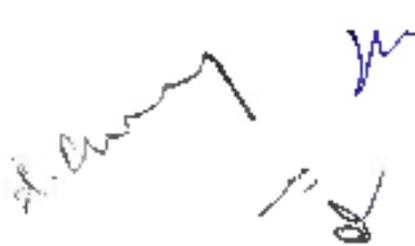
- 4.2.5 Within three weeks of release of purchase order for bought out items/ components, GE POWER shall furnish to NTPC a copy of the purchase order without price details but together with detailed purchase specification, QP and delivery conditions.

4.3 QUALITY PLANS

- 4.3.1 List of items requiring approval of quality plans shall be finalized by NTPC during detailed engineering.
- 4.3.2 GE POWER shall finalize a realistic schedule of submission of QPs based on project requirements prior to LOA which shall be incorporated on L-2 network.
- 4.3.3 GE POWER shall submit to NTPC, the Quality Plans with reference documents as per schedule of submission. The final submission of Quality Plans shall be furnished to NTPC in NTPC's online system C folder.
The quality plans shall be submitted for Cat-I & II items as per with additional essential attributes as per NTPC requirement (quantum of check, acceptance norms). Vendor's name may be provided on separate sheet attached with QAP.
Extracts of reference documents will be annexed. However, any other interlinking documents mentioned in the extracts can be viewed by NTPC in GE POWER/ collaborator's works. Acceptance criteria shall be reviewed by NTPC in case of deviation from NTPC specification. For other equipment, quality plans shall be submitted in NTPC format during execution phase for approval. Witness points / documentation requirements shall be mutually agreed.
- 4.3.4 Reference documents which were already submitted along with MQP/RQP/SQP for the earlier projects need not be submitted provided there is no change/revision in the document submitted last, whereas for the new/fresh MQP/RQP/SQP, the relevant documents shall be submitted along with the above Quality plans. Resubmission of RQP/SQP shall be done wherever changes are made in the already approved RQP/SQP for the earlier projects.
- 4.3.5 RQP/SQP shall be furnished along with all reference documents such as purchase specification, dwg, data sheet, test procedure, plant standards, etc. In case where RQPs are already finalized, GE POWER shall confirm that items required for Lot-2 FGD projects (7 projects) is exactly same or shall state minor changes that are applicable. For exactly same items, RQPs already finalized shall be made applicable for Lot-2 FGD projects (7 projects) also.
- 4.3.6 Monthly progress report of quality plan submission/approval shall be furnished by GE POWER overall coordinator in attached format.

4.4 FIELD WELDING AND FIELD QUALITY PLAN

- 4.4.1 The field quality plan for equipment and services shall be furnished by GE POWER and their Vendors, so as to finalize the same at least 2 months prior to start of work and shall include the quality practices and procedures followed by them during various stages of site activities from receipt of material/equipment till final erection. The list of FQP to be approved by NTPC shall be tied up during execution.
- 4.4.2 The welding consumable approved by OEM/Main contractor shall be used for site welding
- 4.4.3 M/s GE POWER's FQA manpower deployment shall be tied up after award.



4.5 INSPECTION

4.5.1 The notice period for inspection of materials/components/equipments for witnessing of the CHP stages by NTPC at the vendor's works shall be as follows:

- (a) Vendors of Indian origin - 10 working days.
- (b) Vendors of Foreign origin - 45 days

4.5.2 All the matters regarding inspection call shall be coordinated as follows:

4.5.4.1 For supplies of other than Indian origin: GE POWER shall issue inspection call notice to NTPC-QA coordinator.

4.5.4.2 For supplies of Indian origin: GE POWER/ their vendors will issue an inspection call to the concerned NTPC-RIO office. GE POWER's relevant offices shall closely co-ordinate with NTPC RIO for inspection of bought out items.

4.5.5 Where witnessing of the test is waived off in writing by NTPC, GE POWER/vendors shall proceed with the test which shall be deemed to have been carried out in the presence of NTPC inspector and shall forward duly certified copies of the test reports to the concerned NTPC inspection office as follows:

- a. For the tests conducted within the GE POWER's premises shall be within one week
- b. For the tests conducted at vendors' premises shall be within two weeks.

In case of any objection, the concerned RIO office shall notify the same to the concerned GE POWER/vendors within 5 working days from receipt of the test reports.

4.5.6 For the witnessed tests, when the factory test at identified CHP stages have been satisfactorily completed including computation of test results wherever applicable, NTPC inspector shall sign jointly with GE POWER/vendors/authorized representative(as applicable as per approved QAP) on the CHP Clearance/Interim Inspection report in the format .

4.5.7 For the witnessed tests, in case of deviation, NTPC inspector shall convey their non-conformities in writing on the CHP report itself for clarification by GE POWER/Vendors, who shall give due considerations to the objections raised and shall take corrective measures (as per the procedure laid down in clause 4.7 after due approval from NTPC) to rectify the non-conformities and shall confirm in writing to the concerned inspection office on rectification of the objections raised. However decision of NTPC shall be final and binding upon GE POWER/vendors within the purview of the contract requirements.

4.5.8 GE POWER will make available to the NTPC inspector their relevant documents and plant standards/procedure relevant to the checks/tests carried out on material/items equipments. Further, GE POWER/vendors shall also ensure the availability of approved drawings/data sheets and approved Quality Plan at the place of inspection.

4.5.9 INSPECTION PLAN: To facilitate advance planning of inspection of supplies, in addition to giving inspection notice at identified CHP stages as per approved QAP, GE POWER shall furnish three monthly rolling inspection programme every month indicating schedule dates of inspection at identified CHP stages. Such a programme shall be updated each month and a copy of the same is made available to the resident inspector/RIO as applicable. Such programme shall be confirmed by specific inspection call in accordance with clause 4.5.1 above.

4.5.10 Three monthly inspection programme for shop manufactured & BOIs shall be furnished directly to respective NTPC-RIO.

4.5.11 GE POWER contracts/commercial/QA shall furnish monthly inspection status report for previous month including pending calls and exception reports/NCR on or before 7th of every month.

4.6 **QUALITY AUDIT:** GE POWER/VENDORS shall provide the necessary facilities to NTPC inspector/team for carrying out of the Quality Surveillance and Audits as envisaged in the contract.

4.7 **NON-CONFORMITY DISPOSITIONING PROCEDURE:**

4.7.1 Whenever any deviation is observed with respect to relevant document and good Engg practices, the same shall be referred along with justification to NTPC office where inspection call has been raised by GE POWER/vendors. The details shall be furnished in the format attached for NTPC review and necessary action. NCR can be raised irrespective of the CHP stages to the concerned inspection office in whose jurisdiction the item/equipment is being manufactured.

4.7.2 Non-conformities with respect to the site activities shall also be dealt with similarly except that the NCR in the specified format shall be routed through NTPC-FOA group.

4.8 **Material Dispatch Clearance Certificate (MDCC)** upon satisfactory completion of all tests/inspection including type test as required by the approved documents (Cat-1 approved Quality Plan drawing/data sheet as applicable). NTPC inspector/Authorized Representative shall issue the MDCC in prescribed format attached against approved BBU

4.8.1 **Responsibility for Issuing MDCC:**

Before requesting NTPC for issuance of MDCC, GE POWER shall verify and confirm that the equipment meets the stipulated technical requirements as per the contract. In NTPC, the responsibility of issuing MDCC shall be as follows:

4.8.1.1 **Where inspection by NTPC is envisaged in QP.**

4.8.1.1(a) **INDIGENOUS SUPPLIES:**

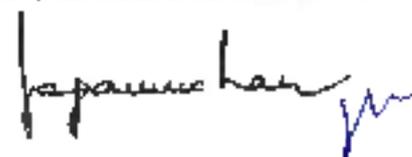
The concerned Regional Inspection Office under whose jurisdiction the manufacturer is located. Inspecting Engineer or reviewing engineer (in case of waiver of presence of NTPC engineer) shall issue the MDCC.

4.8.1.1(b) **FOREIGN SUPPLIES:**

For items directly dispatchable to site from foreign manufacturer, the MDCC shall be issued by NTPC's Inspecting engineer. In case of waiver of presence of NTPC engineer, the MDCC shall be issued by CQA Engineer on satisfactory review of test reports.

For items to be brought to GE POWER works from foreign manufacturer, before final dispatch to site, MDCC shall be issued by relevant Resident Inspector/RIO after satisfactory activities at GE POWER works and on review of CHP report of NTPC's Inspecting Engineer for inspection at foreign manufacturer's works or on verifying acceptance report of CQA, in case of waiver of presence of NTPC Engineer for inspection at foreign source.

NOTE: MATERIAL inspected by RIO-A at the work of sub-contractor in their respective jurisdiction & dispatched to the works of the other contractor for assembly or otherwise in the jurisdiction of RIO-B for



final despatch to project site, shall be accorded despatch clearance on a CHP clearance report by RIO-A and the MDCC of the completed item/equipment will be issued by RIO-B as per the approved BBU.

- 4.8.1.2 In case only review of TC by NTPC has been envisaged as per approved QP, for such items test certificates shall be submitted to NTPC resident inspection in respect of GE POWER manufactured item and to concerned RIO where level-I vendor is located for such BOIs, for issuance of MDCC. It is clarified that wherever multilevel vendors are not applicable, for bought out items of this category, GE POWER's shall submit the test certificate to NTPC's resident inspection.
- 4.8.1.3 In case where QP has not been envisaged, all such materials shall be cleared on the basis of COC from GE POWER. COC shall be submitted on similar line as per Clause No. 4.8.1.2.
- 4.8.1.4 As per Tech specification, no item shall be dispatched by GE POWER without obtaining MDCC from NTPC.

4.9 **QUALITY ASSURANCE DOCUMENTATION PACKAGES:** GE POWER shall submit to NTPC QA the Quality Assurance documents in two hard copies and two CD ROM.

4.10 **OPINSPECTION CATEGORY:**

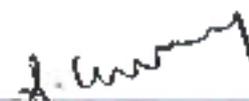
CAT-I: For those items the Quality Plans are approved by NTPC and final acceptance will be on physical inspection witness by NTPC.

CAT-II: For those items the Quality Plans are approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis of review of documents as per QP.

CAT-III: For those items main supplier approved Quality Plan. The final acceptance by NTPC shall on the basis of Certificate of Conformance by main supplier.

Further, as it is clearly understood that NTPC reserves the right to conduct Surveillance Inspection/ Audit of the material, which will be identified in Inspection category Cat-II/ Cat-III by NTPC QA during detailed engg., to verify the effectiveness of Quality System of M/s GE POWER and conformance of the offered lot, to the applicable Standards/ requirements. It is agreed that M/s GE POWER will submit the copies of unpriced Purchase Order (as provided in GTR) of the orders placed on vendors for the items other than those listed in table at Sl. No. 2.0 above, to NTPC for the purpose of surveillance audit, if desired by NTPC, prior to issue of Despatch Clearance of the concerned item.


(NTPC)


(GE POWER)
(SURYYA CHOUDHURY)
GE POWER





PROJECT : FGD SYSTEM PACKAGE LOT-2
 PACKAGE: FGD PACKAGE
 SYSTEM
 SUPPLIER : GE Power
 CONT. NO.: C9-0011-10023-9

DOC. No. :
 DATE: 21.12.2018
 PAGE 1 OF 1

ITEM	QI/RS/SPN CAT	QI NO. CS	PROPOSED SUB-SUPPLIER BY MAIN CONTRACTOR	PLACE	SUB-SUPPLIER APPROVAL STATUS/ CATEGORY	REMARKS
OIL FREE SCREW COMPRESSOR			ELIGIBLE EQUIPMENTS	COIMBATORE	A	UP TO 74M3/MINUTE (AIR ENDS FROM HITACHI JAPAN), 45 M3/MINUTE FORM OWN
			ATLAS COPCO	PUNE (SCREW ASSEMBLY FROM ATLOS COPCO, BELGIUM)	A	UP TO 2R 630-MODEL CAPACITY 75 NM3/MINUTE
			INGERSOLL RAND	AHEMDABAD	A	UP TO 36 NM3/MINUTE

3:

TE-1 SYSTEM SUPPLIER / SUB-SUPPLIER STATUS CATEGORY (SHALL BE FILLED BY NTPC).

For those items proposed vendor to NTPC. To be indicated with letter "A" in the list along with condition of approval, if any.

2. INSPECTION CATEGORY:

- (i) For those items the quality plans are approved by NTPC and final acceptance will be after physical inspection witness by NTPC.
- (ii) For those items the quality plans are approved by NTPC. However, no physical inspection will be done by NTPC. The final acceptance by NTPC shall be on the basis of documents as per QP.
- (iii) For those items Main Supplier approves quality plans. The final acceptance by NTPC shall be on the basis of certificate of conformance by Main Supplier

[Signature]
 21/12/18
 NTPC Main Contractor

[Signature]
 (SUDHYA CHANDRAN)
 Main Contractor
 GE POWER

PROJECT ROP LOT-2		NTPC DOC NO		QA-BIH-01		
PACKAGE: FGD PACKAGE		REVISION NO		0		
MAIN SUPPLIER: GE POWER INDIA		DATE		23.12.2018		
CONTRACT NO.: CS-00011-18921-9		Sub-supplier approval status / category		Remarks		
Item	Q/ Insp. Ckt.	Q/ Req. Ckt.	Proposed sub-supplier	Place	Sub-supplier approval status / category	Remarks
FLUID COUPLING (TRACTION TYPE)	I	ROP	PREMIUM TRANSMISSION LTD	AURANGABAD	A	
	I	ROP	ELECON	V V NAGAR	A	
	I		FLUIDOMAT	INDORE	A	
	I		VOITH (INDIA)	HYDERABAD	A	
FLUID COUPLING (SCOOP TYPE)	I	ROP	FLUIDOMAT	GERMANY	A	
	I		VOITH	INDORE	A	UPTO SC-1330
	I		VOITH	GERMANY	A	
	I	ROP	PREMIUM TRANSMISSION LTD	AURANGABAD	A	UPTO PST 1150
LIMESTONE SAMPLING SYSTEM	I		ELECON	V V NAGAR	A	UPTO MODEL ESC 780
	I		VOITH (INDIA)	HYDERABAD	A	UPTO SVNL 1330
	I		EAST MAN CRUSHER	KOLKATA	DR	
	I		ADVANCE SYSTEMS SAMPLING	KOLKATA	DR	

ENDS

SYSTEM SUPPLIER/SUB-SUPPLIER APPROVAL STATUS CATEGORY (SHALL BE FILLED BY NTPC)

For these items proposed vendor is acceptable to NTPC. To be indicated with letter 'A' in the list alongwith the condition of approval, if any.

- For these items "Detailed inspection" for NTPC vendor. To be identified with letter "DR" in the list.

REASON - For these items vendor are approved by Main Supplier and accepted by NTPC without special vendor approval from NTPC. To be identified with 'N' in the list.

-I: For these items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection whereas by NTPC

-II: For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents if pre approved CP.

-III: For these items Main Supplier approve the Quality Plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main supplier.

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G.C. ROUSE

Appendix - C
Page - 19 of 30

Project : I-01-2		ELECTRICAL ITEMS				Doc No		Remarks
Package : ACD		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL				Rev No	Date	
Supplier : GE		Proposed sub-supplier		Plant	Sub-supplier approval /ampacity	Date		
Contract No. : C-001-01012-0		Q1/ Insp. Lot	Q2 Sub. Sph.	Q3 approved Sph.	Q4 approved Sph.	Page		
ITEM DESCRIPTION								
18	Lugs							
19	Emergency Light, Tri-nail Clamps, Ceiling Fans							
20	MCS, BDD, G.L. Flat, G.L. Vipes, Wash Wad							
21	Local Master Station Panels							
22	Limit Switches							
23	RCC Reinforcement & Jacking Jibs							
24	Fire walling system - Type A Material supplier							
25	Fire walling system - Type B Material supplier							
26	Insulating Agency for fire walling system							

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Project : 10712		ELECTRICAL ITEMS				Doc No				
Package : RCD		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL				Reg No				
Supplier : GE						Date				
Contract No: CS-0011-10423-6						Page				
Sl No	ITEM DESCRIPTION	Q.P. / Job. Cl.	Q.P. No.	Q.P. Sub. Scl.	Q.P. Approval Scl.	Proposed sub-supplier	Place	Sub-supplier approval Status / Category	Sub-supplier Details / Sub	Remark
37	CIRCUIT BREAKER	1				GE T&D ABB	KANCHIPURAM VADODARA	A		SUB-QR ITEM
38	ISOLATOR	1				SIEMENS CGL	AERANGARAD NASHIK	A		SUB-QR ITEM
39	CURRENT TRANSFORMER	1				GE POWER HITACHI SAS POWER SIEMENS	HYDERABAD CHENNAI PONDICHERY HYDERABAD	A		SUB-QR ITEM
40	CVT	1				SWITCHGEAR & STRUCTURALS ABB	HYDERABAD VADODARA	A		SUB-QR ITEM
41	SURGE ARRESTOR	1				GE T&D BHEL	HOSUR IRANDE	A		SUB-QR ITEM
42	POST INSULATOR	1				CGL MERRIL	NASHIK BEHWARDI	A		SUB-QR ITEM
43	CLAMPS & CONNECTORS & WELDING ELECTRODES	1				ABB CGL	VADODARA TRC/GR	A		SUB-QR ITEM
44	INSULATOR HARDWARE, CONDUCTOR ACCESSORIES & EARTHURE ACCESSORIES	1				ORIAM ADITYA BIRLA BEC	NASHIK NASHIK MUMBAI	A		SUB-QR ITEM
45	DIS INSULATOR / PIN INSULATOR	1				SARVANA LTD/RAJ MODERN INSULATOR WSP	CHUDALORE ARI ROAD CHENNAI	A		SUB-QR ITEM
46						ELECTROMECH TRANSTECH EKALI	KOLKATA	A		SUB-QR ITEM
47						KLEMMEN ENGE MEGHA 1836 MELIND	MUMBAI CHENNAI CHENNAI	A		SUB-QR ITEM
48						FEB VIB ENGG ELECTROTECH TRANSTECH	MUMBAI KOLKATA	A		SUB-QR ITEM
49						EMI TRANSMISSION LAC ELECTRICALS ITPL	BANGALORE KOLKATA KOLKATA	A		SUB-QR ITEM
50						RASHIRA UTKONG TAG CORPORATION ALUVA NIRLA	MUMBAI KOLKATA CHENNAI	A		SUB-QR ITEM
51						BHEL BEC	RISHRA (WB) BANGALORE	A		SUB-QR ITEM
52						IMPERIAL CERAMICS MURDUN INSULATOR SARVA	IRANDE ARI ROAD KUDDALORE	A		SUB-QR ITEM

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Sl. No	ITEM DESCRIPTION	ELECTRICAL ITEMS				Doc No	Date	Page	Remarks
		INDICATIVE VENDOR LIST FOR BIDDING BIDDING QUALITY PLAN AND SUB-VENDOR APPROVAL	Proposed sub-vendor	Part	6 to 8 supply approval category				
Package	Lot	QIP / Sup. Cat	QIP Sub. Sol.	QIP approval %	QIP No.	QIP Sub. Sol.	QIP approval %		
	Package : FGD Supplier : GE Contract No. : C-0011-0011-1								
	EVENT LOGGER				GE TAP	UK / FRANCE / CHENNAI	A		
	GPS TRAIL SYNCHRONISATION EQUIPMENT				HARWAY	UK	A		
					ARBITER	USA	A		
					HARWAY	UK / USA	A		
					BOFF	GERMANY	A		
					SERIEL	CHENNAI	A		
					DOUBLE ENGT.	USA	A		
					MEGGER	UK	A		
					OMERON	USA / AUSTRALIA	A		
					SCAPE T & M	INDIA	A		
					ABB	FINLAND	A		
					GE TRD.	USA	A		
					HARWAY	UK	A		
					SIEMENS	GERMANY	A		
					FAHDD	INDIA	A		
					DELTA	CHINA	A		
					FLUOR	USA	A		
					ABB	SWEDEN	A		
					GE TAP	BANGALORE	A		
					SCHNEIDER	UK / CHENNAI	A		
					SIEMENS	UK	A		
					ATOUR LINE	GERMANY	A		
					ABB	USA	A		
					ENERVAC	GERMANY	A		
					VACUUM PLANT INDUSTRIES	CANADA	A		
						PUNE	A		
30	Oil Gas Filling and Evaporator Plant Oil Purifying & Purifier Plant Oil Leakage Detector	Oil							

document

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Appendix-c
Page 23 of 30

Project : LOT-2		ELECTRICAL ITEMS				Doc No	Remarks
Package : ICD		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SITE VENDOR APPROVAL				Rev No	
Supplier : GE		Qp No	Qp Sub. approved Sub.	Proposed sub-supplier	Place	Date	
ITEM DESCRIPTION		Qp No	Qp Sub. approved Sub.	Proposed sub-supplier	Place	Page	Sub-supplier Details (substitution with)
51	OPERATIONAL ANALYSER WITH DCRM KIT	01		HROGER OMRON MELGER	UK USA SWEDEN	A	
52	LEAKAGE CURRENT ANALYSER	01		DOUBLE ENDC ISA SCOPE T & M TRANSIBOR	USA ITALY JUNE NORWAY	A	
53	GS PLAT 400M DIA MEDIUM / M S BATHS BOXES / ATCLAMPY OF LEADEN PIPE / CERAM / GI CONTAINT (INCLUDING WENDS) / TAC TPOC	01		MAIN CONTRACTOR APPROVED SOURCES		A	
54	GS BATHBOXES / LIGHTING WIRS	01		MAIN CONTRACTOR APPROVED SOURCES		A	
55	LIGHTING POLE	01		IS approved Vendor as per IS-2713		A	
56	RAY IDENTIFICATION TAGS, PAUSE MARKERS & BANNER PLATES	01		MAIN CONTRACTOR APPROVED SOURCES		A	
57	PIANO SWITCHES	01		IS APPROVED SOURCES		A	
58	WTR (Aluminium Tube)	T	W-010	MAIN CONTRACTOR APPROVED SOURCES		A	
59	WTR (Galvanizing Steel)	I	M-010	MAIN CONTRACTOR APPROVED SOURCES	BALLABGARH SAWMI	A	
60	BILT WELDER	I		AVERY INDIA ELECORN EPC KOSTER EXPORTS SCHNEIDER PROCESS	HYDRABAD GURGAON BANGLORE	A	UP TO 2500 TPH
61	WEDG BRIDGE	I		IPN AVERY INDIA RICE LAKE ELECORN EPC	BALLABGARH SHRIPEDEBUDUR SAVLI	A	UP TO 2700 TPH
62	INLINE MAGNETIC SEPARATOR - SUSPENDED M-CANET	I		MAGNETIC CORPORATION ELECTRO ZAVOD ELECTRO MMS ELECTRO HMG THERMO RAMSEY ELECORN EPC SMA SYSTEMS BCH	BANGALORE KOLKATA MUMBAI MUMBAI AUSTRALIA SAVLI GOA FARIDABAD MUMBAI	A	
63	METAL DETECTOR	II		STORM CRAFT	MUMBAI	A	
63	ELECTRO MAGNETIC (EM) BRACK						

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Project : LOT64		MEDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL		ELECTRICAL ITEMS		ENR No	
SI No	QTY / Subp. Cat.	QTY No.	QTY Subp. No.	QTY Approval No.	Proposed sub-supplier	Photo	Sub-supplier Details/ Specifications with category
64	CABLE REELING DRUMS				ELECTROMAG WHITTON KIDAMMER BROOK GRAMPTON	MUMBAI	Sub-supplier Details/ Specifications with category A FOOD WAGON TRAYFLER BRIDGE ONLY
65	ON THRUSTER BRIDGE / RAKE CLAMP				BENGAL TECHNOCAL ELECTRO ZAVED ELETON	BOKRATA	With Drawing Germany make stall Import Motor With Drawing Germany make stall Import motor
66	PULL CORD / BELTWAY INDICATION SYSTEM				WADI PINTCH SUBAPZED ELECTROMAG	MUMBAI	With Drawing Germany make stall Import motor
67	ELECTRICAL SPREAD SWITCH/LESS DIT SWITCH/MAGNETIC SWITCH/PROX MITS SWITCH				JAYASHREE PHOTO CONTROL PS ELECTRONICS VIRTECAL ELECTRONICS	GERMANY MUMBAI PUNE PUNE MUMBAI PUNE MUMBAI	FOR DISC TYPE ONLY
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Project : MOTV1		ELECTRICAL ITEMS				Item No :
Package : BGD		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL				Rev No :
Contract No. : CB-111-0013-01						Date :
ITEM DESCRIPTION		QTY / Lot	QTY / Lot	QTY / Lot	QTY / Lot	Page
LINE		QTY / Lot	QTY / Lot	QTY / Lot	QTY / Lot	Sub-supplier approval category
						Sub-supplier Details submission category
69	HEAVY DUTY UNIT SWITCHES	01				
70	FULL COMPLY BELT SWAY SWITCHES WITH BELT SWITCH	01				
71	GEARED MOTOR	01				
72	Starting Motor / GI Cabinet	01				
73	PIP for electrical works					

LEGEND:

1. SYSTEM SUPPLIER/SUB-SUPPLIERS APPROVAL STATUS CATEGORIES SHALL BE FILLED BY MTEC

A. For the items proposed vendor is acceptable to MTEC To be indicated with letter 'A' in the box along with completion of approval date

B. If not acceptable then it shall be indicated with letter 'N/A' in the box along with completion of approval date

2. QTY / Lot

CAT-I: For items where the Quality Plan is approved by MTEC and acceptance will be on physical inspection witness by MTEC

CAT-II: For items where the Quality Plan is not approved by MTEC However the physical inspection shall be done by MTEC. The final acceptance by MTEC shall be on basis of review of documents as per approved QP

CAT-III: For items where the supplier provides the Quality Plan. The final acceptance by MTEC shall be on basis of verification of quality assurance by the vendor/supplier.

3. UNITS/VALUES : This is a unit/quantity of items to be supplied.

NOTES:

1. All vendor certificates shall be submitted for MTEC approval. Approval certificate is attached to show the offer. Vendor, as applicable shall be addressed to:

- 1) Site: 20/05/2013; Cat-III; Acceptance on basis up to 50 KW is based on QOC of the manufacturer is the same. Contractor confirming MTEC's technical specifications.
- 2) Site: 20/05/2013; Cat-III; For manufacturers who have already supplied this range of motor to MTEC, which have been common reference and no adverse feedback has been reported from BCO/ project holder.
- 3) Site: 20/05/2013; Cat-III; For items where the Quality Plan is approved by MTEC. However the physical inspection shall be done by MTEC. The final acceptance by MTEC shall be on basis of review of documents as per approved QP.
- 4) MTEC's technical specifications.
- 5) 10) Above 50 KW and up to 750 KW: Cat-I as per MTEC approved Quality Plan
- 6) Above 750 KW: Cat-I as per MTEC approved Quality Plan

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3/3/2009 - E 19
Carpenter
Approved

PROJECT - 007-2 FACILITY		LIST OF ITEMS TO BE PURCHASED		APPROVAL & APPROVAL DATE		DATE 03.12.2008	
PACKAGE - 1000 MOB LIFT 2 PROJECTS		CONTRACTORS OR SUPPLIERS		APPROVAL & APPROVAL DATE		DATE 03.12.2008	
CONTRACTOR: 007-2 FACILITY		CONTRACTOR: 007-2 FACILITY		APPROVAL & APPROVAL DATE		DATE 03.12.2008	
CONTRACT: 007-2 FACILITY		CONTRACT: 007-2 FACILITY		APPROVAL & APPROVAL DATE		DATE 03.12.2008	
Item	Item Description	Qty	Unit	Sub-approval	Sub-approval	Sub-approval	Sub-approval
01	MOB LIFT	1	EA	1	1	1	1
02	MOB LIFT	1	EA	1	1	1	1
03	MOB LIFT	1	EA	1	1	1	1
04	MOB LIFT	1	EA	1	1	1	1
05	MOB LIFT	1	EA	1	1	1	1
06	MOB LIFT	1	EA	1	1	1	1
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99	MOB LIFT	1	EA	1	1	1	1
100	MOB LIFT	1	EA	1	1	1	1

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POST BID DISCUSSIONS ON SAFETY PLAN TO FINALISE THE SAFETY COORDINATION PROCEDURE HELD BETWEEN NTPC LIMITED (NTPC) AND M/s GE POWER INDIA LTD. ON 03.01.2019 & 06.02.2019 AT ENGG OFFICE COMPLEX, NOIDA FOR "FLUE GAS DESULPHARISATION (FGD) SYSTEM PACKAGE FOR LOT-2 PROJECTS"

PRESENT

NTPC

1. Mr. Arin Bordoloi (AGM- Safety)
2. Mr. Subodh Khare (Mgr Safety)

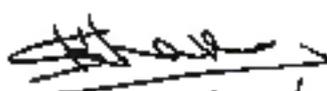
M/s GE POWER INDIA LTD

1. Mr. Lalit Sankrani, Executive (Business Operations)
2. Mr. DS Baghel, Sr. Regional Leader (EHS)
3. Mr. Roshan Singh, Sr. Manager (Sales)

With reference to the Techno-Commercial Bid of M/s GE POWER INDIA LTD. ref no QFEC51326662 dated 03.12.2018 against NTPC Bidding Document No. CS-0011-109(2)- 9 issued vide NIT dated 31.08.2018 of which Technical bid was opened on 04.12.2018, post bid discussions were held between M/s GE POWER INDIA LTD and NTPC - Safety to discuss and finalize the Safety Coordination procedure. The following were discussed and agreed to:

1. During discussions, M/s GE POWER INDIA LTD informed that they have submitted their detailed information regarding safety management at Appendix-I to Attachment- 19 of their Technical bid covering various aspects for compliance to Safety during the execution , in case they are considered for award. M/s GE POWER INDIA LTD further informed that they are having well-established Safety Manual / Plan which has been submitted along with bid and further discussion on safety plan on 03.01.2019 and finalized on 06.02.2019.
2. GE POWER INDIA LTD confirmed that would comply with all the points listed in Attachment - 19 of Techno-Commercial bid. "Safety Plan" submitted by GE POWER INDIA LTD (enclosed as Annexure-I to this MOA). GE POWER INDIA LTD further, confirmed that they shall submit their final "Safety Plan" to Project Manager/ Engineer-in-charge for approval by Project Manager/ Engineer-in-charge/Head of the Project before start of the work at site.
3. The Safety Coordination Procedure shall form an Integral part of the Contract and shall be complied with, in case of award on GE POWER INDIA LTD.

NTPC



Arin Bordoloi
18/02/2019

SK

GE POWER INDIA LTD



Roshan Singh

Appendix - D

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ATTACHMENT - 19
Page 1 of 1

(FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE
FOR LOT-2 PROJECTS
COMMON BIDDING DOCUMENT NO. CS-0011-108(2)-9
(INFORMATION REGARDING SAFETY MANAGEMENT)

NTPC LOT 2 (APPLICABLE FOR ALL PROJECTS)

Bidder's Name and Address :
GE Power India Limited,
Building, Plot No. 7,
Noida-201301,
Pradesh.

To
Contract Services-I IHDP
NTPC Limited, 6th Sector-127,
Floor, Engg. Office Uttar
Complex, Plot No. A-
8A, Sector-21, Noida -
201301

Dear Sirs,

We have read the provisions pertaining to Safety and hereby undertake to comply all the provisions of Bidding Documents in this regard.

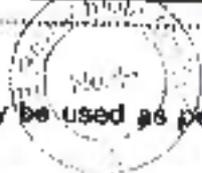
We hereby confirm that all the measures to ensure highest level of Safety during execution at Site shall be taken by us.

Further, in terms of the provisions of Clause No. 44.00.00 of Part-D of Technical Specification (Section-VI) of Bidding Documents, a proposed "Safety Plan" is attached herewith as Appendix-I to this Attachment.

A "Safety Co-ordination Procedure" shall be finalized during post bid discussions of Techno-Commercial Bid.

The above proposed "Safety Plan" shall be further discussed/ finalized at Site, in line with the agreements made in "Safety Co-ordination Procedure", and shall be approved by Project Manager/Engineer-in-Charge/ Head of Project before start of work at Site.

Date : 27/11/2018
Place : Noida

(Signature) Lalit Senkrant
(Printed Name) Lalit Senkrant
(Designation) Executive - Business Operations
(Company Seal) 

Note : Continuation sheets of like size and format, may be used as per Bidder's requirement and shall be annexed to this Attachment.

* Clause no. 10 to be inserted by the Package Coordinator in the Bidding documents.

Appendix - D

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APPENDIX-D to ATTACHMENT-19**SAFETY PLAN**

01. Safety Policy of the Contractor to be enclosed: Refer attached Safety Policy in EHS plan
02. When was the Safety Policy last reviewed: April 2016
03. Details of implementation procedure / methods to implement Safety Policy /Safety Rules: Refer attached EHS Plan - Page no 3-26
04. Name, Qualification, experience of Safety Officer: Degree or diploma engineer/ B.Sc. + 1 year diploma in industrial safety from a recognized institute or 4-year engineering degree in Safety, plus 3 to 4 years of practical experience in Safety at construction sites. EHS Resources - 3 EHS Officer (1 nos. from GE and 2 nos. of subcontractor of GE)
05. Review of Accidents Analysis Method, Methods to ensure Safety and Health: Refer attached EHS Plan - (Section - 2.4.3)
06. Unit executive responsible to ensure Safety at various levels in work area: Refer attached EHS Plan - (Section - 1.6.2)
07. List of employees trained in safety employed before execution of the job. Give the details of training: All employees are trained as per their job category. Name & training records will be shared once employees get identified & finalized before execution of the job. Safety training Programme are mentioned Refer attached EHS Plan - (Section - 2.6). As well as training schedule and matrix is attached.
08. Safety Training Targets, Schedules, methods Adopting to providing safety training to all employee: All trainings have been schedule to every individual employee based on the job category and managed online by every GE employee. In case of contractors Please Refer attached EHS Plan - (Section - 2.6).
09. Details of checklist for different jobs / work and responsible person to ensure compliance (copy of checklist to be enclosed): Refer attached Checklist
10. Regular Safety Inspection Methods and Periodicity and list of members to be enclosed: Refer attached EHS Plan - (Section - 2.4.7.2 & 2.4.7.3).
11. Risk Assessment, Safety Audit by Professional Agencies, Periodicity: Safety Audit Internal / external will be performed after 3-4 months of site mobilization and will continue at construction site - (Section -2.4.7). Internal audit in each quarter, after 3 to 4 months of mobilization of site. Refer attached EHS Plan - (Section - 2.4). Sample copy of RA for Turbine Island is attached.
12. Implementation of Recommendations of Audit / Inspections, Procedures for Implementation and follow up: Refer attached EHS Plan - (Section - 2.4.7.4)
13. Provision for treatment of injured persons at work site: First Aid boxes equipped with requisite articles shall be provided at construction sites for the use of workers. Basic

Appendix-P
Page 4 of 4.

training has to be provided on first aid to workmen & office bearers working at site. Refer attached EHS Plan - (Section - 2.5.2).

14. Review of overall safety by top Management and Periodicity: Refer attached EHS Plan - (Section - 2.7)
15. System for Implementation of Statutory legislations: Refer attached EHS Plan - (Section - 3.2.4)
16. Issue of PPEs to employees, Periodicity / stock on hand etc.: Will be done at site by the responsible site admin person. Refer attached EHS Plan - (Section -3 1.17). Safety Shoes & Helmets shall be provided to all site personals along with other necessary applicable PPE's & shall be replaced on damage. 10% of stock should be maintained.

PPE matrix & periodicity of replacement

#	PPEs	Replacement Frequency	IS/ EN/ CE code
1	Safety Helmet	Twice in year	IS2925
2	Safety Shoe	Yearly	IS15298
3	Nose Protection	As and when required	IS9473
4	Safety Glass	As and when required	EN 166
5	Ear Protection	As and when required	IS: 9167-1979
6	Reflective Jackets	As and when required
7	Full Body Harness	As and when required	EN 361 / IS3521
8	Fall Arrestor	As and when required	EN 361
9	Hand Gloves	As and when required	IS: 6994
10	Ear Plug / Muffs	As and when required	IS: 6994
12	Face Shield	As and when required	IS: 8520-1977

17. Specify safety measures for round the clock working (especially during night):
Deployment of safety officers in day/night shift before mobilization to ensure complete hold on the activities round the clock and we will ensure adequate illumination for performing GE activities. All activities shall be done as per PTW - (Section 2.4.2)

Signature Head of the Organization With date & stamp

Qualitative
analysis of
the data

Appendix - E
Page 1 of 21

MINUTES OF POST BID DISCUSSION (COMMERCIAL ISSUES) HELD BETWEEN M/s NTPC LIMITED (NTPC) AND M/s GE POWER INDIA LIMITED (GEPIL) ON 18.04.2019 FOR FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE FOR SIPAT SUPER THERMAL POWER STATION STAGE-I (3 X 660 MW) UNDER LOT-2 PROJECTS

PRESENT:

NTPC	GEPIL
Mr. Adesh, GM (CS)	Mr. Lalit Sankrani
Mr. Udayan Kumar, GM (PE-Mech)	Mr. Roshan Singh
Mr. V. N. Jain, GM (FIN)	Mr. Hiren Nariyelwala
Mr. Bikram Mandal, AGM (CS)	
Mr. Shrish Kumar Singh, DGM (CS)	
Mr. P. Vijay, Manager (CS)	

With reference to Price Bid ref. No. QFEC51328662 dated 03.12.2018 for FGD System Package for Sipat STPS Stage-I (3 x 660 MW) under lot-2 Projects opened on 08.04.2019 and Reverse Auction conducted on 08.04.2019 for the subject Package, discussions were held between GEPIL and NTPC, wherein the following have been agreed to:

1.0 GEPIL has confirmed the compliance to the terms and conditions of Bidding Documents read in conjunction with all the Amendments and Clarifications to Bidding Documents issued by NTPC for the subject Package. GEPIL have also confirmed that they shall complete the work in accordance with the provisions of Technical Specifications/Bidding Documents, in case of award.

2.0 GEPIL in Attachment-3P of their bid have indicated percentage of Import content in Ex-works price is <30% of Supply Value. Further, GE confirmed that value of import content in Ex-work Price is INR 127,40,00,000/-.

Further, GEPIL confirmed that as declared in Attachment 3P(A), CIF value of the Construction Equipment to be imported by the Bidder including sub-contractor(s) of the Bidder is 'NIL'.

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3.0 Break-Up of Prices/Final Prices after Reverse Auction

GE have quoted lump sum prices against Schedule-1 in their bid. GE have not indicated breakup against Main Equipment and Mandatory Spares. Further, GE have also not quoted breakup of Prices in Schedule-2 & 3 (Transportation, Installation, Civil Works, Structural Steel Works and AMC Charges etc.).

During discussions, GE have furnished price breakup of Schedule-1, Schedule-2 and Schedule-3.

Further, GE confirmed that in line with the provisions of the Bidding Documents, they have applied uniform percentage (%) discount (as applicable after Reverse Auction) over the original items rate quoted in various Price Schedules/Attachments of their Price Bid.

During discussions, GE also confirmed the following with regard to Main Equipment, Mandatory Spares, Type tests and Site fabricated items:

Main Equipment

GE confirmed that based on the break-up of Prices submitted in Schedule-1 for Main Equipment, further Billing break-up (BBU) shall be submitted and finalized atleast 60 days prior to start of dispatch.

Mandatory Spares

GE have indicated lumpsum cost in Schedule-1 for Mandatory Spares specified in the Technical Specifications. GE confirmed that they shall provide the detailed Price break-up of Mandatory Spares before release of initial advance and supply all the Mandatory Spares within the quoted cost.

Site fabricated items

GE confirmed that they shall submit the list of items to be fabricated at Site within 90 days from the date of NOA.

4.0 Taxes & Duties

GEPIL in Schedule-6 (Taxes and Duties) furnished the details of Goods and Services Tax (as on Seven (07) days prior to the last date for submission of Price Bids) applicable on the price of Goods and Services quoted in Schedule-1, 2 & 3 not included in the Bid Price. The details of Taxes and Duties (after considering discount as applicable after Reverse Auction and same rates of Taxes & Duties as mentioned in Schedule-6) are as under:

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Bid Price Component	Rate of GST (%)	Amount on which GST applicable (INR) (rounded off)	Total GST payable (INR) (rounded off)
Ex-Works-Main Equipment (Schedule-1)	18%	₹701,69,38,918	₹126,30,49,005
Ex-Works-Mandatory Spares (Schedule-1)			
Type Test Charges (Schedule - 1)			
F&I-Main Equipment (Schedule-2)			
F&I-Mandatory Spares (Schedule-2)			
Erection Services (Schedule-3)			
Civil Works (Schedule-3)			
Structural Works (Schedule-3)			
Training Charges (Schedule-3)			
AMC Charges (Schedule-3)			
TOTAL (GST)			

Taxes, Duties & levies shall be paid/ reimbursed to GEPIL as per the provisions of Bidding Documents.

5.0 Unit Rates

GEPIL in Schedule B (Unit Rates) of their Bid have not filled Unit Rates of items referred therein. During the discussions, GEPIL confirmed that they shall submit the Unit Rates along with price justification as and when required.

- 6.0 GEPIL confirmed that, as per the provisions of the Bidding Documents and as per the details furnished by the Bidder, after Reverse Auction, there will be two Contracts only viz First Contract (for Ex-works (India) Supply Portion) and Second Contract (for Installation, Civil & all Services portion). The details of the aforesaid two Contracts as agreed by GE are as under:

(A) First Contract:

1.	Ex-Manufacturing Works/Place of Dispatch Price (both in India) for Plant & Equipment	INR 399,48,84,379/-
2.	Ex-Manufacturing Works/Place of Dispatch Price (both in India) for Mandatory spares	INR 26,60,63,239/-
3.	Type Test Charges	INR 3,73,241/-
4.	Total (A) [1+2+3]	INR 426,13,20,859/-

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(B) Second Contract:

1.	Local Transportation including Inland Insurance charges for Plant and Equipment covered under First contract	INR 7,07,60,918/-
2.	Local Transportation including Inland Insurance charges for Mandatory Spares covered under First Contract	INR 50,00,000/-
3.	Installation Services	INR 64,73,38,448/-
4.	Civil & Architectural Works	INR 195,01,81,170/-
5.	Structural Steel Works	INR 8,04,97,100/-
6.	Training Charges	INR 8,29,425/-
7.	AMC Charges	INR 10,00,000/-
8.	Total (B) [1+2+3+4+5+6+7]	INR 276,56,18,059/-
Grand Total (A+B)		INR 701,69,38,918/- (INR Seven Hundred One Crore, Sixty Nine Lakh Thirty Eight Thousand Nine Hundred and Eighteen Only)

7.0 GEPIL re-confirmed that all other conditions/stipulation/deviation/non-conformity/undeclared deviation etc. contrary to the provisions of Bidding Documents (to be read in conjunction with Amendments/Clarifications/Errata) stands withdrawn without any financial implication to NTPC.

8.0 The aforesaid resolutions are subject to Management Approval of NTPC.

(NTPC)

S. P. Sharma
(GEPIL)

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SCHEDULE 1
PAGE 1 OF 2

USE GAS DEBULMINATION SYSTEM (GDS) PACKAGE FOR 300T SUPER THERMAL POWER STATION, STAGE-4 (SUDD MHW) UNDER LOT 2 PRODUCTS; COMMON BIDDING DOCUMENT NO. CS-0811-18021-9						
Bids's Name and Address: Oil Power India Limited, (HDP Building, Plot No 7 Sec 127, Mohda-201301)						
SCHEDULE OF RATES AND PRICES						
REQUIRE-1: PLANT AND EQUIPMENT INCLUDING TYPE TESTS CHARGES AND MANDATORY SPARES TO BE SUPPLIED FROM WITHIN THE EMPLOYER'S COUNTRY						
Sl. No.	Description	Qty.	Unit	Unit rate (per)	Total Ex-works (India) Price (INR)	
1	MAJN EQUIPMENT INCLUDING FACTORY PACKAGED STEEL STRUCTURES FOR PLUS GAS DEBULMINATION SYSTEM PACKAGE FOR 300T SUPER THERMAL POWER PROJECT, STAGE-4 (SUDD MHW)	3	lot	₹	6278	
2	FGO SYSTEM	1	lot			Included in TOTAL (A) (MAIN EQUIPMENT) of Schedule 1
3	LIMESTONE AND GYPSUM HANDLING SYSTEM	1	lot			Included in TOTAL (A) (MAIN EQUIPMENT) of Schedule 1
4	ITEMS RELATED TO CHEMIEY	1	lot			Included in TOTAL (A) (MAIN EQUIPMENT) of Schedule 1
5	ANY OTHER					
TOTAL (A) (MAIN EQUIPMENT)						INR
MANDATORY SPARES (B) AS SPECIFIED IN SUB-SECTION VII, PART-A, SECTION-VII (B) (B) is required to fill the prices of all the items as specified in Part-A, Section-VII						3,92,48,84,379
Sub total B						
SUB-TOTAL (A+B)						28,80,63,238
SUB-TOTAL OF TYPE TEST CHARGES AS PER SCHEDULE-7						4,26,08,47,818
GRAND TOTAL (A+B+C) -Schedule-1 (To be filled up in Item Data)						3,73,241
						4,26,13,20,859
Deduct						
<p>Unless stated otherwise a 'unit' means labor or sub-assembly required for each type/size of the assembly's sub-assembly, required for complete replacement in one unit. It is further intended that the assembly/sub-assembly which have different orientation (left hand or right hand, top or bottom), different direction of rotation or minor image positioning or any other reasons which result in manufacturing two different sets of the spares to be used for the subject assembly/sub-assembly, these shall be considered as different types of assembly/sub-assembly.</p> <p>Wherever quantity has been specified as percentage (%), the quantity of mandatory spares to be provided by the Contractor shall be the specified percentage (% of the total population required to meet the specification requirements. In case the quantity of mandatory spares so calculated to be fraction, the same shall be rounded off to next higher whole number.</p>						

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SCHEDULE 1
PAGE 2 OF 2

<p>Whenever the quantities have been indicated for each type, size, thickness, materials, radius, range etc. these shall cover all the items supplied and installed and the bracket for these shall be furnished in the bid.</p>
<p>In case items indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer quotes applicable to classed design with quantities generally in line with approach followed in the above list</p>
<p>Bidders are required to indicate the break-up of type level charges as per Schedule-7.</p>
<p>In case the description / quantity for any item mentioned in Schedule is at variance from what has been stated in Technical Specification and in subsequent amendments and clarifications, the latter shall prevail.</p>

OK *[Signature]* (LS)

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Schedule-3
PAGE 1 OF 1

FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SUPAT SUPER THERMAL POWER STATION, STAGE-I (3x660 MW) UNDER LOT-2, PROJECTS; COMMON BIDDING DOCUMENT NO. CB-0011-106/2)-9

Bidder's Name and Address : GE Power India Limited, IHDP Building, Plot No 7 Sec. 127, Noida-201301

Schedule No. 3 : Installation Services (Erection, Civil, Factory Fabricated Steel Structural Works (Erection) & allied works) including insurance (other than theft insurance and other services as specified in the Bidding Documents)

Item	Description	Total Price in Indian Rupees
1		3
(i)	MAIN EQUIPMENT INCLUDING FACTORY FABRICATED STEEL STRUCTURES	64,73,38,446
(ii)	CIVIL & ARCHITECTURAL WORKS	1,95,01,91,170
(a)	Geo-Technical investigation & slope protection works	Included in (ii) Civil & Architectural works of Schedule 3, above
(b)	Infrastructure works	Included in (ii) Civil & Architectural works of Schedule 3, above
(c)	FGD facilities	Included in (ii) Civil & Architectural works of Schedule 3, above
(d)	Other works not covered in the above items but required to cover complete scope of works.	Included in (ii) Civil & Architectural works of Schedule 3, above
(iii)	Structural Steel Works	8,04,87,100
(iv)	Training Charges (Refer Clause 28.66.00, Part-C, Technical Specification, Section-VI)	8,29,425
(v)	AMC Charges as per scope	10,00,000
	TOTAL (i) + (ii) + (iii) + (iv) + (v) (TO SCHEDULE 4 GRAND SUMMARY AND TO BEM E-TENDER SITE)	2,67,98,57,141

NOTE:

Bidder is required to indicate the Total of Schedule-3 in "Item Details" Tab of E-Tender Site.

In case the description/ quantity for any item mentioned in schedule is at variance from what has been stated in Technical Specification and its subsequent amendments and clarifications, latter shall prevail.

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USE GAS DESULPHURIZATION SYSTEM (FGD) PACKAGE FOR SFPAT SUPER THERMAL POWER STATION, STAGE-4 (3x660 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-011-104(2)-9

Bidder's Name and Address : GSE Power India Limited, R&D Building, Plot No 7 Sec 127, Noida-201301

SCHEDULE OF RATES AND PRICES

SCHEDULE- 2 : Local Transportation including inland Transit Insurance and other local costs incidental to delivery of plant & equipment including mandatory spares

Item	Description	Qty	Unit	Total Price (Median Rupees)
1	2	3	4	5
1	TOTAL (I) MAIN EQUIPMENT	1	lot	7,07,60,918
I)	FGD SYSTEM	1	lot	Included in TOTAL (I) MAIN EQUIPMENT of Schedule 2 above
II)	LIMESTONE AND GYPSUM HANDLING SYSTEM	1	lot	Included in TOTAL (I) MAIN EQUIPMENT of Schedule 2 above
III)	ITEMS RELATED TO CHIMNEY	1	lot	Included in TOTAL (I) MAIN EQUIPMENT of Schedule 2 above
IV)	ANY OTHER		lot	NIL
2	TOTAL (II) MANDATORY SPARES (Refer Technical Specification)		lot	50,00,000
	TOTAL (I + II) (TO GRAND SUMMARY (SCHEDULE-4) AND TO SPM E-TENDER SITE)			7,57,60,918

Bidder is required to indicate the Total of Schedule-2 in 'Item Details' Tab of E-Tender Site.

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SCHEDULE 4
PAGE 1 OF 4

FLUE GAS DESULFURATION SYSTEM (FGD) PACKAGE FOR BRAT LEPPER THERMAL POWER STATION STAGE 1 (2x240 MW) UNDER LOT-3 PROJECTS; COMMON BIDDING DOCUMENT NO. 03-4013-4022-3							
Bidder's Name and Address:		GE Power Inc United, NADP Building, Plot No 7 Sec 107, Huda-309201					
Schedule No. 5 - Recommended Spare Parts							
Item	Description	Quantity	Unit	Unit Price	Total Price	*Local Fabrication charges (including inland insurance, port clearance & cost charges (if any))	Total Price (as observed at Project)
				*Ex-Works (Index) (BEP)	*Ex-Works (Index) (BEP)		For 500 (BEP)
PRICE SHALL BE FURNISHED BEFORE AWARD OF CONTRACT							
1	Absorber Recycle Pump						
	Impeller GFS	3	No.				
	Mechanical Seal Complete	3	No.				
	Section Cover	2	No.				
	Set of Original Control	12	No.				
	Mechanical Seal repair kit	3	No.				
	Bearings	2	No.				
2	Oxidation Blower						
	Air Filter	18	No.				
	Oil filter cartridge	3	No.				
	O-Ring	3	No.				
	Oil Seal	3	No.				
	Oil Seal	3	No.				
	Seal	3	No.				
	Health	3	No.				
	Anti-Vibration Pads	252	No.				
	Bearings RTDc	6	No.				
	Acoustic VDV	2	No.				
	Acoustic FGF	2	No.				
	Bearing Vibration Sensor	6	No.				
3	Ball Mill						
	Major Components						
	Main bearing insert	2	No.				
	Pinion bearings (without housing)	3	No.				
	Wear Components						
	Mill Liners (Shell and Head) with hardware	1	No.				
	Feed spout	2	No.				
	Feed Trunnion Liner	2	No.				
	Discharge Trunnion Liner	2	No.				
	Trommel Screen	2	No.				
	Seals						
	Main bearing oil seal	5	No.				
	Feed Spout Seals	2	No.				
	Discharge end Seals	2	No.				
	Pinion shaft (gear guard) seals	4	No.				
	O-ring for Trunnion Liner	4	No.				
	RTD's						
	Pinion Shaft RTD	2	No.				
	Main Bearing RTD	3	No.				
	Make Bearing Lubrication System						
	Filter elements	6	No.				
	Suction strainer	2	No.				
	Breather	2	No.				
	Low Pressure Pump	2	No.				
	High pressure pump	2	No.				
	Heat Exchanger (Cooler)	2	No.				
	Flow divider valve	2	No.				
	Electric heater	2	No.				
	Pinion Spray System						
	Spray Nozzles	3	No.				
	Air Filter	2	No.				
	Cycle switch	2	No.				
	Air solenoid valve	2	No.				

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SCHEDULE 4
PAGE 2 OF 4

	DAVCO valve with indicator	2	No
	Pneumatic Pump	2	No
	Regulator	2	No
4	Agitator		
	Gearbox V Belt Drive		
	V belts	2	No
	Flexible Coupling parts	2	No
	Shaft Seal Ring	2	No
	Antifriction Bearing	2	No
	Impeller		
	Cap nuts for impeller	2	No
	Gaskets	2	No
	Mechanical Seal		
	Seal rings, O rings	2	No
	Springs, shaft wear rings, Antifriction bearing	2	No
5	Vacuum Belt Filter		
	Filter Cloth	6	No
	Scraper for Cake	6	No
	Wear-out Belt	6	No
	Deflection-correcting screw	6	No
	Sensitive valve for deflection-correcting	2	No
	Motors for Washing	14	No
	Bearing UPC20BCD	36	No
	Valve Plate For Vacuum Pump	6	No
	V-Belt For Vacuum Pump	6	No
	Seal Packing For Vacuum Pump	6	No
	Bearings - Vacuum pump	3	No
	Bearings - Filtrate pump	3	No
	Seals - Filtrate pump	3	No
6	Hydrocyclone		
	VF Body	24	No
	VF Insert	60	No
	Body Extension	24	No
	Cone	36	No
	Spigot	96	No
	GrF Pipe	12	No
	Rubber Hose	132	No
7	Booster Fan		
	O Rings For Bearing	3	No
	Metallic Rings For Bearings	3	No
	Filter For Lube Oil	3	No
8	Booster Fan Inlet Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plugs for Seal)	8	No
	Limit switch (DPDT)	10	No
9	Booster Fan Outlet Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plugs for Seal)	8	No
	Limit switch (DPDT)	10	No
10	FGD Outlet Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plugs for Seal)	8	No
	Limit switch (DPDT)	10	No
11	Bypass Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plugs for Seal)	8	No
	Limit switch (DPDT)	10	No
12	Material Handling System		

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SCHEDULE 4
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20' Trough carrying idlers complete with base boards & mounting brackets etc. for A size belt width	30	No.
Flat type return idlers complete with crossing base boards & mounting bracket etc. for A size belt width	18	No.
20' Trough Impact idlers complete with mounting base boards and brackets etc. for B size belt width	8	No.
20' Trough Self aligning carrying idlers complete with mounting base boards and brackets etc. for B size belt width	4	No.
Flat Belt aligning return idlers complete with mounting base boards and brackets etc. for B size belt width	4	No.
10' Transition idlers complete with overlying base boards and brackets etc. for B size belt width	2	No.
Rubber disc for the impact idlers	5% of the total qty	No.
Rollers for idlers	10% of the installed capacity	No.
Pulley complete with shaft and including planetary block and bearings	01 no of each size in pulley shaft diameter	No.
Planetary block complete with bearing and shaft	02 nos of each type and size	No.
Rubber/nylon strip for belt clearance and limit boards	20% of total quantity used	No.
Complete Belt Scraper (Primary & Secondary)	1 set for each conveyor	Set
Conveyor belt A with width	01 full length of each width	
Complete set of gear box	1 set each type, size and rating	No.
Oil seal for gear box	4 sets of each type and rating	Set
Sealing for gear box	1 set of each size and rating	Set
Coating for gear box	1 set of each size and rating	Set
Fluid coupling complete set	1 no each type, size and rating	No.
Metal disc assembly for fluid coupling	1 set of each size	Set
Fusible plug for fluid coupling	0	No.
Complete brakes	1 no. for each type and size	No.
Brake shoes	1 set of each type and size	Set

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SCHEDULE-1
PAGE 4 OF 4

Plummer block assembly complete with lock washers, lock nuts etc. for shaft and non-drive end for crusher	2 Set each	Set
Roller assembly for crusher	1	Set
Shaft seal for crusher	2	No.
Head sprocket assembly complete with shaft and plummer block with bearing	1	Set
Tail sprocket assembly complete with shaft and plummer block with bearings	1	Set
Traction rollers carrying side	10% of total qty	No.
Traction rollers return side	10% of total qty	No.
Sprocket segment	2 set of each type and size	Set
Chain link	10% of population each type and size	No.
Pin (diprod)	10% of population	No.
Puller complete with oval reducing bearing & plummer block (complete with logging for magnetic separator)	01 set of each type and size	Set
V belt for magnetic separator	01 No. of each type and size	No.
Load cell for belt weigher	1	No.
SMPS for belt weigher	1	No.
Regulated power supply for belt weigher	1	No.
Fan housing for dust extraction system	1 set of each type	Set
V belt	1 set of each size	Set
Filter bags	10% of the total quantity used	No.
Cocks for solenoid valve	4 no each type and rating	No.
Motor	01 no of each rating	No.
Driving End & Non-Driving End bearing	01 no for each type and rating of Motor	No.
Cooling Fan	01 no for each type and rating of Motor	No.

We also confirm that the items of Recovered Spares with serial identification number but with different item code have been quoted by us at the same price. Further all such items of spares have been clubbed together and enclosed separately at Enclosure ... to our offer.

Bidders shall Quote prices in INR and fill in the amount in figures and words.

Note:

- Spares shall be quoted as the-unit (bulk) basis.
- Comparison sheets of Bidding and format may be used as per Bidder's requirements and attached to this Bid.

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SCHEDULE-4
PAGE 1 OF 1

FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SHPAT SUPER THERMAL POWER STATION, STAGE-I (3x800 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-0811-199(2)-8

Bidder's Name and Address : GE Power India Limited, MIDP Building, Plot No 7 Sec 127, Noida-201301

Schedule No. 4 : Goods and Services Tax (GST), applicable on Schedules - 1, 2 & 3, not included in bid price.

The details of Goods and Services Tax (as on seven (07) days prior to the last date for submission of price bids) applicable on the price of goods and services quoted in Schedules-1, 2 & 3, not included in the Bid Price and which may be payable by the Employer in accordance with the provisions of Bidding Documents are as under :

S. no.	Bid Price Component	Rate of GST (%)	Amount on which GST applicable (in INR)	Total GST payable (in INR)
1	Ex-Works-Main Equipment (Schedule-1)	18%	As mentioned in TOTAL (A) [MAIN EQUIPMENT] of Schedule-1	Included in Total (GST) of schedule 4 below
2	Ex-Works-Mandatory Spares (Schedule-1)	18%	As mentioned in Sub total B of Schedule-1	Included in Total (GST) of schedule 4 below
3	Type Test charges (Schedule-1)	18%	As mentioned in Item C Sub total of type test charges of Schedule-1	Included in Total (GST) of schedule 4 below
4	F&I-Main Equipment (Schedule-2)	18%	As mentioned in TOTAL (F) MAIN EQUIPMENT of Schedule-2	Included in Total (GST) of schedule 4 below
5	F&I-Mandatory Spares (Schedule-2)	18%	As mentioned in TOTAL (G) MANDATORY SPARES of Schedule-2	Included in Total (GST) of schedule 4 below
6	Erection - Main Equipment (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (B) of Schedule-3	Included in Total (GST) of schedule 4 below
7	Civil Works (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (B) of Schedule-3	Included in Total (GST) of schedule 4 below
8	Training charges (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (B) of Schedule-3	Included in Total (GST) of schedule 4 below
9	AMC charges (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (B) of Schedule-3	Included in Total (GST) of schedule 4 below
10	Structural Works (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (B) of Schedule-3	Included in Total (GST) of schedule 4 below
11	Any other Price Component (not covered above)	NIL	NIL	NIL
TOTAL (GST)				1,28,30,49,008.385

Notes:

- Bidder shall quote the GST as applicable in the Employer's country as on seven (7) days prior to the last date of submission of price bids.
- In case rate of GST is different for various items, such different rates of GST along with the amount on which such GST is applicable shall be suitably indicated by the bidders in this schedule.
- Bidder is required to indicate the Total of Schedule-4 in "Total Bid" Tab of Bid invitation of NTPC E-Tender Site.

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SCHEDULE 3-7
PAGE 1 OF 2

<p>in case of additional handling for any particular item are found during unloading. The type used for the items shall be decided and reported to the Employer, if other, in case of unloading of any type based on such additional handling. The unit type for items as stated in this schedule for each particular item shall be applicable for unloading of the same.</p>

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SCHEDULE-8
PAGE 1 OF 4

FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SPPAT SUPER THERMAL POWER STATION, STAGE I (3x660 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-0011-10B(2)-8

Bidder's Name and Address : GE Power India Limited, HDP Building, Plot No 7 Sec 127, Noida-201301

Schedule No. 8 : Schedule of Unit Rates

Unit Rates of various items are given as under. We confirm that the prices of these items as per the requirement of Technical Specifications are already included in the lump-sum prices quoted in Schedule-1. We further confirm that these unit rates shall be used for contract price adjustment in case of any changes in quantities/components of the package.

S. No.	Description of Equipment	Qty	Unit Price in INR
1	Control & instrumentation (C&I) (Unit rates for the following C&I items)		
A	Microprocessor based Control System with HMI for FGD and other systems being provided in the Contract		
(a)	Control System		
(i)	Controller, each type		
(ii)	Input modules, each type		
	\$ 4-20 mA Input (Model No.)		
	\$ RTD Input (Model No.)		
	\$ T/C Input (Model No.)		
	\$ Digital input (Model No.)		
	\$ SOE Input (Model No.)		
	\$ Others (Bidder to specify)		
(iii)	Output Modules, each type		
	\$ Analog output (4-20 mA) (Model No.)		
	\$ Binary Output (Model No.)		
	\$ Other, if any		
(iv)	Communication Controller each type		
	(Model No.)		

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SCHEDULE-8
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(v)	Power Supply Module, each type
(vi)	Other modules, each type
(b)	HMI/PLC
(i)	Operator Works Station
(ii)	Server/work station
(iii)	Laser printer
(iv)	Other modules, components used
(c)	Other modules used in Microprocessor based Control System with HMI (if any)
(B.)	Measuring Instruments
a)	Primary & Secondary Instrument
(i)	Pressure Indicator (PI)
(ii)	Pressure Transmitter (PT)
(iii)	Differential Pressure Indicator (DPI)
(iv)	Differential Pressure Transmitter (DPT)
(v)	Pressure Switch (PS)
(vi)	Differential Pressure Switch (DPS)
(vii)	Temperature Guage (TG)
(viii)	Temperature Element - RTD
(ix)	Temperature Element - T/C
(x)	Temperature Transmitter (TTx)
(xi)	Temperature Switch (TS)
(xii)	Flow Element (FE)
	a. Orifice Plate
	b. Flow Nozzle
	c. Any other type
(xiii)	Flow Indicator (FI)
(xiv)	Flow Transmitter (FT)
(xv)	Flow Switch (FS)
(xvi)	Level Gauge (LG)
(xvii)	Level Transmitters (LT)
(xviii)	Density meter
(xix)	pH analyser
(xx)	SO2 Analyser
(xxi)	Vibration Monitoring System:
	a) Contact type vibration measurement point (vibration sensor comprising of associated vibration monitor, probe drivers (if applicable), prefab cables, prefab extension cables, mounting pads/brackets)
	b) Junction boxes for vibration sensors
(C)	Instrumentation cable of each type & size
(i)	Instrumentation Cable
(a)	G TYPE

Bidder will furnish this
breakup during contract
execution phase

Bidder will furnish this
breakup during contract
execution phase

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SCHEDULE-8
PAGE 3 OF 4

1	2 PAIR STRANDED COPPER (0.5 MM ²)
2	4 PAIR STRANDED COPPER (0.5 MM ²)
3	8 PAIR STRANDED COPPER (0.5 MM ²)
4	12 PAIR STRANDED COPPER (0.5 MM ²)
5	16 PAIR STRANDED COPPER (0.5 MM ²)
6	24 PAIR STRANDED COPPER (0.5 MM ²)
7	48 PAIR STRANDED COPPER (0.5 MM ²)
(b)	F TYPE
1	2 PAIR STRANDED COPPER (0.5 MM ²)
2	4 PAIR STRANDED COPPER (0.5 MM ²)
3	8 PAIR STRANDED COPPER (0.5 MM ²)
4	12 PAIR STRANDED COPPER (0.5 MM ²)
5	16 PAIR STRANDED COPPER (0.5 MM ²)
6	24 PAIR STRANDED COPPER (0.5 MM ²)
(ii)	CONTROL CABLES
1	10C (2.5 MM ²)
2	5C (1.5 MM ²)
3	3C (1.5 MM ²)
4	2C (1.5 MM ²)
5	5C Unarmoured (2.5 MM ²)
6	3C Unarmoured (2.5 MM ²)
7	2C Unarmoured (2.5 MM ²)
8	4 Core single Mode OFC
9	12 Core single Mode OFC
(D)	Electrical Power Supply System
(i)	24 V DC CHARGER SYSTEM WITH BATTERIES of each type and rating
(a)	24 V DC Charger System - Complete Charger System comprising of Controller, Rectifier Modules, Transformer, DCDB, Ni Cd battery bank, Battery Health Monitoring, Cabinet and Other Accessories.
(ii)	UPS SYSTEM WITH BATTERIES of each type and rating
(a)	UPS with chargers and inverters with input isolation transformers, Ni Cd battery bank, Bypass line transformers & voltage stabilizer, static switch manual bypass switch, ACDB, Battery Health Monitoring system (BHMS), Cabinets and other necessary protective devices and accessories.
(b)	MINI UPS of each type and rating

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SCHEDULE-8
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W *r* *d* *LS*

FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SIPAT SUPER THERMAL POWER STATION, STAGE-I (3000 MW) UNDER LOT-2
PROJECTS: COMMON BIDDING DOCUMENT NO. C8-0911-109(2)-0

Bidder's Name and Address : GE Power India Limited, IHDP Building, Plot No 7 Sec 127, Noida-201301
Schedule No. 8: SCHEDULE OF TAKE OUT PRICE

Take out price for certain items/services are indicated below. We confirm that the prices for these items are already included in the Bid Price. We further confirm that the Employer may delete from our scope any of the items given below based on the prices given in this schedule.

Sl. No.	Description	Reference of Bid where Technical Details have been furnished			Remarks	
		*Ex-Works (India) (Indian Rupees)	Local transportation & Insurance charges (Indian Rupees)	*Installation (Indian Rupees)		
1	2	3	4	5	6	7
1	Training as per clause no. 28.00.00, Part-C, Section-VI for O&M personnel	-	-	\$,80,000	-	
(b)	Engineering personnel	-	-	2,46,828	-	

Handwritten marks: A large checkmark is present on the right side of the table. There are also some scribbles and initials, including a signature-like mark at the bottom right and the letters 'US' written vertically on the right side.

L2 Schedule

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NTPC SIPAT STPP STAGE-I (3X660MW) FGD SYSTEM PACKAGE

Activity ID	Activity Name	DUR	Start	Finish	2019							2020							2021							2022															
					M	Jun	Jul	Aug	S	Oct	N	D	Jan	F	M	Apr	M	Jun	Jul	Aug	S	Oct	N	D	Jan	F	Mar	Apr	M	Jun	Jul	Aug	S	Oct	N	D	Jan	Feb	Mar	Apr	M
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6
NTPC SIPAT, 3x660MW, FGD System L2					1066	21-May-19	23-Apr-22																																		
Project Management					1066	21-May-19	23-Apr-22																																		
Project Milestone Unit 1 & Common					978	21-May-19	23-Jan-22																																		
M-LOT-20006	Notice of Award	0	21-May-19	21-May-19																																					
M-LOT-20010	Initial Mobilization for site enabling activities	0	21-May-19	23-Jun-19																																					
M-LOT-20015	C&I and Structural Works- Start	0	23-Aug-19																																						
M-LOT-20020	BOI Ordering -Start	0	23-Aug-19																																						
M-LOT-20025	Basic Engineering Completion	0		23-Sep-19																																					
M-LOT-20030	Finalization of Engineering related to FGD Inlet Duct connection with ID Chimney Duct	0		23-Nov-19																																					
M-LOT-20035	Manufacturing & Supply of Equipment- Start	0	23-Dec-19																																						
M-LOT-20040	BOI Ordering Finish	0		23-Jan-20																																					
M-LOT-20045	Equipment Erection Starts	0	23-May-20																																						
M-LOT-20050	Detail Engineering Completion	0		23-May-20																																					
M-LOT-20055	Manufacturing & Supply of gate, support struc, actuators etc. required for FGD Inlet duct connection with ID chimney duct	0		23-May-20																																					
M-LOT-20060	Electrical and C&I Erection Starts	0	23-Sep-20																																						
M-LOT-20065	Supply of Mandatory Spares	0		23-Jan-21																																					
M-LOT-20070	Manufacturing & Supply of Equipment- Completion	0		23-Jan-21																																					
M-LOT-20075	C&I and Structural Works- Finish	0		23-Apr-21																																					
M-LOT-20080	Equipment Erection Finish	0		23-Jul-21																																					
M-LOT-20085	Electrical and C&I Erection Finish	0		23-Oct-21																																					
M-LOT-20090	Commissioning of FGD	0		23-Nov-21																																					
M-LOT-20095	Completion of Facilities	0		23-Jan-22																																					
Project Milestone Unit 2					881	23-Nov-19	23-Apr-22																																		
M-LOT-20100U2	C&I and Structural Works- Start	0	23-Nov-19																																						
M-LOT-20100U2	Manufacturing & Supply of Equipment- Start	0	23-Nov-20																																						
M-LOT-20100U2	Equipment Erection Starts	0	23-Aug-20																																						
M-LOT-20110U2	Manufacturing & Supply of Equipment- Completion	0		23-Apr-21																																					
M-LOT-20110U2	C&I and Structural Works- Finish	0		23-Jul-21																																					
M-LOT-20120U2	Equipment Erection Finish	0		23-Oct-21																																					
M-LOT-20130U2	Electrical and C&I Erection Finish	0		23-Jan-22																																					
M-LOT-20130U2	Commissioning of FGD	0		23-Feb-22																																					
M-LOT-20150U2	Completion of Facilities	0		23-Apr-22																																					
Project Milestone Unit 3					885	23-Aug-19	23-Jan-22																																		
M-LOT-20140U3	C&I and Structural Works- Start	0	23-Aug-19																																						
M-LOT-20140U3	Manufacturing & Supply of Equipment- Start	0	23-Dec-19																																						
M-LOT-20140U3	Equipment Erection Starts	0	23-May-20																																						
M-LOT-20150U3	Manufacturing & Supply of Equipment- Completion	0		23-Jan-21																																					
M-LOT-20150U3	C&I and Structural Works- Finish	0		23-Apr-21																																					
M-LOT-20160U3	Equipment Erection Finish	0		23-Jul-21																																					
M-LOT-20160U3	Electrical and C&I Erection Finish	0		23-Oct-21																																					
M-LOT-20170U3	Commissioning of FGD	0		23-Nov-21																																					
M-LOT-20170U3	Completion of Facilities	0		23-Jan-22																																					

Prepared By: Duttatrey Parashar

Checked By: Satish Saxena

- Forecast
- Critical
- Actual

- Milestone Forecast
- Milestone Critical
- Milestone Actual

Anand Prakash
 24-May-19
 आनंद प्रकाश / ANAND PRAKASH
 Addl. General Manager (P & M)
 प्रबंधक (P & M) / NTPC Limited

NOA: 24-May-19

date:



L2 Schedule

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NTPC SIPAT STPP STAGE-1 (3X660MW) FGD SYSTEM PACKAGE

Activity ID	Activity Name	DUR	Start	Finish	2019												2020												2021												2022																																			
					M			J			A			S			O			N			D			J			F			M			A			M			J			J			A			S			O			N			D			J			F			M			A			M		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37																																			
Client's Obligation					778	23-Jun-19	10-Aug-21																																																																					
M-LOT-20181	Access to Levelled FGD Area	0		23-Jun-19																																																																								
M-LOT-20185	Access to Site for Geo Facilitator (to be signed by O&E)	0		23-Jun-19																																																																								
M-LOT-20190	Land allocation, Legal and physical possession of site and other required areas	0		23-Jun-19																																																																								
M-LOT-20188	Stake Marks, reference marks and lines for setting out of the Facilities	0		23-Jun-19																																																																								
M-LOT-20200	Availability of Construction Frame	0		22-Jul-19																																																																								
M-LOT-20206	15days Unit shutdown for FGD duct connection in a window between (12th-14 days) to (28th-18days) with 15days prior notice	411	24-May-20	08-Jul-21																																																																								
M-LOT-20210	Power availability for Cold and Hot Commissioning	0		27-Feb-21																																																																								
M-LOT-20216	Availability of DAI Water, Clarified Water and Instrument & Service Air at Terminal Point	0		17-Feb-21																																																																								
M-LOT-20220	Availability of Limestone, Plus gse for commissioning from Client	0		10-Aug-21																																																																								
Engineering					368	24-May-19	23-May-20																																																																					
M-LOT-11230	Basic Engineering	123	24-May-19	23-Sep-19																																																																								
M-LOT-11676	Finalization of Engineering related to FGD inlet duct Connection with ID chimney duct	184	24-May-19	23-Nov-19																																																																								
M-LOT-12538	Detail Engineering Completion	243	24-Sep-19	23-May-20																																																																								
MDL					316	23-Jun-19	23-May-20																																																																					
M-LOT-MDL1002	Geotechnical investigation work: Location of borehole and other field test	65	02-Aug-19	29-Oct-19																																																																								
M-LOT-MDL1003	PAID along with process description - Absorber, Outfall Blower, Gypsum Slurry Pump & Purge Water System, Wet Scrubbers	85	17-Aug-19	04-Nov-19																																																																								
M-LOT-MDL1004	PAID - Primary & secondary Dewatering, Wet Scrubbers Discharge System	65	13-Aug-19	04-Nov-19																																																																								
M-LOT-MDL1005	Main Flow Balance (Design Point & Guarantee point) data and FGD System Design Basis - PROCESS	96	23-Jun-19	13-Oct-19																																																																								
M-LOT-MDL1006	Flue gas system design, Chimney and Duct Sizing Calculation	60	04-Sep-19	27-Nov-19																																																																								
M-LOT-MDL1007	ABSORBER DESIGN BASIS/RT BBA	60	08-Sep-19	29-Nov-19																																																																								
M-LOT-MDL1008	Sizing Calculation, Selection parameter for all tanks (Slurry & Water)	85	01-Sep-19	26-Nov-19																																																																								
M-LOT-MDL1009	PAID along with process description - Limestone Pulverizer-Wet Ball Mill & Reagent Preparation System, Feed Tank & Pump	85	12-Aug-19	04-Nov-19																																																																								
M-LOT-MDL1010	Process Flow Diagram of FGD System	65	23-Jun-19	15-Oct-19																																																																								
M-LOT-MDL1011	Sizing Calculation & Selection parameter for Slurry Recirculation Pumps	65	07-Aug-19	30-Oct-19																																																																								
M-LOT-MDL1012	Sizing Calculation & Selection parameter for BOOSTER PUMPS	65	04-Sep-19	27-Nov-19																																																																								
M-LOT-MDL1013	Sizing Calculation, Selection parameter for Wet ball Mill	65	02-Sep-19	26-Nov-19																																																																								
M-LOT-MDL1014	General Layout of FGD Ducting	65	08-Sep-19	01-Feb-20																																																																								
M-LOT-MDL1015	Sizing Calculation & Selection parameter for all slurry pumps	65	01-Sep-19	24-Nov-19																																																																								
M-LOT-MDL1016	GA and Discharge for Equipment Cooled Water Cooling System	6	18-Aug-20	23-May-20																																																																								
M-LOT-MDL1017	Sizing Calculation & Selection parameter for Outfall Air Blower	65	07-Aug-19	30-Oct-19																																																																								
M-LOT-MDL1018	Sizing Calculation, Selection parameter for Emergency Purge Water System	65	01-Sep-19	24-Nov-19																																																																								
M-LOT-MDL1019	Sizing Calculation & Selection parameter for all Water Pumps	65	01-Sep-19	24-Nov-19																																																																								
M-LOT-MDL1020	Detail sheet & General Arrangement and Positioning load table for Absorber along with staircase and platform	65	24-Dec-19	17-Mar-20																																																																								
M-LOT-MDL1021	General arrangement of Ball Mill Building & gypsum De-water Building	65	28-Feb-20	22-May-20																																																																								
M-LOT-MDL1022	Electrical load list for complete FGD system	0	18-May-20	23-May-20																																																																								
M-LOT-MDL1023	DESIGN GUIDELINES FOR LIGHTNING PROTECTION	65	26-Feb-20	22-May-20																																																																								
M-LOT-MDL1024	PILOT PLAN OF LIME STONE & GYPSUM HANDLING PLANT	65	06-Nov-19	28-Jan-20																																																																								
M-LOT-MDL1025	FLOW DIAGRAM OF LIME STONE AND GYPSUM HANDLING PLANT	65	06-Nov-19	29-Jan-20																																																																								
M-LOT-MDL1026	General Arrangement of Limestone Dry Silo	6	18-May-20	23-May-20																																																																								
M-LOT-MDL1027	FGD Wet Stack-General Arrangement of Wet Stack	65	19-Dec-19	12-Mar-20																																																																								
M-LOT-MDL1028	Combustion Study for Low Height Chimney	65	17-Feb-20	11-May-20																																																																								
M-LOT-MDL1029	Sizing Calculation & Selection parameter for Slurry pumps	65	01-Sep-19	24-Nov-19																																																																								
M-LOT-MDL1030	Sizing Calculation & Selection parameter for Limestone Ball Mills	65	28-Feb-20	22-May-20																																																																								
M-LOT-MDL1031	GA & RCC Detail of Foundation of Reagent Feed Tank	65	28-Feb-20	22-May-20																																																																								
M-LOT-MDL1032	General Arrangement and Load Data of Auxiliary Absorbent (Storage) Tank	65	28-Feb-20	22-May-20																																																																								
M-LOT-MDL1033	CRUSHER HOUSE - STRUCTURAL ELEVATION AND CROSS SECTION	65	28-Feb-20	22-May-20																																																																								
M-LOT-MDL1034	STRUCTURAL GA OF TRANSFER POINT (FLOORS, SECTIONS)	65	28-Feb-20	22-May-20																																																																								

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L2 Schedule

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NTPC SIPAT STPP STAGE-I (3X660MW) FGD SYSTEM PACKAGE

Activity ID	Activity Name	Start	End	2019	2020	2021	2022												
		Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Compressed Air System				379	30-Oct-19	30-May-21													
Procurement : Compressed Air System (Compressor, Dryer, Strainer, Trap)				425	30-Oct-19	30-Dec-20													
M-LOT-20610	Inquiry and Ordering	62	30-Oct-19	30-Dec-19															
M-LOT-21220	Manufacturing	222	31-Dec-19	16-Nov-20															
M-LOT-21225	Dispatch to Site	0		16-Nov-20															
M-LOT-21530	Transportation & Receipt at Site	44	17-Nov-20	30-Dec-20															
Erection				341	02-Oct-20	30-May-21													
M-LOT-23260	Civil Works	90	02-Oct-20	30-Dec-20															
M-LOT-23260	Erection Work	181	31-Dec-20	30-May-21															
Fire Detection & Protection System				582	20-Nov-19	29-Jun-21													
Procurement : Fire Fighting System, Detection System				411	20-Nov-19	23-Jan-21													
M-LOT-20735	Inquiry and Ordering	65	20-Nov-19	23-Jan-20															
M-LOT-21288	Manufacturing	322	24-Jan-20	16-Dec-20															
M-LOT-21370	Dispatch to Site	0		16-Dec-20															
M-LOT-21585	Transportation & Receipt at Site	44	11-Dec-20	25-Jan-21															
Erection				261	26-Oct-20	23-Jun-21													
M-LOT-23334	Civil Works	90	26-Oct-20	23-Jun-21															
M-LOT-23335	Erection Work	181	24-Jan-21	23-Jun-21															
AC and Ventilation				579	20-Nov-19	20-Jun-21													
Procurement : HVAC				426	20-Nov-19	20-Jan-21													
M-LOT-20715	Inquiry and Ordering	62	20-Nov-19	20-Jan-20															
M-LOT-21338	Manufacturing	322	21-Jan-20	07-Dec-20															
M-LOT-21340	Dispatch to Site	0		07-Dec-20															
M-LOT-21665	Transportation & Receipt at Site	44	08-Dec-20	20-Jan-21															
Erection				241	23-Oct-20	20-Jun-21													
M-LOT-23329	Civil Works	90	23-Oct-20	20-Jun-21															
M-LOT-23330	Erection Work	181	21-Jan-21	20-Jun-21															
Electrical and C&I equipment				824	21-Oct-19	21-Jan-22													
CIVIL WORKS				401	9-Nov-20	23-Apr-21													
Electrical Building				401	9-Nov-20	23-Apr-21													
V LOT 21155 Civil Works for Electrical equipment & control Building				401	15-Mar-21	23-Apr-21													
Transformer yard				90	01-Aug-20	29-Oct-20													
M-LOT-22635	Foundation Work of Transformer	90	01-Aug-20	29-Oct-20															
Procurement & Erection				824	21-Oct-19	21-Jan-22													
Procurement : CONTROL AND INSTRUMENTATION, Lighting System				429	22-Nov-19	23-Jan-21													
M-LOT-20720	Inquiry and Ordering	60	22-Nov-19	20-Jan-20															
M-LOT-21450	Manufacturing	310	21-Jan-20	25-Nov-20															
M-LOT-21855	Dispatch to Site	0		25-Nov-20															
M-LOT-21856	Transportation & Receipt at Site	119	27-Sep-20	23-Jan-21															
Erection CONTROL AND INSTRUMENTATION, Lighting System				413	05-Dec-20	21-Jan-22													
M-LOT-23430	Erection Work Unit 1&2	322	08-Dec-20	23-Oct-21															
M-LOT-23460	Erection Unit 2	242	26-May-21	21-Jan-22															
Procurement : MV & LV Cable				450	23-Oct-19	16-Jan-21													
M-LOT-20730	Inquiry and Ordering	90	23-Oct-19	20-Jan-20															
M-LOT-21425	Manufacturing	332	21-Jan-20	17-Dec-20															
M-LOT-21435	Dispatch to Site	0		17-Dec-20															
M-LOT-21560	Transportation & Receipt at Site	150	18-Aug-20	14-Jan-21															
Erection MV&LV CABLES				295	23-Sep-20	15-May-21													
M-LOT-21895	Installation of Cables	236	23-Sep-20	16-May-21															
Procurement : 415 V MCC UPS, Battery, Junction Box				455	23-Oct-19	23-Jan-21													
M-LOT-20725	Inquiry and Ordering	90	23-Oct-19	20-Jan-20															
M-LOT-21420	Manufacturing	332	21-Jan-20	17-Dec-20															

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एन टी पी सी लिमिटेड
(भारत सरकार का कंपनी)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
कॉर्पोरेट कार्यालय/Corporate Centre

Ref. No.: CS-9518-109(2)-9-SC-NOA-6816

Date: 24.05.2019

M/s GE Power India Limited
Plot No.7, IHDF Building,
Sector-127, Noida-201301

Kind Attn.: Mr. Lalit Sankarni, Executive-Business Operations

Sub.: Notification of Award (NOA) for Inland Transportation, Inland Insurance, Installation, Testing & Commissioning for Sipat Super Thermal Power Station Stage-I (3 x 660 MW) as per Common Bidding Document No. CS-0011-109(2)-9.

Dear Sir,

1.0 This has reference to the following:

- Our Invitation for Bids (IFB) No. 40087737 dated 31.08.2018 inviting Envelope-I (Techno-Commercial) Bids and IFB no. 40087818 for Envelope-II (Price) Bids.
- Bidding Documents for the subject package downloaded by you from SRM portal comprising the following:

S. No.	Description of Bidding Documents
1	Section-I : Invitation for Bids (IFB)
2	Section-II : Instructions to Bidders (ITB)
3	Section-III : Bid Data Sheets (BDS)
4	Section-IV : General Conditions of Contract (GCC)
5	Section- V : Special Conditions of Contract (SCC)
6	Section-VI : Technical Specifications including Tender Drawings and Technical Data Sheets
7	Section-VII : Forms & Procedures (FP) consisting of Part-1 of 3, Part-2 of 3 and Part-3 of 3

- Various Amendments/Clarifications/Errata issued to the Bidding Documents for the subject package as per details given below:

श्रीराम सिंह / SHRISH SINGH
उप महाप्रबन्धक (संविदा सेवाएं)
Dy. General Manager (Contract Services)
एन टी पी सी लिमिटेड / NTPC Limited
EOC, A-8A, Sector-24, NOIDA-201301 (U.P.)



प्रशासनिक कार्यालय परिसर, प्लॉट नं. 7-ए, सेक्टर 24, नोएडा (उ.प्र.), पिन: 201301
ADMINISTRATIVE OFFICE COMPLEX, Plot No. 7-A, Sector-24, Post Box No. 12, NOIDA (U.P.) Pin 201301
कॉर्पोरेट कार्यालय सेवा: एन.टी.पी.सी. लि. नोएडा-201301, पिन: 201301, वेबसाइट: www.nptc.co.in
Corporate Service Number : 1421810117600000000, Website: www.nptc.co.in
हेल्पलाइन नं. - 0120-241033 (10 लाईन), 0120-241044 (8-लाइन), फ़ैक्स: 0120-2410130, 0120-2410137
दैनिकीय कार्यालय: एन.टी.पी.सी. लि. नोएडा, एन.टी.पी.सी. लि. नोएडा-201301, पिन: 201301 - 14-000
Regd. Office: NTPC Shewari, SCOPE Complex, 7 Institutional Area, Lodhi Road, New Delhi-110085

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List of Clarifications			
Commercial Clarifications			
S. No.	Description	Ref. no.	Issuance/ Uploading Date
1	Clarification no. 1 (Commercial) to Bidding Documents	CS-0011-109(2)-9-CLRF.01 (Comm)	03.10.2018
2	Clarification no. 2 (Commercial) to Bidding Documents	CS-0011-109(2)-9-CLRF.02 (Comm.)	24.10.2018
Technical Clarifications			
S. No.	Description	Ref. no.	Issuance Date
1	Clarification no. 1 (Technical)	CS-0011-109(2)-9-CLRF-01(TECH)	26.10.2018
2	Clarification no. 2 (Technical)	CS-0011-109(2)-9-CLRF-02(TECH)	19.11.2018
3	Clarification no. 3 (Technical)	CS-0011-109(2)-9-CLRF-03(TECH)	28.11.2018
List of Amendments			
S. No.	Description	Ref. no.	Issuance Date
1	Amendment no 1 to Bidding Documents consisting of : (i) Amendment No. 01 to Section VII	CS-0011-109(2)-9-AMDT.01	19.09.2018
2	Amendment no. 2 to Bidding Documents consisting of : (i) Amendment No. 01 to BDS (Section-III) (ii) Amendment No. 01 to SCC (Section-V) (iii) Amendment No. 02 to Section VII	CS-0011-109(2)-9-AMDT-02	03.10.2018
3	Amendment no. 3 to Bidding Documents consisting of : (i) Amendment No. 01 to Technical Specification (Section-VI)	CS-0011-109(2)-9-AMDT-03	26.10.2018
4	Amendment no. 4 to Bidding Documents consisting of :	CS-0011-109(2)-9-AMDT-04	27.10.2018



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असि-सीपीसी कार्यालय परिसर, ब्लॉक ए. ४-६२, सेक्टर 24, नोएडा (उ.प्र.), पिन: 201301
ENGINEERING OFFICE COMPLEX, Plot No. A-24, Sector-24, Plot Area No. 43, NOIDA (U.P.), Pin. 201301
केन्द्रीय कार्यालय: एन. टी. सी. लि. कार्यालय, सेक्टर 24, नोएडा, उत्तर प्रदेश, भारत। वेबसाइट: www.ntpc.co.in
Corporate Identification Number: LAD101DL1971G01027000, Website: www.ntpc.co.in
दूरभाष नं.: +९१-११-२६१३३ (10-संदिग्ध), +९१-११-२६१३३ (10-संदिग्ध), फोन: +९१-११-२६१३३, +९१-११-२६१३३
Telephone No.: 0120-2410033 (10 Lines), 0120-2410134 (10 Lines), Fax: 0120-2410136, 0120-2410137
दूरभाष नं.: +९१-११-२६१३३ (10-संदिग्ध), +९१-११-२६१३३ (10-संदिग्ध), फोन: +९१-११-२६१३३, +९१-११-२६१३३
Head Office: NTPC Bhawan, SCOPE Complex, 7 Institutional Area, Lodi Road, New Delhi-110003

श्रीमती शिवाजी शर्मा/श्रीमती शर्मा
उप महाप्रबन्धक (सांख्यिक सेवाएँ)
Dr. General Manager (Cost/Account Services)
एन टी सी लिमिटेड / NTPC Limited
EOC, A-24, Sector-24, NOIDA-201301 (N.P.)



commissioning, testing, commissioning and performance testing of all Equipments/ systems and materials, and all other services leading to successful "completion of facilities" and handing over to Employer of the Equipment/ Materials including Mandatory Spares etc. covered under Flue Gas Desulphurisation (FGD) System Package for Sipat Super Thermal Power Station Stage-I (3 X 660 MW), as per Bidding Document and its Amendments/ Clarifications/ Errata read in conjunction with agreed Minutes of Meeting, as referred to in para 1.0 above (hereinafter referred to as the 'Second Contract').

3.0 We have also issued Notification of Awards to you vide our NOA no. CS-9518-109(2)-9-FC-NOA-8815 dated 24.05.2019 for the work of Design, Engineering, Manufacturing, Shop fabrication, Assembly, Inspection and Testing at Supplier's works, Type Testing, Packing, Forwarding to site of all Ex-Manufacturing Works/Place of Dispatch (both in India) Equipments/ materials/ Special tools & tackles and Mandatory Spares etc. (hereinafter referred to as the 'First Contract') covered under Flue Gas Desulphurisation (FGD) System Package for Sipat Super Thermal Power Station Stage-I (3 x 660 MW), as per Bidding Document and its Amendments/ Clarifications/ Errata read in conjunction with agreed Minutes of Meeting, as referred to in para 1.0 above.

3.1 You shall also be fully responsible for the works to be executed under the 'First Contract' and it is expressly understood and agreed by you that any breach under the 'First Contract' shall automatically be deemed as a breach of this 'Second Contract' and vice-versa and any such breach or occurrence or default giving us a right to terminate the 'First Contract' and/or recover damages there under, shall give us an absolute right to terminate this Contract and/or recover damages under this 'Second Contract' as well and vice-versa. However, such breach or default or occurrence in the 'First Contract' shall not automatically relieve you of any of your responsibilities/obligations under this 'Second Contract'. It is also expressly understood and agreed by you that the equipment/ materials to be supplied by you under 'First Contract' when installed and commissioned under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

4.0 CONTRACT PRICE

4.1 The total Contract Price for the entire scope of work covered under this NOA shall be ₹ 275,58,18,059/- (INR Two Hundred and Seventy Five Crore, Fifty Six Lakh, Eighteen Thousand and Fifty Nine only) as per the following break up:

श्रीश सिंह / SHRISH SINGH
 उपायुक्त प्रबंधक (संयोजित सेवाएं)
 Dy. General Manager (Contract Services)
 एन टी पी सी लिमिटेड / NTPC Limited
 EOC, A-8A, Sector-24, Noida-201301 (N.P.)



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 अधिकारिता/अधिकारिता अधिकारी, प्लॉट नं. ए-ए 8, सेक्टर 24, नोएडा नोएडा नं. 24, नोएडा (उ.प्र.), पिन 201301
 ENGINEERING OFFICE COMPLEX, Plot No. A-8A, Sector-24, Post Box No. 12, NOIDA (U.P.), Pin: 201301
 कॉर्पोरेट ऑफिस/अधिकारिता अधिकारी, प्लॉट नं. ए-ए 8, सेक्टर 24, नोएडा नोएडा नं. 24, नोएडा (उ.प्र.), पिन 201301
 Corporate Office/अधिकारिता अधिकारी, Plot No. A-8A, Sector-24, Noida, Website: www.npc.co.in
 कॉर्पोरेट नं. 24-24-24 (10 लाइन्स), 24-24-24 (10 लाइन्स), फोन: 24-24-24, 24-24-24
 Telephone No.: 24-24-24 (10 Lines), 24-24-24 (10 Lines), Fax: 24-24-24, 24-24-24
 कॉर्पोरेट कार्यालय: एन टी पी सी लिमिटेड, एन टी पी सी लिमिटेड, एन टी पी सी लिमिटेड, एन टी पी सी लिमिटेड - 201301
 Regd. Office: NTPC Bhawan, EOCPE Complex, 7 Institutional Area, Lodhi Road, New Delhi 110008

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S. No.	Particulars	Contract Price
1.	Local Transportation including Inland Insurance charges for Plant and Equipment covered under First contract	₹ 7,07,60,918/-
2.	Local Transportation including Inland insurance charges for Mandatory Spares covered under First Contract	₹ 50,00,000/-
3.	Installation Services	₹ 64,73,39,446/-
4.	Civil & Architectural Works	₹ 195,01,91,170/-
5.	Structural Steel Works	₹ 8,04,97,100/-
6.	Training Charges	₹ 8,29,425/-
7.	AMC Charges	₹ 10,00,000/-
8.	Total (B) [1+2+3+4+5+6+7]	₹ 278,56,18,059/-

- 5.0 You shall prepare and finalize the Contract Documents for signing of the formal contract Agreement and shall enter into the Contract Agreement with us, as per Performa enclosed with the Bidding Documents, on non-judicial stamp paper of appropriate value within 28 days from the date of this Notification of Award.
- 6.0 This NOA is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including all the enclosed Appendices, by the authorized signatory of your Company as a proof of your acknowledgement and confirmation.

Please take necessary action to commence the work and confirm action.

Thanking You,

Yours faithfully,
For and on behalf of NTPC Ltd.

Shrish Kumar Singh
24/10/13

श्रीरा सिंह / SHRISH SINGH
उप महाप्रबन्धक (संवित्त सेवाएं)
Dy. General Manager (Contract Services)
एन टी पी सी लिमिटेड / NTPC Limited
SOC, A-8A, Sector-24, Noida-201301 (U.P.)

Shrish Kumar Singh
DGM (CS)
Tel no.: 0120-4948668
email: shrishksingh@ntpc.co.in
Fax no.-0120-2410011



अभियंत्रण कार्यालय परिसर, प्लॉट नं. ए - ८ ए, सेक्टर २४, नोएडा कॉम्प्लेक्स नं. १३, नोएडा (उ.प्र.), पिन: २०१३०१
ENGINEERING OFFICE COMPLEX, Plot No. A-8A, Sector-24, Post Box No. 13, NOIDA (U.P.), PIN: 201301
अभियंत्रण कार्यालय परिसर प्लॉट नं. ए-८ ए सी. एम. सी. जे. १३, नोएडा, उत्तर प्रदेश
Corporate Identification Number: L40190DL19750Q0007986, Website: www.ntpc.co.in
दूरभाष नं.: ०१२०-४९४८६६८ (१० लाइन), ०१२०-२४१००११ (१० लाइन), फैक्स: ०१२०-२४१००११, ०१२०-२४१००१२
Telephone No. 0120-4948668 (10 Lines), 0120-2410011 (10 Lines), Fax: 0120-2410011, 0120-2410012
दूरदर्शन कार्यालय: एन टी पी सी लिमिटेड, एन टी पी सी कॉम्प्लेक्स, ७ इन्डिपेंडेंट एरिया, लोहा रोड, नोएडा-२०१३०१
Regd. Office: NTPC Bhawan, SOCPCL Complex, 7 Independent Area, Loha Road, New Delhi-110003

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MINUTES OF POST BID DISCUSSIONS (COMMERCIAL) HELD BETWEEN NTPC LIMITED (NTPC AND GE POWER INDIA LIMITED (GEPIL) ON 28.12.2018 FOR FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE UNDER LOT-2 (AS PER COMMON BIDDING DOCUMENT NO. CS-0011 1092)-9.

PRESENT

NTPC

GEPIL

Mr. Naveen Jain, GM (CS-& P&S)
Mr. V. N. Jain, GM (Fin.)
Mr. P K Singh, AGM (CS-f)
Mr. Binay Malik, AGM (CS-I)
Mrs Priyanka Kumari, Sr. Manager (CS-f)

Mr. Lalit Santami, Executive (Business Operations)
Mr. Roshan Singh, Lead Manager (Sales)

With reference to GEPIL Envelope-I (Techno-Commercial) Bid Ref No. QFEC51326482 dated 3rd December 2018 submitted online for Flue Gas Desulphurization (FGD) System Package for Lot-2 Projects, discussions were held between GEPIL and NTPC at NTPC EOC, NOIDA, wherein the following have been agreed to with respect to Projects under FGD Lot-2:

- 1.0 GEPIL confirmed that all Deviations/ Exceptions/Variations, if any, explicit or implicit contained in their proposal with respect to NTPC's bidding documents including its Amendments/Clarifications/Errata shall stand withdrawn. Further, GEPIL confirmed that they would execute the work strictly as per the provisions of the Bidding Documents including its Amendments/ Clarifications/Errata in case of award.
- 2.0 GEPIL in Attachment 4 has stated that the facilities viz. all plant and equipment to be supplied and installed and services to be carried out under the flue gas desulphurisation package for TALCHER, SIMHADRI, SIMHADRI Projects. However, during the discussion GEPIL confirmed that the facilities offered are eligible facilities and conform to the Bidding Documents for TALCHER, SIMHADRI, SIPAT Projects.
- 3.0 GEPIL confirmed that any additional Special Maintenance Tools & Tackles, other than those indicated by them at Attachment-4A, required for the equipment supplied under this package shall be furnished by them at no extra cost to NTPC, in case of award.
- 4.0 GEPIL submitted details with regard to Erection Tools & Plant and Safety Equipments & Safety Personnel Protective Equipments (as required in Attachment-10). Further, GEPIL confirmed that they will deploy the quantity and type of tools and equipment as per the requirement of NTPC and agreed to bring more equipment, if so warranted, in the opinion of the Project Manager. Further, with regards to Safety issues including bringing the minimum suggestive Safety Equipments & Safety Personal Protective Equipments to site, separate Minutes of meeting are being finalized by GEPIL with Safety department of NTPC.
- 5.0 GEPIL submitted a list of Commissioning/Start-up Spares (Attachment-11) and further confirmed that they shall ensure the availability of the required quantity of Commissioning spares, in line with the Bidding Documents, without any additional cost before start-up/initial operation.
- 6.0 With reference to Attachment-16, GEPIL has confirmed that they will submit the value of all indices for Price Adjustment as per Appendix-2 Section VII book 3 of 3 of bidding document during the signing of Contract agreement.

Priyanka

JK

Appendix - A
Page 2 of 2

MINUTES OF POST BID DISCUSSIONS (COMMERCIAL) HELD BETWEEN NTPC LIMITED (NTPC) AND GE POWER INDIA LIMITED (GEPIL) ON 26.12.2018 FOR FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE UNDER LOT-2 (AS PER COMMON BIDDING DOCUMENT NO. CS-011-10N2-9.

- 7.0 With regards to the Work Schedule, GEPIL confirmed that they shall strictly adhere to the Work Schedule specified in the BDS and comply to the requirements stipulated in the Bidding Documents in this regard.
- 8.0 GEPIL has confirmed that they have carried out a comprehensive assessment of the capacity and capability of M/s General Electric Company, USA Associate/Collaborator/QFGDM for packages under FGD LOT-2 and confirmed that M/s General Electric Company, USA have sufficient capacity and capability to execute the scope of work as per the provisions of the Bidding Documents.
- 9.0 It was agreed by GEPIL that these discussions with them on their Techno-Commercial offer shall not be construed by GEPIL that they have been considered qualified and eligible for calling/opening of their price bid and award.

(NTPC)

[Handwritten Signature]

(GEPIL)

[Handwritten Signature]
[Handwritten Signature]

Appendix - B

Page 1 of 3

ANNEXURE - I

MINUTES OF POST BID TECHNICAL DISCUSSIONS BETWEEN NTPC LIMITED & GE POWER INDIA LTD. IN RESPECT OF TECHNO COMMERCIAL BID PROPOSAL FOR FLUE GAS DESULPHURIZATION SYSTEM PACKAGE FOR LOT-2 PROJECTS AT ENGG. OFFICE COMPLEX, NTPC, NOIDA ON 19.12.2018

Participants:

NTPC LIMITED	GE POWER INDIA LTD.
Udayan Kumar GM (PE-Mech/SG)	Lalit Sankrani Executive Business Operations
Deepak AGM (PE-Mech/SG)	Naresh Sharma Manager (Commercial Proposal)
P.K.Gupta AGM(PE-Mech/SG)	Prashant Sapkal Lead Project Engineer
P. K. Behera DGM (PE-Mech/WS)	Sunil Sahu Manager (Commercial Proposal)
Pramod Chandra Nath DGM (PE-Mech/Piping)	Hiren Nariyelwala Manager (Sales)
Prabhat Ranjan Deen Sr. Manager (PE-Mech/Layout)	Roshan Singh Manager (Sales)
Md Suhel Khan Sr. Manager (PE-Mech/SG)	
Sujeet Kumar Sr. Manager (PE-Mech/MH)	
Anuj Kumar Shahi Sr. Manager (PE-Mech/PU)	
Raj Seth Sr. Manager (PE-C&I)	
Kuntal Bhuiyan Manager (PE-Electrical)	
Abuzar Ahmed Manager (PE-Civil)	
Adarsh Agarwal Manager (PE-Mech/SG)	

FGD System Package for Lot-2 Projects covers seven (7) projects and GE have furnished bids for three (3) projects namely Sipat STPS Stage-I (3x660 MW), Talcher Stage-I&II (2X500 MW+4X500 MW) and Simhadri Stage-I & II (2X500MW+2X500 MW). Further, GE has declared to be interested in taking award of only two (2) projects as per Attachment-1A. Based on the discussion between NTPC and GE on submitted bids for three (3) nos. of projects, following agreements were reached.

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Page 2 of 3

1. Compliance to Tender Documents:

GE confirmed that all deviations, variations, exceptions and clarifications with respect to the NTPC specification contained in their bid proposal, implicit or explicit, except those specifically agreed herein, stand unconditionally withdrawn without any cost implications to NTPC. GE further confirmed that all work shall be performed by them in total conformity with the Technical Specification, Bid Document No. CS-0011-109(2)-9 including its amendments/clarifications issued by NTPC from time to time for FGD System Package for Lot-2 Projects.

2. FGD System Layout:

With regard to Project wise Layouts for FGD system, NTPC pointed out that, some of the equipment/facilities indicated in bidder's layout are outside the specified area for FGD in GLP Included in tender document. GE stated that the layouts submitted in the bid are indicative and final layout showing arrangement of equipment shall be finalised during detailed engineering. Further, GE confirmed that final layout shall be such that all equipment for FGD system shall be located within the identified space in GLP as included in technical specification.

Further, the layout shall be prepared such that the noise levels of equipment covered under this contract shall not exceed the ambient noise standards specified by CPCB (i.e. 55 dBA in day time and 45 dBA in night time) in nearby residential areas such as Township etc.

3. Provenness Criteria:

GE has indicated name of the sub-vendors in the bid. GE confirmed that complete provenness data along with end user certificates as per Sub-section I-A, Part-A, Section-VI of the bidding documents to establish the provenness of the systems, equipment, auxiliaries and bought out items shall be submitted to NTPC for review and approval, in case of award, within time schedule as indicated in bidding documents along with Deed of Joint Undertaking (DJU), if required, before placement of order on the sub-vendor.

4. Technical Data Sheet

NTPC stated that GE has not furnished most of the data in the Bid Data Sheet and has indicated 'During Detailed Engineering' at many places. GE has also indicated "Refer attached Curves" in the bid data sheet which are not attached. GE agreed to furnish the complete data sheet including missing data, which could not be finalised and given at the bidding stage, within four weeks after award of contract in case of award.

5. Special Maintenance Tools & Tackles:

GE has furnished the list of special maintenance tools and tackles in Attachment-4A. NTPC asked GE to furnish the justification for the completeness of the list. GE stated that the items covered under the list are exhaustive and are as per their practice adopted in earlier projects. However, in case any additional maintenance tools and tackles are required at a later stage, same shall be supplied to NTPC without any additional cost implication.

6. Performance Guarantee & Demonstration Parameters:

GE has indicated demonstration parameters in Attachment-9B for various guaranteed parameters. GE stated that the guaranteed figures for Booster fan head, Wet Ball Mill capacity and Vacuum Belt filter capacity are indicative value. GE agreed that in case any change during detailed engineering (w.r.t. the guaranteed figures) in line with technical specification requirement, the same will be considered for guarantee.

Appendix - B

Page 3 of 3

GE has informed that vacuum belt filter capacity indicated in attachment-9B for Sipat project is 69.5 T/hr which is on dry basis and confirmed that the corresponding value with 10% moisture (wet basis) shall be 77.2 T/hr. Accordingly vacuum belt filter capacity will be demonstrated.

7. Specific Confirmations:

GE made following specific confirmations with regard to their proposal to emphasize their commitment/focus on issues.

- i. GE confirmed that mandatory spares shall be included and supplied in line with the specification requirements.
- ii. GE confirmed that number of flue in the stack, Stack height and its location shall be in line with the specification requirements.
- iii. GE confirmed that terminal points shall be in line with the specification requirements.
- iv. GE confirmed that erection strategy for FGD System of the awarded project shall be furnished by them after award.
- v. GE confirmed that the duct lining from absorber outlet to chimney shall be in line with specification and not flake glass lining which was inadvertently declared in data sheet.
- vi. GE confirmed that the max purge flow rate to waste water treatment system shall not be more than 12 m³/hr for 660 MW Unit and 10 m³/hr for 500 MW unit averaged over a 24 hour period.


19/12/2018
Md. Subul Khan (HTPC)




(GE)
Sunil Kumar Barua


(Niven J. Nariyelu)



MINUTES OF MEETING OF POST BID DISCUSSIONS HELD AT NTPC FOC OFFICE, ON
19/12/2018 BETWEEN NTPC LTD AND M/s GE POWER INDIA LTD. REGARDING QA&I
ISSUES FOR FGD SYSTEM PKG. FOR LOT-2 PROJECTS (7 PROJECTS)
BID DOCUMENT NO. CS-0011-109 (2)-9

Present:

M/s NTPC Ltd.		M/s GE POWER
K K Chattopadhyay, (GM/QA)	S K Lal, AGM(QA)	Suryya Nath Choudhury, HOD/Quality ECS
Sankar Bajal, AGM(QA)	Mukesh Kashyap -DGM(QA)	Abhimanyu Sharma, Manager-Tendering
B C Roy, AGM(QA)	S. M. Tripathy -DGM(QA)	Roshan Singh, Manager- Sales
K J Rao, AGM(QA)	M Khaliquezama, DGM (QA)	
Alok Srivastav, AGM(QA)	Manan Sharma, Sr Manager (QA)	
Nishith Agarwal, AGM(QA)	Ankush Birla, Manager (QA)	

Following was discussed and agreed:

1.0 Deviations in Bid:

M/s GE POWER confirmed that there are no deviations in the bid w.r.t. QA&I requirements of the tender. M/s GE POWER shall comply with the QA&I requirements, as contained in the bid documents.

2.0 Sub-Contractors/ Sub-Vendors/ Sub-Suppliers:

In exercise of provisions of Cl. 19.1 of GCC (General Conditions of Contract), NTPC-QA will control the items/Systems as listed below, for the purpose of acceptance of their suppliers:

SN.	Item/system	SN.	Item/system
1	Booster Fans	15	FGD Tie Transformer(100 MVA 220/34.5kV)
2	Slurry Recirculation Pumps	16	Auxiliary Oil Filled Transformers
3	Oxidation Blowers	17	Switchyard 220kV Equipment(220kV Circuit Breakers, 220 kV Instrument Transformers, 220kV Disconnectors, 220kV Surge Arrestors)
4	Wet Limestone Grinding Mills	18	Control & Protection (for Switchyard)
5	Slurry Pumps	19	Control & Instrumentation(C&I) Equipments / Systems
6	Agitators	20	RO based Desalination Plant Equipment/Systems for FGD
7	Vacuum Belt Filters	21	Water Pre-treatment Equipment/Systems for FGD
8	Limestone Sampling System	22	Oil Free compressor(HVAC)
9	Agency for civil works	23	Gear Box for Limestone/Gypsum handling system
10	Design agency for civil & steel structural works	24	Fluid Coupling for Limestone/Gypsum handling system
11	HT motor- booster fan motor	25	Crusher for Limestone/Gypsum handling system
12	LT Switchgear	26	Conveyor belt for Limestone/Gypsum handling system
13	33KV/11KV/6.6KV/3.3KV Switchgears	27	Analyzers for FGD
14	Numerical relays & Not working	28	Control Systems for FGD

J. J. J.
NTPC

The process of vendor approval of the above items shall be as under:

i) In case the item is also covered under Sub QR list, the proposed vendors for the same shall be accepted by QA after acceptance of the vendor by NTPC Engg. For these items, M/s GE POWER will submit the relevant vendor details of the proposed vendors for sub QR clearance to NTPC PE.

ii) For the item not covered under Sub QR but has been listed in above table, NTPC approved vendors shall only be employed by the main contractor. A list of proposed vendors for such items have been placed at Annex-I to this MOM. List of NTPC approved vendors against similar package/item has shared with the main contractor to enable him to consider the same, if he so wishes. However, the main contractor has specifically advised to carry out his own due diligence before consider the sub vendor previously known to NTPC. List of sub vendors placed at Annex I has been drawn with 'A' identified against such vendors previously known to NTPC. M/s GE POWER agreed to comply with the NTPC approval conditions, if any, for vendors identified with "A" in this list. For vendor proposals where status of proposal is in "DR" category (details required, as NTPC does not have any past experience with them) in the above mentioned list, M/s GE POWER agreed to furnish the following details of such proposals, in NTPC Formats (copies handed over), in time bound manner, so as not to impede the progress of the Project/ Works -

- i. Duly Filled Main supplier Evaluation Report
- ii. Duly Filled Sub-Supplier Questionnaire.
- iii. Factory Registration Certificate.
- iv. Overall Organization Chart with Manpower details (Design, Manufacturing, Quality etc.)
- v. Supply reference list of the Sub-Supplier indicating similar product supply order reference no., customer name, rating of product, date /year of supply, date / year of commissioning.
- vi. List of Manufacturing Equipment available with sub vendor.
- vii. List of Testing Equipment available with sub vendor.
- viii. Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any.
- ix. Details of Outsourced Manufacturing Processes, if any.
- x. Quality control exercised during receipt, in-process & final inspection.

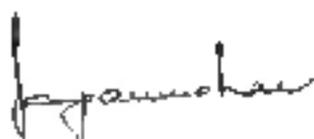
M/s GE POWER will furnish the required details, as detailed out above, of the proposed Manufacturer/ Sub-Vendor, along with their own detailed recommendations, in the NTPC formats (copies handed over). NTPC informed that proposals/ details shall be received only up to 3 months prior to ordering date of the concerned item (L-2 Network/ BOI Schedule), for NTPC review and assessment. M/s GE POWER will accordingly plan the submissions.

It is understood that in terms of provisions of Cl. 19.1 of GCC (General Conditions of Contract), in case M/s GE POWER opts for additional Vendor proposals, over & above the agreed list hereto, may be given by M/s GE POWER, in sufficient time, so as not to impede the progress of the work. Accordingly, all such proposals along with required details (as given above), shall be received only up to 3 months prior to ordering date of the concerned item/ Scheduled start of the Manufacture of Self Manufactured Item, for NTPC review and assessment.

iii) In case the item is not covered under Sub. QR and list of items at sl. No. 2.0 above, the vendors proposed for the same shall be accepted based on Main Contractor's certification regarding past experience with the vendor for supply of similar items. The certification to be submitted to NTPC, before placing the order on the vendor. In case, proposed vendors for such items are not having past experience with Main Contractor, these vendors shall be assessed by the Main Contractor for their capability, and the assessment report shall be submitted to NTPC for reference & record, before placing order on the vendor.

iv) During detailed engineering, NTPC QA will review list of all items to be used for completion of FGD system pkg. Based on its review, NTPC will decide the inspection categorization of all items. There will be 3 inspection categories of items -

- a) CAT-I: For these items the Quality Plans are approved by NTPC and the final acceptance will be after physical inspection witness by NTPC.



Page 2 of 3





- b) CAT-II: For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP.
- c) CAT-III: For these items main Contractor approves the Quality Plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main contractor.

It is clearly understood that NTPC reserves the right to conduct Surveillance Inspection/ Audit of the material, which are identified in Cat-II/ Cat-III, to verify the effectiveness of Quality System of M/s GE POWER and conformance of the offered lot, to the applicable Standards/ requirements. It is agreed that M/s GE POWER will submit the copies of unpriced Purchase Order (as provided in GTR) of the orders placed on vendors for the items other than those listed in table at S. No. 2.0 above, to NTPC for the purpose of surveillance audit, if desired by NTPC, prior to issue of Dispatch Clearance of the concerned item.

- 3.0 The schedule of submission and approval of QP shall be finalized within three weeks of effective date as per LOI/NOA of the contract. The schedule shall be detailed with L2 network in such a manner the QP is approved at least 6 weeks prior to scheduled start of manufacturing of the respective item and FQP is approved at least three months before scheduled start of field activity.
- 4.0 M/s GE POWER confirmed that they shall deploy appropriate Batching Plant for producing Concrete, which will be having digitized recording system. This plant shall be calibrated with NPL traceable weights. The plant shall have the facility of delivering the output on recorder, giving separate details of the various constituents (cement, aggregate, water, admixtures, fly ash etc.) in each batch of concrete being produced.
- 5.0 M/s GE POWER confirmed that for Schedule-I/ Schedule-II supplies, orders shall be placed suitably on approved Sub-Vendors' manufacturing location (Foreign/ Indigenous), keeping the Contractual requirements in view.
- 6.0 M/s GE POWER confirmed that the QA Documentation Package shall include copy of approved Data Sheets/ Drawings & QP, along with all Material Test Certificate (MTCs), CHPs, Material Dispatch Clearance Certificate (MDCCs) for all items. The same shall be reviewed by M/s GE POWER for its completeness and only thereafter it shall be submitted to NTPC.
- 7.0 M/s GE POWER confirmed that requisite storage facilities for the equipment/materials shall be established by M/s GE POWER at site prior to receipt of equipment/material at site, after allotment of land by NTPC. For this purpose, requisite storage plan and schedule for the same shall be agreed between M/s GE POWER and NTPC site within 3 months of effective date as per LOI/NOA.
- 8.0 M/s GE POWER confirmed that similar to supply portion of the work, the non-conformities observed during field erection activities shall also be dispositioned according to NTPC's NCR dispositioning system in the prescribed format of NTPC.
- 9.0 A QA&I coordination procedure has been mutually agreed upon and has been placed as annexure to this MOM.


(NTPC)


(GE POWER)

(SUDHYAN CHANDRA)
GE - POWER

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**QA CO-ORDINATION PROCEDURE for
FGD SYSTEM PKG. OF LOT -2 PROJECTS (7 PROJECTS)**

1. **PURPOSE:**

This document specifies procedure to be adopted for the coordination of QA&I activities relating to FGD System pkg. of Lot-2 projects (7 projects) to satisfy the QA&I requirements laid down in contract.

2. **SCOPE:**

This document specifies procedure of:

- Vendor Approval
- Quality Plan - Bought-out items/Manufacturing items approval/finalization.
- Field Quality Plan approval/finalization.
- Inspection/Testing of equipments/items.
- Dispositioning of Non-conformities.
- Dispatch clearance of equipments/items.
- QA documentation Package
- Quality audit & surveillance.

3. **DEFINITIONS:**

- 3.1 **NTPC Inspector:** Means NTPC's Own Inspector/duly authorized third party inspection agency.
- 3.2 **Resident Inspector:** Means NTPC's own inspector posted in the country of origin of the equipment or manufacturing works. NTPC Inspectors at Regional Inspection Offices near the works of GE POWER and at other Regional Inspection Offices are considered as resident inspectors.

4. **PROCEDURE:**

4.1 **CO ORDINATORS AND CORRESPONDANCE**

- 4.1.1 Overall QA coordinator of GE POWER for this contract shall be informed within four weeks of LOI / effective date of contract.

4.2 **VENDOR APPROVAL**

- 4.2.1 List of items requiring vendor approval is identified and enclosed with LOA. The List contains the vendors as proposed by GE POWER, and acceptable vendors to NTPC are marked with "A" as APPROVED. Vendors not known to NTPC for which details are required to be submitted by GE POWER as per agreement are marked 'DR'. Other information regarding vendor approval is as per agreed MOM.
- 4.2.2 GE POWER shall submit the complete vendor details for "DR" Category vendors (in NTPC prescribed format) as per MOM.
- 4.2.3 Upon receipt of complete vendor details, NTPC shall review and respond expeditiously.
- 4.2.4 Monthly progress report of vendor approval for vendors identified in 'DR' category shall be furnished by GE POWER overall coordinator.

4.2.5 Within three weeks of release of purchase order for bought out items/ components, GE POWER shall furnish to NTPC a copy of the purchase order without price details but together with detailed purchase specification, QP and delivery conditions.

4.3 QUALITY PLANS

4.3.1 List of items requiring approval of quality plans shall be finalized by NTPC during detailed engineering.

4.3.2 GE POWER shall finalize a realistic schedule of submission of QPs based on project requirements prior to LOA which shall be incorporated on L-2 network.

4.3.3 GE POWER shall submit to NTPC, the Quality Plans with reference documents as per schedule of submission. The final submission of Quality Plans shall be furnished to NTPC in NTPC's online system C folder.

The quality plans shall be submitted for Cat-I & II items as per with additional essential attributes as per NTPC requirement (quantum of check, acceptance norms). Vendor's name may be provided on separate sheet attached with QAP.

Extracts of reference documents will be annexed. However, any other interlinking documents mentioned in the extracts can be viewed by NTPC in GE POWER/ collaborator's works. Acceptance criteria shall be reviewed by NTPC in case of deviation from NTPC specification. For other equipment, quality plans shall be submitted in NTPC format during execution phase for approval. Witness points / documentation requirements shall be mutually agreed.

4.3.4 Reference documents which were already submitted along with MQP/RQP/SQP for the earlier projects need not be submitted provided there is no change/revision in the document submitted last, whereas for the new/fresh MQP/RQP/SQP, the relevant documents shall be submitted along with the above Quality plans. Resubmission of RQP/SQP shall be done wherever changes are made in the already approved RQP/SQP for the earlier projects.

4.3.5 RQP/SQP shall be furnished along with all reference documents such as purchase specification, drg. data sheet, test procedure, plant standards, etc. In case where RQPs are already finalized, GE POWER shall confirm that items required for Lot-2 FGD projects (7 projects) is exactly same or shall state minor changes that are applicable. For exactly same items, RQPs already finalized shall be made applicable for Lot-2 FGD projects (7 projects) also.

4.3.6 Monthly progress report of quality plan submission/approval shall be furnished by GE POWER overall coordinator in attached format.

4.4 FIELD WELDING AND FIELD QUALITY PLAN

4.4.1 The field quality plan for equipment and services shall be furnished by GE POWER and their Vendors, so as to finalize the same at least 2 months prior to start of work and shall include the quality practices and procedures followed by them during various stages of site activities from receipt of material/equipment till final erection. The list of FQP to be approved by NTPC shall be tied up during execution.

4.4.2 The welding consumable approved by OFM/Main contractor shall be used for site welding.

4.4.3 M/s GE POWER's FOA manpower deployment shall be tied up after award.



4.5 INSPECTION

4.5.1 The notice period for inspection of materials/components/equipments for witnessing of the CHP stages by NTPC at the vendor's works shall be as follows:

- (a) Vendors of Indian origin - 10 working days.
- (b) Vendors of Foreign origin - 45 days

4.5.2 All the matters regarding inspection call shall be coordinated as follows:

4.5.4.1 For supplies of other than Indian origin: GE POWER shall issue inspection call notice to NTPC-QA coordinator.

4.5.4.2 For supplies of Indian origin: GE POWER/ their vendors will issue an inspection call to the concerned NTPC-RIO office. GE POWER's relevant offices shall closely co-ordinate with NTPC RIO for inspection of bought out items.

4.5.5 Where witnessing of the test is waived off in writing by NTPC, GE POWER/vendors shall proceed with the test which shall be deemed to have been carried out in the presence of NTPC inspector and shall forward duly certified copies of the test reports to the concerned NTPC inspection office as follows:

- a. For the tests conducted within the GE POWER's premises shall be within one week.
- b. For the tests conducted at vendors' premises shall be within two weeks.

In case of any objection, the concerned RIO office shall notify the same to the concerned GE POWER/vendors within 5 working days from receipt of the test reports.

4.5.6 For the witnessed tests, when the factory test at identified CHP stages have been satisfactorily completed including computation of test results wherever applicable, NTPC inspector shall sign jointly with GE POWER/vendors/authorized representative(as applicable as per approved QAP) on the CHP Clearance/Interim Inspection report in the format .

4.5.7 For the witnessed tests, in case of deviation, NTPC Inspector shall convey their non-conformities in writing on the CHP report itself for clarification by GE POWER/Vendors, who shall give due considerations to the objections raised and shall take corrective measures (as per the procedure laid down in clause 4.7 after due approval from NTPC) to rectify the non-conformities and shall confirm in writing to the concerned inspection office on rectification of the objections raised. However decision of NTPC shall be final and binding upon GE POWER/vendors within the purview of the contract requirements.

4.5.8 GE POWER will make available to the NTPC inspector their relevant documents and plant standards/procedure relevant to the checks/tests carried out on material/items equipments. Further, GE POWER/vendors shall also ensure the availability of approved drawings/data sheets and approved Quality Plan at the place of inspection.

4.5.9 INSPECTION PLAN: To facilitate advance planning of inspection of supplies, in addition to giving inspection notice at identified CHP stages as per approved QAP, GE POWER shall furnish three monthly rolling inspection programme every month indicating schedule dates of inspection at identified CHP stages. Such a programme shall be updated each month and a copy of the same is made available to the resident inspector/RIO as applicable. Such programme shall be confirmed by specific inspection call in accordance with clause 4.5.1 above.

- 4.5.10 Three monthly inspection programme for shop manufactured & BOIs shall be furnished directly to respective NTPC-RIO.
- 4.5.11 GE POWER contracts/commercial/QA shall furnish monthly inspection status report for previous month including pending calls and exception reports/NCR on or before 7th of every month.
- 4.6 **QUALITY AUDIT:** GE POWER/VENDORS shall provide the necessary facilities to NTPC inspector/town for carrying out of the Quality Surveillance and Audits as envisaged in the contract.
- 4.7 **NON-CONFORMITY DISPOSITIONING PROCEDURE:**
- 4.7.1 Whenever any deviation is observed with respect to relevant document and good Engg practices, the same shall be referred along with justification to NTPC office where inspection call has been raised by GE POWER/vendors. The details shall be furnished in the format attached for NTPC review and necessary action. NCR can be raised irrespective of the CHP stages to the concerned inspection office in whose jurisdiction the item/equipment is being manufactured.
- 4.7.2 Non-conformities with respect to the site activities shall also be dealt with similarly except that the NCR in the specified format shall be routed through NTPC-FQA group.
- 4.8 **Material Dispatch Clearance Certificate (MDCC)** upon satisfactory completion of all tests/inspection including type test as required by the approved documents (Cat-1 approved Quality Plan drawing/data sheet as applicable). NTPC inspector/Authorized Representative shall issue the MDCC in prescribed format attached against approved BBU
- 4.8.1 **Responsibility for Issuing MDCC:**
- Before requesting NTPC for issuance of MDCC, GE POWER shall verify and confirm that the equipment meets the stipulated technical requirements as per the contract. In NTPC, the responsibility of issuing MDCC shall be as follows:
- 4.8.1.1 **Where inspection by NTPC is envisaged in QP.**
- 4.8.1.1(a) **INDIGENOUS SUPPLIES:**
- The concerned Regional Inspection Office under whose jurisdiction the manufacturer is located, Inspecting Engineer or reviewing engineer (in case of waiver of presence of NTPC engineer) shall issue the MDCC.
- 4.8.1.1(b) **FOREIGN SUPPLIES:**
- For items directly dispatchable to site from foreign manufacturer, the MDCC shall be issued by NTPC's inspecting engineer. In case of waiver of presence of NTPC engineer, the MDCC shall be issued by CQA Engineer on satisfactory review of test reports.
- For items to be brought to GE POWER works from foreign manufacturer, before final dispatch to site, MDCC shall be issued by relevant Resident Inspector/RIO after satisfactory activities at GE POWER works and on review of CHP report of NTPC's Inspecting Engineer for inspection at foreign manufacturer's works or on verifying acceptance report of CQA, in case of waiver of presence of NTPC Engineer for inspection at foreign source.
- NOTE:** MATERIAL inspected by RIO-A at the work of sub-contractor in their respective jurisdiction & dispatched to the works of the other contractor for assembly or otherwise in the jurisdiction of RIO-B for

Jagan Mohan

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final despatch to project site, shall be accorded despatch clearance on a CHP clearance report by RIO-A and the MDCC of the completed item/equipment will be issued by RIO-B as per the approved B&U.

4.8.1.2 In case only review of TC by NTPC has been envisaged as per approved QP, for such items test certificates shall be submitted to NTPC resident inspection in respect of GE POWER manufactured item and to concerned RIO where level-I vendor is located for such BOIs, for issuance of MDCC. It is clarified that wherever multilevel vendors are not applicable, for bought out items of this category GE POWER's shall submit the test certificate to NTPC's resident inspection.

4.8.1.3 In case where QP has not been envisaged, all such materials shall be cleared on the basis of COC from GE POWER. COC shall be submitted on similar line as per Clause No. 4.8.1.2.

4.8.1.4 As per Tech specification, no item shall be dispatched by GE POWER without obtaining MDCC from NTPC.

4.9 **QUALITY ASSURANCE DOCUMENTATION PACKAGES:** GE POWER shall submit to NTPC QA the Quality Assurance documents in two hard copies and two CD ROM.

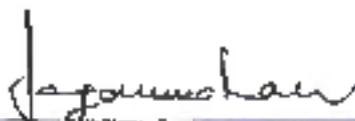
4.10 **QP/INSPECTION CATEGORY :**

CAT - I: For those items the Quality Plans are approved by NTPC and final acceptance will be on physical inspection witness by NTPC.

CAT - II: For those items the Quality Plans are approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis of review of documents as per QP.

CAT-III: For those items main supplier approved Quality Plan. The final acceptance by NTPC shall on the basis of Certificate of Conformance by main supplier.

Further, as it is clearly understood that NTPC reserves the right to conduct Surveillance Inspection/ Audit of the material, which will be identified in inspection category Cat-II/ Cat-III by NTPC QA during detailed engg., to verify the effectiveness of Quality System of M/s GE POWER and conformance of the offered lot, to the applicable Standards/ requirements. It is agreed that M/s GE POWER will submit the copies of unpriced Purchase Order (as provided in GTR) of the orders placed on vendors for the items other than those listed in table at Sl. No. 2.0 above, to NTPC for the purpose of surveillance audit, if desired by NTPC, prior to issue of Despatch Clearance of the concerned item.


(NTPC)


(GE POWER)
(SURYYA CHOUDHURY)
GE POWER





PROJECT : FGD SYSTEM PACKAGE LOT-2
PACKAGE: FGD PACKAGE SYSTEM
SUPPLIER : GE Power
CONT. NO.: C9-0011-10023-9

DOC. No. :
DATE: 21.12.2018
PAGE 1 OF 1

LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL
SUB SYSTEM: MECHANICAL-BOP WS

ITEM	QTY	QTY	PROPOSED SUB-SUPPLIER BY	PLACE	REMARKS
	BSFN CAT	CS	MAIN/CONTRACTOR		
OIL FREE SCREW COMPRESSOR					
			ELGI EQUIPMENTS	COIMBATORE	
			ATLAS COPCO	PUNE (SCREW ASSEMBLY FROM ATLOS COPCO , BELGIUM)	UP TO 74M3/MINUTE (AIR ENDS FROM HITACHI JAPAN), 45 M3/MINUTE FORM OWN
			INGERSOLL RAND	AHEMDABAD	UP TOZR 630-MODEL CAPACITY 75 NM3/MINUTE
					UP TO 36 NM3/MINUTE

TE-1 SYSTEM SUPPLIER / SUB-SUPPLIER STATUS CATEGORY (SHALL BE FILLED BY NTPC).

For those items proposed vendor to NTPC. To be indicated with letter "A" in the list along with condition of approval, if any.

I- 2. INSPECTION CATEGORY:

- I: For those items the quality plans are approved by NTPC and final acceptance will be after physical inspection witness by NTPC.
- II: For those items the quality plans are approved by NTPC. However, no physical inspection will be done by NTPC. The final acceptance by NTPC shall be on the basis of documents as per QP.
- III: For those items Main Supplier approves quality plans. The final acceptance by NTPC shall be on the basis of certificate of conformance by Main Supplier

(Signature)
NTPC Mumbai (Contractor)
S. S. ...

(Signature)
SURYA CHANDRAN
Main Contractor
GE POWER

PROJECT / SLD LOT-2		LIST AND STATUS OF ITEM REQUIRING QP AND SUB-SUPPLIER APPROVAL				NTPC DOC NO	QA-MH-DT
PACKAGE: FSD PACKAGE		APPROVAL Sub systems: Mechanical				REVISION NO 0	
MAIN SUPPLIER: GE POWER INDIA						DATE	21.12.2018
CONTRACT NO.: CS-0011-109(2)-9						Sub-supplier approval status / category	Remarks
Item	Qty (Imp. Unit)	QP No.	Proposed sub-supplier	Place			
FLUID COUPLING (TRACTION TYPE)	1	ROP	PREMIUM TRANSMISSION LTD	AURANGABAD	A		
	1	ROP	ELECON	VV NAGAR	A		
	1		FLUIDOMAT	INDORE	A		
	1		VOITH (INDIA)	HYDERABAD	A		
FLUID COUPLING (SCOOP TYPE)	1	ROP	FLUIDOMAT	GERMANY	A		
	1		VOITH	INDORE	A		
	1		VOITH	GERMANY	A		
LIMESTONE SAMPLING SYSTEM	1	ROP	PREMIUM TRANSMISSION LTD	AURANGABAD	A		UPTO PST 1150
	1		ELECON	VV NAGAR	A		UPTO MODEL ESC 760
	1		VOITH (INDIA)	HYDERABAD	A		UPTO SYNL 1330
	1		EAST MAN CRUSHER	KOLKATA	DR		
			ADVANCE SYSTEMS SAMPLING	KOLKATA	DR		

REMARKS:
 SYSTEM SUPPLIER/SUB-SUPPLIER APPROVAL STATUS CATEGORY SHALL BE FILLED BY NTPC.
 For those items proposed vendor is acceptable to NTPC. To be marked with letter 'A' in the last along with the condition of approval, if any.
 For those items 'Detailed request' for NTPC review. To be identified with letter 'B' in the last.
 For those items vendors are approved by Main Supplier and accepted by NTPC without specific vendor approval from NTPC. To be identified with 'N' in the last.
 CATEGORY:
 '1' : For those items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection witness by NTPC.
 '4' : For those items the Quality Plans are approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP.
 'A' : For those items Main Supplier approves the Quality Plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main supplier.

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 GE POWER

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Project : MOTTI		ELECTRICAL ITEMS			Proc No	Remarks	Sub-QR ITEM	
Package : FGD		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL			Rev No			
Supplier : GIB					Date			
Contract No.: CS-0111/0902-0					Page			
ITEM DESCRIPTION	QTY/ Lot/ Ch	QTY Sub. approx. %	QTY Sub. %	Approved sub-supplier	Plant	Sub-supplier Details Submission job		
LT (415 V) Motors				Technical Associate Ltd Tesda, Durg-2	Shangai		UP to 14 MVA, 50 KV Class, Approved up to 50 MVA, 33 KV Class	
				ABB MARATHON SIEMENS TOSHIBA BHEL MCC LTP PMTL PBL INTERNAL COMBUSTION NEW ALLENBURY MACHINES ABB MARATHON CGE (GEC Industrial Area) COGNITION BHEL WEG SIEMENS KCC TOSHIBA ABB MARATHON ELECTRIC MOTORS BHARAT BHEL SIEMENS Powermate				
LT (415 V) Motors	500 Nos-2						UP to 600 V, 900 KW for Investment Daily & up to 400V, 300 KW for Non-Investment Daily	
							UP TO 550KW 545V - 200KW UP TO 150KW UP TO 90KW UP TO 120KW Vendor to be supplied from MPPC approved sources	
LT (415 V) Motors							UP to 60V, 2500KW to 11KV, 2000KW UP to 11KV, 1600KW UP to 6.6KV, 1000KW to 11KV, 1300KW UP to 11KV, 1400V	
							UP to 11V, 2000KW UP to 690V, 500 KW 1.1 KV, 500 KW UP to 6KV, 2500KW UP to 690V, 250KW	
LT (415 V) Motors							UP to 690V, 1000KW UP TO 600V, 500 KW UP to 600 V, 200 KW UP to 33 KW with following conditions 1) VFD from Schneider - France, upto 400V. 2) VFD from Schneider & being to 400 litres stand 3) VFD from MPPC acceptable make & 4) Engineering support for installation will be provided by M/s Schneider / Authorized Distributor of M/s Schneider	
LT VFD Board								

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Sl No	ITEM DESCRIPTION	BIDDING ITEMS				INDUCTIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL		BIDDING ITEMS		Doc No		Remarks
		QF / Item Cat	QF No	QF Sub-Item	QF Sub-Item	Proposed sub-supplier	MOM	Sub-Supplier approval status/ category	Sub-Supplier Details/ specifications/ Q/L	Ref No	Date	
										Page	Page	
										CS-0011-10912-4	21.12.2015	
12												
	L1 PV-Sound Chbr											
13												
14												

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Project : KOT-2		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL				BIDDING ITEMS		Doc No	Page	Request
QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY
Req. Cat	Req. Cat	Req. Cat	Req. Cat	Req. Cat	Req. Cat	Req. Cat	Req. Cat	Req. Cat	Req. Cat	Req. Cat
Item Description	Item Description	Item Description	Item Description	Item Description	Item Description	Item Description	Item Description	Item Description	Item Description	Item Description
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Project : LOTE		SUBCIRCUAL ITEMS				Doc No	CS-0811-10023-9			
Package : BGD		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUP-VENDOR APPROVAL				Doc No	21.12.2008			
Contract No: CS-0811-10023-9		Q#	Q# No	Q# Sub	Q# Approved S.N.	Proposed sub-supplier	Place	Sub-supplier approval status / category	Sub-supplier Details (address / sub-division / etc)	Remarks
Q#1 Insp. Q#1		Q# No	Q# Sub	Q# Approved S.N.	Proposed sub-supplier	Place	Sub-supplier approval status / category	Sub-supplier Details (address / sub-division / etc)	Remarks	
Q#1 Insp. Q#1										
Q#2 Insp. Q#2										
Q#3 Insp. Q#3										
Q#4 Insp. Q#4										
Q#5 Insp. Q#5										
Q#6 Insp. Q#6										
Q#7 Insp. Q#7										
Q#8 Insp. Q#8										
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Project : LOT 2		ELECTRICAL ITEMS				INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL		User Map	
Sl No	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	Sl No	QTY / Desc / Cat
Sl No	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	QTY / Desc / Cat	Sl No	QTY / Desc / Cat
1	5757 LOGGER				UK / FRANCE / CHINA			1	Sub-supplier Approval Status / Category
2	60S TIME SYNCHRONISATION EQUIPMENT				UK			2	Sub-supplier Details (Manufacturer PCB)
3	RELAY TEST KIT				USA			3	Remark
4	DISTURBANCE RECORDER				UK / USA / GERMANY			4	
5	TAJCE VIDEO CAMERA (VIB)				GERMANY			5	
6	SHELLS for SWITCH AND (NUMERICAL AND AUXILIARY)				INDIA			6	
7	500 Gm Filling and Packaging Plant Gas Recycling & Purifying Plant Gas Leakage Detector				USA			7	

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Appendix-c
Page 23 of 30

Project : LOY-8		ELECTRICAL ITEMS				Doc No	E
Package : RGD		INDICATIVE VENDOR LIST FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL				Rev No	
Supplier : CI						Date	21.12.2019
Current No: CS-0011-10001-9						Page	1
ITEM DESCRIPTION	QTY/ Bunch/ Ckt	QTY/ Bunch/ Ckt	QTY/ Bunch/ Ckt	QTY/ Bunch/ Ckt	QTY/ Bunch/ Ckt	Sub-supplier approval status/ category	Market
OPERATIONAL ANALYSER WITH LOGICAL LIST	11				UK	A	
LEAKAGE CURRENT ANALYSER	20				USA SWEDEN USA ITALY PUNE NORWAY	A A A A A A	
CS PLAT/ MINI DIA. HSLBODY / MS BENCH POPS / VCLAMP / CE EASTM PIPE / CE MFS / CE CONDUIT (INCLUDING BENCH / PNA, MFS)	11				USA PUNE NORWAY	A A A	
CS BARTERWARE / LIGHTING WIRE	11				USA PUNE NORWAY	A A A	
LIGHTING POLE	11				USA PUNE NORWAY	A A A	
BAY COMMUNICATION TOWER PHASE MERCURY & DANGER PLATES	11				USA PUNE NORWAY	A A A	
WIRE SWITCHES	11				USA PUNE NORWAY	A A A	
WTS (Aluminium Tube)	1	W-440			USA PUNE NORWAY	A A A	
WPS (Aluminium Tube)	1	W-400			USA PUNE NORWAY	A A A	
WPS WEEGHER	1				USA PUNE NORWAY	A A A	
WBSH BRIDGE	1				USA PUNE NORWAY	A A A	
JIN LINE MAGNETIC SEPARATOR - SUSPENDER MAGNET	1				USA PUNE NORWAY	A A A	
METAL DETECTOR	1				USA PUNE NORWAY	A A A	
IMP. NONMAGNETIC END BRACE	1				USA PUNE NORWAY	A A A	

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Appendix - C
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Project : L014		ELECTRICAL ITEMS				Doc No :		
Package : BGD		PREDICATIVE VENDOR QUT FOR ITEMS REQUIRING QUALITY PLAN AND SUB-VENDOR APPROVAL				Rev No :		
Supplier : GE						Doc :		
Contract No: Q-000-09924						Page :		
ITEM DESCRIPTION	QTY Req. Ck	QF No.	QF Sub-Item	QF Sub-supplier	Place	Sub-supplier approval status / to be used	Sub-supplier Details / re-approval status	Remarks
HEAVY DUTY LIMIT SWITCHES	10			DAI BALAJI	CHENNAI	A		
				NAVASHREE	PUNE	A		
				PROTD CONTROL	PUNE	A		
				AG SYSTEMS	MUMBAI	A		
				INTERNATIONAL COMBUSTION	MUMBAI	A		
				MAIN	MUMBAI	A		
				PHL	MUMBAI	A		
				SECH EURODRIVE	MUMBAI	A		
				SEMPRAS	MUMBAI	A		
				ISS (associated with valid CML no)	MUMBAI	A		
PULL CONHYBRET SWAY SWITCHES, LIMBOP BELT SWITCH	10			DAI BALAJI	CHENNAI	A		
				NAVASHREE	PUNE	A		
				PROTD CONTROL	PUNE	A		
				AG SYSTEMS	MUMBAI	A		
				INTERNATIONAL COMBUSTION	MUMBAI	A		
				MAIN	MUMBAI	A		
				PHL	MUMBAI	A		
				SECH EURODRIVE	MUMBAI	A		
				SEMPRAS	MUMBAI	A		
				ISS (associated with valid CML no)	MUMBAI	A		

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SCENARIOS

- SYSTEM SUPPLIERS/ SUB-SUPPLIER APPROVAL STATUS CATEGORIES SHALL BE RULED BY NITC**
 After all items proposed vendor is acceptable to NITC to be followed with letter "A" in the list along with completion of approval of any OR for other items "to be required for NITC review" to be identified with letter "D" in the list
- QUALITY PLAN CATEGORIES**
 C-1: For items where the Quality Plans approved by NITC is and acceptance will be on physical inspection witness by NITC
 C-2: For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP
 C-3: For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of verification of documents by the main supplier.
 C-4: For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP
 C-5: For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP

NOTES

1. Relevant certificate shall be submitted for NITC approval. Approval certificate attached to above identified vendors, as applicable shall be submitted to the NITC.
2. The NITC acceptance shall be on basis of review of documents as per approved QP. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
3. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
4. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
5. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
6. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
7. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
8. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
9. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.
10. For items where the Quality Plans approved by NITC. However no physical inspection shall be done by NITC. The final acceptance by NITC shall be on basis of review of documents as per approved QP.

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 A. S. ...

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PROBATION SUPERVISOR				LIST OF TRANSCRIPTIONS		DATE		REMARKS	
INVOICE # FOR MONTH 3 SERVICES				APPROVAL & ACCEPTANCE		DATE: 11.22.2018			
CONTRACT # 467-13-0011-10023 4				APPROVED BY		DATE			
1	2	3	4	5	6	7	8	9	10
Service	Qty	Unit	Rate	Description	Transcription	Pages	Words	Minutes	Cost
1	1	hour	100.00	Transcription Services	1	1	1	1	100.00
2	1	hour	100.00	Transcription Services	1	1	1	1	100.00
3	1	hour	100.00	Transcription Services	1	1	1	1	100.00
4	1	hour	100.00	Transcription Services	1	1	1	1	100.00
5	1	hour	100.00	Transcription Services	1	1	1	1	100.00
6	1	hour	100.00	Transcription Services	1	1	1	1	100.00
7	1	hour	100.00	Transcription Services	1	1	1	1	100.00
8	1	hour	100.00	Transcription Services	1	1	1	1	100.00
9	1	hour	100.00	Transcription Services	1	1	1	1	100.00
10	1	hour	100.00	Transcription Services	1	1	1	1	100.00
11	1	hour	100.00	Transcription Services	1	1	1	1	100.00
12	1	hour	100.00	Transcription Services	1	1	1	1	100.00
13	1	hour	100.00	Transcription Services	1	1	1	1	100.00
14	1	hour	100.00	Transcription Services	1	1	1	1	100.00
15	1	hour	100.00	Transcription Services	1	1	1	1	100.00
16	1	hour	100.00	Transcription Services	1	1	1	1	100.00
17	1	hour	100.00	Transcription Services	1	1	1	1	100.00
18	1	hour	100.00	Transcription Services	1	1	1	1	100.00
19	1	hour	100.00	Transcription Services	1	1	1	1	100.00
20	1	hour	100.00	Transcription Services	1	1	1	1	100.00
21	1	hour	100.00	Transcription Services	1	1	1	1	100.00
22	1	hour	100.00	Transcription Services	1	1	1	1	100.00
23	1	hour	100.00	Transcription Services	1	1	1	1	100.00
24	1	hour	100.00	Transcription Services	1	1	1	1	100.00
25	1	hour	100.00	Transcription Services	1	1	1	1	100.00
26	1	hour	100.00	Transcription Services	1	1	1	1	100.00
27	1	hour	100.00	Transcription Services	1	1	1	1	100.00
28	1	hour	100.00	Transcription Services	1	1	1	1	100.00
29	1	hour	100.00	Transcription Services	1	1	1	1	100.00
30	1	hour	100.00	Transcription Services	1	1	1	1	100.00
31	1	hour	100.00	Transcription Services	1	1	1	1	100.00
32	1	hour	100.00	Transcription Services	1	1	1	1	100.00
33	1	hour	100.00	Transcription Services	1	1	1	1	100.00
34	1	hour	100.00	Transcription Services	1	1	1	1	100.00
35	1	hour	100.00	Transcription Services	1	1	1	1	100.00
36	1	hour	100.00	Transcription Services	1	1	1	1	100.00
37	1	hour	100.00	Transcription Services	1	1	1	1	100.00
38	1	hour	100.00	Transcription Services	1	1	1	1	100.00
39	1	hour	100.00	Transcription Services	1	1	1	1	100.00
40	1	hour	100.00	Transcription Services	1	1	1	1	100.00
41	1	hour	100.00	Transcription Services	1	1	1	1	100.00
42	1	hour	100.00	Transcription Services	1	1	1	1	100.00
43	1	hour	100.00	Transcription Services	1	1	1	1	100.00
44	1	hour	100.00	Transcription Services	1	1	1	1	100.00
45	1	hour	100.00	Transcription Services	1	1	1	1	100.00
46	1	hour	100.00	Transcription Services	1	1	1	1	100.00
47	1	hour	100.00	Transcription Services	1	1	1	1	100.00
48	1	hour	100.00	Transcription Services	1	1	1	1	100.00
49	1	hour	100.00	Transcription Services	1	1	1	1	100.00
50	1	hour	100.00	Transcription Services	1	1	1	1	100.00

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ITEM NO.	DESCRIPTION OF WORK	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE	TAXES	TOTAL	REMARKS
<p>CONTRACT NO. 03-0013-0001</p> <p>CONTRACTOR: [Name]</p> <p>DATE: 2013.08.18</p>								
1	Excavation	m ³	100	100	10000		10000	Excavation work for foundation
2	Concrete	m ³	50	100	5000		5000	Concrete for foundation
3	Reinforcement	kg	1000	5	5000		5000	Reinforcement for foundation
4	Formwork	m ²	100	50	5000		5000	Formwork for foundation
5	Backfill	m ³	100	100	10000		10000	Backfill for foundation
6	Foundation	m ²	100	100	10000		10000	Foundation for building
7	Structure	m ²	100	100	10000		10000	Structure for building
8	Roof	m ²	100	100	10000		10000	Roof for building
9	Interior	m ²	100	100	10000		10000	Interior for building
10	Exterior	m ²	100	100	10000		10000	Exterior for building
11	Paint	m ²	100	100	10000		10000	Paint for building
12	Electrical	m	100	100	10000		10000	Electrical for building
13	Plumbing	m	100	100	10000		10000	Plumbing for building
14	Mechanical	m	100	100	10000		10000	Mechanical for building
15	Sanitary	m	100	100	10000		10000	Sanitary for building
16	Water	m	100	100	10000		10000	Water for building
17	Gas	m	100	100	10000		10000	Gas for building
18	Fire	m	100	100	10000		10000	Fire for building
19	Security	m	100	100	10000		10000	Security for building
20	Other	m	100	100	10000		10000	Other for building

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POST BID DISCUSSIONS ON SAFETY PLAN TO FINALISE THE SAFETY COORDINATION PROCEDURE HELD BETWEEN NTPC LIMITED (NTPC) AND M/s GE POWER INDIA LTD. ON 03.01.2019 & 06.02.2019 AT ENGG OFFICE COMPLEX, NOIDA FOR "FLUE GAS DESULPHARISATION (FGD) SYSTEM PACKAGE FOR LOT-2 PROJECTS"

PRESENT

NTPC

1. Mr. Arin Bordoloi (AGM- Safety)
2. Mr. Subodh Khare (Mgr Safety)

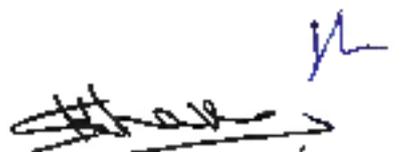
M/s GE POWER INDIA LTD

1. Mr. Lalk Sankran, Executive (Business Operations)
2. Mr. DS Baghel, Sr. Regional Leader (EHS)
3. Mr. Roshan Singh, Sr. Manager (Sales)

With reference to the Techno-Commercial Bid of M/s GE POWER INDIA LTD. ref no QFEC51326662 dated 03.12.2018 against NTPC Bidding Document No. CS-0011-109(2)- 9 issued vide NIT dated 31.08.2018 of which Technical bid was opened on 04.12.2018, post bid discussions were held between M/s GE POWER INDIA LTD and NTPC - Safety to discuss and Finalize the Safety Coordination procedure. The following were discussed and agreed to:

1. During discussions, M/s GE POWER INDIA LTD informed that they have submitted their detailed information regarding safety management at Appendix-I to Attachment- 19 of their Technical bid covering various aspects for compliance to Safety during the execution, in case they are considered for award, M/s GE POWER INDIA LTD further informed that they are having well-established Safety Manual / Plan which has been submitted along with bid and further discussion on safety plan on 03.01.2019 and Finalized on 06.02.2019.
2. GE POWER INDIA LTD confirmed that would comply with all the points listed in Attachment - 19 of Techno-Commercial bid. "Safety Plan" submitted by GE POWER INDIA LTD (enclosed as Annexure-1 to this MOM). GE POWER INDIA LTD further, confirmed that they shall submit their final "Safety Plan" to Project Manager/ Engineer-in-charge for approval by Project Manager/ Engineer-in-charge/Head of the Project before start of the work at site.
3. The Safety Coordination Procedure shall form an integral part of the Contract and shall be complied with, in case of award on GE POWER INDIA LTD.

NTPC


Arin Bordoloi
18/02/2019

GE POWER INDIA LTD


Roshan Singh

Appendix - D

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ATTACHMENT - 19

Page 1 of 1

(FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE
FOR LOT-2 PROJECTS

COMMON BIDDING DOCUMENT NO. CS-0011-100(2)-0

(INFORMATION REGARDING SAFETY MANAGEMENT)

NTPC LOT 2 (APPLICABLE FOR ALL PROJECTS)

Bidder's Name and Address :
GE Power India Limited,
Building, Plot No. 7,
Noida-201301,
Pradesh.

To
Contract Services-I IHDP
NTPC Limited, 6th Sector-127,
Floor, Engg. Office Uttar
Complex, Plot No. A-
8A, Sector-21, Noida -
201301

Dear Sirs,

We have read the provisions pertaining to Safety and hereby undertake to comply all the provisions of Bidding Documents in this regard.

We hereby confirm that all the measures to ensure highest level of Safety during execution at Site shall be taken by us.

Further, in terms of the provisions of Clause No. ~~44.00.00~~ of Part-D of Technical Specification (Section-VI) of Bidding Documents, a proposed "Safety Plan" is attached herewith as Appendix-I to this Attachment.

A "Safety Co-ordination Procedure" shall be finalized during post bid discussions of Techno-Commercial Bid.

The above proposed "Safety Plan" shall be further discussed/ finalized at Site, in line with the agreements made in "Safety Co-ordination Procedure", and shall be approved by Project Manager/Engineer-In-Charge/ Head of Project before start of work at Site.

Date : 27/11/2018
Place : Noida

(Signature) [Signature]
(Printed Name) Lalit Sangrahl
(Designation) Executive - Business Operations
(Company Seal) [Seal]

Note : Continuation sheets of like size and format, may be used as per Bidder's requirement and shall be annexed to this Attachment.

* Clause no. to be inserted by the Package Coordinator in the Bidding documents.

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APPENDIX-I to ATTACHMENT-18

SAFETY PLAN

01. Safety Policy of the Contractor to be enclosed: Refer attached Safety Policy in EHS plan
02. When was the Safety Policy last reviewed: April 2016
03. Details of implementation procedure / methods to implement Safety Policy / Safety Rules: Refer attached EHS Plan - Page no 3-26
04. Name, Qualification, experience of Safety Officer: Degree or diploma engineer/ B.Sc. + 1 year diploma in industrial safety from a recognized institute or 4-year engineering degree in Safety, plus 3 to 4 years of practical experience in Safety at construction sites. EHS Resources - 3 EHS Officer (1 nos. from GE and 2 nos. of subcontractor of GE)
05. Review of Accidents Analysis Method, Methods to ensure Safety and Health: Refer attached EHS Plan - (Section - 2.4.3)
06. Unit executive responsible to ensure Safety at various levels in work area: Refer attached EHS Plan - (Section - 1.6.2)
07. List of employees trained in safety employed before execution of the job. Give the details of training: All employees are trained as per their job category. Name & training records will be shared once employees get identified & finalized before execution of the job. Safety training Programme are mentioned Refer attached EHS Plan - (Section - 2.6). As well as training schedule and matrix is attached.
08. Safety Training Targets, Schedules, methods Adopting to providing safety training to all employee: All trainings have been schedule to every individual employee based on the job category and managed online by every GE employee. In case of contractors Please Refer attached EHS Plan - (Section - 2.6).
09. Details of checklist for different jobs / work and responsible person to ensure compliance (copy of checklist to be enclosed): Refer attached Checklist.
10. Regular Safety Inspection Methods and Periodicity and list of members to be enclosed: Refer attached EHS Plan - (Section - 2.4.7.2 & 2.4.7.3).
11. Risk Assessment, Safety Audit by Professional Agencies, Periodicity: Safety Audit Internal / external will be performed after 3-4 months of site mobilization and will continue at construction site - (Section - 2.4.7). Internal audit in each quarter, after 3 to 4 months of mobilization of site. Refer attached EHS Plan - (Section - 2.4). Sample copy of RA for Turbine island is attached.
12. Implementation of Recommendations of Audit / Inspections, Procedures for Implementation and follow up: Refer attached EHS Plan - (Section - 2.4.7.4)
13. Provision for treatment of injured persons at work site: First Aid boxes equipped with requisite articles shall be provided at construction sites for the use of workers. Basic

Appendix - D

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training has to be provided on first aid to workmen & office bearers working at site. Refer attached EHS Plan - (Section - 2.5.2).

14. Review of overall safety by top Management and Periodicity: Refer attached EHS Plan - (Section - 2.7)
15. System for Implementation of Statutory legislations: Refer attached EHS Plan - (Section - 3.2,4)
16. Issue of PPEs to employees, Periodicity / stock on hand etc.: Will be done at site by the responsible site admin person. Refer attached EHS Plan - (Section - 3.1.17). Safety Shoes & Helmets shall be provided to all site personals along with other necessary applicable PPE's & shall be replaced on damage. 10% of stock should be maintained.

PPE matrix & periodicity of replacement

#	PPEs	Replacement Frequency	IS/ EN/ CE code
1	Safety Helmet	Twice in year	IS2925
2	Safety Shoe	Yearly	IS15298
3	Nose Protection	As and when required	IS9473
4	Safety Glass	As and when required	EN 166
5	Ear Protection	As and when required	IS: 9167-1979
6	Reflective Jackets	As and when required
7	Full Body Harness	As and when required	EN 361 / IS3521
8	Fall Arrestor	As and when required	EN 361
9	Hand Gloves	As and when required	IS: 6994
10	Ear Plug / Muffs	As and when required	IS: 6994
12	Face Shield	As and when required	IS : 8520-1977

17. Specify safety measures for round the clock working (especially during night):
Deployment of safety officers in day/night shift before mobilization to ensure complete hold on the activities round the clock and we will ensure adequate illumination for performing GE activities. All activities shall be done as per PTW - (Section 2.4.2)

Signature Head of the Organization With date & stamp

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MINUTES OF POST BID DISCUSSION (COMMERCIAL ISSUES) HELD BETWEEN M/s NTPC LIMITED (NTPC) AND M/s GE POWER INDIA LIMITED (GEPIL) ON 15.04.2019 FOR FLUE GAS DESULPHURISATION (FGD) SYSTEM PACKAGE FOR SIPAT SUPER THERMAL POWER STATION STAGE-I (3 X 660 MW) UNDER LOT-2 PROJECTS

PRESENT:

NTPC	GEPIL
Mr. Adesh, GM (CS)	Mr. Lalit Sankrani
Mr. Udayan Kumar, GM (PE-Mech)	Mr. Roshan Singh
Mr. V. N. Jain, GM (FIN)	Mr. Hiren Nariyehwala
Mr. Bikram Mandal, AGM (CS)	
Mr. Shrish Kumar Singh, DGM (CS)	
Mr. P. Vijay, Manager (CS)	

With reference to Price Bid ref. No. QFEC51326662 dated 03.12.2018 for FGD System Package for Sipat STPS Stage-I (3 x 660 MW) under lot-2 Projects opened on 08.04.2019 and Reverse Auction conducted on 08.04.2019 for the subject Package, discussions were held between GEPIL and NTPC, wherein the following have been agreed to:

- 1.0 GEPIL has confirmed the compliance to the terms and conditions of Bidding Documents read in conjunction with all the Amendments and Clarifications to Bidding Documents issued by NTPC for the subject Package. GEPIL have also confirmed that they shall complete the work in accordance with the provisions of Technical Specifications/Bidding Documents, in case of award.
- 2.0 GEPIL in Attachment-3P of their bid have indicated percentage of Import content in Ex-works price is <30% of Supply Value. Further, GE confirmed that value of import content in Ex-work Price is INR 127,40,00,000/-.

Further, GEPIL confirmed that as declared in Attachment 3P(A), CIF value of the Construction Equipment to be imported by the Bidder including sub-contractor(s) of the Bidder is 'NIL'.

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Roshan Singh

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E

3.0 Break-Up of Prices/Final Prices after Reverse Auction

GE have quoted lump sum prices against Schedule-1 in their bid. GE have not indicated breakup against Main Equipment and Mandatory Spares. Further, GE have also not quoted breakup of Prices in Schedule-2 & 3 (Transportation, Installation, Civil Works, Structural Steel Works and AMC Charges etc.).

During discussions, GE have furnished price breakup of Schedule-1, Schedule-2 and Schedule-3.

Further, GE confirmed that in line with the provisions of the Bidding Documents, they have applied uniform percentage (%) discount (as applicable after Reverse Auction) over the original items rate quoted in various Price Schedules/Attachments of their Price Bid.

During discussions, GE also confirmed the following with regard to Main Equipment, Mandatory Spares, Type tests and Site fabricated items:

Main Equipment

GE confirmed that based on the break-up of Prices submitted in Schedule-1 for Main Equipment, further Billing break-up (BBU) shall be submitted and finalized atleast 60 days prior to start of dispatch.

Mandatory Spares

GE have indicated lumpsum cost in Schedule-1 for Mandatory Spares specified in the Technical Specifications. GE confirmed that they shall provide the detailed Price break-up of Mandatory Spares before release of initial advance and supply all the Mandatory Spares within the quoted cost.

Site fabricated items

GE confirmed that they shall submit the list of items to be fabricated at Site within 90 days from the date of NOA.

4.0 Taxes & Duties

GEPIL in Schedule-6 (Taxes and Duties) furnished the details of Goods and Services Tax [as on Seven (07) days prior to the last date for submission of Price Bids] applicable on the price of Goods and Services quoted in Schedule-1, 2 & 3 not included in the Bid Price. The details of Taxes and Duties (after considering discount as applicable after Reverse Auction and same rates of Taxes & Duties as mentioned in Schedule-6) are as under.

M

Bid Price Component	Rate of GST (%)	Amount on which GST applicable (INR) (rounded off)	Total GST payable (INR) (rounded off)
Ex-Works-Main Equipment (Schedule-1)	18%	701,89,38,918	126,30,49,005
Ex-Works-Mandatory Spares (Schedule-1)			
Type Test Charges (Schedule - 1)			
F&I-Main Equipment (Schedule-2)			
F&I-Mandatory Spares (Schedule-2)			
Erection Services (Schedule-3)			
Civil Works (Schedule-3)			
Structural Works (Schedule-3)			
Training Charges (Schedule-3)			
AMC Charges (Schedule-3)			
TOTAL (GST)			

Taxes, Duties & levies shall be paid/ reimbursed to GEPIL as per the provisions of Bidding Documents.

5.0 Unit Rates

GEPIL in Schedule 8 (Unit Rates) of their Bid have not filed Unit Rates of items referred therein. During the discussions, GEPIL confirmed that they shall submit the Unit Rates along with price justification as and when required.

- 6.0 GEPIL confirmed that, as per the provisions of the Bidding Documents and as per the details furnished by the Bidder, after Reverse Auction, there will be two Contracts only viz First Contract (for Ex-works (India) Supply Portion) and Second Contract (for Installation, Civil & all Services portion). The details of the aforesaid two Contracts as agreed by GE are as under:

(A) First Contract:

1.	Ex-Manufacturing Works/Place of Dispatch Price (both in India) for Plant & Equipment	INR 399,48,84,379/-
2.	Ex-Manufacturing Works/Place of Dispatch Price (both in India) for Mandatory spares	INR 26,60,63,239/-
3.	Type Test Charges	INR 3,73,241/-
4.	Total (A) [1+2+3]	INR 426,13,20,859/-

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(B) Second Contract:

1.	Local Transportation including Inland insurance charges for Plant and Equipment covered under First contract	INR 7,07,60,918/-
2.	Local Transportation including Inland insurance charges for Mandatory Spares covered under First Contract	INR 50,00,000/-
3.	Installation Services	INR 64,73,39,446/-
4.	Civil & Architectural Works	INR 195,01,91,170/-
5.	Structural Steel Works	INR 8,04,97,100/-
6.	Training Charges	INR 8,29,425/-
7.	AMC Charges	INR 10,00,000/-
8.	Total (B) [1+2+3+4+5+6+7]	INR 275,56,19,059/-
Grand Total (A+B)		INR 701,69,38,918/- (INR Seven Hundred One Crore, Sixty Nine Lakh Thirty Eight Thousand Nine Hundred and Eighteen Only)

7.0 GEPL re-confirmed that all other conditions/stipulation/deviation/non-conformity/undeclared deviation etc. contrary to the provisions of Bidding Documents (to be read in conjunction with Amendments/Clarifications/Errata) stands withdrawn without any financial implication to NTPC.

8.0 The aforesaid resolutions are subject to Management Approval of NTPC.

(NTPC)

L. J. Shankar
(GEPL)

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APPENDIX
5.21 M

FLUE GAS DESULPHURIZATION SYSTEM (FGD) PACKAGE FOR SPAT SUPER THERMAL POWER STATION, STAGE-I (3000 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-0811-46294 Bidder's Name and Address : GE Power India Limited, 11th Floor Building, Plot No 7 Sec 127, Noida-201301 SCHEDULE OF RATES AND PRICES SCHEDULE-1 : PLANT AND EQUIPMENT INCLUDING TYPE TESTS CHARGES AND MANDATORY SPEARS TO BE SUPPLIED FROM WITHIN THE EMPLOYER'S COUNTRY						
Item	Description	Qty.	Unit	Unit rate (INR)	Total Ex-works (India) Price (INR)	
1	2	3	4	5	6=3*5	
A	MAIN EQUIPMENT INCLUDING FACTORY FABRICATED STEEL STRUCTURES FOR FLUE GAS DESULPHURIZATION SYSTEM PACKAGE FOR SPAT SUPER THERMAL POWER PROJECT, STAGE-I (3000 MW)					
1)	FGD SYSTEM	1	lot		Included in TOTAL (A) (MAIN EQUIPMENT) of Schedule 1	
2)	LIMESTONE AND GYPSUM HANDLING SYSTEM	1	lot		Included in TOTAL (A) (MAIN EQUIPMENT) of Schedule 1	
3)	ITEMS RELATED TO CHIMNEY				Included in TOTAL (A) (MAIN EQUIPMENT) of Schedule 1	
4)	ANY OTHER					
	TOTAL (A) (MAIN EQUIPMENT)				INR	3,99,48,84,379
B	MANDATORY SPEARS (NOQ AS SPECIFIED IN SUB-SECTION NO. PART-A, SECTION-VI) (Notes: It is required to fill the prices of all the items suitably as specified in Part-A, Section-VI)					
	Sub total B					26,60,63,238
	SUB TOTAL (A+B)					4,26,09,47,618
C	SUB-TOTAL OF TYPE TEST CHARGES AS PER SCHEDULE-7					3,73,241
	GRAND TOTAL (A+B+C) (To be filled up in Item Data)					4,26,13,20,859
Notes:						
1	Deleted					
2	Unless stated otherwise, all spares items or sub-items required for each type/size range of the assembly/sub-assembly, required for complete replacement in one unit. It is further, intimated that the assembly/sub-assembly which have different orientation (like left hand or right hand), different direction of rotation or minor size peabbling or any other reasons which result in maintaining two different sets of the spares to be used for the subject assembly/sub-assembly, these shall be considered as different types of assembly/sub-assembly.					
3	Whenever quantity has been specified as percentage (%), the quantity of mandatory spares to be provided by the Contractor shall be the specified percentage (%) of the total population required to meet the specification requirements. In case the quantity of mandatory spares so calculated to be fraction, the same shall be rounded off to next higher whole number.					

K. S. Shrivastava

APPENDIX - E

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SCHEDULE 1
PAGE 2 OF 2

4	Whenever the quantities have been indicated for each type, size, thickness, material, etc., these shall cover all the items supplied and installed and the break-up for these shall be furnished in the bid.
5	In cases where indicated in the bid are not applicable to the particular design offered by the bidder, the bidder should offer special application to offered design with quantities generally in line with approach followed in the above bid.
6	Bidder are required to indicate the break-up of type and charges as per Schedule-7.
7	In case the description / quantity for any item mentioned in Schedule is at variance from what has been stated in Technical Specification and its subsequent amendments and clarifications, the latter shall prevail.

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FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR 80AT SUPER THERMAL POWER STATION, STAGE-I (3x660 MW) UNDER LOT-2 PROJECTS, COMMON BIDDING DOCUMENT NO. CS-8011-001(2)-0		
Bidder's Name and Address : GE Power India Limited, IHDP Building, Plot No 7 Sec 127, Noida-201301		
Schedule No. 3 : Installation Services (Erection, Civil, Factory Fabricated Steel Structural Works (Erection) & allied works) including insurance (other than transit insurance and other services as specified in the Bidding Documents)		
Item	Description	Total Price in Indian Rupees
1	2	3
(I)	MAIN EQUIPMENT INCLUDING FACTORY FABRICATED STEEL STRUCTURES	64,73,39,466
(II)	CIVIL & ARCHITECTURAL WORKS	1,95,01,91,170
(a)	Geo-Technical investigation & slope protection works	Included in (II) Civil & Architectural works of Schedule 3, above
(b)	Infrastructure works	Included in (II) Civil & Architectural works of Schedule 3, above
(c)	FGD facilities	Included in (II) Civil & Architectural works of Schedule 3, above
(d)	Other works not covered in the above items but required to cover complete scope of works.	Included in (II) Civil & Architectural works of Schedule 3, above
(III)	Structural Steel Works	Included in (II) Civil & Architectural works of Schedule 3, above
(IV)	Training Charges (Refer Clause 28.60.00, Part-C, Technical Specification, Section-VI)	8,04,97,100
(V)	AMC Charges as per scope	8,29,425
TOTAL (I) + (II) + (III) + (IV) + (V) (TO SCHEDULE 4 GRAND SUMMARY AND TO SRM E-TENDER SITE)		10,00,000
		2,67,98,57,141
NOTE:		
1. Bidder is required to indicate the Total of Schedule-3 in "Item Details" Tab of E-Tender Site.		
2. In case the description/quantity for any item mentioned in schedule is at variance from what has been stated in Technical Specification and its subsequent amendments and clarifications, the latter shall prevail.		

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FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SIPAT SUPER THERMAL POWER STATION, STAGE-1 (3x660 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-0919-009(2)-9					
Bidder's Name and Address : GE Power India Limited, IEDP Building, Plot No 7 Sec 127, Noida-201301					
SCHEDULE OF RATES AND PRICES					
SCHEDULE- 2 : Local Transportation Including Inland Transit Insurance and other local costs incidental to delivery of plant & equipment including mandatory spares					
Item	Description	Qty	Unit	Total Price (Indian Rupees)	
1	2	3	4	5	
1	TOTAL (I) MAIN EQUIPMENT	1	lot	7,07,60,918	
(i)	FGD SYSTEM	1	lot	Included in TOTAL (I) MAIN EQUIPMENT of Schedule 2 above	
(ii)	LESTONOME AND GYPSUM HANDLING SYSTEM	1	lot	Included in TOTAL (I) MAIN EQUIPMENT of Schedule 2 above	
(iii)	ITEMS RELATED TO CHIMNEY	1	lot	Included in TOTAL (I) MAIN EQUIPMENT of Schedule 2 above	
(iv)	ANY OTHER		lot	MIL	
2	TOTAL (II) MANDATORY SPARES (Refer Technical Specification)		lot	50,00,000	
	TOTAL (I + II) (TO GRAND SUMMARY (SCHEDULE-4) AND TO SRM E-TENDER SITE)			7,57,60,918	
Note:	Bidder is required to indicate the Total of Schedule-2 in "Item Details" Tab of E-Tender Site.				

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SCHEDULE 4
PAGE 1 OF 4

FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SIPAT SUPER THERMAL POWER STATION, STAGE 1 (2x660 MW) UNDER LOT 2 PROJECTS: COAL-FIRED GENERATOR DOCUMENT NO. CS-001-10021-0							
Bidder's Name and Address :		GE Power India Limited, IHD Building, Plot No 7 Sec 127, Noida-201304					
Schedule No. 5 : Recommended Spare Parts							
Item	Description	Quantity	Unit	Unit Price	Total Price	*Local transportation charges including 10% for materials, port charges & port charges (RM)	Total Price (ex-works) as Project FOR (RM) (RM)
				*Ex-Works (India) (INR)	*Ex-Works (India) (INR)		
PRICE SHALL BE FURNISHED BY BIDDERS AS PART OF CONTRACT							
1	Absorber Recycle Pump						
	Inverter CPS	3	No.				
	Mechanical Seal Complete	3	No.				
	Section Cover	2	No.				
	Set of O-rings Gasket	12	No.				
	Mechanical Seal support kit	3	No.				
	Bearings	2	No.				
2	Oxidation Blower						
	Air Filter	18	No.				
	Oil filter cartridge	3	No.				
	O-Ring	3	No.				
	Oil filter	3	No.				
	Oil seal	3	No.				
	Seal	3	No.				
	Bearings	3	No.				
	Anti-Vibration Pads	252	No.				
	Bearings RTDs	6	No.				
	Acuator 10V	2	No.				
	Acuator 10V	2	No.				
	Bearing Vibration Sens	6	No.				
3	Ball Mill						
	Major Components						
	Main bearing insert	2	No.				
	Pinion Bearings (without housing)	3	No.				
	Wear Components						
	Mill Liners (Shell and Head) with hardware	2	No.				
	Feed spout	2	No.				
	Feed Trunnion Liner	2	No.				
	Discharge Trunnion Liner	2	No.				
	Trunnion Screen	2	No.				
	Seals						
	Main bearing oil seal	6	No.				
	Feed Spout Seals	2	No.				
	Discharge and Seals	3	No.				
	Pinion shell (gear guard) seals	4	No.				
	O-ring for Trunnion Liner	4	No.				
	RTDs						
	Pinion Shaft RTD	2	No.				
	Main Bearing RTD	3	No.				
	Main Bearing Lubrication System						
	Filter elements	6	No.				
	Quench strainer	2	No.				
	Resistor	2	No.				
	Low Pressure Pump	2	No.				
	High pressure pump	2	No.				
	Heat Exchanger (Cooler)	2	No.				
	Flow divider valve	2	No.				
	Electric heater	2	No.				
	Pinion Spray System						
	Borax Nozzles	3	No.				
	Air Filter	2	No.				
	Cycle switch	2	No.				
	Air solenoid valve	2	No.				

	Divider valve w/low indicator	2	No
	Pneumatic Pump	2	No
	Regulator	2	No
4	Agitator		
	Gearbox V Belt Drive		
	V belts	2	No
	Flexible Coupling parts	2	No
	Shaft Seal Ring	2	No
	Antifriction Bearing	2	No
	Impeller		
	Cap nuts for Impeller	2	No
	Gaskets	2	No
	Mechanical Seal		
	Seal rings, O rings	2	No
	Spring, Shaft seal rings, Antifriction bearing	2	No
5	Vacuum Belt Filter		
	Filter Cloth	6	No
	Scraper for Cake	6	No
	Wear-out Belt	6	No
	Deflection-correcting girder	6	No
	Sensitive valve for deflection-correcting	2	No
	Wheels For Wheeling	18	No
	Bearing UFG208CD	36	No
	Valve Plate For Vacuum Pump	4	No
	V-Ring For Vacuum Pump	4	No
	Seal Packing For Vacuum Pump	6	No
	Bearings - Vacuum pump	2	No
	Bearings - Filtrate pump	2	No
	Seals - Filtrate pump	2	No
6	Hydrocyclone		
	VF Body	24	No
	VF Inlet	60	No
	Body Mechanism	24	No
	Cone	24	No
	Spigot	60	No
	Oil Pipe	12	No
	Rubber Hoop	120	No
7	Booster Fan		
	O Rings For Bearing	3	No
	Metallic Rings For Bearings	3	No
	Filter for Lube Oil System	3	No
8	Booster Fan Inlet Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plug for Seal)	6	No
	Limits switch (DPDT)	10	No
9	Booster Fan Outlet Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plug for Seal)	6	No
	Limits switch (DPDT)	10	No
10	FGD Outlet Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plug for Seal)	6	No
	Limits switch (DPDT)	10	No
11	Booster Damper		
	Leaf Seal (Stainless Steel)	30	No
	Leaf Seal (Plug for Seal)	6	No
	Limits switch (DPDT)	10	No
12	Material Handling System		

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SCHEDULE 4
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20" Trough carrying base complete with base boards & mounting brackets etc. for A size belt width	30	No
18" type drum idlers complete with mounting base boards & mounting brackets etc. for A size belt width	15	No
30" Trough idler idlers complete with mounting base boards and brackets etc. for B size belt width	8	No
20" Trough belt idling carrying idlers complete with mounting base boards and brackets etc. for B size belt width	4	No
18" belt idling return idlers complete with mounting base boards and brackets etc. for B size belt width	4	No
18" Transition idlers complete with mounting base boards and brackets etc. for B size belt width	2	No
Rubber disc for the impact idlers	5% of the total qty	No
Rollers for idlers	85% of the installed capacity	No
Pulley complete with shaft and locking pin and nut and bearing	0.1 no of each size in pulley shaft diameter	No
Plummer block complete with bearing and pin	0.02 no of each type and size	No
Roller support strip for belt drive and belt skirt	20% of total quantity used	No
Complete Belt Scraper (Primary & Secondary)	1 set for each Conveyor	Set
Conveyor belt A size width	0.1 belt length of each rating	
Complete set of gear box	1 no each type size and rating	No
Oil seal for gear box	4 sets of each type and rating	Set
Bearing for gear box	1 set of each size and rating	Set
Cooling fan for gear box	1 set of each size and rating	Set
Fluid coupling complete set	1 no each type size and rating	No
Half dia. assembly for fluid coupling	1 set of each size	Set
Flange plate for fluid coupling	1	No
Complete flange	1 no for each type and size	No
Crane chain	1 set of each type and size	Set

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Plummer block assembly complete with lock washers etc. for drive shafts etc. and for castles	2 Set each	Set
Rotor assembly for crusher	1	Set
Shaft seal for crusher	4	No.
Head sprocket assembly complete with shaft and plunger	1	Set
Block with bearings		
Tail sprocket assembly complete with shaft and plunger block with bearings	1	Set
Traction rollers carrying side	10% of total qty	No.
Traction roller return side	10% of total qty	No.
Sprocket segment	2 set of each type and size	Set
Chain link	10% of population each type and size	No.
Pin (Pin/ka)	10% of population	No.
Pulley complete with shaft including mounting & plunger blocks (complete with bearings) for magnetic separator	01 set of each type and size	Set
V belt for magnetic separator	01 no. of each type and size	No.
Lead coil for belt weigher	1	No.
SMPS for belt weigher	1	No.
Regulated power supply for belt weigher	1	No.
Fan bearing for dust extraction system	1 set of each type	Set
V belt	1 set of each size	Set
Filter bags	80% of the total quantity used	No.
Coils for solenoid valve	4 no each type and rating	No.
Motor	01 no of each rating	No.
Driving End & Non-Driving End bearing	01 no for each type and rating of motor	No.
Cooling Fan	01 no for each type and rating of motor	No.

We also confirm that the terms of supply mentioned above with same specification having same identification number but with different item code have been quoted by us at the same price. Further all such items of spares have been clubbed together and enclosed separately at Annexure - 1 to our offer.

*Bidders shall Quote prices in INR and in the amount in figures and words.

Note:

1. Spares shall be quoted on Ex-manuf (Inc-S&D) basis.
2. Calculation sheets of the size and format may be used as per bidder's requirements and annexed to this schedule.

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FLUE GAS DEBULPHURISATION SYSTEM (FGD) PACKAGE FOR SIPAT SUPER THERMAL POWER STATION, STAGE-I (3x660 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-0011-189(Z)-9

Bidder's Name and Address : GE Power India Limited, HDF Building, Plot No 7 Sec 127, Noide-201301

Schedule No. 6 : Goods and Services Tax (GST), applicable on Schedules - 1, 2 & 3, not included in bid price.

The details of Goods and Services Tax (as on 01-07-07) days prior to the last date for submission of price bids applicable on the price of goods and services quoted in Schedules-1, 2 & 3, not included in the bid price and which may be payable by the Employer in accordance with the provisions of Bidding Document are as under :

S. No.	Bid Price Component	Rate of GST (%)	Amount on which GST applicable (in INR)	Total GST payable (in INR)
1	Ex-Works-Main Equipment (Schedule-1)	18%	As mentioned in TOTAL (A) (MAIN EQUIPMENT) of Schedule-1	Included in Total (GST) of schedule 6 below
2	Ex-Works-Mandatory Spares (Schedule-1)	18%	As mentioned in Sub total B of Schedule-1	Included in Total (GST) of schedule 6 below
3	Type Test charges (Schedule-1)	18%	As mentioned in Item C Sub total of type test charges of Schedule-1	Included in Total (GST) of schedule 6 below
4	F&M-Main Equipment (Schedule-2)	18%	As mentioned in TOTAL (B) MAIN EQUIPMENT of Schedule-2	Included in Total (GST) of schedule 6 below
5	F&M-Mandatory Spares (Schedule-2)	18%	As mentioned in TOTAL (B) MANDATORY SPARES of Schedule-2	Included in Total (GST) of schedule 6 below
6	Erection - Main Equipment (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (A) of Schedule-3	Included in Total (GST) of schedule 6 below
7	Civil Works (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (B) of Schedule-3	Included in Total (GST) of schedule 6 below
8	Training charges (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (C) of Schedule-3	Included in Total (GST) of schedule 6 below
9	AMO charges (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (D) of Schedule-3	Included in Total (GST) of schedule 6 below
10	Structural Works (Schedule-3)	18%	As mentioned in Column no. "3" (Total Price in Indian Rupees) of Item (E) of Schedule-3	Included in Total (GST) of schedule 6 below
11	Any other Price Component (not covered above)	NIL	NIL	NIL
TOTAL (GST)				1,26,96,49,005.29\$

Notes:

- Bidder shall quote the GST as applicable in the Employer's Country as on seven (7) days prior to the last date of submission of price bids
- In case rate of GST is different for various items, such different rates of GST along with the amount on which such GST is applicable shall be suitably indicated by the bidder in this schedule.
- Bidder is required to indicate the Total of Schedule 4 in "Item Data" Tab of Bid Invitation at NTPC E-Tender Site.

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PLUG GAS DECONTAMINATION SYSTEM (PDS) PACKAGE FOR SPAT SUPER THERMAL POWER STATION, STAGE-I (STONE MIN) UNDER LOT-2 AND/OR ITS COMMON BIDDING DOCUMENT NO. CG-0811-14434-9						
Bidder's Name and Address : GE Power India Limited, HQ Building, Plot No 7 Sec 67, Noida-201301						
Schedule No. 7 : Break up of Type Test Charges priced as Schedule-1.						
We Confirm that the charges for all the type tests stipulated in the bidding documents are included in our bid price. Further, the break-up of various type test charges are given below which, at your option, can be used for adjustment in contract price in case any of the type tests is not to be carried out.						
Sl. No.	Description of equipment	Description of Type Test	*Charges for one Type Testing	Number of Type Testing Charges	Total Type Test Charges	Remaining Test charges
1	2	3	4	5	6	7
1	M.T. Motors for each type and rating of MT motor	(a) No load saturation and loss curves (b) Measurements of torque at no load (c) Necessary torque torque test (subject to test bed constraint). (d) Full load test (subject to test bed constraint) (e) Temperature rise test at rated conditions	28,800	6	1,74,178	
2	Leak tightness testing of dampers at shop for (each type and size) (Refer clause no. 18.01.09 of Sub-section-1.11, Part-B of Section-VI)					
3	Full range and full scale performance tests to be conducted at shop using actual fan for following fans (as per BS 444, Part-1) (Refer clause no. 18.01.01 of Sub-section-1.11, Part-B of Section-VI)		8,284	4	35,177	
4	(a) Booklet Fan MV VFD (for each type and rating)	(a) Overall efficiency determination of VFD systems including transformer Harmonic filters etc at motor full load (b) Temperature rise test (c) Noise level (d) Harmonics of no load current (Input/Output)	87,943	1	87,943	
Grand Total Break-up of Type Test Charges to Schedule-1			87,943	1	87,943	3,73,247
Note:						
1 * Please fill in the amount in figures and words in INR.						
2 The currency of charges for Type Tests shall be INR in which the corresponding equipment is being offered in Schedule-1.						

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SCHEDULE 7
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8	<p>In cases of additional accounting for any particular month are found during any accounting, the type tests for the same shall be carried out without any additional cost to the Employer. Further, in cases of removal of any type tests or such additional accounting, the cost for the same as stated in this schedule for that particular item shall be applicable for meeting out the related</p>
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SCHEDULE-8
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FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SIPAT SUPER THERMAL POWER STATION, STAGE I (3x660 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-0011-103(2)-8

Bidder's Name and Address : GE Power India Limited, IHDP Building, Plot No 7 Sec 127, Noida-201301

Schedule No. 8 : Schedule of Unit Rates

Unit Rates of various items are given as under. We confirm that the prices of these items as per the requirement of Technical Specifications are already included in the lump-sum prices quoted in Schedule-1. We further confirm that these unit rates shall be used for contract price adjustment in case of any changes in quantities/components of the package.

S. No.	Description of Equipment	Qty	Unit Price in INR
1	Control & Instrumentation (C&I) (Unit rates for the following C&I items)		
A	Microprocessor based Control System with HMI for FGD and other systems being provided in the Contract		
(a)	Control System		
(i)	Controller, each type		
(ii)	Input modules, each type		
	\$ 4-20 mA input (Model No.)		
	\$ RTD Input (Model No.)		
	\$ T/C Input (Model No.)		
	\$ Digital input (Model No.)		
	\$ SOE Input (Model No.)		
	\$ Others (Bidder to specify)		
(iii)	Output Modules, each type		
	\$ Analog output (4-20 mA) (Model No.)		
	\$ Binary Output (Model No.)		
	\$ Other, if any		
(iv)	Communication Controller each type		
	(Model No.)		

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(v)	Power Supply Module, each type
(vi)	Other modules, each type
(b)	HMI/PIS
(i)	Operator Works Station
(ii)	Serverwork station
(iii)	Laser printer
(iv)	Other modules, components used
(c)	Other modules used in Microprocessor based Control System with HMI (if any)
(B.)	Measuring Instruments
a)	Primary & Secondary Instrument
(i)	Pressure Indicator (PI)
(ii)	Pressure Transmitter (PT)
(iii)	Differential Pressure Indicator (DPI)
(iv)	Differential Pressure Transmitter (DPT)
(v)	Pressure Switch (PS)
(vi)	Differential Pressure Switch (DPS)
(vii)	Temperature Guage (TG)
(viii)	Temperature Element - RTD
(ix)	Temperature Element - T/C
(x)	Temperature Transmitter (TTx)
(xi)	Temperature Switch (TS)
(xii)	Flow Element (FE)
	a. Orifice Plate
	b. Flow Nozzle
	c. Any other type
(xiii)	Flow Indicator (FI)
(xiv)	Flow Transmitter (FT)
(xv)	Flow Switch (FS)
(xvi)	Level Gauge (LG)
(xvii)	Level Transmitters (LT)
(xviii)	Density meter
(xix)	pH analyser
(xx)	SO2 Analyser
(xxi)	Vibration Monitoring System:
	a) Contact type vibration measurement point (vibration sensor comprising of associated vibration monitor, probe drivers (if applicable), prefab cables, prefab extension cables, mounting pads/brackets)
	b) Junction boxes for vibration sensors
(C)	Instrumentation cable of each type & size
(I)	Instrumentation Cable
(a)	G TYPE

Bidder will furnish this
breakup during contract
execution phase

Bidder will furnish this
breakup during contract
execution phase

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SCHEDULE-6
PAGE 3 OF 4

1	2 PAIR STRANDED COPPER (0.5 MM ²)
2	4 PAIR STRANDED COPPER (0.5 MM ²)
3	8 PAIR STRANDED COPPER (0.5 MM ²)
4	12 PAIR STRANDED COPPER (0.5 MM ²)
5	16 PAIR STRANDED COPPER (0.5 MM ²)
6	24 PAIR STRANDED COPPER (0.5 MM ²)
7	48 PAIR STRANDED COPPER (0.5 MM ²)
(b)	F TYPE
1	2 PAIR STRANDED COPPER (0.5 MM ²)
2	4 PAIR STRANDED COPPER (0.5 MM ²)
3	8 PAIR STRANDED COPPER (0.5 MM ²)
4	12 PAIR STRANDED COPPER (0.5 MM ²)
5	16 PAIR STRANDED COPPER (0.5 MM ²)
6	24 PAIR STRANDED COPPER (0.5 MM ²)
(II)	CONTROL CABLES
1	10C (2.5 MM ²)
2	5C (1.5 MM ²)
3	3C (1.5 MM ²)
4	2C (1.5 MM ²)
5	5C Unarmoured (2.5 MM ²)
6	3C Unarmoured (2.5 MM ²)
7	2C Unarmoured (2.5 MM ²)
8	4 Core single Mode OFC
9	12 Core single Mode OFC
(D)	Electrical Power Supply System
(i)	24 V DC CHARGER SYSTEM WITH BATTERIES of each type and rating
(a)	24 V DC Charger System - Complete Charger System comprising of Controller, Rectifier Modules, Transformer, DCDB, Ni Cd battery bank, Battery Health Monitoring, Cabinet and Other Accessories.
(ii)	UPS SYSTEM WITH BATTERIES of each type and rating
(a)	UPS with chargers and inverters with Input isolation transformers, Ni Cd battery bank, Bypass line transformers & voltage stabilizer, static switch manual bypass switch, ACDB, Battery Health Monitoring system (BHMS), Cabinets and other necessary protective devices and accessories.
(b)	MINI UPS of each type and rating

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SCHEDULE 4
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FLUE GAS DESULPHURISATION SYSTEM (FGD) PACKAGE FOR SIPAT SUPER THERMAL POWER STATION, STAGE-I (3x660 MW) UNDER LOT-2 PROJECTS; COMMON BIDDING DOCUMENT NO. CS-0011-109(2)-9						
Bidder's Name and Address : GE Power India Limited, IHDP Building, Plot No 7 Sec 127, Noida-201301						
Schedule No. 9: SCHEDULE OF TAKE OUT PRICE						
Take out price for certain items/services are indicated below. We confirm that the prices for these items are already included in the Bid Price. We further confirm that the Employer may delete from our scope any of the items given below based on the prices given in this schedule.						
Sl. No.	Description	*Ex-Works (India) (Indian Rupees)	Local transportation & Insurance charges (Indian Rupees)	*Installation (Indian Rupees)	Reference of Bid where Technical Details have been furnished	Remarks
1	2	3	4	5	6	7
1	Training as per clause no. 28.00.00, Part-C, Section-VI for					
(a)	O&M personnel	-	-	5,00,598	-	
(b)	Engineering personnel	-	-	2,48,828	-	

US

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Item No. 05

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 459/2018
(Earlier O.A. No.196/2014 (CZ))

Rashmi Singh

Applicant(s)

Versus

National thermal Power Corporation
Ltd. & Ors.

Respondent(s)

Date of hearing: 27.02.2020

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER
HON'BLE MR. SIDDHANTA DAS, EXPERT MEMBER**

For Applicant(s): Mr. Saurabh Sharma, Advocate

For Respondent(s): Mr. Shailesh Madiyal and Mr. Kartik Anand,
Advocates for NTPC

ORDER

1. This application seeks direction to revoke Environment Clearance (EC) dated 22.02.1999 and the NOC dated 05.03.1997 granted by the Chhattisgarh Environment Conservation Board (CECB) for non-compliance of the mandatory conditions stipulated therein and restore the area to its original form. According to the applicants, Respondent No. 1, National Thermal Power Corporation (NTPC) has set up a coal based Thermal Power Plant in District Bilaspur in Chhattisgarh. EC has been granted subject to certain conditions. However, the plant is being operated in violation of the said conditions, adversely affecting the environment and the public health.

2. The application was filed before this Tribunal on 11.07.2014 and has been dealt with by several orders in the last about six years. Reference may be made to some significant orders passed by this Tribunal.
3. Vide order dated 05.01.2016, the Tribunal noted the main objections of the applicants as follows:

“(1). Discharge from the plant into the Lilagar river contrary to the EC conditions.

(2). The quality of the coal being used, in particular reference to the conditions imposed for sulphur content.

(3). The sulphur dioxide emissions as a result of coal of higher sulphur content than what is prescribed in the EC condition.

(4). Ash content in the coal being beyond the prescribed standard.

(5). Fly ash disposal in terms of the MoEF Notification of 2009.

(6). Not complying with the green belt requirement.

Apart from the above, we find that among the conditions prescribed, it was directed that additional monitoring station on the Sonthi Pahad (reserved forest) be located for assessing the ambient air quality as also the requirement of FGD installation. In addition to the above, as provided in condition No. 2(ii), the requirement for having continuous monitoring facility at each of the stacks was required to be complied with.”

4. The Tribunal noted that apart from mere denial, relevant documents had not been filed and directed filing of following documents:

“NTPC and CECB as well as the MoEF to submit the following documents:

(1) Water sample reports of the Lilagar river of the past one year.

(2) Since the NTPC in their reply has submitted that the water quality is being maintained at the same standard as it was at the time of the submission of the EIA report, the standards that were shown to be in existence at the time of EIA reports that was submitted by the NTPC.

- (3) *The NTPC shall provide the list of the source from where they are procuring the coal and also the sulphur content as also the ash content.*
- (4) *In the reply that was filed by the NTPC in January 2015, it had been submitted in the reply that the NTPC had invited tenders for construction of pump house and peripheral drains along the ash dyke. The NTPC shall file the present status with regard to the aforesaid.*
- (5) *Since in para No. 18 of reply by NTPC, it has further been stated that the NTPC has sought the assistance of IIT Delhi and NIT Raipur on the directions of the CECB for raising the height of the ash dyke for additional volume and ash dyke disposal, what steps have been taken in pursuance of the recommendations made and whether the height of the ash dyke has been raised.”*

5. The Tribunal further observed:

“One of the issues, that have been raised in this Application is with regard to the area in close proximity with the ash dyke and the Lilagar river belonging to the farmers getting adversely affected and waterlogged due to seepage and other reasons attributable to the ash dyke, the parties would submit a fresh proof of the present position of the land around the ash dyke. In addition, we would direct the Collector Bilaspur / party Respondent No. 8 to direct soil testing of the land in villages of Raliya, Hardadih, Raank, Bhilai, Kaudiya, Gatora, Sukhripali where allegedly the soil has been adversely affected as a result of being in close proximity with the ash dyke of the Respondent No. 1 NTPC at Sipat . The Applicant would also file a map indicating locations of these villages with their agricultural lands which allegedly have been adversely affected on account of getting waterlogged due to seepage from the ash dyke with the locations of the ash dyke and the distances from the ash dyke to the agriculture fields in the above villages as also the water course of the river Lilagar. The CECB and the NTPC would also file the report of the stack emissions and ambient air quality with particular reference to sulphur dioxide emissions from the NTPC at Sipat for the last one year. The CECB would also file an additional affidavit with regard to what steps it decides to take after having come to know that the NTPC has not installed the continuous monitoring system as required by the conditions of EC. In the event of CECB finding no compliance of the EC conditions contained in the EC of 22.02.1999, whether the CECB would consider issuing show cause notice to the NTPC / Respondent No.1 indicating the violations and / or non-compliance of EC conditions which may have come to their notice as to why the power plant of Sipat NTPC may not be directed to be shut down. The NTPC would also indicate what steps it has taken pursuant to the EC conditions for creating the green belt and compensatory afforestation in the light of the MoEF Guidelines and also the EC conditions. As regards the issue of fly ash

utilisation, since this Tribunal is dealing with the same issue in another matter with regard to all the thermal power plants in the State of Chhattisgarh, directions in that behalf would be given in the aforesaid matters, nonetheless the NTPC / Respondent no. 1 needs to respond on what steps it has taken and proposed in this behalf.”

6. Vide order dated 22.03.2017, following further directions were issued:

“We direct that the MoEF while carrying out the inspection shall also in particular take specific note of the allegations made in the Original Application and submit their observations with regard to the same.

Learned Counsel for the State submitted that since remaining plantation work of compensatory afforestation is likely to be taken up in the coming monsoon season of 2017, the matter may be taken up for hearing after 15.07.2017.

In view of the same, the Learned Counsel for the parties submits that the matter may be listed on 18.07.2017. The complete figures in this behalf shall be provided along with the copies of the inspection report by the Learned Counsel for the Respondent.”

7. On 21.05.2019, the Tribunal observed:

“After having considered the matter and on hearing the Learned Counsels for the parties, we deem it proper that before proceeding to finally decide the matter, it will be appropriate that a report be called from the Regional Office of the MoEF & CC at Nagpur, in respect of compliance of the Environmental Clearance conditions, after visiting the site. The needful may be done within four weeks positively. On receipt of the report and filing a copy of the same before the Tribunal, the Ministry may place it on their website for perusal of all the parties concerned.

8. Finally, on 07.01.2020, the matter was directed to be listed with O.A. No. 117/2014 dealing with the issue of fly ash.

9. On 27.01.2020, the Tribunal issued directions in O.A. No. 117/2014, *Shantanu Sharma v. Union of India & Ors.* on the subject of fly ash and certain other issues applicable to all Thermal Power Plants and since Counsel for the NTPC was not available, the matter was deferred to today.

10. We have heard learned Counsel for the applicants and learned Counsel for the NTPC and perused the report dated 20.06.2019 filed by the MoEF&CC and the report filed by the CECB on 15.10.2019 and also objections of the applicants to the said report by way of reply affidavit filed on 25.02.2020, in response to the report of the MoEF&CC dated 20.06.2019 and affidavit of the applicants dated 30.10.2019, in response to the report filed by CECB. We proceed to consider the reports and the objections of the applicants.
11. The report of the MoEF&CC mentions that monitoring of compliance of conditions was conducted by Regional Office on 10th – 11th June, 2019 in the light of the documents produced by the project proponent with reference to the conditions of EC. The monitoring reports are with regard to the conditions stipulated in EC Stage-I dated 22.02.1999, amendment letter dated 30.04.2004 and in respect of conditions stipulated in EC for Stage-II dated 08.06.2004, conditions of EC amendment for Stage-I dated 08.09.2014 and 17.05.2018. The status found is in the categories of 'complied', 'partially complied' and 'being complied'. Since there is no objection filed to the said report, we direct the NTPC to fully comply with the observations other than category of 'complied'. Wherever there is a 'partial compliance' or 'being complied', full compliance may be ensured and compliance report filed by 31.05.2020 to the Committee constituted by this Tribunal on 14.02.2019 in *O.A. No. 200/2018, Dukalu Ram & Ors. v. Union of India & Ors.*, with nodal agency being CPCB. CPCB may furnish its report in the matter with the observations, if any, before this

Tribunal after evaluating the compliance report filed by the NTPC by 30.06.2020 by e-mail at judicial-ngt@gov.in.

12. The non-compliances, which according to the applicants, have not been looked into are:

- “1. A perusal of para 3 i. of the Report shows that the EC condition No. (viii) providing for coal transport to be done through closed wagon transport has not being complied with and no exemption should be granted in this context.
2. A perusal of para 3 ii of the Report shows that the EC condition No. (ix) is not being complied despite more than 10 years of plant operation. It is mentioned therein that 70 acres of revenue land has been identified at Saler Village which has got transferred to Dept. of industries, Govt. of Chhattisgarh and then to CSIDC. It is mentioned therein that CSIDC has sought approval from concerned authorities and the same is awaited. It is also mentioned in the Report that NTPC is pursuing the matter with CSIDC for early implementation. All in all it is clear from a mere reading that the above mentioned EC condition No. (ix) is not being complied with.
3. A perusal of para 3 iii of the Report shows that this EC condition has not been complied with. It is stated that the maximum land for stage I and II of Sipat is 4382.44 acres. According to the Applicants this condition is being violated in a big way because of leakage from Ash Dykes, as more than 200 Acres of land has got marshy. Photographs in support of the same have been filed with earlier affidavits/applications by the applicants and all are in record.
4. A perusal of para 3 iv of the Report shows that the EC condition pertaining to Fly Ash utilization condition is being blatantly violated and even 49.54% figure of use is not correct as maximum portion of the ash is being used for raising height of ash dam. Any independent study will further prove the same.
5. A perusal of para 3 vi of the Report shows that the study on heavy metals in coal and fly ash said to have been done by the IICT Hyderabad but the same has not been brought on the record and NTPC is not complying the condition in this regard.
6. A perusal of para 3 vii of the Report shows that a study for impact on forest, crop etc. by TCB College of agriculture, Bilaspur, Chhattisgarh is under process i.e. still not done hence the non-compliance.

7. A perusal of para 4 of the Report states that there are ongoing court cases thereby proving that NTPC is in breach of mandatory requirements of environment regulations.
8. A perusal of data sheet 1 at Entry 9 of the Report shows that the capital cost on EMPIS has only been mentioned whereas no breakup/item wise details have been provided to ascertain the actual use.
9. A perusal of part II of the Report shows that at point i) it is falsely stated that all conditions of MPSPCB's NOC dated 5th March, 1997 has been complied with. Condition No. 7 at page 23 of the MPSPCB's NOC annexed with Original Application states that Zero Liquid Discharge had to be achieved but a perusal of Annexure 6 at page 53 with the Original Application, Additional Affidavit of Applicant dated 21.01.2016 and para 7 of Reply to CECB's Affidavit of October, 2019 at pages 1082 to 1087 shows that there has been a discharge of polluted water from Ash dams and how such pollution is causing the land to become marshy and causing damage to the crops.
10. The EC had a condition No. 2 (viii) of using coal of only 0.24% sulphur. The NTPC violated this condition till 2014 and got the condition amended during the pendency of this application. Even the new norm 0.40% sulphur content is being violated as the sulphur content is much higher as evident from the chemical property chart filed by the applicant earlier. Annexure A8 at page 58 with the original Application and Additional Affidavit dated 27.07.2016 at para 6 may kindly be perused in this regard which clearly show that the sulphur content in the coal derived from Korba Coal fields is more than 0.40%. It is also stated that any independent study will conclusively prove the above submission of the Applicant.
11. The NOC of MPSPCB provides that green belt condition has to be complied with. It is stated that this condition has been violated blatantly by the Project Proponent. False information has been submitted by NTPC to MoEF&CC which has not BEEN verified independently. The Google image produced by the applicant has a calculation that instead of 259 acre of green belt area as claimed by the NTPC, hardly 120 acre can be considered as green belt. (Page 18 of the Rejoinder dated 10.11.2015, para 9 of the Additional Affidavit of November, 2016 and Rejoinder of August 2016 to Collector's report may kindly be perused in this regard.)
12. That it is re-iterated by the Applicants that EC conditions are not being complied as has explained above. Ash utilization figures provided by the MoEF&CC in its Report are misleading and majority of ash generated till date is lying in the ash dykes or is being discharged in the agricultural fields. Any independent measurement of the quantity would show the blatant lie being spoken by the

NTPC on this issue. It is stated that till date even after 10 years of operation no monitoring station on Sonthi Pahar forest has been established. As per the knowledge of the Applicant out of 3743 PAP only 379 have been provided employment. Zero discharge condition is being violated blatantly and polluted effluent is being released in rivulets and canals continuously. Even the new limit of 0.4% of sulphur content is not being complied as coal source Korba Coal Fields has higher sulphur quantity which information has already placed on record by the Applicants. It is stated that there is no progress on FGD installation as nothing on record proves the same. No Air and Water monitoring reports have been filed by the CECB till date which calls for drawing of adverse inference against the Respondents.”

13. We are of the view that these aspects may be considered by the Committee constituted on 14.02.2019 in O.A. No. 200/2018, *Dukalu Ram & Ors. v. Union of India & Ors.* mentioned above. The NTPC may give its response in respect of the above to the Committee within one month from today. If considered necessary, the Committee will be at liberty to undertake visit to the site.

14. As regards the conditions of installing FGD plant/system, while the MoEF&CC has suggested that period of two years may be given, having regard to the impact of absence of such device on the health of the citizens, such a long time cannot be allowed being against the ‘Sustainable Development’ principle which is part of right to life and also mandatory under Section 20 of the National Green Tribunal Act, 2010. Such device may be positively installed within six months failing which Chief General Manager of the concerned project of NTPC will be personally accountable and coercive measures may have to be taken for non-compliance. The installation of FGD system may be overseen by the Chairman, NTPC.

15. We also find that according to NTPC, MoEF&CC has relaxed condition of covering raw material/coal by tarpaulin which is otherwise an essential safeguard to prevent air pollution. We are of the view that such essential safeguard cannot be dispensed with and must be adopted being a mandate of Article 21 of the Constitution and 'Precautionary' and 'Sustainable Development' principles under Section 20 of the NGT Act, 2010. Such safeguards may be positively adopted within one month from today which will also be the responsibility of the Chief General Manager of the concerned project of NTPC which may be overseen by the Chairman, NTPC.

List again on 28.07.2020.

Adarsh Kumar Goel, CP

Dr. Nagin Nanda, EM

Siddhanta Das, EM

February 27, 2020
Original Application No. 459/2018
(Earlier O.A. No.196/2014 (CZ)
DV