



**F.No. J-13012/15/2018-IA-I(T)**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**

3<sup>rd</sup> Floor, Vayu Block,  
Indira Paryavaran Bhawan, Jor Bagh Road,  
Aliganj, New Delhi-110003

Dated: 11.12.2019

To

The Chief Engineer (Projects)  
**M/s Tamil Nadu Generation and Distribution Corporation Ltd (TANGEDCO)**  
5<sup>th</sup> Floor, Western Wing,  
NPKRR Maaligai, 144,  
Anna Salai, Chennai-600002.

**Email:** [cepr@tnebnet.org](mailto:cepr@tnebnet.org); **Telephone:** 044-28520878; **Fax:** 044-28520878.

**Sub: 1x660 MW Ennore Supercritical Thermal Power Project (Expansion), Village Ennavur, District Ennore, Tamil Nadu by M/s Tamil Nadu Generation and Distribution Corporation Ltd (TANGEDCO)- reg. grant of Environmental Clearance.**

Sir,

The undersigned is directed to refer to your online application No.IA/THE/TN/2062/2018 dated 16.08.2019 for grant of Environmental Clearance.

2. It has been noted that the Environmental Clearance (EC) for establishing 1x660 MW Ennore Thermal Power Project has been accorded on 3.6.2009 which was initially valid for five years and the EC was subsequently extended for further period of five years (i.e. till 2.6.2019). It has been noted that the construction activities and commissioning of the project could not be completed within outer limit of EC validity of 10 years. It has been further noted that only 17% of physical progress has been achieved with an expenditure of Rs.703 Crores.

3. It has been noted that you have applied for extension of EC validity beyond 10 years. Subsequently, Ministry has advised to obtain a fresh EC as there is no provision available in the EIA Notification to extend the EC beyond the outer limit of validity (10 years). Further, Terms of Reference (ToR) for the project was issued on 21.1.2019. Further, amendment in ToR was issued on 1.5.2019 for using the existing baseline data and exemption of examination of alternate sites. Subsequently, the Ministry vide letter dated 10.7.2019 has exempted for conducting Public Hearing for the project.

4. It has been noted that the proposed power project is located within the existing Ennore Thermal Power Station (ETPS) complex as expansion to the existing decommissioned units (2x60 MW & 3x110 MW). The nearest airport is at Chennai, which is about 26 km.

5. It has been noted that the total land available inside the ETPS complex is about 237 acres out of which 84 acres (southern side) is earmarked for the proposed ETPS expansion project. Another 6 acres is required for laying pipelines and belt conveyor

for transporting water and coal. The land available within ETPS is sufficient to accommodate this power plant of 1x660MW capacity unit, with common coal stock yard and common cooling water intake system for both proposed units (i.e.) ETPS expansion project and ETPS replacement project (1x660 MW). Additionally, the existing ash pond of 113.6 acres which will be used for disposal of ash incase of emergency. Thus, the total proposed project area including ash pond is 197.6 acres.

6. There are one perennial water bodies near project, i.e. Kosasthaliya River at about 500m (W) and several small village/irrigation tanks, Peeriyathoppu lake 6.1 km (SW), Kadapakkam lake 5.4 km (SW), Buckingham Canal adjacent (W), Bay of Bengal 0.8km (E). There are no protected areas or other ecologically sensitive areas under Wildlife Protection Act, 1976 and Environment (Protection) Act, 1986 within the 10 km radius of the study area.

7. The present project is based on Super-critical technology boilers. Total coal requirement is 2.0 MTPA (imported coal) based on 85% Plant Load Factor (PLF). The Proponent has signed an MoU with MMTC on 23.07.2012 for supply of imported coal over 2.0 MTPA. The coal will be brought to Ennore port by ship and further it is transported by belt conveyors up to crusher plant. The crushed coal will brought by pipe conveyor to the project site. The calorific value of coal 5805 kCal/kg. The ash and Sulphur contents in the coal are estimated at 6.62% and 0.53%, respectively. There is no separate external coal handling system for this project as the crushed coal from the North Chennai Thermal Power Station (NCTPS) stockyard will be transported to the ETPS through Pipe conveyors directly which is at a distance of 3 km.

8. The daily water requirement for the project is 1,70,712 m<sup>3</sup>/day (cooling water make up: 1,36,800 m<sup>3</sup>/day and Sea water treated through RO Treatment for other utilities: 33,912 m<sup>3</sup>/day). One time requirement for Natural draft cooling tower system and Ash water system requirement is 1,01,490 m<sup>3</sup>/day. The water will be drawn through intake pipelines from Bay of Bengal. Sea water intake pipe line of 3.15 km and discharge pipeline of 1.55 km will be laid to meet the water requirement of the power plant and to discharge the water from cooling systems.

9. The intake and outfall locations for drawing the sea water and discharging the wastewater respectively, have been located as per the detailed study by NIO, Goa. The intake pipeline and the outfall pipeline has been provided at a distance of 650m and 250m respectively from the shore. The intake and the outfall are provided at different directions from each other to avoid mixing of water. The total quantity of intake for the Replacement unit and the Expansion unit is 25000 m<sup>3</sup>/hr and the total quantity of discharge is 16000 m<sup>3</sup>/hr.

10. The Tamil Nadu Coastal Zone Management Authority vide letter dated 14.8.2019 has recommended for CRZ clearance for setting up of Pipe Coal conveyor from North Chennai Power Plant to proposed Project, intake and outfall water pipelines from the sea to project site and vice versa for both this power project and another project of (1x600 MW) proposed at the same location.

11. The fly ash generated from the proposed power plant would be collected in dry form and fully utilized and disposed through e-auction. The bottom ash would be

disposed off in slurry form to the existing ash Pond. Existing housing colony will be renovated to accommodate the essential O & M staff of this proposed power plant.

12. Electro Static Precipitators (ESP) to control suspended particulate matter in the flue gas is proposed to limit the emission to 30mg/Nm<sup>3</sup>. Advanced combustion technology for lower emission of nitrogen dioxide is proposed to control NOX emissions in the boilers. To control the Sulphur dioxide emissions, Flue Gas Desulphurization (FGD) system is proposed. The design and layout of steam generator and its auxiliaries will be designed such that wet / dry FGD system can be installed. For proper dispersion of SO<sub>2</sub> emissions and to meet the MoEFCC & TNPCB guidelines, single flue RCC stack of 275m height will be provided. The chimney would be provided with personal access for regular monitoring of stack emissions. The exit velocity would be more than 22 m/sec and minimum chimney internal diameter at exit will be 7.0m.

13. Closed cycle condenser cooling is envisaged with natural draft cooling tower (NDCT). Makeup water will be pumped to the circulating water sump from there is pumped to condenser and will discharge back to NDCT having cooling range of 9°C and maintaining a cycle of concentration of 1.3. The recooled water from cooling tower will be channeled to cooling water sump. Suitable arrangement for adding NaOCl to curb organic growth will be taken.

14. The ash pond is located near to the power plant and it is an existing ash pond. The slurry pump chain head shall be designed to enable discharge at farthest point in the dyke area up to ultimate dyke height. The ash slurry pipes will discharge into the ash pond and ash particles will settle inside the ash pond.

15. Ambient air quality (AAQ) monitoring is carried out during July, 2018 to September, 2018. LULC, Water, Noise, Soil, Ecological and Socio-economic conditions were carried out during April- May, 2019. During the study period (July to September 2018), the winds were predominantly recorded from SW closely followed by WSW. Calm conditions prevailed for 2.38 % of the total time and the average wind speed for the season is 2.85 m/sec.

16. The 98<sup>th</sup> percentile of Particulate Matter 2.5 (PM<sub>2.5</sub>) in the ambient air recorded with in the study area was in range of 35.6-58.4 µg/m<sup>3</sup>. The 98<sup>th</sup> percentile of SO<sub>2</sub> recorded within the study area was in the range of 12.1-26.5 µg/m<sup>3</sup>. The 98<sup>th</sup> Percentile of NO<sub>x</sub> recorded within the study area was in the range of 20.8-38.5 µg/m<sup>3</sup>. The 98<sup>th</sup> percentile of Ozone (O<sub>3</sub>) recorded within the study was in the range of 28.3-50.8 µg/m<sup>3</sup>. Further, the 98<sup>th</sup> percentile of particulate matter PM<sub>10</sub>, recorded with in the study area is in the range of 74.8 to 98.5 µg/m<sup>3</sup>. The baseline ambient air quality for PM<sub>10</sub> is exceeding the national ambient air quality standards in the study area.

17. It has been informed that that two locations of baseline AAQ stations which are exceeding the standards are far away from the proposed ETPS Expansion project (Athipattu: 5.5 km NW & North Chennai: 6.5 km North) and they are in cross wind direction. Further, it has been informed that the reason of higher PM<sub>10</sub> values is that the construction activities of North Chennai Thermal Power Station (NCTPS stage III:1x800 MW) and Ennore SEZ TPP (2x660 MW) which are nearby and are under construction. The construction of these projects is in full swing and transportation of

materials for the ongoing projects and nearby Ennore port causes the temporary raise in PM<sub>10</sub> level. Once the construction activities are over, the PM<sub>10</sub> level will be reduced. TANGEDCO assures to take stringent measures to reduce the pollutant levels by making suitable dust suppression control measures in the ongoing projects. However, the remaining seven locations of baseline AAQ stations which are within 4 km are having lesser PM<sub>10</sub> values.

18. Ground water results in the study area are pH: 7.0-7.8 (standard: 6.5 to 8.5); Total dissolved solids: 462- 2545 mg/l (Standard: 500 mg/l & 2000 mg/l in absence of alternate source); Chlorides: 120-762 mg/l (Standard: 250 mg/l & 1000 mg/l); Hardness: 295- 983 mg/l (Acceptable limit: 200 mg/l & permissible: 600 mg/l); Fluoride: <0.5- 1.6 mg/l (Acceptable limit: 1 mg/l & permissible limit: 1.5 mg/l). Ground Water Levels in the study area varies between 3.5-25.0 m bgl. The seasonal fluctuation shows a rise between 0.28- 4.80 m bgl. Surface water quality in the study area, pH: 6.9-8.2; TDS: 1850-39417 mg/l; Chloride: 604- 19134 mg/l; Hardness: 413-4817 mg/l; Fluoride: 0.94-1.5 mg/l.

19. It has been informed that the Noise levels in the study area have been measured and the values are within the standards as per the Noise Pollution Rules, 2000. The natural drainage of the study area is consisting of streams, drains, Buckingham Canal, Kosasthaliyar River and Bay of Bengal. Bay of Bengal is about 815 m away from the project site towards East. These streams, drains and canal are found throughout the study area. The drainage system is showing sub-dendritic drainage pattern. The streams are flowing through the study area finally flowing towards Kosasthaliyar river.

20. The incremental air quality concentrations from the proposed project have been predicted through plume dispersion modeling and the details are as below:

Worst case Scenario	Cumulative concentrations (µg/m <sup>3</sup> )		
	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub>
	With FGD		
Baseline air quality	98.5	26.5	38.5
Predicted Ground level concentrations	0.64	2.7	2.9
Total ground level concentrations (Baseline+ incremental)	99.14	29.2	41.4
National Standard	100	80	80

21. The existing ash dyke earlier utilized for the now defunct is proposed to be utilized for the proposed ETPS Expansion Project. The ash dyke is located in Survey Nos. 237, 238, 239 of Edayanchavadi Village, Ponneri Taluk, Tiruvallur District. This is located west of the proposed project at a distance of about 1 km. Total area of existing Ash Dyke is about 175 acres out of which 61.40 acres had already been filled up and reclaimed for setting up North Chennai 765 KV Pooling Station, to evacuate

the power from the ongoing North Chennai Thermal Power Project Stage-III (1x800 MW) and Ennore SEZ Thermal Power Project (2x660 MW).

22. The balance area in the existing ash dyke 113.60 Acres out of which a small portion (10.5 acres) is falling within the CRZ (i.e. 100 m from the HTL of back waters), as per the latest CRZ Map prepared by Institute of Remote Sensing, Anna University. TANGEDCO undertakes that this area (10.5 acres) will not be utilized for dumping ash. A separate bund will be constructed leaving the CRZ portion and will be kept as "No activity Zone". It was that this area will be taken up as part of development of green belt. The balance ash pond available after deducting the area in CRZ is 103.1 acres. Volume available for dumping wet ash in the existing pond 16,69,635 m<sup>3</sup> with the bund height of 4 m. About 2,00,000 Tonnes of ash has been deposited till date. Considering the ash density 700 kg/m<sup>3</sup>, this balance area can store about 11,68,744 Tonnes of ash.

23. With ash content of 6.62% in imported coal, the annual generation of ash is about 1,52,935 Tonnes/annum (Fly ash: 1,22,348 Tonnes & Bottom ash: 30,587 Tonnes). The present ash dyke area is sufficient to dispose bottom ash for 38 years, which is more than the life of the proposed ETPS Expansion TPP. There is a proposal for raising the height of bund for 3.5 meters. In such case, the volume of ash pond to dump the ash will be around 44,00,000 m<sup>3</sup>. The existing ash dyke has been constructed over a layer of impervious clay. Hence, no leaching will occur from the ash pond. Hence, no geo-textiles or lining was provided.

24. The existing ash pond and ash water lines components of the old ETPS are in good condition because of the periodical maintenance undertaken and it proposed to utilize the same facility for this ETPS expansion thermal power project (1x660 MW). The existing ash pipelines are laid over a RCC bridge with patrolling road crosses the back waters and Buckingham canal. Hence there will be no requirement for laying of new pipelines for transporting ash slurry and there will be no hindrance to the water bodies.

25. It has been noted that some portion of existing ash pond area is falling in the CRZ area as per the latest CRZ map and the same will kept as no activity zone. A new bund will be constructed in that area leaving the above no activity CRZ area.

26. Capital Cost and recurring cost of Environmental Management Plant is Rs.977 Crores and Rs.98 Crores, respectively. It has been proposed to incur Rs. 500 Crores towards installation of FGD (Flue Gas Desulfurization) and SCR (Selective Catalytic Reduction) to comply the latest emission norms. Installation of FGD has already been provisioned in the (proposed) work award to M/s. BGRESL, which is yet to be initiated after the receipt of Environmental Clearance. Further, it is submitted that the Power Project will be commissioned only after providing FGD and complying with all the environmental measures.

27. Out of total project area 197.6 acres, 33% of green belt works out to be 60 acres. It has been proposed to develop greenbelt in an area of 65 acres (14 acres in the plant, 14 acres (100 m x 570 m) along Buckingham canal, 10 acres in the ash pond area falling in CRZ, 27 acres around the periphery of ashdyke). Capital outlay of Rs.68 Lakhs/annum and maintenance of Rs. 5 Lakhs have been earmarked for developing

greenbelt. The additional Greenbelt endowment fund of Rs. 1.0 Crore has been allocated for greenbelt development.

28. The Public Hearing for the project has been exempted. Further, the draft EIA/EMP report has been uploaded on Tamil Nadu Pollution Control Board (TNPCB) for seeking comments/concerns from the public. The TNPCB has informed vide their letter dated 18.09.2019 that no comments have been received so far after uploading of the EIA Report.

29. Estimated Project is Rs.5,421.38 Crores. Employment generated during construction phase is 2100 and operation phase is 550. The Company shall earmark the fund of Rs. 13.65 Crores (0.25% of project cost) for CER which shall be utilized over a period of 3 years.

29. The proposal was appraised by Re-constituted EAC (Thermal) in its 32<sup>nd</sup> and 33<sup>rd</sup> meetings held on 23.8.2019 and 25.9.2019. In acceptance of the recommendations of the Re-constituted EAC (Thermal Power) in its meeting held on 25.9.2019 and in view of the information, clarifications, documents submitted by you, **the Ministry hereby accords the Environmental Clearance** to the above project under Schedule 1(d) of the EIA Notification dated September 14, 2006 and subsequent amendments therein subject to compliance of the following conditions.

- i. The conditions prescribed in the CRZ recommendations made by Tamil Nadu Coastal Zone Management Authority (TNCZMA) vide letter dated 14.8.2019 shall be complied with.
- ii. A HDPE liner shall be laid over the existing ash pond before discharging the ash into the ash pond. Further piezometric wells around the four corners of the ash pond, preferably towards villages shall be set up. The ground water depth and quality including Heavy metals shall be measured pre and post monsoon. The data generated shall be analysed with the baseline data, drinking water standards and submit the findings whether there is any occurrence of leaching of heavy metals from the ash.
- iii. An undertaking shall be submitted that Coastal Water, marine life and mangroves shall not be disturbed while laying pipelines over RCC bridge which had already been constructed in the CRZ area. The undertaking should also state that ash pond area falling in CRZ will not be constructed.
- iv. Minimum of 100 m from the CRZ boundary shall be maintained for the ash pond on all sides. The land as part of CRZ area (10.5 acres) should be developed as greenbelt.
- v. The TNCZMA shall examine the ash pond area and pipelines crossing the CRZ area and communicate its findings and recommendations within 6 months for stipulating additional mitigation measures, if any.
- vi. The Electrostatic Precipitator, Flue-gas Desulphurisation (FGD) System and NO<sub>x</sub> control systems shall be established to meet the new emission norms of PM:100 mg/Nm<sup>3</sup>, SO<sub>2</sub>: 100 mg/Nm<sup>3</sup> and NO<sub>x</sub>: 100 mg/Nm<sup>3</sup> and Mercury: 0.03 mg/Nm<sup>3</sup>. The progress of implementation of FGD and De-NO<sub>x</sub> systems shall be submitted to the Ministry.
- vii. The capital cost towards CER of an amount of Rs.13.6 Crores (0.25% of total project cost Rs.5,421.38 Crores) shall be earmarked separately and implement various developmental activities in the surrounding villages. The six monthly

progress report on various welfare activities (such as infrastructure, health, education, skill training, livelihood generating activities, fishermen needs) in the villages within 10 km radius of the project, shall be submitted to the District Collector and as well as Regional Office of this Ministry. The District Collector may decide the extent villages beyond the 10 km radius, if needed. The District Collector should oversee the developmental activities in the villages based on the need and utilisation certificate annually shall be obtained by the District Collector.

- viii. The monthly ash generation (both bottom and flyash), utilisation and disposal to ash pond along with the breakup of ash utilised for various purposes shall be submitted as part of compliance report.
- ix. Date of commissioning (COD) of the plant shall be informed to the Ministry.
- x. As committed, the greenbelt shall be developed in an area of 65 acres. The land area between Buckingham canal and project shall be developed with mangrove afforestation.
- xi. The monthly quantities of sea water drawl, water consumption, discharge of cooling water, brine and other wastewater into the sea shall be submitted to the Ministry.
- xii. The Standard EC conditions for Thermal Project to be complied with as enclosed as **Annexure-I** and also uploaded on the website of the Ministry ([http://moef.gov.in/wp-content/uploads/2018/03/E1200QNG\\_Standardisation-of-Conditions-of-EC-for-TPP-19112018.pdf](http://moef.gov.in/wp-content/uploads/2018/03/E1200QNG_Standardisation-of-Conditions-of-EC-for-TPP-19112018.pdf)).

30. An as built or as completed report on EMP to be submitted stating the scope/extent of work envisaged in the EIA along with estimated cost vis-à-vis the actual completed works and cost incurred. A certificate/completion certificate accordingly, shall have to be submitted before commissioning of the TPP.

31. The Ministry reserves the right to revoke the clearance if conditions stipulated are not implemented to the satisfaction. The Ministry may also impose additional environmental conditions or modify the existing ones, if necessary.

32. The environmental clearance accorded **shall be valid for a period of 7 years** from the date of issue of this letter to start operations by the power plant.

33. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

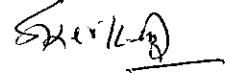
34. In case of any deviation or alteration in the project proposed including coal transportation system from those submitted to this Ministry for clearance, a fresh reference should be made to the Ministry to assess the adequacy of the condition(s) imposed and to add additional environmental protection measures required, if any.

35. The above stipulations would be enforced among others under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and rules there under, Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, 2008 and its amendments, the Public Liability Insurance Act, 1991 and its amendments.

36. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

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 (SEZ), 1<sup>st</sup> and 2<sup>nd</sup> Floor, Handloom Export Promotion Council, 34, Cathedral Garden Road, Nungambakkam, Chennai - 34.
5. The Principal Secretary, Department of Environment and Forests, Government of Tamil Nadu, No.1, Jeenis Road, Panagal Building, Ground Floor, Saidapet, Chennai-600 015.
6. The Chairman, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
7. The District Collector, Ennore District, Govt. of Tamil Nadu, Tamil Nadu -623 503.
8. Guard file/Monitoring file.
9. Website of MoEF&CC.



**Director, IA.I**



**Standard Conditions for Thermal Power Plants stipulated in Environmental Clearance**

**A. Statutory compliance:**

- i. Emission Standards for Thermal Power Plants as per Ministry's Notification S.O. 3305(E) dated 7.12.2015, G.S.R.593(E) dated 28.6.2018 and as amended from time to time shall be complied.
- ii. Part C of Schedule II of Municipal Solid Wastes Rules, 2016 dated 08.04.2016 as amended from time to time shall be complied for power plants based on Municipal Solid Waste.
- iii. MoEF&CC Notification G.S.R 02(E) dated 2.1.2014 as amended time to time regarding use of raw or blended or beneficiated/washed coal with ash content not exceeding 34% shall be complied with, as applicable.
- iv. MoEF&CC Notifications on Fly Ash Utilization S.O. 763(E) dated 14.09.1999, S.O. 979(E) dated 27.08.2003, S.O. 2804(E) dated 3.11.2009, S.O. 254(E) dated 25.01.2016 as amended from time to time shall be complied.
- v. Thermal Power Plants other than the power plants located on coast and using sea water for cooling purposes, shall achieve specific water consumption of 3.0 m<sup>3</sup>/MWh and Zero effluent discharge.
- vi. The recommendation from Standing Committee of NBWL under the Wildlife (Protection) Act, 1972 should be obtained, if applicable.
- vii. No Objection Certificate from Ministry of Civil Aviation be obtained for installation of requisite chimney height and its siting criteria for height clearance.
- viii. Groundwater shall not be drawn during construction of the project. In case, groundwater is drawn during construction, necessary permission be obtained from CGWA.

**B. Ash content/ mode of transportation of coal:**

- ix. EC is given on the basis of assumption of 6.62 % of ash content and 5 km distance of transportation in pipe conveyor from Ennore Port. Any increase of % ash content by more than 1 percent, and/or any change in transportation mode or increase in the transport distance (except for rail) require application for modifications of EC conditions after conducting the 'incremental impact assessment' and proposal for mitigation measures.

**C. Air quality monitoring and Management:**

- x. Flue Gas Desulphurisation System shall be installed based on Lime/Ammonia dosing to capture Sulphur in the flue gases to meet the SO<sub>2</sub> emissions standard of 100 mg/Nm<sup>3</sup>.
- xi. Selective Catalytic Reduction (SCR) system or the Selective Non-Catalytic Reduction (SNCR) system or Low NOX Burners with Over Fire Air (OFA) system shall be installed to achieve NO<sub>x</sub> emission standard of 100 mg/Nm<sup>3</sup>.

- xii. High efficiency Electrostatic Precipitators (ESPs) shall be installed in each unit to ensure that particulate matter (PM) emission to meet the stipulated standards of 30 mg/Nm<sup>3</sup>.
- xiii. Stacks of prescribed height 275 m shall be provided with continuous online monitoring instruments for SO<sub>x</sub>, NO<sub>x</sub> and Particulate Matter as per extant rules.
- xiv. Exit velocity of flue gases shall not be less than 20-25 m/s. Mercury emissions from stack shall also be monitored periodically.
- xv. Continuous Ambient Air Quality monitoring system shall be set up to monitor common/criteria pollutants from the flue gases such as PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> within the plant area at least at one location. The monitoring of other locations (at least three locations outside the plant area covering upwind and downwind directions at an angle of 120° each) shall be carried out manually.
- xvi. Adequate dust extraction/suppression system shall be installed in coal handling, ash handling areas and material transfer points to control fugitive emissions.
- xvii. Appropriate Air Pollution Control measures (DEs/DSs) be provided at all the dust generating sources including sufficient water sprinkling arrangements at various locations viz., roads, excavation sites, crusher plants, transfer points, loading and unloading areas, etc.

**D. Noise pollution and its control measures:**

- xviii. The Ambient Noise levels shall meet the standards prescribed as per the Noise Pollution (Regulation and Control) Rules, 2000.
- xix. Persons exposed to high noise generating equipment shall use Personal Protective Equipment (PPE) like earplugs/ear muffs, etc.
- xx. Periodical medical examination on hearing loss shall be carried out for all the workers and maintain audiometric record and for treatment of any hearing loss including rotating to non-noisy/less noisy areas.

**E. Human Health Environment:**

- xxi. Bi-annual Health check-up of all the workers is to be conducted. The study shall take into account of chronic exposure to noise which may lead to adverse effects like increase in heart rate and blood pressure, hypertension and peripheral vasoconstriction and thus increased peripheral vascular resistance. Similarly, the study shall also assess the health impacts due to air polluting agents.
- xxii. Baseline health status within study area shall be assessed and report be prepared. Mitigation measures should be taken to address the endemic diseases.
- xxiii. Impact of operation of power plant on agricultural crops, large water bodies (as applicable) once in two years by engaging an institute of repute. The study shall also include impact due to heavy metals associated with emission from power plant.
- xxiv. Sewage Treatment Plant shall be provided for domestic wastewater.

## **F. Water quality monitoring and Management:**

- xxv. Induced/Natural draft open cycle cooling system shall be set up with minimum Cycles of Concentration (COC) of 1.5 or above for power plants using sea water.
- xxvi. In case of the water withdrawal from river, a minimum flow 15% of the average flow of 120 consecutive leanest days should be maintained for environmental flow whichever is higher, to be released during the lean season after water withdrawal for proposed power plant.
- xxvii. Records pertaining to measurements of daily water withdrawal and river flows (obtained from Irrigation Department/Water Resources Department) immediately upstream and downstream of withdrawal site shall be maintained.
- xxviii. Rainwater harvesting in and around the plant area be taken up to reduce drawl of fresh water. If possible, recharge of groundwater to be undertaken to improve the ground water table in the area.
- xxix. Regular (at least once in six months) monitoring of groundwater quality in and around the ash pond area including presence of heavy metals (Hg, Cr, As, Pb, etc.) shall be carried out as per CPCB guidelines. Surface water quality monitoring shall be undertaken for major surface water bodies as per the EMP. The data so obtained should be compared with the baseline data so as to ensure that the groundwater and surface water quality is not adversely impacted due to the project & its activities.
- xxx. The treated effluents emanating from the different processes such as DM plant, boiler blow down, ash pond/dyke, sewage, etc. conforming to the prescribed standards shall be re-circulated and reused. Sludge/ rejects will be disposed in accordance with the Hazardous Waste Management Rules.
- xxxi. Hot water dispensed from the condenser should be adequately cooled to ensure the temperature of the released surface water is not more than 5 degrees Celsius above the temperature of the intake water.
- xxxii. Based on the commitment made by the Project Proponent, Sewage Treatment Plants within the radius of 50 km from proposed project, the treated sewage of 397 KLD from STP of Chennai Metro Water Supply and Sewage Board (CMWSSB) shall be used as an alternative to the fresh water source to minimize the fresh water drawl from surface water bodies.
- xxxiii. Wastewater generation of 1,23,360 KLD from various sources (viz. cooling tower blowdown, boiler blow down, wastewater from ash handling, etc) shall be treated to meet the standards of pH: 6.5-8.5; Total Suspended Solids: 100 mg/l; Oil & Grease: 20 mg/l; Copper: 1 mg/l; Iron:1 mg/l; Free Chlorine: 0.5; Zinc: 1.0 mg/l; Total Chromium: 0.2 mg/l; Phosphate: 5.0 mg/l;
- xxxiv. Sewage generation of 216 KLD will be treated by setting up Sewage Treatment plant to maintain the treated sewage characteristics of pH: 6.5-9.0; Bio-Chemical Oxygen Demand (BOD): 30 mg/l; Total Suspended Solids: 100 mg/l; Fecal Coliforms (Most Probable Number): <1000 per 100 ml.

## **G. Risk Mitigation and Disaster Management:**

- xxxv. Adequate safety measures and environmental safeguards shall be provided in the plant area to control spontaneous fires in coal yard, especially during dry and humid season.
- xxxvi. Storage facilities for auxiliary liquid fuel such as LDO and HFO/LSHS shall be made as per the extant rules in the plant area in accordance with the directives of Petroleum & Explosives Safety Organisation (PESO). Sulphur Content in the liquid fuel should not exceed 0.5%.
- xxxvii. Ergonomic working conditions with First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.
- xxxviii. Safety management plan based on Risk Assessment shall be prepared to limit the risk exposure to the workers within the plant boundary.
- xxxix. Regular mock drills for on-site emergency management plan and Integrated Emergency Response System shall be developed for all kind of possible disaster situations.

#### **H. Green belt and Biodiversity conservation:**

- xl. Green belt shall be developed in an area of 33% of the total project with indigenous native tree species in accordance with CPCB guidelines. The green belt shall inter-alia cover an entire periphery of the plant.
- xli. *In-situ/ex-situ* Conservation Plan for the conservation of flora and fauna should be prepared and implemented.
- xlii. Suitable screens shall be placed across the intake channel to prevent entrainment of life forms including eggs, larvae, juvenile fish, etc., during extraction of seawater.

#### **I. Waste management:**

- xliv. Solid waste management should be planned in accordance with extant Solid Waste Management Rules, 2016.
- xlv. Toxicity Characteristic Leachate Procedure (TCLP) test shall be conducted for any substance, potential of leaching heavy metals into the surrounding areas as well as into the groundwater.
- xlv. Ash pond shall be lined with impervious liner as per the soil conditions. Adequate dam/dyke safety measures shall also be implemented to protect the ash dyke from getting breached.
- xlvi. Fly ash shall be collected in dry form and ash generated shall be used in phased manner as per provisions of the Notification on Fly Ash Utilization issued by the Ministry and amendment thereto. By the end of 4<sup>th</sup> year, 100% fly ash utilization should be ensured. Unutilized ash shall be disposed off in the ash pond in the form of High Concentration Slurry. Mercury and other heavy metals (As, Hg, Cr, Pb, etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. Flyash utilization details shall be submitted to concerned Regional Office along with the six-monthly compliance reports and utilization data shall be published on company's website.

- xlvi. Unutilized ash shall be disposed off in the ash pond in the form of High Concentration Slurry/Medium Concentration Slurry/Lean Concentration Slurry method. Ash water recycling system shall be set up to recover supernatant water.

**J. Monitoring of compliance:**

- xlvi. Environmental Audit of the project be taken up by the third party for preparation of Environmental Statement as per Form-V & Conditions stipulated in the EC and report be submitted to the Ministry.
- xlix. Resettlement & Rehabilitation Plan as per the extant rules of Govt. of India and respective State Govt. shall be followed, if applicable.
- i. Energy Conservation Plan to be implemented as envisaged in the EIA / EMP report. Renewable Energy Purchase Obligation as set by MoP/State Government shall be met either by establishing renewable energy power plant (such as solar, wind, etc.) or by purchasing Renewable Energy Certificates.
  - ii. Monitoring of Carbon Emissions from the existing power plant as well as for the proposed power project shall be carried out annually from a reputed institute and report be submitted to the Ministry's Regional Office.
  - iii. Energy and Water Audit shall be conducted at least once in two years and recommendations arising out of the Report should be followed. A report in this regard shall be submitted to Ministry's Regional Office.
  - iv. Environment Cell (EC) shall be constituted by taking members from different divisions, headed by a qualified person on the subject, who shall be reporting directly to the Head of the Project.
  - v. The project proponent shall (Post-EC Monitoring):
    - a. send a copy of environmental clearance letter to the heads of Local Bodies, Panchayat, Municipal bodies and relevant offices of the Government;
    - b. upload the clearance letter on the web site of the company as a part of information to the general public.
    - c. inform the public through advertisement within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment, Forest and Climate Change (MoEF&CC) at <http://parviesh.nic.in>.
    - d. upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same periodically;
    - e. monitor the criteria pollutants level namely; PM (PM<sub>10</sub> & PM<sub>2.5</sub> incase of ambient AAQ), SO<sub>2</sub>, NO<sub>x</sub> (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same

at a convenient location for disclosure to the public and put on the website of the company;

- f. submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MoEF&CC, the respective Zonal Office of CPCB and the SPCB;
- g. submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company;
- h. inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project and the date of commencement of the land development work.

**K. Corporate Environmental Responsibility (CER) activities:**

- lv. CER activities will be carried out as per OM No. 22-65/2017-IA.II dated 01.05.2018 or as proposed by the PP in reference to Public Hearing or as earmarked in the EIA/EMP report along with the detailed schedule of implementation with appropriate budgeting.

**L. Marine facilities:**

- lvi. As the seawater intake systems are required for the plant fall in CRZ area, recommendations from State Coastal Zone Management Authority (SCZMA) as per CRZ Notification shall be implemented.
- lvii. Marine intake and outfall pipelines shall be located as per the recommendations State Coastal Zone Management Authority (SCZMA).

**M. Sea Water Intake:**

- lviii. Seawater intake system shall be so designed and constructed to ensure sufficient seawater in terms of quantity and quality.
- lix. The withdrawal of seawater shall be preferably through a pipeline with a riser equipped with a velocity cap arrangement and bar screen to arrest the impingement of large marine organisms.
- lx. In all tide conditions (particularly at spring low tides) the riser head must be flooded with the required submergence of seawater above its top.

**N. Effluent Release:**

- lxi. At the effluent release point, maximum temperature of the discharge water shall not be more than 5°C and salinity shall not exceed 50 ppt with respect to that of the ambient seawater.
- lxii. Use of antifouling agents like chlorine / hypochlorite, shall be carefully controlled. The chlorine concentration shall not exceed 0.2 ppm at the effluent release point.

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- lxiii. The effluent when released at the selected location shall attain sufficient dilution so that near ambient water quality (particularly temperature and salinity) is attained within 500 m from the release location, at low tide.
- lxiv. The location of the diffuser shall be marked with a solar lighted buoy to avoid accidents.
- lxv. The site selected based on mathematical modeling shall ensure absence of recirculation of the effluent plume in the seawater intake area under all tidal conditions.
- lxvi. The effluent shall be released through a properly designed multiport diffuser above the seabed to facilitate its efficient initial mixing with the receiving seawater.
- lxvii. Efficacy of the diffuser shall be ascertained at least once in 2 years through scientific studies and corrective actions such as cleaning of the diffuser from marine growth, removal of silt deposits, etc. shall be taken up, if warranted.
- lxviii. Continuous online monitoring system for Temperature and Salinity shall be installed to monitor the quality of effluent.

**O. Common to intake and effluent:**

- lxix. The pipeline shall be buried below the seabed at a depth to ensure its stability under rough sea conditions particularly during cyclone / tsunami. The depth of burial will depend on the seafloor strata but normally the top of the pipeline shall be at least 1 m below the bed level. In the surf and intertidal zones, the pipeline shall be buried below the maximum scour level.
- lxx. In case of open channel, the channel shall be constructed as per the recommendations of State Coastal Zone Management Authority (SCZMA).
- lxxi. If the substratum is rocky the pipeline may be anchored to the rock provided the geology of the area satisfactorily supports the structure which shall be ascertained through geo-technical investigations.
- lxxii. Exposed pipeline section and riser shall be protected by armour stone from waves, boats anchoring, fishing activities etc.
- lxxiii. The location of the riser & diffuser shall be marked with a solar lighted buoy to avoid accidents from boats.
- lxxiv. Marine / Sea water quality shall be monitored at effluent release location at the center. Parameters to be monitored shall be as follows:
  - a. *Physico-chemical*: Temperature, Salinity, pH and Dissolved Oxygen.
  - b. *Biological*: Primary Productivity, Phytoplankton (Chlorophyll a, Phaeophytin, Population, Species), Zooplankton (Biomass, Population, Species) and Benthos (Biomass, Population, Species).
- lxxv. The Mangrove plantation shall be taken up in an area of 30 ha, along the coast/ on the banks of Kosasthalaiyar River, Ennore Creek and Bay of Bengal in consultation with State Forest Department.