Draft Environment Impact Assessment Report
for
The Proposed Modernisation of Existing Unit # 6 (500 MW) by change of fuel
at
Trombay Thermal Power Station

Executive Summary

Project Proponent

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EXECUTIVE SUMMARY

1. INTRODUCTION

Tata Power's Trombay Thermal Power Station (TTPS) has proposed modernization of its existing Unit # 6 (500 MW) by change of fuel from Low Sulphur Heavy Stock/ Low sulfur fuel oil (LSHS/LSFO) to low sulphur imported coal.

1.1 PROPOSED PROJECT DETAILS:

In 1960's the industrial growth demanded continuous uninterrupted power supply to the city of Mumbai. With this aim, the TTPS was established in 1956 for providing clean and uninterrupted power supply to the city of Mumbai and vital installations like Bhabha Atomic Research Centre (BARC), Refineries and Indian Railways. Presently the TTPS provides power to majority consumers (bulk & retail) in Mumbai and has an installed generation capacity of 1580 MW. TTPS consists of following thermal power generating units:

- Unit No. 4 - 150 MW - (Presently Stand by)
- Unit No. 5 - 500 MW - (Coal)
- **Unit No. 6 - 500 MW - (Oil)**
- Unit No. 7 - 180 MW - Gas Combined Cycle Power Plant (CCPP)
- Unit No. 8 - 250 MW - (Coal)

Table – 1: Salient Feature of the Project

Sr. No.	Components	Details
1	Project Type	Modernization of existing unit with change of Fuel from LSHS/ LSFO to coal
2	Capacity	500 MW
3	Area	Area of TTPS is 430 Acres
4	Location	Trombay, Near Mahul Village, Chembur, Mumbai, Maharashtra
5	Technology	Sub critical Boiler (Existing)
6	Fuel	Imported low sulphur low ash coal
7	Project cost	1174 Crores

1.2 OBJECTIVE OF THE STUDY:

This Environmental Impact Assessment (EIA) report is prepared for obtaining the Environmental Clearance (EC) from Ministry of Environment and Forests (MoEF), Government of India, New Delhi, for the proposed modernisation of existing Unit # 6 at TTPS. The Draft EIA report has been prepared in accordance with the Terms of References (ToR) issued by MoEF vide letter no. No.J-13012/121/2011-IA.II (T) dated 25th January 2012 and letter no. J-13012/121/2011-IA.II (T) dated August 24, 2012. EIA for the proposed project has been carried out by TATA Consulting Engineers Ltd., which is accredited by Quality Council of India (QCI) NABET

1.3 ENVIRONMENTAL SETTINGS:

The Environmental settings of the proposed project is given in **Table – 2**

Table – 2: Environmental settings of the TTPS

Sr. No	Particulars	Details
1	Elevation above MSL	0 - 6m
2	Climatic conditions (Annual as per IMD-Colaba)	Annual Mean Max Temp: 31.2 ^{0}C Annual Mean Min Temp : 23.7 ^{0}C Annual Rainfall : 2146 mm
3	Climatic conditions (Summer as per IMD-Colaba)	Maximum Temperature: 33.4 ^{0}C Minimum Temperature: 22.7 ^{0}C Rainfall: 4.4 mm
5	Site specific climatological data (Summer season 2012)	Maximum Temperature: 39.4 ^{0}C Minimum Temperature: 21.4 ^{0}C Rainfall: Nil
6	Nearest Highway	Sion Panvel Highway about 6 KM
7	Nearest Railway station	Kurla Railway Station about 7 km
8	Nearest Air Port	Chatrapati Shivaji International Airport about 12 km
9	Reserve Forest	Nil in 10 km Radius
10	Ecologically sensitive zones	Nil in 10 km Radius
11	Archaeological monuments	Elephanta caves about 5 km
12	Water bodies (River/ Lake))	Ashish Lake at about 4km
13	Defence Installations	BARC, Naval Communication Centre within 1 km area from site
14	Seismic Zone	III

1.4 JUSTIFICATION FOR THE PROPOSED PROJECT:

The peak power demand of Mumbai was 3391 MW (Including Maharashtra State Electrical Distribution Company Limited load fed by Mumbai) in June 2011, which is expected to increase to 4000 MW by the year 2014-15. The total generation availability in Mumbai is about 2277 MW resulting in a gap of about 1114 MW during Financial Year (FY) 2011-12 with all generating units generating at full capacity. This gap would further increase to 1723 MW by FY 2014-15 if no generation is added to Mumbai network.

This has increased the importance of embedded generation within the city of Mumbai at affordable cost. With the increase in the cost of LSHS/ LSFO of desired low sulphur, the Unit #6 generation is becoming unaffordable to the consumers. Hence, Tata Power has proposed modernization of existing Unit #6 by change of fuel to use low sulphur imported coal instead of LSHS/ LSFO.

Unit #6 (500 MW) is operational since 1990. It is currently being operated on LSHS/ LSFO and gas as and when available. LSHS/ LSFO of desired low sulphur is not available locally in adequate quantity to meet the environment norms. It has to be imported at very high cost resulting in uneconomical generation cost of power from Unit #6. The unit is currently operated

at 50% capacity only. Natural gas is not available in sufficient quantity and is unlikely to be available in near future also. With the widening gap between demand and supply of power, it is necessary that existing Unit #6 should be operated at full capacity with the only alternative fuel available which is low sulphur imported coal. Thus proposed modernization of Unit # 6 with coal firing is essential to meet the demand of power at reasonable cost to consumers.

2. DESCRIPTION OF PROJECT

A coal based thermal power plant converts the thermal energy of the coal into electrical energy. This is achieved by raising the steam to high temperature and pressure in the boilers, expanding it through the turbines and coupling the turbines to the generators which converts mechanical energy into electrical energy. There will not be any change in the production process after proposed modernization as coal will be utilised as fuel instead of LSHS/ LSFO. The generation capacity of the unit after the proposed modernisation of Unit #6 will be same as it will continue to generate 500 MW.

It is proposed that imported low sulphur low ash coal shall be used in Unit #6. With the use of imported coal, TTPS can remain within existing limits of emission and additional ash generated can be easily utilized by extending current facilities. Considering Gross Calorific Value (GCV) of 5000 Kcal/ kg of design coal, the coal requirement for Unit #6 at full load works out to 250 TPH i.e, 6000 TPD. Annual requirement at 90% PLF is estimated to be 2.0 Million MT.

There will not be any change in the water requirement after the proposed modernization of Unit #6. Presently Unit #6 requires 66,000 m^3/hr of sea water which is drawn from the Thane Creek. After the proposed modernization the quantity will remain same.

TTPS has its own captive coal berth facility for handling and unloading of coal for other units at Trombay. The same is operational with installed capacity of 2.4 million Metric Tonne (MT) per year. This existing facility will be suitably augmented with additional equipment to unload coal for Unit #6. This will increase the coal unloading and handling capacity of the Captive Coal Berth from 2.4 Million MT/ year to 4.4 Million MT/ year. Additional coal storage facility will be created next to the coal berth for storing coal up to 2 Lakh MT. The said facility will be provided with the mechanized coal handling system to handle coal in an environment friendly manner. The existing coal berth will be optimally utilized with additional equipment without increase in the length of berth.

Two coal conveyors are proposed from the captive coal berth to the Unit #6 for feeding the coal from the West side of the power Plant. The coal conveyor will be partially of belt type and partially pipe type with the proper covering arrangement to avoid dust emission. All existing system of captive coal berth will be utilized during the proposed modernization and there is no anticipation of any additional construction except installation of equipments for coal unloading such as additional coal unloader of 1500 TPH for enhancing coal unloading capacity, stacker reclaimer and conveying system.

The ash content in the coal will be approximately 4.5% to 5.5%. Total Ash generation after proposed modernization of Unit #6 will be 270 MT/ day. Out of this, Fly Ash generation will be about 216 MT/ day and bottom ash generation will be about 54 MT/ day. Fly ash will be utilized in Ready Mix Concrete, Cement plant, construction area etc. Bottom ash will be stored in hydro bins and same will be utilized in brick making.

Layout of the TTPS has been optimized considering the space requirements for all the equipment, systems, buildings and structures required for the proposed 500 MW coal conversion of existing Unit # 6. Hence there will not be any additional land required for the proposed modernization project.

3. DESCRIPTION OF THE ENVIRONMENT

Primary baseline environmental monitoring studies were conducted during summer season (March 2012 to May 2012), summary of same is as follows:

3.1 Meteorological Data Generated at Site:

The meteorological parameters were recorded on hourly basis during the study period near proposed plant site. The parameter like wind speed, wind direction, temperature, relative humidity, atmospheric pressure, rainfall and cloud cover.

The summary of meteorological data generated at site enlisted in below table:

Table – 3: Meteorological Detail of the project site

Sr. No.	Parameters	Min. Value	Max. Value	Avg. Value
1	Wind speed (m/s)	0.3	14.6	2.3
2	Temperature (°C)	21.4	39.4	26.9
3	Humidity (%)	19.5	86	54.7
4	Rainfall (mm)	Nil	Nil	Nil

3.2 Air Quality:

The study area represents mostly urban and developed environment. Seven ambient air quality monitoring stations were selected in and around project site within 10 km radius of the study area. The parameters like Suspended Particulate Matter (SPM), Particulate Matter<10µ (PM_{10}), Particulate Matter<2.5µ $PM_{2.5}$, Sulphur dioxide (SO_2), Nitrogen Oxide (NO_x) & Ozone (O_3)were monitored during Summer season of 2012. Ambient air qualities at these locations were compared with National Ambient Air Quality Standards. Summary of the results are given below.

- SPM

Out of the seven sampling locations the minimum concentration of SPM was observed as 199 µg/m^3 recorded at Ulva and Nhava Villages and the maximum concentration observed as 392 µg/m^3 recorded at Sewri Fort during the study period. The NAAQ standards of 2009 does not specify any standard for SPM.

- PM_{10}

Out of the seven sampling locations the minimum concentration for PM_{10} was observed as 75 µg/m^3 recorded at TTPS and with the maximum concentration observed as 212 µg/m^3 recorded at Uran Village during study period. Values at TTPS site are within the NAAQ standard.

- $PM_{2.5}$

  Out of the seven sampling locations the minimum concentration of $PM_{2.5}$ was observed as 29 µg/m^3 recorded at Nhava Village and the maximum concentration observed as 78 µg/m^3 recorded at Sewri Fort during the study period. Values at TTPS site are within the NAAQ standards.

- SO_2

  Out of the seven sampling locations the minimum concentration for Sulphur dioxide (SO_2) was observed as 12.5 µg/m^3 recorded at Nhava Village and the maximum concentration observed as 35 µg/m^3 recorded at Wadala Truck Terminus during the study period. Observed values are well within the NAAQ standards of 80 µg/m^3 for Industrial/ Residential/ Rural areas.

- NO_x

  Out of the seven air quality locations the minimum concentration observed as 22 µg/m^3 recorded at Nhava Village and the maximum concentration for Oxides of Nitrogen (NO_x) was observed as 40 µg/m^3 recorded at Wadala Truck Terminus during the study period. Observed values are well within the NAAQ specified standards of 80 µg/m^3 Industrial/ Residential/ Rural areas.

- Ozone

  Out of the seven sampling locations the minimum observed concentration of ozone was 41.7 µg/m^3 recorded at Maravali Church and the maximum concentration for Ozone (O_3) was observed as 73.9 µg/m^3 recorded at Sewri Fort during the study period. The O_3 concentrations in the region are observed to be well under the limits of 100 µg/m^3 as specified by NAAQ standards of 80 µg/m^3 or Industrial/Residential/Rural areas.

- Hg

  Heavy metal mercury was not detected during the entire study period in the study area at all the locations.

3.3 Water Quality:

Water samples were collected from eight locations (04 Surface Water and 04 Ground water). These samples were taken as grab samples and analyzed for various parameters to compare with the standards. Summary of the results is given below:

- pH: the pH level of samples are within the stipulated range as per drinking water standards IS10500 for SW 1.
- Inorganic parameters: the inorganic parameters such as concentration of sodium, chlorides, fluorides are stipulated range as per drinking water standards IS10500
- Hardness : Hardness and alkalinity values at Gavan Pada village and Elephanta Caves are high because of the close proximity to sea.
- Toxic chemicals/ heavy metals: Result shows that there is no toxic chemicals/ heavy metals in the water samples which indicate that there is no contamination.
- Microbial parameters: The microbial population in the water sample at Mahul and Gavan Pada village are higher than the drinking water standards, however, these sources are not

being used for the drinking purpose. The sources of water (well) are sparingly used. These wells are not cleaned regularly. Local municipal water supply is available for these villages.

- The inland surface water lake analyis reveals that the water is contaminated with coliforms. It was revealed by the residents surrounding the lake that the water is not used anywhere. This lake is also the immersion point during Ganpati festival.
- The comparative study of the sea water samples including samples near intake and outfall points reveal that all the parameters are in the range of regular sea water sample regime.

3.4 Soil Environment:

The soil samples were collected from five different locations from the study area. The analysis was carried out for various parameters. The project site and its vicinity is densely urbanized centre with number of industrial and commercial establishments. The open land is hardly available to delineate the contamination of the soil. The project boundary is also touching to the luxuriant green area of BARC vicinity, which can't be assessed due to security reason. However, observing the trees and greenery, it can be concluded that the area has healthy soil system to support greenery.

3.5 Noise Level Survey:

The noise monitoring has been conducted for determination of noise levels at six locations in the study area. Noise monitoring results reveal that the ambient noise levels at all locations are well within the limits as per Ambient Noise standards.

3.6 Ecology of study area:

A reconnaissance survey of the area was carried out during the study period to find out the existing baseline ecological condition. The field surveys were carried out during study period in order to observe and understand the ground features. A detailed inventory of trees, shrubs, herbs, climbers was made through primary and secondary sources.

As most of the region is covered by the built up area, no forest cover is seen within the study area. Vegetation cover is seen on BARC hills, Elephanta Island and Maharashtra Nature Park. Mangrove patches are seen on the coastal region of Elephanta Island, Thane creek, Mahul creek & Mahim creek. No Sanctuary, National Park, Reserved Forest observed within study area of 10 KM from TTPS except recently declared Mangrove forest. Detail flora and fauna study has been carried out and incorporated in EIA report. Marine Ecology study has been carried out by Central Marine Fisheries Research Institute (CMFRI), Mumbai

3.7 Socioeconomic Status:

TTPS falls in M ward (West) as per MCGM record. The area is well developed due to the various industries like refineries of Hindustan Petroleum Corporation Limited (HPCL) and Bharat Petroleum Corporation Limited (BPCL), RCF, Aegis Chemicals etc. and vital installations like BARC and Naval Communication Centre. The area is well connected with road network and has all the amenities like drinking water, schools, health care centers, bus services, police station, post office etc.

The project site touches the most densely populated metro conglomerate of Mumbai. The 10kms radial distance comprises of area like Kurla, Sion, Chembur, Maravali Church, Wadala Truck Terminus, Sewri Fort etc.

The demography details of the study area is presented in Table 4. The salient features of the study area are as follows:

- Total population of the study area is 7,03,603 (M-E & W ward).
- Scheduled Caste population is 6.03% while Scheduled Tribe population in the study area is only 0.81%
- Sex ratio (No. of females per 1000 males) is 791 which indicates that females are less in number than the male in the study area. This also indicates that this being an industrialized area a high migrant population of male workers leading to low sex ratio.
- The overall literacy rate is 66.72%

Above findings are based on the Census study conducted in 2001. However, the demographic pattern in last 10 years has changed dramatically in many parts of Mumbai.

The 2011 census data is still not yet available. Some provisional information is available in public domain. The salient features as per the provisional census 2011 of the study area are as follows:

- Total population of Mumbai Suburban area is about 9,332,481
- Sex ratio (No. of females per 1000 males) is 857 which indicates that females are less in number than the male in the study area
- The overall literacy rate is about 82.32%

Table 4: Demographic Structure of the Study Area - 2011 Data

Name of Village/ Town	Population								
	Total			0-6 years			Literates		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Mumbai sub urban area	9,332,481	5,025,165	4,307,316	876,917	459,101	417,816	7,685,917	4,304,754	3,381,163

* Source; Census CD 2011, Maharashtra (provisional figures)

4. ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

4.1 IMPACT DURING CONSTRUCTION PHASE:

4.1.1 Impact on Air Quality

Particulate matter is the predominant pollutant affecting the air quality during the construction phase, especially during dry condition. Major construction activities responsible for dust and gaseous emissions are as mentioned below:

- Excavation and earth work for foundations
- Civil work at site
- Vehicles transportation for sourcing of building material to site.

Dust suppression by spraying of water will reduce these impacts considerably.

The impact due to additional vehicles plying during the construction period is of temporary nature and their impact on air quality will not be significant.

4.1.2 Impact of Noise Level

The major noise generating source during the construction phase is vehicular traffic, construction equipments like dozer, scrapers, concrete mixer, crane, generators pumps, and compressor, rock drills, pneumatic tools, vibrators, etc. During construction, these equipments will generate noise ranging between 75-85 dB (A). This can be mitigated by providing proper Personal Protective Equipment (PPE's) to the labours working at site.

4.1.3 Impact on Water Quality

Approximately 1000 temporary workers are expected to be involved in construction phase. It is expected that most of the construction workers may be made available from the nearby areas in the vicinity of the project site. No migration of workers is envisaged for this project. Since, only local workers would be engaged for the project, sanitation problem is not expected. Existing sanitation facility will be provided for the workers working during the construction phase. So the overall impact on water environment due to construction of proposed project is likely to be temporary, short term and insignificant.

4.1.4 Impact on Soil Quality

This is a modernization project and all the construction activities will be limited for the plant area only. Therefore, no additional impact on the soil quality is expected due to construction activities within the plant and surrounding area.

4.1.5 Impact of Solid Waste Generation

Solid waste during the construction phase will consist primarily of scrap building materials, excess concrete and cement, rejected components and materials, packing and shipping materials (pallets, crates, Styrofoam, plastics etc.) and human waste. It is expected that there will be generation of sizeable amount of garbage, which will be taken care by the existing solid waste management practices of TTPS. Hazardous waste will be stored separately and disposed off appropriately using the facilities already existing for the plant.

4.1.6 Impact On Land Use

As the proposed project is a modernization project, therefore, most of the facilities already existing shall be used. Site is already having industrial land-use; hence no change in land-use is envisaged due to the proposed modernization.

4.1.7 Impact On Ecology

Trombay already has built up areas including operational areas, plants, stores, offices, etc. Removal of vegetation is not expected and all the construction work will be carried out in the premises of the existing plant. The green belt will also be strengthened to contain the dust and noise due to various activities. Hence no significant impact on ecology is expected during construction phase.

4.1.8 Impact On Socio-Economics

In addition to the opportunity of getting employment as construction labourers, the local population would also have employment opportunities in related service activities like commercial establishments, small contracts/subcontracts and supply of construction materials for buildings and ancillary infrastructures etc. There will be positive impact for the local workforce during construction phase of the project.

4.2 IMPACT DURING OPERATION PHASE:

4.2.1 Impact on Air Quality:

Prediction of impacts on air environment has been carried out using Industrial Source Complex (ISCST3) to find out Maximum Ground Level Construction of PM, SO_2 and NO_x. Two scenarios were developed, scenario 1 represents Ground Level Concentration (GLC) of existing operations due to TTPS and scenario 2 represents GLC after proposed modernisation. The worst case maximum GLC of all the pollutants were observed at about 4.5 km in the SE direction from the project site.

The result of Industrial Source Complex Short Term (ISCST 3) model is tabulated below:

Table –5: Summary of Results of Air Quality Impact Assessment – Worst case scenario

Particulars	PM (µg/m^3)	SO_2 (µg/m^3)	NOx (µg/m^3)
Scenario 1	2.24	3.91	4.58
Scenario 2	1.94	3.85	4.43
Change	-0.3	-0.06	-0.15
Change %	-13.4	-1.5	-3.3

After the implementation of proposed modernisation project there will be reduction in level of PM, SO_2 and NO_x due to installation of pollution control equipments. Therefore, the proposed modernisation project is not likely to have any significant adverse impact on the ambient air quality of the surrounding area.

- Fugitive Emission:

The modernization of Unit #6 will increase the coal consumption of the entire TTPS, thus increasing the coal handling. TTPS has existing port facility which is proposed to be augmented by additional coal handling and unloading equipments. Fugitive emission control will be done by covering all the conveyor belts carrying coal, setting up of dust suppression system, strengthening green belt around coal yard etc.

4.2.2 Waste water treatment and disposal:

There will not be any additional water requirement for the proposed modernization project. Presently Unit # 6 requires 66,000 m3/hr of sea water for condenser cooling. There will not be any additional fresh water requirement due to the proposed project. The discharge water will meet all the norms prescribed by Maharashtra Pollution Control Board (MPCB) as per the existing Consent to Operate. Domestic effluent will be treated in Sewage Treatment Plant (STP) and the treated water will be utilized for gardening and for spraying on coal. Hence there will not be any significant negative impact on water resources in the study area due to proposed project.

4.2.3 Impact on Noise Level

Noise level within the plant boundary of TTPS is found to be within the prescribed ambient standard. Adequate protective measures during operation phase will be provided in the form of earmuffs/ ear-plugs to the workers working in high noise areas. All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources. In addition, lower exposure can be achieved by carrying out remote operation where ever possible.

4.2.4 Impact on Ecology:

The impacts of pollutants on surround environment were identified. Air dispersion modelling is carried out to delineate its concentrations at different locations. The modelling results reveal that; the resultant concentrations for study period are within the limits as per National Ambient Air Quality Standards. Hence impact on ecology is not expected.

CMFRI has also carried out the rapid marine impact assessment study to quantify the impact on marine ecology due to the additional barge movement into the sea. The result shows that there will not be any adverse negative impact on marine environment due to increase in barge movement for carrying coal to captive coal berth of Tata Power due to adaptation of best practices during the present operations.

5. ENVIRONMENTAL MONITORING PROGRAM:

TTPS is regularly carrying out environmental monitoring for various environmental components like air, water, meteorology etc. as per the Consent to Operate granted by Maharashtra Pollution Control Board (MPCB). Same will be followed during construction and operation phase of the project.

6. ADDITIONAL STUDIES:

Being an operational unit, TTPS has well set risk assessment and disaster management plan in place. Risk associated with the coal handling system has been evaluated and the mitigation measures were suggested. These will be implemented during the project execution. Same is being followed on regular basis.

The Marine Impact assessment has been carried out by Central Marine Fisheries Research Institute(CMFRI), Mumbai. Public Consultation report will be incorporate in EIA after the completion of public hearing.

7. ENVIRONMENT MANAGEMENT PLAN:

Environment Management Plan has been prepared during construction and operation phase to mitigate the impact arising from the project site. Same is summarized below:

7.1 DURING CONSTRUCTION PHASE:

Table No- 6: EMP During Construction Phase

Sr. No	Components	Probable Source of Impact	Mitigation Measures
1.	Occupational Health and Safety	➢ Construction activities	➢ Necessary approved Personal Protective Equipment (PPE) like helmet, eye protection, safety belt should be provided to the employees and arrange training & awareness program for the effective use of PPE. ➢ Accessibility of site should be safely and properly marked for any danger point like slippage, deep hole, and mud should be identified and barricade. ➢ All material stores in tiers stacked, racked, blocked, interlocked or otherwise secured to prevent from sliding, falling or collapse. ➢ Aisles and passageways kept clear and in good condition. ➢ Live part of all electric equipment should be guarded

Sr. No	Components	Probable Source of Impact	Mitigation Measures
			against accidental Contact. ➢ Ground Fault interrupters should be used to protect the user. ➢ Ensure that effective and appropriate use of eye and face protection equipments are placed during cutting & welding. Proper mechanical ventilation system should be in place, which helps to exhaust the toxic gases.
2.	Air	➢ Excavation and earth work for site preparation; ➢ Civil work at site; ➢ Vehicles transportation for sourcing of building material to site.	➢ More emphasis should be given on deployment of vehicles with Pollution Under Control (PUC) certificates even for contractor vehicles/transporters. ➢ Workers shall be provided with protection masks. ➢ Dust covers will be provided on trucks that would be used for transportation of materials prone to fugitive dust emissions. ➢ Water sprinkling shall be done at the location where ever dust generation is anticipated.
3.	Noise & Vibrations	➢ Operation of machinery like compressors, compactors, concrete plant, cranes etc. as well as transportation of vehicles. ➢ Vibrations are caused due to heavy dumpers, and construction machineries	➢ Noise protection equipments such as noise shields for high noise producing equipments and ear muffs/plugs to workers shall be provided during construction activities. ➢ Maximum efforts shall be made to restrict use of noisy construction equipment during night hours. ➢ Vibration control damped tools shall be used and the number of hours that a worker used them will be limited.
4.	Water	➢ Site excavations ➢ Accidental spills of paints, oils, grease or other materials	➢ Minimum water to be used during construction.. ➢ Leak proof containers will be used for storage and transportation of oil and greases. ➢ Segregating all waste oils and lubricants from maintenance of construction equipment and disposing of them properly through approved agency/ disposal areas.
5	Land	➢ Dumping of construction spoils (plastics, glass, fiber insulation, roofing, steel piping)	➢ Existing solid waste management plan will take care of this construction waste. ➢ Construction workers will be trained for proper handling, storage and disposal of hazardous or toxic materials.
6	Socio economic	➢ Creation of employment opportunity in the	➢ Local people from the Greater Mumbai area will be employed during the construction process; ➢ Proper facilities, including drinking water, sanitation,

Sr. No	Components	Probable Source of Impact	Mitigation Measures
		region	transport within plant premises and other essential community services will be made available to the construction workers.

7.2 DURING OPERATION PHASE:

7.2.1 Air Quality Management

- Electrostatic Preceptor (ESP) of adequate efficiency shall be provided to limit the particulate matter emission below 50 mg/nm3
- A seawater scrubbing FGD unit, treating 100% of the flue gas flow from Unit #6 shall be installed, achieving 90% removal of SO_2 from the flue gas. This will help to maintain stringent SO_2 emission standard of 24 MT/day from TTPS.
- Low NOx coal burners provided by BHEL shall be installed
- Process interlocking system will be provided to trip off the complete process in case of failure of ESP
- Low Ash Low Sulphur coal shall be utilised

7.2.2 Fugitive Emission Control measures in the plant

To control the fugitive emissions, the following measures are proposed in the plant:

- Screw unloader shall be installed at coal berth to unload additional coal from barges
- All the coal conveyor belts shall be fully covered
- Adequate capacity air pollution control equipments shall be installed at all the transfer points to control the fugitive emissions during the coal conveying;
- An effective dust suppression system shall be installed at coal handling system;
- All the workers and officers working inside the plant are to be provided with PPEs;
- Adequate greenbelt shall be planned around the coal yard and coal berth plant to arrest the fugitive emissions;
- Water sprinkling shall be carried out on the coal stock pile to avoid fugitive emission;
- Adequate wind barriers will be provided to avoid dust going in the ambient air from coal storage area

7.2.3 Noise Level Management

Following measures will help in reducing the noise in and around the project site:

- All the machines will be well lubricated to reduce noise transmission
- Acoustic Enclosures shall be provided at high noise generating sources
- Workers at high noise generating sources shall be provided with PPEs

7.2.4 Water Pollution Management

- Process effluent water will be re-circulated within the process where possible. Where this cannot be re-circulated it will be treated to a suitable level and will be discharged to the sea;
- Adequate treatment of FGD water to be ensured before discharging into the sea

- Online temperature measurement shall be installed in the discharge channel
- A programme of ongoing monitoring shall be implemented to ensure that any discharge of process effluent water continues to meet required standards;
- No wastewater or waste materials will be discharged to ground;
- Regular dredging shall be carried out in the discharge channel so that the discharge channel would give the adequate cooling effect
- STP treated water shall be used for gardening and for coal dust suppression
- It is suggested to explore possibility of shifting of mangroves from the discharge channel within the plant premises elsewhere. This will open more area for the water to cool down in the channel itself. This may further increase the efficiency of cooling water channel to bring down the temperature of water to ambient level.
- Rainwater harvesting shall be carried out as per plan.

7.2.5 Solid Waste Management:

- 100% fly ash shall be utilised from day one by using the best practices presently followed at TTPS
- Use of low ash coal shall be used to control the fly ash generation from the unit
- Brick making plant shall be installed to utilize bottom ash for brick making
- Existing solid waste management facilities shall be extended to utilize the solid waste generated from the proposed modernization
- Hazardous waste generated from the proposed modernization shall be disposed of as per the Hazardous Waste (Management, Handling & Transboundary Movement) Rule, 2009

7.2.6 Conservation of Ecology in and around Trombay:

- BNHS has formulated Mangrove Conservation plan in and around TTPS. The recommendations as suggested in the plan shall be followed.
- CMFRI will be carrying out one year marine impact assessment study for Trombay. The final recommendations coming out from yearlong study shall be implemented by Tata Power.

7.2.7 Green Area Development Plan:

- Additional green belt to be developed around the coal yard
- Various species as suggested in the draft EIA report to be planted
- Grassing of the open area shall be carried out within the plant premises.

8. PROJECT BENEFITS:

The proposed project is a modernization of existing power generation Unit #6 at TTPS. With this modernization project, there shall be significant reduce in cost towards to power generation due to less price of coal compared to fuel oils or natural gas. Followings are some of the major benefits by implementing the proposed modernization project considering the physical infrastructure.

- An expected financial benefit of reduced cost of generation will result in lower tariff for Mumbai Consumers. Variable cost will be nearly one third at current costs and going to reduce further.
- Complete utilization of installed generation capacity at TTPS leading to more reliability on power generation especially in the current scenario of transmission restraints in import of power to the City of Mumbai.
- New Pollution Control Equipment viz. ESP and Flue Gas Desulpherizer (FGD) will be installed which is not going to increase the pollution load.
- The proposed changes will enable Unit #6 to operate at higher PLF and make the system more stable during islanded operation and shall be able to dispatch power at economical tariff to the neighboring grid during lean period of demand in Mumbai.
- There will not be any additional adverse environmental impact as proposed modernization will be within the existing premises of TTPS with optimal use of resources available.

8.1 CSR ACTIVITIES:

As a Tata Group Company, Corporate Governance is a way of life at Tata Power. The Company seeks to focus on enhancement of long-term value creation for all stakeholders without compromising on integrity, social obligations, environment and regulatory compliances. As a responsible corporate citizen, Tata Power has established systems to encourage and recognise employee participation in environment and social initiatives that contribute to organisational sustainability, training, learning, personal growth, conservation of energy and other scarce resources, promoting safety and health of its employees and of the neighbouring communities.

- AIMS & OBJECTIVES OF CORPORATE SOCIAL RESPONSIBILITY (CSR):

a) To improve the status of education, healthcare, environment, infrastructure etc of the villages falling in the study area of the project.

b) Developing assistance group to provide appropriate assistance and volunteering for relief and restoration at the times of national calamities.

c) Capacity building of the local people in all fronts of life.