Executive Summary

In order to meet the continued power and energy demand in the state of Maharashtra, Gupta Energy Private Ltd. (GEPL) proposes to expand the existing 2 x 60 MW TPP by addition of 2 X 270 MW coal fired Thermal Power Plant at Usegaon Village in Ghugus Tehsil, Chandrapur District. The expected expansion project cost will be Rs. 2900 Crores. The annual coal consumption for 2x 60MW is 3720 TPD and for 2x270MW will be 8640 TPD assuming average GCV value of ROM coal as 3350 KCal/kg and plant load factor (PLF) of 80%.

The Gupta Group is involved in various industrial activities e.g. coal, infrastructure, power, mining and logistics. The Gupta Group has in its fold - the investment arm Gupta Corporation Ltd., and other operating companies viz. Gupta Coal India Ltd., Gupta Coalfields & Washeries Ltd., Gupta Energy Private Ltd., PT Gupta Coal International and Gupta Infrastructure India Pvt. Ltd. The Group is amongst top Coal Beneficiation organizations of India, with a chain of Washeries across the country and is also known for efficient coal handling and cost effective logistics.

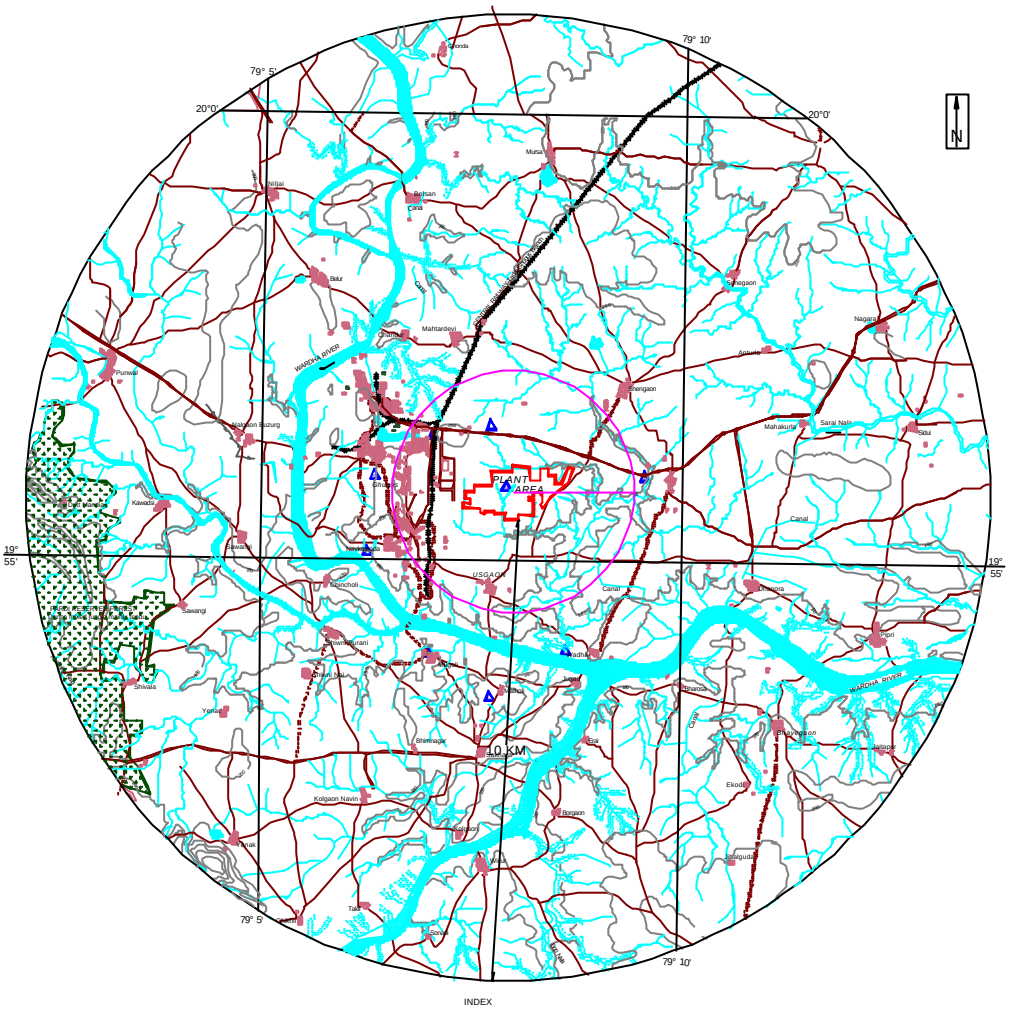
1.0 SALIENT FEATURES

The salient features of the study area (10 km radial distance) are described below

Salient Features of Project Site

Name of the Project	GEPL Thermal Power Project
Expansion Project	2x270 MW
Project Location	Villages: Usegaon, District : Chandrapur, State : Maharashtra
Latitude	19º 55' 45" (North)
Longitude	79º 08’ 02" (East)
Average Elevation	361 M above MSL

Topography	Slightly sloping towards East & towards South required moderate land development work.
Forest	No forest is existing and human habitation in core zone whereas Pardi Reserved forest exist at distance of 8 Km. admeasuring only 4.5 % of total study area.
Nearest Railway Station from the proposed site	Railway siding is at Ghugus Railway siding and the nearest Railway Junction is Chandrapur, which is on the Chennai - New Delhi Rail route, about 20 kms from site.
Distance of nearest Airport from the project site	Nagpur International Airport– about 150kms
Distance of nearest port from the project site	Mumbai Port – about 900 kms
Nearest Highway	State Highway (SH-246)
Nearest River	Wardha - 3 Kms
Nearest Power station	Chandrapur Super Thermal Power Station



2.0 PROJECT AT A GLANCE

Project at a Glance and principle features of the Power Plant are presented below:

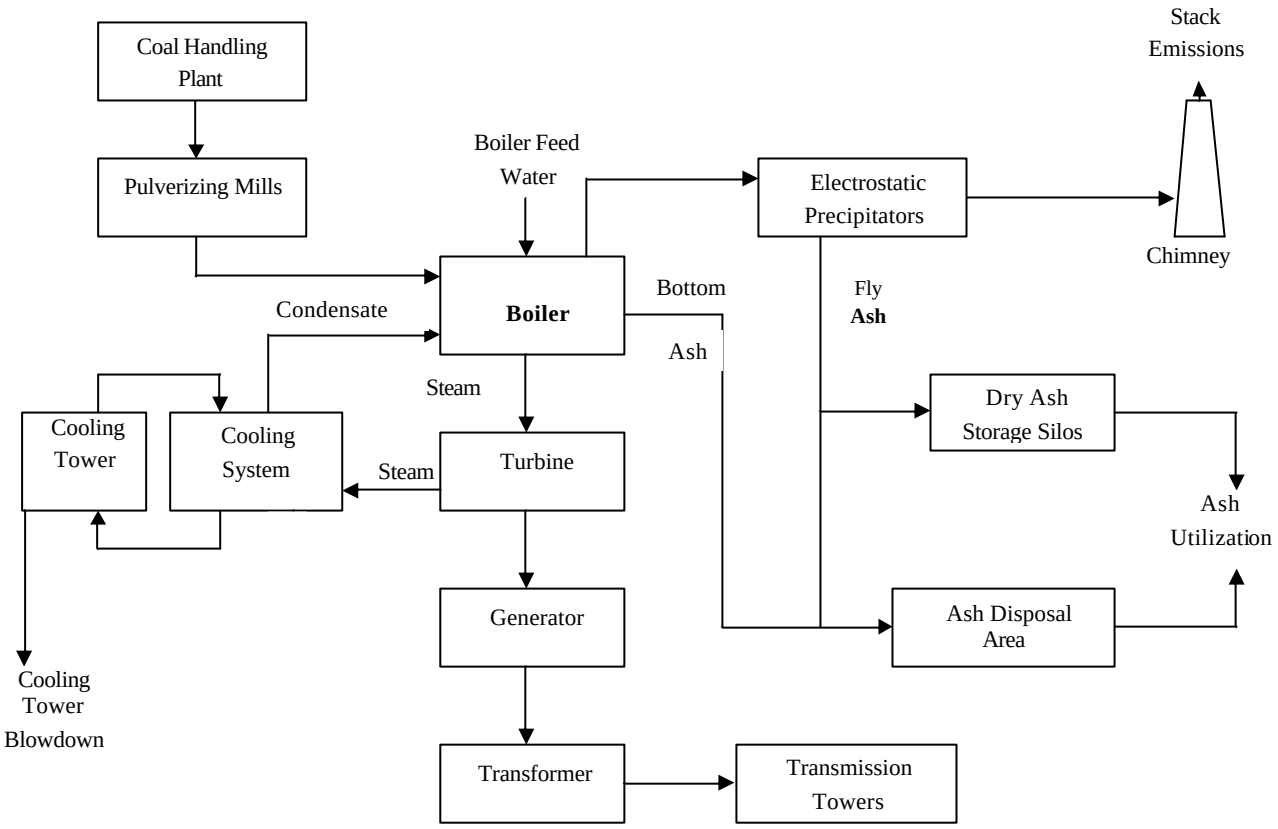
General :	
Project Proponent	**Gupta Energy Private Limited** Nagpur, Maharashtra
Location	Usegaon Village in Chandrapur District, Maharashtra State Latitude 19^0 55' 45" North & Longitude 79^0 08' 02" East. Elevation: 361.8 m above M.S.L Access: 5 Kms from the State Highway (SH-246) & and 20 kms from

Plant	Phase II: 2x270 MW (Proposed)
Plant Basics:	
Land	Area Required: 400 acres including Green Belt, ash
Primary Fuel	**Coal** Quantity/year: 2.7 Million Tonnes /Year GVC 3350 Kcal/kg at 80% PLF, Ash – 40% & Sulphur - 0.5% Source: W.C.L /C.C.L Transportation: By Rail,
Secondary Fuel	HFO & LDO- For Start-up and flame stabilization. Quantity/year:4000 kilolitres @ 1ml/unit Source: IOC depot, Nagpur.
	Transportation: By Road
Water	Quantity: 1300m^3/hr with Zero Discharge Source: Wardha River – 5kms away Mode: Intake Pump house at river bed and through Pipeline. 2 days storage at plant site
Power Evacuation	At 400 kV level through a Double circuit transmission Line via Bhadravati 400KV sub-station.
Project Details	
Technology	PF Boiler with Re-heat Cycle M.S :170kg/cm^2 /537^{0}C; Reheat: 537^{0}C
CW System	Induced Draft Cooling Towers (IDCT)
Coal Handling System	Unloading through Wagon Tippler & through Coal Conveyors. Crushed coal storage: 15 days Mill Bunker capacity : 12 hours requirement.
Ash Handling system	Fly ash & Bottom Ash: Dry collection and Dry disposal Fly Ash: Commercial Utilization (Progressively) Bottom Ash: in ash pond (storage for Plant Life

Environmental Aspects	A Bi-flue common stack of 220 M height to meet the standard set for dispersion of particulate and reduction in Sox and NOx (with use of Low NOx Burners)
	Multiple field twin-path electrostatic precipitators with separation efficiency of more than 99.8%
	Water System: Zero Discharge.
	Environmental aspects during construction, gets
	Green Field: Development as per MOEF guidelines.
	R& R: Nil
Manpower	Direct employment of about 301 persons during Phase-2 plant
Energy Conservation	Reduction in auxiliary power consumption: Methods like usage of VFDs, State of the art Technology etc which will be decided during detailed Engineering.

2.0 PROCESS DESCRIPTION

In thermal power generation, chemical energy of coal is first converted into thermal energy (during combustion), which is then converted into mechanical energy (through a turbine) and finally into electrical energy (through a generator). shows the schematic process flow sheet for coal fired thermal power plant. Its raw materials are coal, air and water.



Process Flow Diagram

The power generating units will consist of boilers, turbo-generators with accessories, transformer and other complementary parts. Coal from the coal handling plant will be transported to the boiler bunkers through Conveyor belts. Thereon, the pulverized coal will be fed to the boiler furnace with the help of heated air driven by primary air (PA) fans. Forced draught (FD) fans will provide additional controllable air to the burners to assist desirable combustion.

This combustion will produce ash, out of which the bottom ash will fall to the bottom of the boiler. The fly ash carried in the flue gases will travel through the electrostatic precipitators (ESP) where it will be precipitated on the high

voltage electrodes. The relatively clear flue gas will pass through the stacks with the help of induced draught (ID) fans.

3.0 BASIC REQUIREMENT OF THE PROJECT

Land

The area required to accommodate the Plant of 2 x 270 MW coal based TPP will be around 400 acres inclusive of Ash pond, Green Belt area etc. Since the proposed power plant is an extension to the existing plant, alternate sites were not considered.

Land Use Break up of Project Area

Ser No.	Land In Acre
Main Plant and its offsite facilities	136
Ash Pond	72
Water Reservoirs	22
Greenbelt	72
Colony/School/Hospital/ Road	87
Railway Siding	11
Total	400

Water Requirement

The total plant water requirement for the 2 x 270 MW Power Plant will be 1271m^3/day**.** Bulk of the water will be required for make-up of cooling tower and auxiliary cooling.

The wastewater generated from plant services and ventilation system only will be recycled in the plant whereas the balance will be lost while use in the facilities.

Wardha River is identified to cater the raw water demand to the proposed plant. Water is being drawn from river Wardha at a distance of 3 km plant. Water is being drawn from river Wardha at a distance of 3 km

through an underground MS Pipe line of 6-7 km and intake jack well. Three nos. pumps (2W+1S) of 600 m^3/hr each capacity is installed in Phase-I. Those pumps will be run on the rated capacity for 10 hrs/day to meet Phase-I water requirement.

8 million m^3 water per year is allotted by Irrigation Department for Phase-I from Wardha River. About 4.5 million m^3 of water is required for Phase-I. Balance 3.5 million m^3 (400 m^3/hr) of water is available for Phase-II. The total water requirement for phase 1 and phase 2 will be more for which the permission for additional requirement from the Irrigation Department is under consideration. The water requirement of the TPP will be limited to the sanctioned quantity. A raw water reservoir is constructed considering ten days storage facility for Phase-I and construction water requirement for Phase-II.

Coal

The steam generators of the proposed power plant will be designed primarily for coal firing. The coal will be sourced from the WCL and Eastern Coal Mines in Orissa and Chattisgarh command area. It is proposed to transport Coal from the coal fields by rail. Rakes of capacity approximately 3000 Tons each would be required. The daily traffic is expected to be of the order of 3 (three) incoming rakes for the 540 MW station. Wagon Tipplers are considered at the plant end for unloading system. Light Diesel Oil (LDO) will be used only for cold start and Heavy Fuel Oil (HFO) will be used as support fuel at low loads and flame stabilization. LDO/ HFo for the project will be sourced from nearest oil depot. It is envisaged that the required quantity will be brought via road transportation by means of road tankers.

Fuel Oil

The secondary fuel for the power plant will be Heavy Furnace Oil (HFO) as per IS:1593. Light Diesel Oil (LDO) will be used for start-up and HFO for flame stabilization at low loads. The HFO/LDO requirement is estimated to

be of the order of 4000 KL/year.

Water Pre-treatment Plant

The pretreatment plant will be designed to remove suspended/colloidal matter from raw water, before feeding the water into various systems. Pre-treatment plant will be capable to meet the water quality requirement for Demineralisation (DM) Plant, potable water system and other services. Softening plant will reduce the hardness of raw water and will make it suitable to feed into various service water requirements. DM plant feed water will not be softened quality.

Effluent Treatment System

The Waste Water Treatment system will be envisaged to collect and treat all the plant wastewater which are to be reused. The objective of the treatment is to make the wastewater suitable for disposal as per the guidelines of the State and Central Pollution Control Board (PCB & CPCB). All the wastewater after treatment will be fed to the common monitoring basin to ensure that the effluent meets the PCB stipulations before reuse within the plant and or disposal outside the plant. Collected water from central monitoring basin (CMB) will be used for ash/coal handling system.

Ash Handling

Bottom ash will be collected in dry form and disposed in ash disposal area. The dry fly ash, stored in the silos will be transported through covered/closed trucks. Fly ash from the intermediate fly ash surge hopper/ buffer hopper will also be conveyed in slurry form to the ash slurry sump through wetting unit in case of non lifting of fly ash by users. During the disposal of the ash vegetation will be grown on the discarded ash dump.

4.0 DESCRIPTION OF THE ENVIRONMENT

The baseline environmental quality for the Summer Season - 2010 was assessed in an area of 10 km radius around the proposed power plant.

Air Environment

The regional climatological data source from the IMD station at Chandrapur indicates that during summer season humidity varied between 39-65 % in the morning and between 20-49% in the evening. The mean Annual rainfall was 1509 mm. The minimum temperature was 12.8^{o}C (Winter Season) and the maximum temperature was 43^{o}C (Summer Season).

During the study period, the wind speed measured at the site varied from 1.2 to 15.8 m/s. The predominant wind directions are from ESE and SE.

The ambient air quality monitored at 9 locations selected based on predominant wind direction, sensitive areas, and human settlements indicated the following ranges for specified parameters:

PM_{10} - 29.3 to 58.6 µg/m^3.

$PM_{2.5}$ - 12.5 to 39.1 µg/m^3.

SO_2 - 6.6 to 14.1 µg/m^3

NO_x - 7.6 to 24.1 µg/m^3.

CPCB Standards (November 2009)				
Industrial, Residential and Rural Areas	100 µg/m^3 (24 hrly.)	60 µg/m^3 (24 hrly.)	80 µg/m^3 (24 hrly.)	80 µg/m^3 (24 hrly.)

The concentrations of PM_{10} $PM_{2.5}$, SO_2 and NO_x were found within the National Ambient Air Quality Standards (NAAQ). Total mercury was found to be below detection limit. The concentration of ozone - a secondary pollutant, were less than 19.5 µg/m^3 in the study area.

Noise Environment

The noise levels are within the MoEF Standards. The relative high values of noise recorded in some rural and suburban areas were primarily due to vehicular traffic and other activities. The minimum noise level 39.3 dB (A) and the maximum noise level 65.9 dB (A) were observed.

Water Environment

The Wardha river is only surface water source which is at 5.0 km south of the proposed plant site. Total 11 samples from Ground water and 3 samples from surface waters were collected. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (IS 10500 – 1993 except high concentration of total coli form, which may be due to the human activities.

Land Environment

Breakup of the Landuse/ Landcover based on satellite imagery

LANDUSE / LANDCOVER	AREA SQ METER	AREA SQ KM	AREA HECTARE	% AREA
Agriculture	232330613.93	232.33	23233.06	73.99064
Wasteland	23730604.78	23.73	2373.06	7.557516
Dense Forest	6032740.05	6.03	603.27	1.921242
Open Forest	8373757.88	8.37	837.38	2.666815
Mining	21700662.75	21.70	2170.07	6.911051
Industrial Area	4022665.75	4.02	402.27	1.281115
River	13311947.78	13.31	1331.19	4.239459
Waterbody	1007801.01	1.01	100.78	0.320955
Builtup	3489206.08	3.49	348.92	1.11121
TOTAL	314000000.00	314.00	31400.00	100.00

Flora & Fauna

The dominant species is Bamboo (Dendrocalamus strictus) unlike Pterocarpus marsupium, Terminalia spp., Madhuca indica, Tectona grandis, Anogeissus latifolia and Diospyros melanoxylon elsewhere in the area. The bamboo is associated with Diospyros melanoxylon, Emblica officinalis and Bauhinia vahlii. The ground flora represented (at the time of survey) by Rungia, Hemigraphis etc. were totally dry and often seen burnt down deliberately.

Herbivorous fauna: The herbivorous animals include sambar (Crenus unicolor), Common mangoose (Herpestes edwardoi), common langur Presbytis intellis).

Avifauna : A variety of bird life is seen in the area. The more important of them are: Duck (Casarca retula), crow (Corvus macrohynchos), bulbul (Pycnonotus sp.,) jungli murgi (Gallus sonnerati), peafowls (Pavocristatus),wood peckera (Dendrocopas mahratlensis) and doves (Streptopelia decocta).

Anticipated Environmental Impacts & Mitigation Measures

During the Operation Phase of the power plant the environmental concerns would result from air emissions, water pollution, noise emissions and solid waste generation.

Air Environment

Major sources of air pollution in a coal-based power plant are boilers, crushers and stockpiles. Fugitive dust emissions are also inevitable from raw material handling system as well as packaging and transportation sections. The pollutants of concern are therefore SPM, RPM, sulphur dioxide and oxides of nitrogen.

With the provision of ESP of high efficiency (99.89%) particulate emissions will be limited to 50 mg/Nm^3. Further, a 220 m high stack will be provided for adequate dispersal of SO_2 and emissions of NO_x will be controlled by using low NO_x burners.

The predictions using Industrial Source Complex AERMOD Model indicate that the maximum incremental 24 hourly Particulate Matter SO_2 & NO_x will be 2.46, 53.88 and 48.89 µg/m^3 respectively at a distance of 2.5 km from the emission source.

The predicted GLCs when superimposed on the baseline concentrations (98^{th} percentiles) indicate that the air quality will be within the prescribed NAAQ Standards for residential areas in the post-project scenario.

The dust generated from coal handling plant will be insignificant because of handling in closed circuit. For further suppression of dust adequate water spray system will be provided. Adequate thickness of insulating material with proper fastening will be provided to control thermal pollution. Fugitive emissions from the ash pond will be controlled by maintaining water cover over the deposited ash. Green belt development and afforestation in the plant and surroundings of the ash disposal area will also minimize the dust pollution.

Noise Environment

Noise generating sources in the power plant include rotating equipments, feed pumps, boiler and super heater safety valves, steam turbine, compressors etc. Noise control will form an integral part of the plant design. The equipments will have inbuilt noise control devices and the measured noise produced by any equipment will not exceed 85 dB(A) at a distance of 1 m from it in any direction. The noise produced in valves and piping will be attenuated to 75 dB(A) at a distance of 1 m from the source by using low noise trims, baffle plate silencers/line silencers, acoustic lagging (insulation),

thick-walled pipe work etc. Noise proof cabins will be provided to operators wherever feasible.

Predictions have been made for worst-case scenario considering all the operations and utilities are in operational conditions. The predicted Noise Levels at the proposed plant boundary are below the ambient noise standards. It is predicted that the high noise levels will be limited to work zone only and the noise levels gradually decreases further away from the source. Therefore the impact of noise due to proposed power plants will be insignificant.

Water Environment

No major impact on ground water quality is envisaged because all the wastewater generated from the proposed power plant will be treated in the effluent treatment plant and reused for ash management, dust suppression and green belt development.

The plant area will be designed with a network of drains to channel runoff during the rainy season. The surface water run-off from the coal stack yard will be led to a sump for settling and the overflow will be discharged to storm water drain after treatment if required to meet the effluent discharge norms. Rainwater harvesting measures will be implemented to utilize the storm water inside plant premises.

Solid Waste

The main solid waste from the proposed power plant will be ash (Fly ash and Bottom ash). The average coal consumption rate from the power plant will be 8640 TPD and plant load factor of 0.85 , which would result in the ash generation of about 3456 TPD. Out of this, the bottom ash will be about 20% of the total ash generated i.e. 691 TPD and the fly ash will be 2765 TPD. It is proposed to utilize 100% of the fly ash for which ash utilization plan is ready. During emergency the ash will be disposed off

safely in ash pond area. Bottom ash and unutilized fly ash will be disposed off in the ash pond. To control fugitive dust emission from the ash pond area water layer will be maintained above the ash pond. After the ash pond is abandoned, the area will be reclaimed through tree plantation. The non-hazardous sludge generation from the guard pond which will be small in quantity will be disposed in a landfill.

Socio-economic Environment

Rehabilitation and resettlement of population involved is under process and will take into account the socioeconomic status of the area, homestead oustees, landless labourers etc.

The proposed project is expected to have several positive impacts on demography and socio-economic condition by way of increase in employment opportunities leading to reduction in migration of locals for employment; growth in service sectors; improvement in prices of indigenous produce and services benefiting local people; improvement in transport, communication, health and educational services etc.

5.0 Environmental Monitoring Program

Environment Management Cell will handle the environmental management system in the unit. The environmental management cell will be headed by Head of Safety (Safety, Health & Environment). HOS will be responsible to HOD (Technical Services). The HOS will be assisted by officers to look after the safety and environmental factors round the clock.

Monitoring Program

The Environment Management Cell is the nodal agency to co-ordinate and to provide necessary services on environmental issues during operation of the

project. This environmental cell is responsible for implementation of environmental management plan, interaction with the environmental regulatory agencies, reviewing draft policy and planning. This cell interacts with Maharashtra Pollution Control Board and other environment regulatory agencies. The cell also interacts with local people to understand their problems and to formulate appropriate community development plan.

Environmental Laboratory Equipment

The industry has an in-house environmental laboratory for the routine monitoring of air, water, noise, and soil quality. For all non-routine analysis, the plant may utilize the services of external laboratories and facilities.

Monitoring System:

Online stack monitoring system will be installed in the plant premises. Ambient monitoring stations will be suitably located, preferably in the vicinity of Boiler, Steam Generator, Steam turbine, Coal stockyard, and Ash disposal area.

- The equipment / instruments of the monitoring station will be housed in suitable enclosure / room.
- Power supply to the station will be made from the central UPS system for all plant instrumentation / emergency shutdown systems for process plants.
- The monitoring stations will include sampling & analysis provisions for particulate Matter PM_{10} & $PM_{2.5}$ NO_x, SO_2

Fire Fighting Arrangements

A Fire Hydrant system has been proposed to meet the norms, in addition to providing fire extinguishers at respective places wherever required.

- Project Authority will strictly adheres to all fire protection and safety measures suggested by manufacturers
- Safety training will be provided to all the employees.
- No open fire is allowed and also smoking is strictly prohibited within the premises.
- Signboards will be displayed in restricted areas.
- The fuel storage yards will be isolated and maintained properly such that there is no chance of ignition.
- The electrical system will be designed with safety provisions like flameproof fittings in the vulnerable areas and also by providing isolated distribution system.
- EPCL will provide fire-fighting equipments at various locations in the plant premises.

Environmental Budget

EPCL has proposed to take adequate measures to mitigate all possible adverse impacts at the plant premises. EPCL has earmarked an amount of Rs.66 Crores for the Environmental Protection and Corporate Social cost for the proposed Thermal Power Plant.

6.0 ADDITIONAL STUDIES

Risk Assessment & Environment Management Plan

Possible emergencies that can arise in the power plant due to operations and storages and handling of the fuels and gases are explosion in boilers, turbo generators, transformers and hydrogen plant; heavy leakage and subsequent fire in the fuel oil handling area and storage tanks; large fires involving the coal stockyard and coal handling areas; and accidental release

of ash slurry; chlorine leakage in the water treatment plant etc. Out of these, the major fire and explosion hazards are due to storages of LDO, HFO and cylinders of hydrogen and chlorine.

The high intensity thermal radiation contours due to HFO and LDO storage tanks on fire would be confined to the plant premises. Hence, the effect of thermal radiation levels on general public outside the plant premises would be insignificant. To minimize the risk, the firewater cooling system and foam facilities will be provide as per OISD requirements.

The threat zones due to the storage of hydrogen and chlorine cylinders would be within the plant premises. All standard measures of safety such as regular inspections of piping and appurtenances for damage and corrosion; storages in a cool, dry, well-ventilated area away from incompatible materials in tightly sealed containers; labeling in accordance with OSHA's Hazard Communication Standard; special training in safety to workers handling and operating chlorine containers, cylinders, and tank wagons; approved storage cabinets, tanks, rooms and buildings to store cylinders will be taken.

All the instruments like pressure, temperature transmitters/gauges and alarms switches and safety interlocks will be tested for their intended application as per the preventive maintenance schedule. Similarly, the emergency shutdown system will be tested as per the preventive maintenance schedule.

Hydrocarbon, smoke and fire detectors will be suitably located and linked to fire fighting system in the vulnerable zones to reduce the response time and ensure safe dispersal of vapours before ignition can occur. Combustible materials will not be kept in storage and process areas as well as road tankers loading/unloading sites where there is maximum possibility of presence of flammable hydrocarbons.

Disaster Management Plan

The DMP will be designed to intercept full range of hazards specific 'to power plant such as fire, explosion, major spill etc. Emergency medical aids to those who might be affected by incident heat radiation flux, shock wave overpressures and toxic exposure will be inherent in the basic capabilities. The most important capability of this DMP will be the required speed of response to intercept a developing emergency in good time so that man made disasters are never allowed to happen.

Since the fire and explosion hazards in power plants mainly occur in the event of loss of containment, one of the key objectives of technology selection, project engineering, construction, commissioning and operation is "Total and Consistent Quality Assurance". The DMP will consist of "On-site Emergency Plan" and "Off-site Emergency Plan" and will be prepared in consonance with the guidelines laid by the MOEF.

7.0 PROJECT BENEFITS

- Increase in employment opportunities and reduction in migrants to outside for employment.
- The project would provide direct employment.
- Increase in literacy rate.
- Growth in service sectors
- Improvement in socio cultural environment of the study area.
- Improvement in transport, communication, health and educational services.
- Increase in employment due to increased business, trade commerce and service sector.

8.0 ENVIRONMENTAL MANAGEMENT PLAN

The EMP will deal with various pollution control measures for mitigating environmental impacts identified during the construction and operation phases of the proposed power plant.

CONSTRUCTION PHASE

Pollution control measures for mitigating environmental impacts identified during the construction phase are as under:

- Site for workers camp will be clearly demarcated and necessary basic needs and infrastructure facilities including water, sewage disposal, drainage and power will be provided to them.
- Safety norms for storage of the petroleum products at the construction site will be followed.
- Vehicles will be properly maintained and shall comply to the exhaust emission requirements.
- Accidental spill of oils from construction equipment and storage sites will be prevented.
- Noise prone activities will be restricted to the day time.
- Tree plantation will be undertaken during the construction phase so that they grow to reasonable height by the time of commissioning of the project
- On completion of construction, surplus of excavated material will be utilized for leveling and all surfaces will be reinstated.
- Preference will be given to local eligible people through both direct and indirect employment.

- The workers will be encouraged to allow their children to attend school.
- The safety department will supervise the safe working of the contractor and their employees.

OPERATIONAL PHASE

Air Environment

The major pollutants from a coal based thermal power plant are PM_{10} and $PM_{2.5}$, Sulphur Dioxide and Oxides of Nitrogen.

Stack Emissions

The following measures will be adopted for the control of emissions from the stacks of the proposed power plant.

- Suitably designed ESP with efficiency of 99.9 % will be placed downstream of the stacks which will separate out the incoming dust in flue gas and limit the dust concentration (SPM) at its designed outlet concentration of 100 mg/Nm^3. However the environment management plan will be worked out to maintain the emissions at the outlet of the stack for SPM about 50 mg/Nm^3.

  The height of the stack will be 220 m and is of multi flue single chimney.

- Complete combustion takes place in the bed itself. Hence no formation of carbon monoxide
- A well-designed burner system, will limit the temperature to maintain low concentration of NO_x.
- Stack emissions will be regularly monitored by GEPL/external agencies on periodic basis.

- Space provision for retrofitting FGD system will be made if required in future

Fugitive Emission Management

- The dust generated from coal handling plant will be suppressed by providing adequate water spray systems
- All vehicles and their exhausts will be well maintained and will be regularly monitored for emission generated from the vehicle exhaust;
- The green belt development in the plant and at ash disposal areas will be undertaken.

Noise Environment

- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Vibration isolators will be provided to reduce vibration and noise wherever possible
- Manufacturers and suppliers of machine/equipment like compressors, turbines and generators will be selected to ensure that the machine/equipment meet the desired noise/vibration standards by providing noise absorbing material for enclosures or using appropriate design/technology for fabricating /assembling machines.
- Proper lubrication and good housekeeping will be practiced to avoid excessive noise generation;
- The workers working in the high noise areas like compressor houses, blowers, generators, feed pumps, steam generation plant and turbo generator area will be provided with ear muffs/ear plugs
- Acoustic laggings and silencers will be provided in equipment wherever necessary. The compressed air station will be provided with suction side silencers. Ventilation fans will generally be installed in enclosed premises

Solid Waste Management

- Major solid wastes from the thermal power plant are bottom ash and fly ash. These are expected to be generated at a rate of bottom ash-691 TPD & fly ash-2765 TPD.
- Fly ash and bottom ash will be collected in dry form and stored in the silos and fly ash will be supplied to cement manufacturing plants and for manufacturing other construction materials like pavement blocks, hollow / solid blocks, mosaic tiles, bricks etc.
- A liner system shall be provided to arrest infiltration of leachate from ash pond to the subsoil in order to protect groundwater quality. It is desirable to provide an impervious liner and/or bottom drain at the base of an ash pond. The water from the bottom drain will monitored regularly to assess its suitability for greenbelt development.
- Waste oil will be stored in leak proof steel drums and sent to the "Spent Oil Storage Site". The waste oil drums will be properly identified with label of its contents both in local language and English. It is proposed to be disposed off by burning it in the boilers under controlled conditions or by selling it to authorized vendors;
- Litter, fuel, oil drums, used grease cartridges will be collected, composted and will be used as fertilizers in green belt development within the plant premises.
- Dust bins will be placed at requisite locations

Water Environment

The necessary design parameters and material of construction for cooling system including cooling towers will be selected in such a way that they are able to utilize water from the clarifier. Provision for oil/grease separators will be made to skim oil / grease, if any in the waste water. Zero

effluent discharge will be practiced by recycling the waste water for dust suppression, plantation etc. The following Management plan are recommended ;

- The treated effluents from all streams will be stored in a guard pond having 3 days retention capacity.
- The heat cycle makeup requirement for thermal power plant will be met from dimineralized water.
- All the treated effluents will be monitored regularly for flow rate and its characteristics in order to assess the performance of the ETPs. Appropriate measures will be taken if the treated effluent quality does not conform to the permissible limits.

Conclusion

The potential environmental, social and economic impacts have been assessed. The proposed power plant has certain level of marginal impacts on the local environment. With effective implementation of proposed environment management plan, these effects will get marginalized. Implementation of the project has beneficial impact in terms of providing direct and indirect employment opportunities. This will be a positive socio-economic development in the region.