EXECUTIVE SUMMARY

INTRODUCTION

Adani Pench Power Limited (APPL), a fully owned subsidiary of Adani Power Ltd is planning to set up a 1320 MW (2 x 660 MW) Coal based Supercritical Thermal Power Project near Chausara village in Chaurai and Chhindwara Tehsil, District-Chhindwara, Madhya Pradesh.

The first unit of 660MW is expected to be completed within the period of 42 months from the date of Financial Closure, while the complete plant shall be under commercial operation within 45 months.

Adani Pench Power Ltd. has appointed GIS Enabled Environment & Neo-graphic Centre (GreenC) to carry out Environmental Impact Assessment (EIA) study for preparation of Environmental Management Plan (EMP) for the proposed 1320 MW coal-fired Thermal Power Plant (TPP).

PROJECT DESCRIPTION

The proposed site is located in Chaurai and Chhindwara Tehsil, District Chhindwara, Madhya Pradesh. The site is surrounded by villages Dhanora, Chousara, Dogwani Pipariya, Hiwerkhedi and Thawriteka. The site is well accessible by an all weather motorable village roads. These roads can also be used for transporting the construction materials and equipments for the power plant to the site during construction.

The total land required for setting up 1320 MW plant is 300 hectare including the main plant and all its auxiliary systems, township, ash disposal area and greenbelt. The land for the project has been transferred by MP Tradeco Ltd. along with basic infrastructures. There is no Rehabilitation and Resettlement issues involved

The coordinates of the plant site including ash pond is between Latitude 22°08′52.90″N to 22°09′57.10″N and Longitude 79°08′02.30″E to 79°08′56.40″E. The nearest town Chhindwara and nearest railway station Parasia are 25 km from the project site. The nearest access road SH-47 is 15 km from the project site.

The water requirement for the proposed project will be met from the reservoir upstream of Pench Diversion Dam located at a distance of 8 km from the proposed project site. Water will be transported through dedicated pipelines from the source and treated in Pre-treatment plant. The treated water will cater the plant needs such as power cycle make up, auxiliary cooling water, services, potable water, etc. Water requirement for the proposed 2 x 660 MW power plant is
estimated to be 33.3 MCM/Annum. A water reservoir for 15 days storage is proposed at the site to meet the water requirement of the plant.

Indigenous coal will be made available from nearby coal mines and the same will be transported to the project site by railway wagons. Storage of 15 days requirement of coal is proposed at the power plant. The annual requirement of coal is estimated to be 5.7 MTPA (Million Tons per annum) for the two units of 660 MW, considering a gross calorific value of 3900 kcal/kg at 90% plant load factor and station heat rate of 2150 Kcal/Kwh.

Light Diesel Oil (LDO) will be used as an auxiliary fuel for cold start-up. The requirement of fuel oil has been estimated to be around 15,610 KL per annum.

It is proposed to sell power generated from the station at 400 KV / 765 KV level to Madhya Pradesh or other states utilities through existing / proposed State Grid & Power Grid Corporation of India Limited (PGCIL) system. Also the proposed power plant needs to consider the options of connecting to Madhya Pradesh Transmission Company Limited (MPTCL) system or the Power Grid Corporation of India Limited (PGCIL) network depending upon the option for sale of power (Intra State v/s Interstate). Study for grant of open access to the project through PGCIL shall also be initiated. The power evacuation from the power station switchyard will be at 400KV / 765 KV levels to Madhya Pradesh or other States’ utilities through existing / proposed State Grid & Power Grid Corporation of India Limited (PGCIL). Part of the power will be evacuated by state grid of Madhya Pradesh Transmission Company Limited (MPTCL) system at power plant’s generation switchyard which shall be utilized for transfer of power across the state of Madhya Pradesh.

The total cost of the project including all facilities is estimated to be INR 7390 crores.

One twin flues RCC Chimney of height 275m is planned. Internal and external platforms shall be of structural steel construction and shall be supported from the windshield. The floors/walkways shall be of chequered plate. The grade level slab shall be of reinforced concrete with a metallic hardener floor finish. Necessary protection and access systems like large roll up door, access door, line hatches, test ports, water drainage system, etc. shall be provided.

Sampling arrangement at mill outlet would be provided for establishing the average gross calorific value of coal as well as coal fineness. The Steam Generator (SG) would be designed to handle and burn HFO as secondary fuel upto about 25 % MCR (maximum continuous rating) capacity of SG, for start-up and for flame stabilization during low-load operation or during mill changeovers. For unit light up and warm up purposes, LDO would be used with air atomization. The fuel oil pressurizing units and fuel oil heating equipment would be appropriately provided along with high-energy electric arc igniters to ignite the fuel oil guns.
BASELINE ENVIRONMENT STATUS

The study area is 10 km radial distance from center of proposed plant site. All the monitoring is done in various locations within the study area during the period of March-May 2010.

The findings of the baseline environmental status on land (topography, geology, soil quality, land use pattern), meteorology (Temperature, Humidity, rainfall, wind speed, wind rose), air (ambient air quality - SPM, PM2.5, PM10, SO2, NOX, ozone), water (surface water, ground water), noise level, ecological environment (flora and fauna), socio-economic conditions (demographic profile and households condition), were presented and interpreted with reference to environmental standards.

The project site is slightly undulating with the average altitude of about 640 m above MSL. Overall there will be no requirements for major cutting and filling. Leveling of land in some parts of the site will be required before construction. The study area falls in Seismic Zone III.

The soil cover of the study was found brownish, greyish in colour. The pH of the soil samples was mostly found to be neutral to alkaline in nature and ranges from 6.9 to 7.8. Moisture content of the soil samples were found to be in the range of 1.85% to 3.31% which indicates that the soil is having moderate moisture contents for agriculture purpose. The texture of the soil is silty and sandy-clay respectively. Organic matter content of the soil samples was found in the range of 2.26 to 4.81 % indicating moderate fertility status of the soil. Nitrogen content was found between 0.54 to 0.71 %, whereas Potash & Phosphorous content in the range 0.14 to 0.18 g/kg as K and 0.20 to 0.27 g/kg as P respectively.

The land-use of the project site is mainly scrub land (77%) and barren land (22%). No forest land, water bodies and settlement is present within the site. The major land use of the study area is single crop agricultural land in 240.2 sq km covering 76.5% of the total land cover followed by forest land and settlement which comprise 26.32 sq.km(8.38%) and 12.18 sq.km(3.89%) respectively.

The average maximum temperature during the study period was 32.6°C while the minimum was recorded at 26°C. The Relative Humidity varied between 61.7% and 64%. The predominant wind direction recorded was NW followed by W as the second predominant. The average wind speed ranged between 5.4 and 7.7kmph. The average rainfall recorded during the study period was 13.8 mm.

Ambient air quality at ten different locations was monitored during the summer seasons for the period from March 2010 to May 2010. The 98th percentile value for SPM and PM10’s level of ambient air in all the stations during monitoring period was recorded in between 148.5 to 152.5µg/m³ and 55.5 to 60.5µg/m³ respectively. The PM2.5 value (P98) was found between 24.1 to
25.1µg/m³. Similarly values of SO₂ and NOₓ ranging from 8.9 to 10.1 µg/m³ and 12.8 to 14.3µg/m³ respectively are well within the stipulated levels of NAAQS. The range of ozone varied from 8.0 to 8.9µg/m³.

Pench River is 5 km from the site. Pench River serves as the principal water sources for irrigation purpose in the study area.

Water samples were collected from 11 stations (6 for groundwater and 5 for surface water). From the observation, it was found that the pH of the groundwater was found ranging from 7.1 to 7.5. The TDS values were found in the range of 267 to 500 mg/l. The hardness values were in the range of 139 to 210 mg/l and the calcium and magnesium were in the range of 31.7 to 42.0 mg/l and 14.5 to 21.0 mg/l respectively. The heavy metals such as Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, and Zinc are all found within drinking water standards and can be used for drinking purpose after necessary disinfection.

The pH and TDS of the surface water samples are found normal with pH range of 7.2 to 7.5 and TDS between 131 and 153. Total hardness varied from 58 to 80.0 mg/l and. Calcium and magnesium were in the range 14 to 17 and 5 to 9 mg/l respectively. Chloride, sulphate, nitrate values are also found well within the limits of drinking water standard prescribed by BIS (IS 10,500: 1991). The heavy metals such as Arsenic, Cadmium, Chromium, Copper, Lead and Mercury are all found below detection limits.

The ambient noise levels monitored at ten different locations indicate that they were within the standards. The $L_{eq}$ were recorded at 43.83 to 45.75dB (A) during daytime and 39.53 to 41.40dB (A) during night time.

There is no ecologically sensitive area such as biosphere reserve, national park and wildlife sanctuary within a radius of 10 km from the project site. There are no major settlements within 10 km of the project site. The project site involves no forestland. The proposed project site is more than 500 m away from any of the riverine floodplain / State & National Highway / Railway line.

There are 79 villages under 5 tehsils in two districts coming in the study area. The 10 km study of the proposed project site covers part of five Tehsil namely; Amawara, Chaurai, Chhindwara, Seoni and Parasia. As per the 2001 Census, the total population of the study area is around 74439 with household size of 4.8. This indicates the family size is not very big in the area and there is a predominance of nuclear families. The population density in the study area is 237.1 per sq km. The literacy rate in the study area is 58.8. The study area has 6.9% of Scheduled Caste and 34.5% of Scheduled Tribe population.
PREDICTION OF IMPACTS

The highest resultant ground level concentrations (baseline + incremental) for SPM is highest at Maduwadhana (153.2 µg/m³) followed by Khakrachaur (152.3 µg/m³) because of the higher level of baseline concentration in these areas. The maximum incremental GLC for both SO₂ and NOₓ will be at Machagora (28.1µg/m³ and 30.8µg/m³ respectively). It is evident that all values of SPM, SO₂ and NOₓ will be well within the prescribed standards of MoEF/CPCB. The GLC for PM10 and PM2.5 were also found to be much below the norms.

Operation of the TPP will not have any long-term impact on water quality as it is proposed to have a zero-discharge plant. The water system of the proposed project has been developed with maximum recycle and reuse of water, so as to minimize the water requirement for the project as well as to reduce the quantity of effluents generated from the plant to minimum discharge.

The ash disposal area for Thermal Power Plant is within the site. The generation of Bottom Ash will be about 53 TPH and fly ash 213 TPH. The ash generated from the power plant will be utilized in cement plants and the remaining ash will be disposed in ash pond for which an area of 48 Hectare has been kept. Full ash will be utilized from the 3rd year onwards.

Noise modeling indicates the noise during daytime will be within the permissible limit about 0.5 Km from the plant site. At boundary it will be less than this value due to green belt proposed all around the plant site.

No significant impact on terrestrial ecology is anticipated due to proper dispersion of pollutants through a chimney of 275 meters.

There will be no displacement of people due to the project. Temporary beneficial socio-economic impact in terms of increased jobs and flow of money to the workers and villagers settled nearby is expected during the construction period. Migration of workers population is expected to be minimum, as local workers from the nearby area will be preferred for temporary employment.

MONITORING PLAN

A structured and certified environment management system is suggested at the industry level for ensuring that all the activities, products and services conform to the environmental requirement.

The Environment Management Cell will be responsible for managing following activities related to environment function of proposed Power Plant:

- Coordinate and manage the EMP implementation during pre-construction, construction and operation phase
Appoint dedicated environment staff to manage environmental monitoring responsibilities

Manage and coordinate environmental monitoring and control

Coordination with other sections of the plant and government agencies in relation to environmental management activities

Implement and monitor greenbelt development and plantation activities

Safety specialist will ensure safe working practices in all the sections of the plant

A well-defined environmental monitoring program would be emphasized with trained and qualified staff that would monitor the ambient air as well as stack emission quality to ensure that the pollutants level is maintained always within the permissible levels.

RISK ASSESSMENT

Likely risks to human, environment and property associated with various activities are addressed in this report. Such activities include transport, storage; handling and usage of fuels (Coal & LDO/HFO) and chlorine. Precautionary measures for preventing any hazards due to these materials are proposed in the report.

All equipments vulnerable to explosion or fire would be designed to relevant IS codes and statutory regulations.

Specific precautions shall be taken with respect to hazardous chemicals. Regular mock drills will be carried out to enact accident scenarios and reports shall be sent to the top management.

Suitable fire protection system comprising hydrants and spray systems shall be provided for fire protection. Fire extinguishers shall be tested periodically to ensure their operational effectiveness.

Surrounding population (including all strata of society) shall be made aware of safety precautions to be taken incase of any mishap in plant.

On-site disaster management and off-site emergency plans, commands communication and controls will be established and maintained.

Adequate provisions like emergency response, response organization, response plan, material safety data sheet, command and control, capabilities, transportation, medical facilities, mitigation measures, training, education, public awareness emergency plan review etc. to control any disaster situation will be made available.
ENVIRONMENT MANAGEMENT PLAN

During the construction phase, no significant impact on air quality is expected. However, fugitive dust emissions and NOx levels may temporarily increase in the immediate vicinity of construction site due to soil excavation and vehicular movement. Such impacts will be confined to the construction site. These will be minimized by sprinkling water and proper maintenance of vehicles. Green belt will be developed all around the plant periphery as per the norm laid down by MoEF to minimize dust nuisance outside the plant boundary.

During the operation stage the main air pollutants will be from the Coal Handling Plants, coal crusher units and the flue gases. Furnaces and boilers would be operated with minimum excess air so that fuel consumption is reduced and NOx emissions are minimized. Low NOx burners shall be installed for further reduction in NOx emission. The fugitive emissions of coal dust from storage facilities, from crushers and at coal transfer points shall be reduced by adopting appropriate measures like cyclones/bag filters/water sprinklers.

Demineralization plant will be sized to meet the internal requirement of fresh water in the proposed power plant. Water storage tank will be provided for distribution of potable water to various consumer points. Provisions for rainwater harvesting will be made and the water will be re-circulated in the plant.

All major noise generating equipments/devices/machines like steam turbine generator, compressors and other rotating equipment will have material to absorb/reduce the noise i.e. using noise absorbing material for enclosures or using appropriate design technology for fabricating/assembling machines. Proper noise barriers/shields etc. shall be provided in the equipment. Noisy equipments shall be adequately attenuated, by providing soundproof enclosure and insulation.

The ash will be recovered as Bottom ash and Fly ash. Bottom ash will be collected in refractory lined dry bottom ash hopper provided below the furnace. The bottom ash handling system envisages evacuation and transportation to a storage silo in wet form and from thereon for onward disposal by jet pumps to the ash disposal area. The Boiler Ash will be collected from the boiler’s hopper precipitator and fly ash from the electrostatic precipitator hoppers. Dry fly ash from the air pre-heater, economizer, stack and ESP hoppers would be collected in the fly ash storage silos.

Fly ash will be evacuated by pneumatic (pressurized) system and stored in fly ash storage silos for onward transportation by trucks. With a view to attenuate air pollutants, to absorb noise and to care of uptake of water pollutants, it is recommended to develop a greenbelt as per norms all around the boundary and at several locations within the power plant premises. Adani Pench Power Limited
will take the responsibility to take up community development work at the village level so as to improve the quality of life. Development of infrastructure, educational and health facilities will be given importance.

**CLEAN DEVELOPMENT MECHANISM**

India has high potential for CDM projects, particularly in the Power Sector. The Baseline Carbon Dioxide Emissions from power sector have been worked out by CEA based on detailed authenticated information obtained from all the operating power stations in the country. The Baseline would benefit all prospective CDM project developers to estimate the amount of Certified Emission Reduction (CERs) from any CDM project activity. The proposed thermal power project is based on the super-critical technology. Therefore the project is likely to take CDM intent.