

EXECUTIVE SUMMARY

INTRODUCTION

D B Power, a company of the Dainik Bhaskar Group proposes to establish a 1200 MW (2 x 600 MW) coal fired thermal power plant in Badadarha Village of Janjgir Champa district, Chhattisgarh. The first unit of 600MW is expected to be completed within the period of 35 months from the date of Financial Closure, while the complete plant shall be under commercial operation within 42 months.

D B Power has been allocated coal blocks in Raigarh Mand area of SECL of Durgapur II/ Sariya coal block to be developed as the captive mines in this block. The company is also getting long term coal linkage from SECL/MCL. Coal will be transported from the mines by rail as well as road.

D B Power 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 1200 MW coal fired Thermal Power Plant (TPP).

PROJECT DESCRIPTION

The proposed site is located in Badadarha Village in Dabhra Tehsil, District Janjgir Champa of Chhattisgarh. The nearest railway station is at Robertson 15km from the site. The site is accessible from the nearest District Road connecting Raigarh and Bilaspur, which is 1 Km away from site. The nearest airport is Raipuri (250 km away). The River Mahanadi flows at a distance of about 23km from the proposed plant location.

Land around 492 hectares has been identified Badadarha village. Out of the total 492 ha land, 48.15 ha comes under govt. land and rest under the category of private land. No forest land is involved at the proposed site. The altitude of the region is between 230-250 m above Mean Sea Level (MSL). The coordinates of the plant site including ash pond are as follows:

- A. 83°11'22.56"E & 21°55'27.48"N
- B. 83°12'05.40"E & 21°54'47.16" N
- C. 83°11'12.84"E & 21°54'92"N
- D. 83°10'30.72"E & 21°54'54'36"N

The total plant water requirement for the ultimate capacity (1200 MW) of proposed power station will be 4562 m³/hr. Water will be drawn from River Mahanadi by setting up anicuts. Water will be taken from the reservoir by an underground pipeline to the plant. A storage reservoir for 15 days is proposed. This is required to ensure that there is continual operation of the plant.

The coal for the project would be indigenous. The coal for the plant will be partially sourced from Durgapur II/ Sariya coal block in Raigarh. The company is trying for other coal linkage from SECL/MCL and also looking for allotment for more coal blocks. Coal will be transported by rail and road systems.

The annual coal consumption for the proposed power plant is estimated as 6.33 million tons per annum duly considering average GCV value of coal as 3320 k Cal / kg and annual Plant Load Factor (PLF) of 90%. Ash content of the coal is 45%.

LDO will be required for start up to the steam generators and HFO would be used for flame stabilization at low loads. The estimated requirement of secondary fuel would be 16820 KL/annum.

The steam generator would be designed for firing 100% indigenous coal. Each generator will be connected to its own unit step-up transformer. The auxiliary power requirement of the unit will be drawn from its unit auxiliary transformer tapped off from the generator bus duct.

Each steam-generating unit would be provided with electro-static precipitators. Each precipitator will have two parallel gas paths, any of which can be isolated for maintenance when required, keeping the other path in operation. Each path will have fields in series for collection of fly ash. The ESP will be such that the outlet dust burden does not exceed 100 mg/Nm³ at 100% MCR condition with (n-1) fields in service.

One twin flues RCC Chimney of height 275m is planned. The flue gas emission point shall be at the top of the chimney. 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 construction. 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 22.5 % 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 2008.

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, RSPM, SO₂, NO_x), water (surface water, groundwater), Noise level, ecological environment (flora & fauna), socio economic conditions (demographic profile and households condition), were presented and interpreted with reference to environmental standards.

The topography of the study area is generally undulating with some outcrops of rocks. The soil is often found mixed with boulders and pebbles. The soil has low infiltration quality. The pH varies within the range of 6.8-7.8 values and the bulk density varies between the ranges of 1.20-1.45 g/cm³. The texture of the soil is clayey loamy. The conductivity is between 40-210 µmhos/cm.

Water samples have been collected from 8 stations (5 for groundwater and 3 for surface water). Surface water analysis showed that all parameters are within the norms. B.O.D level of the streams range from 4.0 to 6.0 mg/l and dissolved iron content is within 0.27 mg/l. The total hardness of water varied between 74 mg/l in Badadarha (near the site) to 112 mg/l in Mand River. The pH level is within 7.4, which is as per the prescribed standards. Surface water is fit for consumption after disinfection. It was noted that quality of groundwater showed that it is potable, The pH ranged from 7.4 to 7.9, total hardness ranged from 98 to 373 mg/ml and all heavy metals were found to be below detectable limits (BDL).

The average maximum temperature during the study period was 42°C while the minimum was recorded at 20.8°C. The Relative Humidity varied between 79% and 29.6%. The predominant wind direction recorded was NE followed by NW as the second predominant. The wind speed ranged between 1 and 16kmph with 8.6% calm condition. The average rainfall recorded during the study period was 30.7mm.

Ambient air quality at seven different locations was monitored during the summer seasons for the period from March 2008 to May 2008. It was noted that P₉₈ value of SPM varied between 128.5 and 147.4µg/m³. The 24 hrs RSPM level of ambient air in all the stations during monitoring period was recorded in between 52.8 to 59.0µg/m³ as against allowable value of 100µg/m³ stipulated in National Ambient Air Quality Standards (NAAQS) for residential cum rural area. Similarly values of SO₂ and NO_x ranging from 8 to 11.5µg/m³ and 8 to 12µg/m³ respectively are well within the stipulated levels of NAAQS. The range of ozone varied from 5.6 to 14µg/m³. On the whole, the prevailing ambient air quality within the study area is well within the NAAQS standard.

The ambient noise levels monitored at different locations indicate that they were within the standards. They were recorded at 37 to 43dB (A) during daytime and 31 to 34dB (A) during nighttime.

There are no ecologically sensitive receptors or endangered species within the study area except for two reserve forests more than 5km from the site. The flora in the study area mostly consists of khair and sal. Bamboo is also found in the area. Grasses and other undergrowths cover the maximum wastelands and vegetation of the area. Fauna in the area consists of mammals (such as wild dog, wild boar, monkeys, etc.) reptiles (such as snakes and lizards) and common avifauna (such as myna, crows, pigeons, sparrows etc).

The 10 km study area of the proposed project site covers part of the tehsil of Dabhra and Malkharoda of Janjgir-Champa district and Kharsia and Raigarh tehsil of Raigarh district. There are 134 villages within the 10 km radius study area. The proposed project site only includes the land of Badadarha village with Rampur as its hamlet. The number of households of villages within the 10 km radius is 26181 with average family size of the area is 4.7 persons. This indicates the family size is not very big in the area and there is a predominance of nuclear families. The household size of project site is 4.9 with a total population of 1140. The literacy rate in the study area is 71.38 with female literacy rate of 58.65. The study area has 15.61% of Scheduled Caste and 23.88% of Scheduled Tribe population.

PREDICTION OF IMPACTS

Based on the impact analysis, it is predicted that there will be negligible impact on environment during construction phase. During construction the likely impacts include dust due to construction, movement of vehicles, gases from engine exhaust, noise from movement of material personnel, etc.

The maximum monitored background ambient air quality values were found to be 11.0, 12.0 and 147.4 $\mu\text{g}/\text{m}^3$ for SO_2 , NO_x and SPM respectively. The maximum resultant GLC's of the study area (which includes the combined impact of the Power Plant and Coal mines) are likely to be 37.6 $\mu\text{g}/\text{m}^3$ for SO_2 , 22.6 $\mu\text{g}/\text{m}^3$ for NO_x and 147.4 $\mu\text{g}/\text{m}^3$ for SPM. It was found that the GLC for SO_2 and NO_x were well within the prescribed norms of CPCB.

Operation of the TPP will not have any long-term impact on water quality as it is proposed to have a minimum 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 zero discharge.

The ash disposal area for Thermal Power Plant is within the site. The ash generated (3.59 MTPA) from the power plant will be utilized in Cement Plant and the remaining ash will be disposed in ash pond for which an area of 138 hectares have been kept.

Noise modeling indicates the noise during daytime will be 67.5 dBA and during nights it is 55 dBA 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.

Around 367 households will be affected from Project Impact Zone. Separate R&R study in details has been initiated to assess and implement the R&R plan. According to the R&R study the one village, namely Badadarha will be affected by the proposed Power Plant project.

ALTERNATIVES

The site for the power plant was selected after exploring four options. The present site was selected based on various criteria such as proximity to the coal link, water source, no acquisition for forest land, extent of displacement etc.

For the present plant sub-critical technology will be used. This is mainly due to the unsuitability of Indian coal for use in Super-critical boilers and also the long waiting time for getting the supply of machineries for Supercritical technology.

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.

ADDITIONAL STUDIES

The additional studies that have been done are area drainage study and R&R Plan Study.

RISK ASSESSMENT

Risks likely to pose a risk to man, environment or property associated with various activities are addressed in this report. Such activities include transport, storage; handling and usage of fuels (Coal & LDO/ HFO), chlorine and hydrogen, Precautionary measures to be taken for preventing any hazards due these materials are proposed in the report.

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

Specific should be taken with respect to hazardous chemicals and regular mock drills should be carried out to enact accident scenarios with reports sent to the top management.

Suitable fire protection system comprising hydrants and spray systems are provided for fire protection. Fire extinguishers should be tested periodically and to always be kept in operational mode.

Surrounding population (including all strata of society) should 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 & 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 process, the impact will be minimal and temporary in nature. So the scope of EMP during the construction phase will be limited to dust suppression and noise attenuation. Care has to be taken to reduce the SPM level of the project area.

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 NO_x emissions are minimized. Low NO_x burners should be installed for further reduction in NO_x emission. The fugitive emissions of coal dust from storage facilities, from crushers and at coal transfer points should be reduced by adopting appropriate measures like cyclones /bag filters/water sprinklers/fog system.

Demineralization plant will be sized to meet the internal requirement of fresh water in the proposed power plant. Product 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 equipment that are major noise generating 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 whenever it required. Noisy equipment 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 is collected from the boiler's hopper precipitator 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 is to 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.

D B 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 sub-critical technology. Therefore the project is not going to take any CDM intent.