

EXECUTIVE SUMMARY

1.1 INTRODUCTION

M/s. Chhattisgarh Power Ventures Pvt. Ltd. promoted by Videocon group is planning to set up a 2 X 600 MW Coal based sub critical Thermal Power plant at Gaud, Dist: Janjgir – Champa in Chhattisgarh State of India. The project consists of two coal fired steam generators connected to a reheat type steam turbine generator along with all the required auxiliaries. The steam turbine shall be tandem compound, single reheat, and regenerative, condensing, multi-cylinder design with HP, IP and LP casings, directly coupled with the generator suitable for indoor installation. The plant would be designed to operate as a base load station.

1.2 PROJECT DESCRIPTION

1.2.1 Location And Communication

The proposed site is located at Gaud village in Janjgir – Champa District, which is about 10 km. away from nearest railway station Naila. Champa town is 25 km away from the site. Site is located close to state highway and by the side of Hasdeo River, NH 200 is around 15 km from the site.

The proposed site co-ordinates lie between 21⁰56'48" to 21⁰ 57'16" North Latitude and 82⁰ 39'56" to 82⁰ 40'38" East Longitude.

For the ash disposal 200 acres of land is identified within the plant site, the coordinates of the proposed ash pond lie between 21⁰ 56' 45" to 21⁰ 57' 03" North Latitude and 82⁰ 39' 29" to 82⁰ 40' 38" East Longitude

1.2.2 Land Requirement

The project requires about 960 Acres of land for setting up the power plant and all related, operational activities. Land break up is given in the table below:

TABLE - 1.1
LAND REQUIREMENT BREAK UP

SI.No	DESCRIPTION	AREA IN ACRES
1	Power Plant and BOP along with Building etc.,	350
2	Coal Storage	20
3	400 kV Switchyard	30
4	Raw Water Reservoir	100
5	Green Belt Development	150
6	Coal Conveyor System	80
7	Emergency Ash Pond	200
8	Residential Colony etc	30
	Total	960 Acres

1.2.3 Coal Requirement, Availability And Linkage

The annual coal requirement for the proposed project is about 6.6 million tonnes including 0.8% loss during its transportation/ handling from the coal mines to the plant site. Source of coal for this site could be arranged from SECL and MCL. The coal quality considered for the project is as follows.

Total Moisture	:	16%
Ash	:	44%
Sulphur content	:	0.4%
HHV	:	3000 Kcal/kg

1.2.4 Water Requirement

The proposed 2X600 MW thermal power plant would require about 86400 Cum per day of raw water for make up requirement, considering closed circuit re-circulation type cooling system using clarified water as make-up with induced draft cooling towers. This quantity includes the Steam Generator make up, potable water, service water and other water requirements of the plant, and colony. Thus plant shall require about 35 Million Cum of water annually which will be met from the Mahanadi River.

1.2.5 Fuel Requirement

Light Diesel Oil (LDO) will be used only for cold start and heavy furnace oil (HFO) will be used as support fuel at low loads and for flame stabilization. The requirement of furnace oil for 2 X 600 MW Power Plant has been estimated as 19000 kilolitres per annum. These fuels will be transported by either by rail tankers or by road tanker.

1.2.6 Ash Handling And Disposal System

The bottom ash shall be extracted and disposed off in wet form. The fly ash shall be extracted in dry form from the electrostatic precipitator hoppers and disposed off either in dry form through ash silos or in wet form into the ash disposal area. The capacity of ash handling plant shall be decided considering an ash content of 40-50 % and average Gross calorific value as 3000 kcal/kg.

Total ash generation (Bottom ash and fly ash) from the plant will be of the order of 3.0 million tonnes per annum. Ash utilization action plan shall be made in conformity with the requirements of MoEF notification, in this regard.

Efforts will be made to encourage brick manufacturers to start setting up their manufacturing units in the vicinity of the power plant, right from the project construction stage so that they are ready to take the ash as soon as the plant comes into operation. For this they may be provided all help and cooperation, including provision of free land and free transport of ash to their units.

Nearby cement manufacturers shall be roped in to accept the fly ash as one of their raw material requirements.

In addition, an emergency ash pond will be constructed to take care of storage of two to three years of ash. For this about 200 acres of land will be earmarked, from the total of 960 acres being acquired. Low lying areas and areas with ditches/ ponds etc may be chosen for

this. Further area will be identified as per need. Ash would also be utilized in raising of ash dyke, road construction and other applications like filling of ditches etc.

1.3 DESCRIPTION OF THE ENVIRONMENT

Environmental Impact Assessment Report covers the baseline data collected in the study region for air, noise, land, biological and socio-economic environment during pre monsoon including prediction of environmental impacts. The salient findings and features of the report are presented below:--

The following micro-meteorological parameters were studied during the season from March 2010 – May 2010:--

- Wind speed
- Wind direction
- Temperature
- Relative humidity
- Rainfall
- Atmospheric Pressure

1.3.1 Air Quality

Ambient air quality was monitored at five locations during the period of March 2010 to May 2010 within the study area of 10 km radius. Air Quality results indicate that the background concentration levels of all the parameters in the study area are within the permissible limit as specified by NAAQS. The RPM concentration ranges from 23.0 $\mu\text{g}/\text{m}^3$ to 51.5 $\mu\text{g}/\text{m}^3$ while SPM concentration varies from 48.9 to 104.8 $\mu\text{g}/\text{m}^3$ and the gaseous concentration of SO_2 and NO_x were in the range of 2.9 to 10.48.1 $\mu\text{g}/\text{m}^3$ and 3.1 to 8.2 $\mu\text{g}/\text{m}^3$ respectively.

1.3.2 Noise Quality

Noise level was measured in and around the proposed site at seven (7) locations. The noise level in the commercial area is slightly exceeding the limits, mostly due to increasing commercial activity in the region, however noise levels at the remaining monitoring locations were found to be well within the permissible limits.

1.3.3 Water Quality

To assess the background water quality, three (3) surface water samples and three (3) ground water samples were collected and analysed during the study period

- **Surface Water Samples:** All the water quality parameters except BOD were found to be within limits as stipulated by the IS – 2296 at SW1 and SW2. Overall scenario indicates that surface water quality is better at SW3 compared to other two locations.
- **Ground Water Samples:** The water analysis results indicate that pH value is little high at GW1. This is due to high alkalinity & comparatively higher dissolved solids. The water quality at locations GW2 & GW3 are observed to be within limits.

1.3.4 Soil Quality

To assess the background soil quality, top soil samples from five (5) different locations during study period were collected and analysed in the laboratory. The soil shows sandy

texture. Nitrogen varied from 63 to 160 mg/kg, phosphorus varied from 1.66 to 5.91 mg/kg and potassium varied from 96 to 352 mg/kg.

1.3.5 Land Use

As per 2001 Census, with in 10 km radius the predominant land use is irrigated land (54.64%), followed by unirrigated land (16.42%). 15.62 % of the land comes under culturable waste land and the total forest land available is very minor (1.05%).

Land use as per satellite imagery shows that 44.96% of total area cultivable land followed by sparse vegetation of 27.2%

1.3.6 Socio-Economic Status

Study of socio-economic profile around the proposed project site are carried out primarily based on published documents by the Government of India through the "Census of India".

The salient features of the study of socioeconomic profile are as follows:

- The Sex Ratio (Female per 1000 Male) in the study area is 975.1.
- Overall literacy rate in the study area according to 2001 Census is 56.07%. Out of which male literacy is 34.96 % while female literacy is 21.10%.
- The percentage of main workers is 31.68 % and the percentage of marginal workers is 10.28 % of the total population.
- Only 1.95 % of population are engaged in household industry workers category and the rest 58.04% are the non-workers, which includes persons engaged in household duties, students, dependents, retired persons, renters and beggars.

1.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The proposed 2x600 MW thermal power plant would create an impact on the environment in two distinct phases:

- Impacts during Construction phase and
- Impacts during Operation phase

1.4.1 Impacts during Construction Phase

The impacts due to construction phase will be on smaller scale and limited to a period of about 4 years from the date of investment appraisal. Construction phase impacts mainly related to levelling of site, construction of plant and erection of structures and other related equipment which are short term impact.

Appropriate environmental mitigative measures will be ensured during construction phase to eliminate/minimize detrimental impacts during this phase.

1.4.2 Operation Phase Impacts

Main activities during operation phase of the proposed project having potential for inducing environmental and/or social impacts are as follows

1.4.2.1 Air Pollution

The main source of air pollution due to operation of the proposed plant will be combustion gases emitted through the stack. Apart from the above, the other sources of air pollution are fly ash handling and disposal system. The main air pollutants envisaged due to plant activities are Suspended Particulate Matter (SPM), Sulphur Dioxide (SO₂) and Nitrous Oxides (NO_x).

- **Mitigation Measures Proposed to Control SPM, SO₂, NO_x**

- i. Particulate Matter will be reduced to maximum extent by the use of high efficiency electrostatic precipitators (ESPs), which will be 99.9% efficient. The design of ESP would be done ensure emission levels of particulate matter to be within 100 mg/Nm³.
- ii. It is proposed to control NO_x emission from the boilers by providing specially designed burners.
- iii. Gases from the boiler will be discharged into air by a 275 m high stack to promote higher mixing and to limit ground level concentrations.

1.4.2.2 Water Pollution

The impacts of proposed power project during operation phase could result from several activities such as discharge of cooling water, discharge of main plant effluents and sanitary effluents and discharge of ash pond overflow.

- **Mitigation Measures**

- The project will have a closed cycle cooling system with cooling towers, hence there will be no thermal pollution of the receiving water body.
- Each of the effluent stream emanating from the project shall be individually treated and then routed through a Central Monitoring Basin (CMB), which will also act as an equalisation chamber.
- The sanitary effluents from the main plant and township areas shall be treated in a Sewage Treatment Plant (STP) and the treated effluent from STP will be used for green belt development, landscape maintenance, Road cleaning , Washing & other non potable purposes.
- All the effluents shall be treated and recycled/ reused to the maximum possible extent.

1.4.2.3 Impact Due To Ash Disposal

The impacts ash disposal could be multi faceted. Area of about 200 acres is identified for final disposal of ash. The disposal of ash into the ash ponds will convert this land into non usable barren land. The ash storage ponds will affect the air quality in the vicinity of the ponds. In addition to the impacts on land, there are possibilities of impact on the ground water through leaching of heavy metals. Overflow from ash ponds having high suspended solids will be discharged in surface water bodies thereby affecting the water quality.

- **Mitigation Measures**

- i. In accordance with MoEF notification November 2008, the fly ash will be made available to construction industry, cement industry, brick kilns and other downstream users through competitive bidding process and full efforts will be taken to ensure 100% utilisation of the fly ash with in 4 years.
- ii. The ash collected from the Project in dry form will be filled in covered trucks and sent to cement factories, brick making units, road building, etc.
- iii. Care will be taken to ensure that the run-off/ percolated water does not affect surface/ ground water bodies or surrounding land. The proposed ash dyke will be used only on emergency. However, the ash dyke shall be suitably lined so that no seepage into the ground takes place.

1.4.2.4 Noise Pollution

The proposed thermal power plant will have various in-house noises generating sources, such as turbines, generators, boilers, coal handling plant, fans, pumps etc.,

The workers in the proposed thermal power plant are likely to be exposed to high noise levels for short term. This short term exposure may have impact on these workers if proper care is not taken which may result in occupational hearing damage

Noise model (Dhwani) was used for predicting impacts due to proposed plant on ambient noise. The results of the noise modelling shows that noise level outside the boundary of the plant will be below 38.9 dB (A). Thus, the impact due to noise will be localised within the plant boundary

- **Mitigation Measures**

- i. Provision of silencers for generators & turbines
- ii. Compulsory use of personnel protective equipment (PPE) such as ear plugs for the workers
- iii. Provision of insulating caps and aids at the exit of noise source on the machinery.
- iv. Use of damping materials such as thin rubber sheet for wrapping the worn places of compressors, generators etc.
- v. Shock absorbing techniques to reduce impact
- vi. Use of physical barriers and green belt development around the plant to restrict the noise from going outside the proposed plant boundary during operation

1.4.2.5 Socioeconomic Aspects

There will be considerable improvement in socio economic aspects of the area.

- Local people will be benefited due to the employment opportunities and income generation.
- Improvement in the health facilities are expected in the study area. Besides the provisions of health facilities by many private clinics are likely to open in the area leading to improvement in the quality of life in the area.
- The proposed power plant will provide employment directly and are expected to provide livelihood indirectly to those engaged in contract works, business and other services.

- Literacy rate and education facilities in the study area will be improved

1.5 ANALYSIS OF ALTERNATIVES

Four alternative sites were inspected, studied and analysed based upon techno- economical environmental considerations. On detailed survey of the related area, the company has selected the most suitable site located at village Gaud, District Janjgir - Champa Chhattisgarh which has following favorable factors,

- Major coal mines / reserves are located within 70 km from the site.
- Adequate water is available throughout the year in Mahanadi.
- For power evacuation system, 400 kV line is proposed to be laid from plant site to PGCIL's upcoming 400 KV switch station near Champa.
- Forest is negligible, hence felling of trees would not be required.
- Railway line is close to the site at a distance of 10km. Dedicated Railway lines for only a short distance therefore will be required for efficient & economical transportation.
- The site is already connected with a well-maintained road.
- Soil condition of the site is favourable.

1.6 ENVIRONMENTAL MONITORING PROGRAMME

The monitoring of various environmental parameters is necessary which is part and parcel of the environmental protection measures. For effective implementation and mid-term corrective measures (if required) monitoring and control of programme is essential. The scope of environmental management includes air quality, water and waste water quality, noise, soil characteristics, and ecology. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. A comprehensive monitoring programme is suggested in EIA report.

1.7 ENVIRONMENTAL MANAGEMENT PLAN

To minimizing any adverse impacts that could arise from the construction and operation of the proposed power plant, an environmental management plan (EMP) is formulated to manage impacts, to adopt the best available proven control technologies and procedures, to ensure a continuing process of review and positive action in the light of available monitoring results, and to consult with local communities on a continued basis.

The EMP will aim to achieve an exemplary environmental performance during construction, operation, to meet this goal, the following activities, measures and programs will be implemented: (i) application of all mitigation and management measures; (ii) an environmental monitoring program; (iii) a social development program; (iv) an emergency plan; (v) an environmental organisation.

1.8 CORPORATE SOCIAL RESPONSIBILITY

The Proposed power plant will lead to the economic social & infrastructural development of the surrounding CPVPL is committed to take responsibility to induce funds & support in the areas of employment vocational training health education water supply & infrastructure development. Total fund allocation to the tune of 4.65 crores is made for this at the planning stage itself.

It will be company's endeavour to be a medium for the overall development of the people in Janjgir – Champa region & in turn of the Chhattisgarh State.

1.9 CONCLUSION

The proposed project is indispensable in view of the forecasted energy shortage. The impact on the social environment is positive given the job and business opportunities created for local residents and the substantial taxes and revenues from the project. Thus, the proposed project will help in accelerating socioeconomic growth, and improving quality of life.

CPVPL will apply all measures stated in the EIA to prevent, mitigate, and deal with impacts related to construction and operation of proposed 2 X 600 MW power plants.

Finally, the project's benefits and advantages outweigh any disadvantages. In sum, the project is a positive contribution to local area, the region, and the country.