

	<p>Environmental Impact Assessment for the Proposed Parsa Opencast Captive Coal Mine (5 MTPA in ML Area of 1252.447 ha) of Chhattisgarh State Power Generation Company Ltd. at Hasdo - Arand Coalfield, Udaypur & Premnagar Tehsils, Surguja & Surajpur Districts, Chhattisgarh</p>
	<p style="text-align: right;">Executive Summary</p>

1.0 PROJECT DESCRIPTION

The Ministry of Coal, Government of India allotted Parsa Coal Block to the Chhattisgarh State Electricity Board for coal mining vide letter No. 13016/23/2006-CA-I dated 02.08.2006. This coal block is located in Hasdo-Arand coalfield, Surguja & Surajpur Districts of Chhattisgarh.

The Government of Chhattisgarh under the Chhattisgarh State Electricity Board transfer scheme 2008 vide Notification No.F-1-8/2008/13/1 dated 19.12.2008 has re-structured the Chhattisgarh State Electricity Board into five companies. In compliance to this, Generation Wing of the Chhattisgarh State Electricity Board has been notified as Chhattisgarh State Power Generation Company Limited. The development of Parsa coal block will be undertaken by the **Chhattisgarh State Power Generation Company Limited (CSPGCL)**.

CSPGCL proposes mechanized opencast mining in Parsa coal block in a total project area of 1252.447 ha, which includes the mine lease area of 1129.37 ha in Hasdo-Arand Coalfield with production capacity of 5 MTPA. Coal from the Parsa block is proposed to be used in 2 x 500 MW Marwa Thermal Power Plant located at Janjgir-Champa, Chhattisgarh.

CSPGCL has retained the services of M/s. Vimta Labs Limited, Hyderabad to undertake Environmental Impact Assessment (EIA) studies as per the *Terms of Reference (TOR)* prescribed by the Ministry of Environment & Forests (MoEF) vide letter No. J-11015/398/2012-IA.II (M) dated 14th May 2013 for assessing the impacts of the proposed 5 MTPA mine project on various environmental parameters and prepare an Environment Management Plan for negating the adverse impacts of the projects.

Total cost of the proposed opencast coal mine is estimated to be about Rs.1000 Crores.

1.1 Location and Description of the Site

The Parsa coal block is located in the north central part of the Hasdo-Arand Coalfield in Surguja and Surajpur districts, Chhattisgarh. The block is located adjacent to the Parsa East and Kante coal blocks of Rajasthan Rajya Vidyut Utpadan Nigam Ltd., Jaipur. The total mine lease area of 1252.447 ha includes 550.894 ha of forest land, 43.112 ha of Government land, 301.354 ha of Adivasi and 41.843 ha of non-advansi land and 315.244 ha of Chhote Bade Jhar Ka Jungle. The block geographically extend from latitude 22°48'57.01" to 22°51'56.85" N and longitude 82°45'10.50" to 82°47'22.86" E. The block is covered under Survey of India topo sheet no. 64J/13 on RF 1: 50000.

The main access to the Hasdo-Arand coalfield is through the State Highway No. 2A aligned in a NE-SW direction, which passes very close to the north western corner of the block. The block can be approached from Tara village, located on SH-2A. The Tehsil Headquarters at Udaypur and the District Headquarters at Ambikapur are located at a distance of 26 km and 70 km northeast of the block on State Highway -2A respectively. Lakhanpur, another small township is located about 43 km northeast of the block on this State Highway. The accessibility within

	Environmental Impact Assessment for the Proposed Parsa Opencast Captive Coal Mine (5 MTPA in ML Area of 1252.447 ha) of Chhattisgarh State Power Generation Company Ltd. at Hasdo – Arand Coalfield, Udaypur & Premnagar Tehsils, Surguja & Surajpur Districts, Chhattisgarh
	Executive Summary

the block is through kutcha/unmetalled roads. Villages within the Coal block are connected by morrum and mud roads.

The proposed project is a mechanised open-cast coal mining project is classified as "**Category-A**" by Ministry of Environment & Forests, New Delhi as per the EIA Notification dated 14th September, 2006.

The mining lease over an area of 1252.447 ha. The total gross geological reserves, mineable reserves and overburden have been estimated as 256.40 MT, 184.26 MT and 1183.30 m³/Tonnes respectively. The overall stripping ratio works out as 6.42 m³/tonnes.

1.2 Coal Reserves and Life of Mine

The mining lease over an area of 1252.447 ha. The total gross geological reserves, mineable reserves and overburden have been estimated as 256.40 MT, 184.26 MT and 1183.30 m³/Tonnes respectively. The overall stripping ratio works out as 6.42 m³/tonnes. The life of mine with production rate of 5 MTPA is estimated to be 41 years.

1.3 Salient Features of the Mine

The applied mine lease extends over an area of 1129.37 ha. The salient features of the project are given in **Table-1**.

TABLE-1
SALIENT FEATURES OF THE MINING PROJECT

Sr. No.	Description	Details
1	Total project area	1252.447 ha
2	Mine lease area (applied)	1129.37 ha 123.077 ha for external dump
3	Type of mine	Opencast Mechanized
4	Method of mining	Shovel-Dumper
5	Rated capacity of mine	5 Million Tonnes Per Annum
6	Expected life of mine	41 years including 2 years construction period
7	Average stripping ratio	6.42 m ³ /Tonnes
8	Geological reserves	256.40 Million Tonnes
9	Mineable reserves	184.26 Million Tonnes
10	Thickness of coal seam range	Seam IV – 5.0-10.0 m Seam V - 1.8-8.0 m Seam VI – 1.0-3.5 m
11	Average no. of working days	330 days/year
12	Number of shifts	3 shifts/day
13	Working hours/shift	8 hr
14	No. of benches	3
15	Bench height for OB	6-10
16	Bench height for coal	10 m or as the parting thickness
17	Ultimate depth of mine	275 m
18	Overburden to be generated during entire life of mine	1183.30 million m ³
19	No. of waste dumps planned	2 internal and 2 external dumps

Environmental Impact Assessment for the Proposed Parsa Opencast Captive Coal Mine (5 MTPA in ML Area of 1252.447 ha) of Chhattisgarh State Power Generation Company Ltd. at Hasdo – Arand Coalfield, Udaypur & Premnagar Tehsils, Surguja & Surajpur Districts, Chhattisgarh	
Executive Summary	

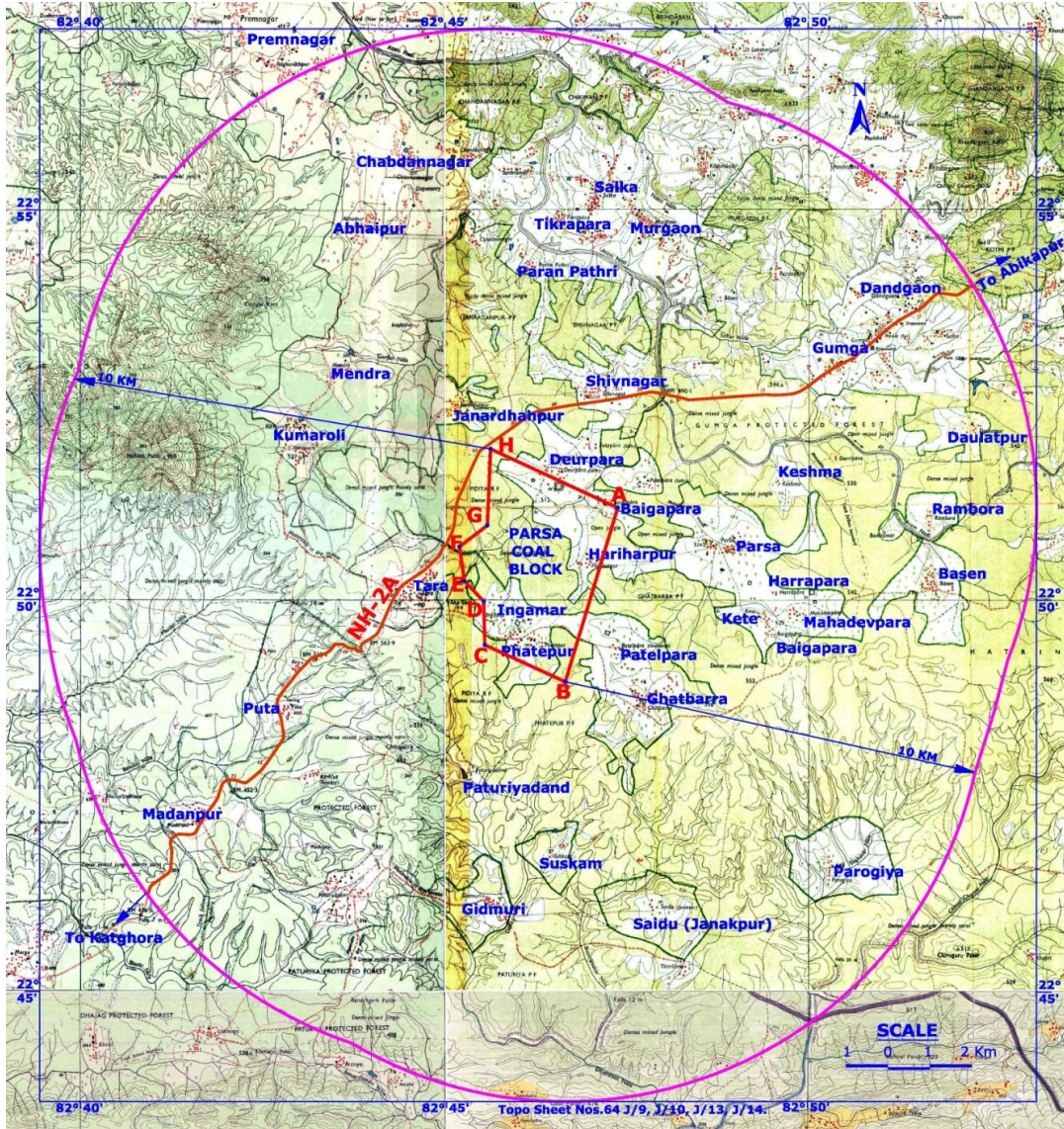
Sr. No.	Description	Details
20	Area of waste dumps	Total internal dump area: 440.09 ha
21	Coal handling plant	1000/1250 TPH capacity
22	No. of crushers	2 Nos. (Plus 2 stand-by)
23	Power requirement	5-7 MVA at 33 kV from Ambikapur sub-station of CSEB
24	Water requirement	2100 m ³ /day
25	Transport of coal from mine face to CHP	By belt conveyors

Source: Mining Plan

1.4 Requirements of the Project

- CSPGCL will develop core infrastructure like power, road, telecommunication, housing colony, service buildings viz office, store, first aid centre, canteen etc.;
- Total water requirement for mining and domestic requirement are estimated as 2100 m³/day. The drinking water will be met from dug bore wells. Water for mining operations will be met from mine sump;
- The total power requirement for the proposed mine will be about 5-7 MVA at 33 KV;
- The total manpower required for Parsa opencast project for 5 MTPA coal productions along with its corresponding OBR, is assessed at 768 till 3rd year of mine operation.
- Vocational Training Centre will be provided for training of operators and other workmen adjoining to the main mines office.

The study area map is given in **Figure-1**.



CO-ORDINATES OF PARSA COAL BLOCK

- A** : 22° 51' 10.51" N, 82° 47' 22.86" E
- B** : 22° 48' 57.01" N, 82° 46' 38.63" E
- C** : 22° 49' 25.25" N, 82° 45' 30.68" E
- D** : 22° 49' 58.92" N, 82° 45' 30.26" E
- E** : 22° 50' 14.70" N, 82° 45' 14.32" E
- F** : 22° 50' 41.58" N, 82° 45' 10.50" E
- G** : 22° 50' 57.73" N, 82° 45' 33.97" E
- H** : 22° 51' 56.85" N, 82° 45' 37.52" E

**FIGURE-1
STUDY AREA MAP**

2.0 DESCRIPTION OF THE ENVIRONMENT

In view of the above proposed activity, to obtain Environmental Clearance and other statutory clearances, CSPGCL has commissioned Environmental Impact Assessment study in 10 km radius around the proposed coal mining block during March 2013 to May 2013 representing pre-monsoon season.

2.1 Topography and Drainage

The block is characterized by highly undulating topography with several mounds as well as elevated and flat land. The elevation of the area above mean sea level (msl) ranges from 505 m in the northwest and southeast to 559 m the northeast with higher values in the central, eastern, southern and southwestern parts. The elevation of the mounds generally ranges from 525 m to 554 m above mean sea level.

2.2 Climate

The temperature recorded on site when compared vis-à-vis the IMD data, slight variations was found. The maximum and minimum temperatures recorded at site during study period were 43.7°C and 17.0°C, whereas the maximum and minimum values recorded at IMD-Ambikapur during the same period are 42.4°C and 10.3°C respectively. The Relative Humidity was observed to range from 26 – 64 % during the study period at the site, whereas according to IMD-Ambikapur the Relative Humidity was observed to be in the range of 21–47% during the same season;

2.3 Ambient Air Quality

To establish the baseline status of the ambient air quality in the study area, the air quality was monitored at ten locations. The PM₁₀, PM_{2.5}, SO₂, NO_x, CO, Ozone, Ar, Ni, NH₃, Pb, BAP and Dust fall are found to be well within the prescribed standards.

2.4 Water Environment

The baseline water quality status in the region is established by analyzing samples at twelve (12) locations consisting of seven (7) ground water samples and five (5) surface water samples. The ground water and surface water samples were analysed as per drinking water standards of IS: 10500. The surface water quality in the study area does not indicate any industrial contamination.

2.5 Noise Environment

The noise monitoring has been conducted at ten locations. The day & night time noise levels at all the locations are observed to be within the prescribed limit of 55 dB (A) and 45 dB (A) respectively.

2.6 Hydrological Conditions

The study area is drained by Hasdeo River of the Mahanadi basin. The drainage network in the northern part joins Atem Nadi, which flows into Gej Nadi. The drainage network in the northwestern part joins Gej Nadi. The drainage network in the southern part joins Chhoti Chornai Nadi, which flows into Chorani Nadi. Gej

Nadi joins Hasdeo River towards west of the study area and Chorani Nadi joins Hasdeo River towards southwest of the study area.

2.7 Soil Environment

The soil samples were collected from eight locations covering various land uses and compared with the standard soil classification. The observation indicates that the soils are fertile and support the vegetation life in the region. The soil quality does not indicate any industrial contamination.

2.8 Landuse Studies

The study area falls in Ambikapur, Surajpur tehsils of Surguja district and Korba, Katghora tehsils of Korba districts covers about 35 villages within 10 km zone around project area. The forestland under the study area consists of 15454 ha (49.85 %) of the total geographic area. The irrigated land under the study area consists of 163 ha (0.53 %) of the total geographic area. Un-irrigated land is about 25.70 % of the total land in the study area. The study area comprises about 18.79 % cultivable wastelands. The land not available for cultivation is 5.14 % of the total study area.

2.9 Ecological Environment

Detailed ecological studies were conducted during pre-monsoon of 2013 to identify the floristic composition in and around proposed project site and surrounding villages, forest blocks in 10 km radius from proposed project site. 161 species belongs to Phanerophytes, 115 species belongs to therophytes, 34 species belongs to Hemicryptophytes, 9 species of hydrophytes and 8 species of geophytes were in the study area. 327 plant species were identified which are belong to 61 families.

As per the Wildlife Protection Act, 1972, such species need to be conserved and preserved. Thus, it is essential to ascertain adverse impacts on such species due to the proposed project, and formulate appropriate management measures. 27 birds species, 05 species of reptiles, 03 species butterflies, and 12 species of mammals are recorded, out of which 4 species belongs to Schedule-I, 5 species belongs to Schedule-II animals and rest belongs to Schedule-III and IV and V of the Wildlife (Protection) Act, 1972. The amount of Rs. 20 Crores has been allotted for Wild life Conservation Plan.

2.10 Socio-Economic Environment

As per 2011 census the study area consisted of 29265 persons inhabited in 35 villages of the study area. The study area had an average family size of 4.5 persons per household in 2011. The density of population reveals that the study area has an overall density of 113 persons per km² (PP km²) as per 2011 census data. As per 2011 census, 3.21 % of the population belongs to Scheduled Castes (SC) and 72.28 % to Scheduled Tribes (ST).

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS

3.1 Impact on Air Environment

The opencast mining operations will generate high levels of Particulate Matter (PM). The potential sources of dust emissions are loading / unloading operations, coal handling at CHP and fugitive emissions from blasting and transportation.

Once the mining operation takes place, it is anticipated that marginal increase will occur in the PM level of the core and the buffer zones. Dust suppression measures are, therefore, of utmost importance.

In order to assess the impact due to coal production on air environment, predictions have been carried out using and USEPA approved Fugitive Dust Model (FDM) for pre-monsoon season. The emission factor has been estimated for the worst case i.e. without control measures from different sources of mining operations. Maximum PM incremental concentration of 41.3 $\mu\text{g}/\text{m}^3$ is observed at the nearest downwind during pre-monsoon season. The predicted concentrations after superimposing on the baseline concentration the resultant concentrations are well within the permissible levels of residential areas.

3.2 Impact on Water Resources and Quality

The potential impact on the surface water quality is likely to be due to higher load of suspended solids. Oil spillage from the workshop in the wastewater will add to the pollution load resulting in oil and grease contamination of surface water from mine infrastructural facilities. For treatment of the wastewater will need to pass through a bar screen followed by oil trap where oil content of wastewater will be recovered. Once the oil is removed and the wastewater generating from the workshop is treated, it will have negligible impact on the environment.

Sanitary wastewater generated from domestic facilities at mine site and the residential colony located outside ML area is proposed to be treated. This sewage will be treated in the Sewage Water Reclamation Plant (SWRP) and used for horticulture; no impact on the aquatic water is envisaged due to mining operations.

3.3 Land Environment

Land degradation is one of the major adverse impacts of opencast mining in the form of excavated voids and also in the form of waste dumps. The total mine area is 1252.447 ha. The disturbed area will comprise excavated land, external dumps, area occupied by infrastructure, roads etc. apart from 1129.37 ha of mine area.

To minimize the area and time of ground disturbance progressive rehabilitation and reclamation of the disturbed areas will be practiced.

3.4 Solid Waste

The total volume of OB has been estimated as 1183.30 M m^3 . The OB removed during initial years will be placed beyond the incrop of the seam-IV. The total

volume of external dump has been estimated as 21.02 M m³ solid. Rest of the OB will be placed in internal dumps. The total volume of internal OB, in that volume which will be accommodated internally by backfilling has been estimated as 1162.28 M m³.

3.5 Impact on Noise and Ground Vibration

Once the mine becomes operational, there would be various sources of noise in the area due to drilling, blasting, operation of HEMM, CHP, Vehicular Movement, etc. The noise level will marginally increase due to operation of equipment.

Ground vibration will increase due to drilling operation. It has been observed that mechanization of mining technology generally leads to higher noise levels if not properly controlled. However, this will not have adverse impact on surrounding population with proper control measures.

3.6 Impact on Flora and Fauna

A part of proposed mine area (core area) falls under protected forest. The existing flora will be disturbed once mining activities are commenced and as the fauna is closely related to and dependent on the flora, fauna will move away from the area to be disturbed.

4.0 ENVIRONMENT MANAGEMENT PLAN

4.1 Air Pollution

- Dust generation will be reduced by using sharp teeth of shovels;
- Wet drilling will be carried out to contain the dust;
- Water sprinkling will be done on haul roads within the ML area;
- Water sprinkler will be provided in the crusher to avoid dust generation during material unloading into crusher;
- Controlled blasting techniques will be adopted;
- Charge per hole and charge per round will be optimized;
- Dense plantation will be carried in and around the proposed mine will also help in combating air pollution;
- Afforestation of completely mined out area will be planned with minimum gap between excavation and afforestation to fix the dust and prevent it from getting airborne;
- Cabins for shovel and dumpers and dust masks to workmen will be provided;
- Advantage of wind direction and meteorology will be considered while planning, so that pollutants, which cannot be fully suppressed by engineering technique, will be prevented from reaching the residential areas; and
- A good housekeeping and proper maintenance will be practiced which will help in controlling pollution.

4.2 Water Pollution

Surface Water Pollution Control Measures

- Retaining walls will be provided at the toe of dumps and the unstable OB benches within the mine to prevent wash off from dumps and sliding of

material from benches. This would help in preventing silting of water drains/channels;

- The water channels/drains carrying the rain water from the mine will be provided with baffles and settling pits to arrest the suspended solids, if any, present in this water;
- The worked out slopes will be stabilized by planting appropriate shrub/grass species on the slopes. This will help in preventing wash-off of coal from these slopes;
- The mine water will be regularly tested for presence of any undesirable elements and appropriate measures would be taken in case any element is found exceeding the limits prescribed by CPCB; and
- Seepage water and rain water collected in the open pits will be pumped out and discharged with natural drainage system after de-silting in series of sedimentation ponds.

Ground Water Pollution Control Measures

- The domestic sewage from the canteen and toilets will be routed to septic tanks followed by soak pits;
- The domestic wastewater from the colony will be treated in Sewage Treatment Plant and used for horticulture;
- The workshop effluent will be routed through oil & grease trap and treated to the discharge standards and reused for mining operations; and
- Regular monitoring of water levels and quality in the existing wells in the vicinity will be carried out both with reference to areas spread and time intervals so as to study the hydrology of the area.

4.3 Noise Pollution and Ground Vibrations

- Secondary blasting will be totally avoided;
- Rock breakers will be used for sizing;
- Controlled blasting with proper spacing, burden and stemming will be maintained;
- Minimum quantity of detonating fuse will be consumed by using alternatively excel non-electrical initiation system;
- The blasting will be carried out during favourable atmospheric condition and less human activity timings;
- The prime movers/diesel engines will be of proper design and will be properly maintained;
- The operator's chamber will be safe guarded with proper enclosures to reduce the noise levels;
- A green belt will be provided in phased manner around the periphery of the mine to attenuate noise; and
- Trees will be planted on both sides of haul roads.

5.0 BUDGET FOR ENVIRONMENTAL PROTECTION MEASURES

CSPGCL has budgeted an amount of about Rs.32.98 crores as a capital and Rs. 14.47 crores as recurring expenditure for implementation of Environmental Management measures of entire mine life period.

	<i>Environmental Impact Assessment for the Proposed Parsa Opencast Captive Coal Mine (5 MTPA in ML Area of 1252.447 ha) of Chhattisgarh State Power Generation Company Ltd. at Hasdo – Arand Coalfield, Udaypur & Premnagar Tehsils, Surguja & Surajpur Districts, Chhattisgarh</i>
	<i>Executive Summary</i>

6.0 PROJECT BENEFITS

- Generation of employment and improved standard of living;
- Establishment of small and medium scale engineering ancillaries;
- Increased revenue to the state by way of royalty, taxes and duties;
- The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages;
- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible; and
- Overall the proposed project will change living standards of the people and improve the socio-economic conditions of the area.