

# ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED EXPANSION OF PARSA EAST AND KANTA BASAN  
OPENCAST MINE AND PIT HEAD COAL WASHERY FROM 10 MTPA  
TO 15 MTPA AT UDAYPUR TEHSIL, SURGUJA DISTRICT,  
CHHATTISGARH

## EXECUTIVE SUMMARY

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## **1.0 SUMMARY & CONCLUSION**

### **1.1 Type of Project**

The proposed expansion project is a mechanised opencast coal mine having a pit head washery of raw coal input of capacity 10 MTPA to 15 MTPA. The washed clean coal will be supplied to RVUNL's thermal power plants by rail.

The opencast mining method will be adopted because of the following reasons:

- There are 3 persistent and potential coal seams, namely, Seam-IV, Seam-V and Seam-VI in the Parsa East and Kanta Basan Block. Out of these 3 seams, Seam-IV is the most potential both qualitatively and quantitatively and has least number of in-seam dirt bands followed by Seam-IV and Seam-V in that order. All these 3 seams incrop within the block and have quarriable potentiality;
- The average stripping ratio for opencast mining is 5.27 m<sup>3</sup>/t;
- The mining by opencast method will be highly productive & economical as compared to underground method; and
- The opencast mining operations ensure higher recovery of coal resource.

### **1.2 Justification for Implementation of the Project**

The total power capacity available with Rajasthan Rajya Vidyut Utpadan Nigam Limited power stations is 6228.35 MW as on 01.01.2016, which includes installed capacity and Inter-state projects of RVUNL power stations. RVUNL owns and operates thermal/gas/hydel power stations in the State sector as listed in **Table-1**.

**TABLE-1**  
**RVUNL-THERMAL AND HYDEL POWER STATIONS IN RAJASTHAN**

<b>Sr. No.</b>	<b>Power Stations</b>	<b>Installed Capacity (MW)</b>
1	Suratgarh STPS, Suratgarh, District Shriganganagar	1500
2	Kota STPS, Kota	1240
3	Chhabra Thermal Power Station, Chhabra, District Baran (Unit 1,2,3 &4)	1000
4	Kalisindh Thermal Power Station, Kalisindh, District Jhalawar (Unit 1 & 2)	1200
5	Dholpur CCPS, Dholpur	330
6	Giral Lignite TPS, Giral, District Barmer	250
7	Ramgarh Gas Thermal Power Station, District Jaisalmer	273.5
8	Mahi Hydel Power Station. District Banswara	140
9	Mini Micro Hydel Schemes	23.85
<b>Total</b>		<b>5957.35</b>

Average Plant Load Factor (PLF) of major coal based thermal power station of Rajasthan State was more than 65% in 2012-13.

In order to meet the requirement of the State, RVUNL is making all possible efforts through expeditious construction of new units aggregating to 2800 MW capacity.



Construction work of the following projects is in progress and the details are given in **Table-2**.

**TABLE-2**  
**RVUNL-UNDER CONSTRUCTION THERMAL POWER STATIONS IN RAJASTHAN**

<b>Particulars</b>	<b>Capacity</b>
Ramgarh Gas Thermal Power Project Stage IV GT	110 MW
Ramgarh Gas Thermal Power Project Stage IV STG	50 MW
Suratgarh Supercritical Thermal Power Station Unit#7	660 MW
Suratgarh Supercritical Thermal Power Station Unit#8	660 MW
Chhabra Supercritical Thermal Power Station Unit#5	660 MW
Chhabra Supercritical Thermal Power Station Unit#6	660 MW
<b>Total</b>	<b>2800 MW</b>

In view of the above, the proposal of augmentation in capacity for coal mine with coal washery project is considered justified from basic raw material requirement considerations.

### **1.3 Environmental Setting**

The study area covers 10 km radius around the proposed expansion mine lease area. The environmental setting of the proposed expansion site is as follows:

- The proposed expansion mine lease area is located between Latitude 22°47'39"N-22°51'29"N-22°47'54.1"N-22°48'58.6"N and Longitude 82°46'38" E- 82°50'51" E-82°49'17.5" E-82°46'44" E.
- The proposed expansion ML area is at a distance of 2.7 km from Atem Nadi. Site elevation is about 505 m to 569 m above MSL;
- Present land use is industrial use;
- There are no ecological sensitive locations, archaeological monuments, places of tourist interests and defence installations within 15 km radius;
- There are 16 protected forests and 1 reserve forest block within 10 km radius.

### **1.4 Project Description**

#### **1.4.1 Salient Features of Coal Mine**

The salient features of coal mine and coal washery are given below in the **Table-3 and Table-4**.



**TABLE-3  
SALIENT FEATURES OF THE MINING PROJECT**

Sr. No.	Description	Details
1	Block area	2767.00 ha
2	Mine lease (applied)	2711.034 ha
3	Coal bearing area	2388.525 ha
4	Non-coal bearing area	322.51 ha
5	Type of mine	Opencast
6	Method of mining	Mechanized
7	Rated capacity of mine	15 MT Per Annum
8	Expected life of mine	31 years
9	Average stripping ratio	5.27 m <sup>3</sup> /T
10	Geological reserves	516.40 MT
11	Mineable reserves	452.46 MT
12	Average thickness of coal seam	Seam VI - 1.2 - 2.0 m Seam V - 2 - 7 m Seam IV - 7 - 8.5 m
13	Average no. of working days	330 day/year
14	Number of shifts	3 shifts/day
15	Working hours/shift	8 hr
16	Bench Height for OB	6 m & 10 m
17	Bench Height for coal	10 m as seam thickness
18	Ultimate depth of mine	225 m
19	Overburden to be generated during entire life of mine	2368.72 million m <sup>3</sup>
20	No. of waste dumps planned	4 Nos
21	Area of waste dumps (External)	112.665 ha
22	Maximum Bench Height	
	Top OB (for 15 m <sup>3</sup> Hydraulic Shovel)	10-12 m
	Top OB (for 3 m <sup>3</sup> backhoe Shovel)	6 m
	Coal and Intervening parting	10 m as seam thickness
	<i>Proposed minimum Bench Width</i>	
	Working Bench Width for 15 m <sup>3</sup> Hydraulic Shovel	40 m
	Non-Working Bench Width for 15 m <sup>3</sup> Hydraulic Shovel	20 m
	Working Bench Width for 3 m <sup>3</sup> backhoe	6 m
	Non-Working Bench Width for 3 m <sup>3</sup> backhoe	6 m
23	Width of the permanent haul road	40 m
24	Width of the temporary transport ramp	20 m
25	Usual height of the spoil dump bench	30 m
26	The width of the active dump bench	30 m
27	Bench Slope	
	OB Bench	70°
	Coal Bench	70°
	Dump bench	37°
28	Overall (Ultimate) pit slope	45°
29	Coal handling & Washing capacity	2500 TPH capacity
30	No. of crushers	2 Nos.
31	Power requirement	15 MVA
32	Water requirement	6880 m <sup>3</sup> /day
33	Transport of OB to dump site	35 T/100 T capacity dumpers
34	Transport of coal from mine face to CHP	By covered belt conveyors
35	Distance and mode of Coal transport to user point	
	Chhabra Unit 3,4,5 & 6 , Rajasthan	Transport by rail
	Jhalawar - Kalisind Unit 1&2, Rajasthan	Transport by rail
	Suratgarh Unit 7 & 8 , Rajasthan	Transport by rail

**Source: Mine Plan**



**TABLE-4  
SALIENT FEATURES OF THE COAL WASHERY PLANT**

Description	Details		
	Capacity	10 MTPA (Present Capacity)	5 MTPA additional Washery
Hourly Throughput capacity	1700 TPH	800 TPH	2500 TPH
No. of Annual working Hours	6000 hrs	6000 hrs	6000 hrs
Washing Technology	Jig Washing	Wet washing process	
Modular details	3 individual modules	Single Module of 5 MTPA	
Plant Process	Wet process comprising of crushing, screening, washing and material handling		
Land Requirement	28.381 ha (no additional land requirement for expansion)		
Water Requirement	3750 m <sup>3</sup> /day	1950 m <sup>3</sup> /day	5700 m <sup>3</sup> /day
Source of Water	Mine discharge.		
Power Requirement & source	10 MVA from existing 33kv Substation	15 MVA from 132 kv Sub-station (proposed)	

**Source: Project Report, RVUNL**

## 1.5 Baseline Environmental Status

The baseline data monitoring studies have been carried out for three months covering Pre-monsoon season 2015 (March 2015 to May 2015).

### 1.5.1 Soil Quality

Ten soil samples were collected and analyzed in and around the mine lease area to assess the present soil quality of the region. The pH of the soil indicates that the soil is slightly alkaline to moderately alkaline in nature. The nitrogen concentration was observed to be in the range of very less to less category. Phosphorous concentration was observed to be in the range of less to medium quantities. Potassium concentration was observed to be in the range of less to more than sufficient category. Based on the results, it is evident that the soils are not contaminated by any pollution sources.

### 1.5.2 Meteorology

Meteorological data at the site was monitored during March to May 2015 representing Pre-monsoon season of 2015. It was observed that during study period, temperature ranged from 22.3<sup>o</sup>C to 43.1<sup>o</sup>C and the relative humidity recorded in the range of 49% to 73%.

### 1.5.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) was carried out at 12 locations with a frequency of two days per week for three months during pre-monsoon season of



2015. The minimum and maximum values of PM<sub>10</sub> were observed in the range of 33.5-67.9 µg/m<sup>3</sup>. The results thus obtained indicate that the concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> and CO in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.

#### 1.5.4 Water Quality

To assess the physical and chemical properties of water in the region, water samples ten eight ground water and five surface water locations were collected and analysed from various water sources around the project site.

##### **Ground Water**

- The analysis results indicate that the pH ranges in between 7.1 to 7.9, which is well within the specified standard of 6.5 to 8.5. The minimum pH of 7.1 was observed at GW6 and the maximum pH of 7.9 was observed at GW3;
- Total hardness was observed to be ranging from 20 mg/l to 74 mg/l. The minimum hardness (20 mg/l) was recorded at GW1 and GW4 and the maximum hardness (74 mg/l) was recorded at GW3 and GW10;
- Chlorides were found to be in the range of 5.7 mg/l to 24.2 mg/l, the minimum concentration of chlorides (5.7 mg/l) was observed at GW3, whereas the maximum value of chlorides (24.2 mg/l) was observed at GW9;
- Sulphates were found to be in the range of 0.2 mg/l to 5.7 mg/l. The minimum value observed at GW1 (0.2 mg/l) whereas the maximum value observed at GW10 (5.7 mg/l);
- The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 42.0 mg/l to 135 mg/l, the minimum TDS observed at GW4 (42.0 mg/l) and maximum concentration of TDS observed at GW7 (135 mg/l); and
- Iron is found in between 0.02 mg/l to 0.08 mg/l and zinc found 0.03 mg/l to 0.98 mg/l.

##### **Surface Water**

- *The analysis results indicate that the pH values were found to be 7.2 to 7.8;*
- *DO was observed to be in the range of 4.6 mg/l to 5.1 mg/l. The TDS was observed in the range of 43 mg/l to 60 mg/l;*
- *The chlorides and sulphates were found to be in the range of 4.3 mg/l to 9.9 mg/l and 11.7 mg/l to 28.1 mg/l, respectively;*
- Total hardness expressed as CaCO<sub>3</sub> ranges between 18.0 mg/l to 35.0 mg/l. The concentration of nitrate fluctuates between <0.1 mg/l; and



- The calcium & magnesium were found to be in the range of 4.4 mg/l to 9.0 mg/l and 1.8 mg/l to 3.9 mg/l, respectively. Iron values are found between 0.01 – 0.08 mg/l and zinc is found between 0.05 – 0.11 mg/l.

#### 1.5.5 Noise Levels

Ambient noise levels were measured at twelve locations around the project site. The daytime and night time noise levels in all the residential locations were observed to be within the permissible limits.

#### 1.5.6 Ecological Environment

From the primary survey and as per forest department records and review of literature, there are no sanctuaries, national parks, biosphere reserves in the study area.

In the buffer zone of the study area, there are few Schedule-I species which are recorded in the study area such as Indian elephant, peafowl, jungle cat, and sloth bear. Rest of the species is recorded in the following Schedules of II, III, IV and V of Indian Wildlife (Protection) Act, 1972, amongst mammals and reptiles. The wildlife conservation plan has been approved.

Migrant birds of belonging to raptor species such as eagle species and kites are listed in the Schedule –I of the Indian Wildlife (Protection), Act 1972 apart from *Pavo cristatus* – peafowl are confined in the Schedule-I.

Among reptilian species *Python molurus* (Indian rock python) in the study area are confined in the Schedule I, and remaining belongs to Schedule-II, IV of the Indian Wildlife (Protection), Act, 1972.

Apparently there is no endangered botanical flora in the study area as per the Botanical Survey of India records.

#### 1.5.7 Social Environment

The study area (10 km radius) area has a total population of 35179 according to 2011 census. Total male population is about 50.70% and total female population is around 49.30%.

### **1.6 Anticipated Environmental Impacts and Mitigation Measures**

The environmental impacts due to the proposed expansion of mining project, associated activities like drilling, blasting, overburden, ore loading, overburden & ore transportation and ore beneficiation have been assessed and adequate management plan has been developed to mitigate the impacts.

#### 1.6.1 Air Quality

The opencast mining includes drilling, blasting, loading activities, waste dumping and vehicular movement etc. These activities are likely to contribute predominantly additional particulate matter and oxides of nitrogen. The existing



baseline concentrations of pollutants are within the limits prescribed by CPCB. Further, the resultant concentrations after expansion of opencast mining methods and surface transport will be within the permissible limits.

The air quality management measures, which are currently implemented, will be practiced after the expansion project also:

- Wet drilling and controlled blasting;
- Dust suppression on haul roads, stack yard and other open surfaces;
- Stationary water sprinkling on permanent haul roads and workshop;
- Regular maintenance of HEMM; and
- Greenbelt development along the mine lease boundary, OB dump areas and colony.

Regular monitoring for air quality within the lease area and other adjoining areas is being carried out and the monitoring reports are submitted to SPCB and MoEF, Regional office and IBM.

#### 1.6.2 Noise Levels and Ground Vibrations

With the mining operations, due to machinery, drilling and blasting for mine development, excavation, transportation and crushing of ore, it is imperative that noise levels would increase. Mathematical modeling has been carried out and the high noise levels will be confined to the mining areas only and the nearby villages and other community areas are not likely to have any major adverse impact.

There are no human settlements within the mine lease area. Further, blast vibration studies have been carried out. As per the recommendations, blasting parameters such as burden, spacing, charge per delay, sub-grade drilling is being maintained. Controlled blasting techniques like presplit blast, use of NONEL and Site Mixed Emulsion (SME) is being followed to minimize the noise and vibration. The same practice will be continued during the expansion project also. Further, all the operator cabins in HEMMs including dozer and drill having made air tight and air conditioned. Acoustic enclosures are being provided in the DG sets. All the workers are provided with ear muffs.

Further, green belt development around the mine lease area, along the OB dump areas and in the colony acts as noise attenuator. Additional green belt is also proposed as part of the expansion project.

#### 1.6.3 Water Resources

About 6880 m<sup>3</sup>/day and 5700 m<sup>3</sup>/day of water will be required for mine and coal washery respectively and will be sourced from mine dewatering. Adequate drainage systems will be planned in the mining, service center for allowing the water to flow in the pre-determined path. The drainage system will be designed in such a way even to meet excess rainfall. No water will be allowed to flow across the waste dumps. However, few check dams will be constructed to arrest wash out from the waste dumps during rainy season. All along the mine roads drainage will be provided and benches will be properly sloped so as to avoid stagnation of water.



With the above measures no adverse impact is envisaged on the surface water quality in proposed expansion mine.

#### 1.6.4 Soil Environment

The environmental impacts of the mining activities on topsoil are based on the quantity of removal of topsoil and its dumping. In the present project, as it is proposed to temporarily store the topsoil and use it for plantation schemes, no impact of dozing of topsoil is envisaged. No waste rock generation will be involved.

#### 1.6.5 Solid Waste

The total volume of OB has been estimated as 2368.72 Mm<sup>3</sup>. The OB removed during initial years will be placed beyond the in crop of the seam-IV. The total volume of external dump has been estimated as 52.07 M m<sup>3</sup> solid. Rest of the OB will be placed in internal dumps.

The internal dumping will start when about 100 m space is available on quarry floor. By adopting the proposed sequence of mining, as the quarry advances, the amount of internal dump will increase as more space for the internal dumping is created. For external dumps no additional land will be required. External dump will be accommodated inside the block boundary. Two external dumps i.e external dump west and external dump east has been proposed on the north western and north eastern side of the block boundary respectively. Two internal dump i.e internal dump west and external dump east has also been proposed.

There will not be any internal dump till 3<sup>rd</sup> year. It is proposed to start internal dumping from 4<sup>th</sup> year of mine operation. As the gradient of the seam is flat, during working of the quarry substantial amount of OB will be accommodated in internal dump. During 4<sup>th</sup> year of mine operation, 7.09 Mm<sup>3</sup> of OB will be accommodated in internal dumped and remaining 19.97 Mm<sup>3</sup> of OB will be accommodated in external dump. From 5<sup>th</sup> year of mine operation, no external dumping will be required. Hence, OB will be accommodated in internal dump for rest of the mine life.

Overburden will be dumped in external as well as internal dump. Dumping has been planned assuming 15 % swelling factor.

#### 1.6.6 Flora and Fauna

As the mining activity is restricted to the core zone, no significant impact on the flora of the buffer zone due to the proposed mining is anticipated. With afforestation on overburden dumps and proper management of forest and development of greenbelt around the mine, the aesthetics will be improved. There are no endangered flora and fauna species within the core area.



### 1.6.7 Socio-Economic Aspects

Based on the requirement of the people in the area, the development activities needs to be taken up. The basic requirement of the community needs to be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages affected, building/strengthening of existing roads in the area.

The preference will be given to the local population for direct and in-direct employment. The proposed project may create opportunities for indirect employment in the field of vehicle hiring, labours, trading of construction material, carpenters etc. This will help in improving the socio economic status of the region.

### 1.7 **Budgetary Allocation for Environmental Protection**

The details of investment for procuring the equipment for efficient control and monitoring of pollution along with annual recurring cost are given in **Table-1.5**.

**TABLE-1.5**  
**COST OF ENVIRONMENTAL PROTECTION MEASURES**

Sr. No.	Particulars	Proposed Cost (Rs. Lakhs)	
		Capital	Recurring
1	Dust suppression	150	20
2	Water quality monitoring & management	50	5
3	Air quality and noise monitoring	10	5
4	Greenbelt / Plantation	350	70
5	Wildlife conservation	Nil	20
6	Reclamation	900	320
	<b>Total</b>	<b>1460</b>	<b>440</b>

### 1.8 **Conclusion**

The proposed opencast coal mine project and coal washery will have impacts on the local environment with proper mitigation measures with the effective implementation of the environment management measures as suggested in the EIA/EMP report and as recommended by MoEF, CPCB and State Pollution Control Board, the negative impacts will be minimized to a great extent. However, development of this project has beneficial impact/effects in terms growth in regional economy, transform the region's economy from predominantly agricultural to significantly industrial, increase Government earnings and revenues and accelerate the pace of industrial development in the region.

The proposed project will provide direct employment to a large number of personnel. This project will also generate indirect employment to a considerable number of families, who will render their services for the employees of the project.

The project will also encourage ancillary industries in the region, which will not only increase the employment potential but also the economic base of the region will be further strengthened.



***Environmental Impact Assessment for the Proposed Expansion of Parsa East and Kanta Basan Opencast Mine and Pit Head Coal Washery from 10 MTPA to 15 MTPA at Udaypur Tehsil, Surguja District, Chhattisgarh***

***Executive Summary***

Thus, in view of considerable benefits from the project, the proposed project is most advantageous to the region as well as to the nation.