

# **M/S D. B. POWER LTD.**

## **EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN FOR DURGAPUR II / SARIYA COAL BLOCK MAND-RAIGARH COALFIELD, DISTRICT RAIGARH, CHHATTISGARH (EXTENT: 693.326 Ha, CAPACITY 2.0 MTPA)**

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*Prepared by:*



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## EXECUTIVE SUMMARY

### 1.0 INTRODUCTION

Sariya coal block, with an extent of 6.93 sq. km. is located in the northern part of the Mand-Raigarh coalfield that constitutes almost the central part of the Son-Mahanadi Valley. It has been allotted to M/s D. B. Power Limited for captive mining and supplying coal to their proposed 1320 MW Thermal Power Plant at Dhabra in Janjgir by the Ministry of Coal, Government of India.

### 1.1 General background

The block is named after Sariya nala flowing south of the block. Mineable reserves come out to be 69.07 MT. Life of mine is 36 years and rated capacity is 2.0 MTPA. It is an opencast coal mine proposed to be operated with a combination of continuous surface miner and shovel-dumper technology. Cost of the project is Rs. 303.75 crores.

### 1.2 Location and Communication

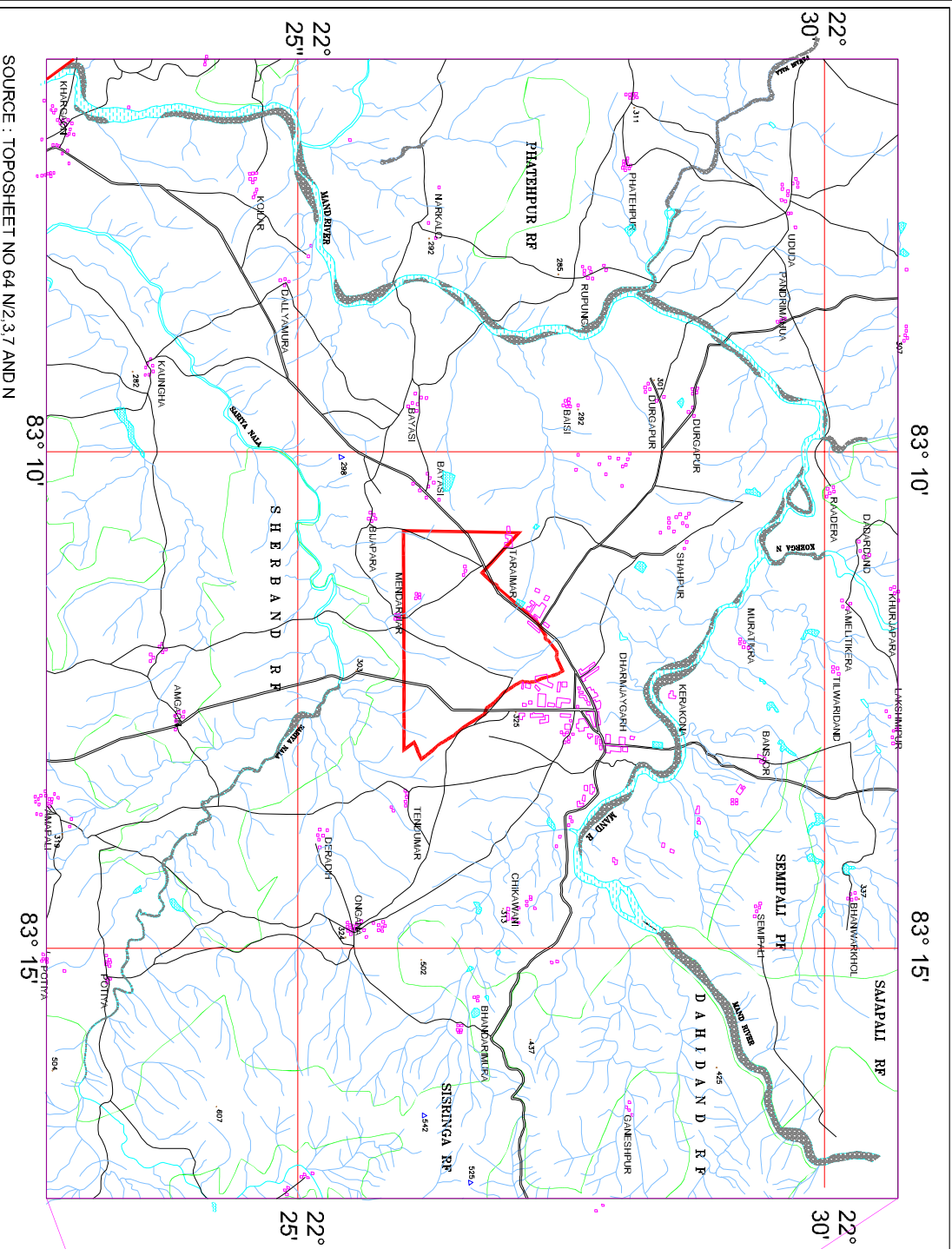
Durgapur-II/Sariya Coal Block is located in villages Taraimar, Bayasi, Medarmar, Dharamjaigarh, Dharam Colony and Bayasi Colony of Raigarh District of Chhattisgarh and is adjacent to Dharamjaygarh town which is a tehsil of Raigarh district. The area falls in Survey of India Toposheet No. 64N/3 and is bounded by latitude 22° 26' 00" to 22° 27' 27" N and Longitude 83° 10' 47" to 83° 13' 10" E. The block is situated to the immediate south and southeast of the earlier explored Durgapur-Shahpur block.

The block is located at a distance of about 65 km north of Kharsia, a Tehsil town in Raigarh district and 80 km northwest of Raigarh, the district headquarter. Kharsia is the nearest railhead on the Howrah-Mumbai line of South Eastern railway. Dharamjaygarh-Kharsia State Highway (No.22) forms northern boundary of the block. Nearest airport is in Raipur, about 205 km from the site. The location of the project can be seen in Fig 1.

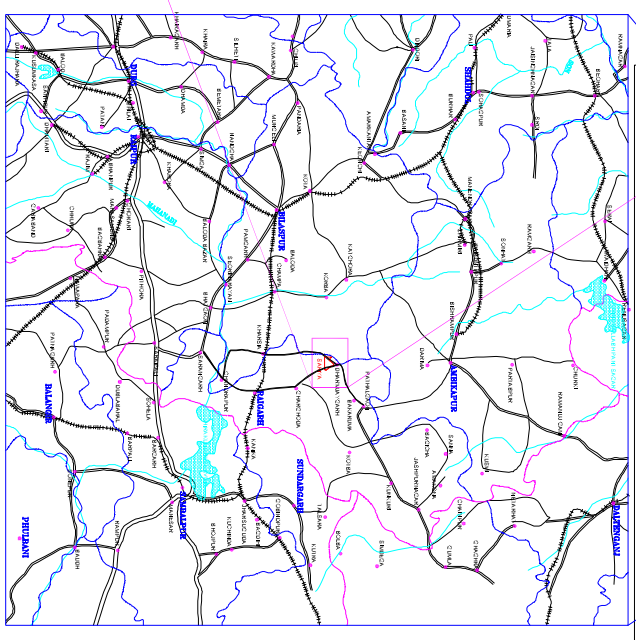
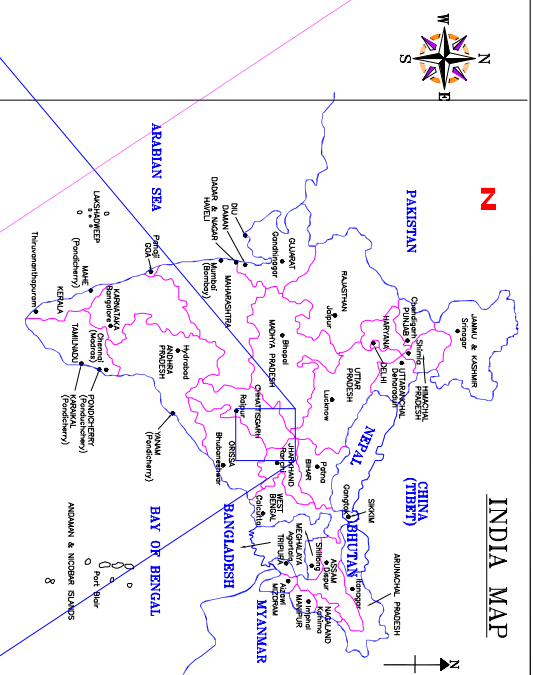
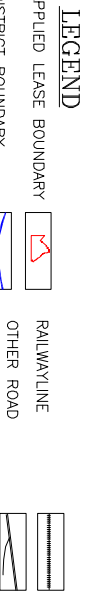
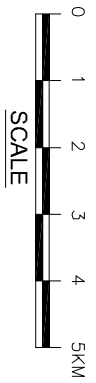
## 2.0 PROJECT DESCRIPTION

### 2.1 Geology

The Mand River coalfield, North Raigarh Coalfield and South Raigarh Coalfield, which were previously studied in isolation and considered as separate entities, are now collectively called Mand-Raigarh coalfield as they are contiguous part of the same basin within Mahanadi basin. It extends over an area of about 3700 sq. km. The strata including coal seams exhibit a broad NNW-SSE trend. The amount of dip mostly varied from 2° to 3° except the western portion where the dip is 4° to 5°.



SOURCE : TOPOSHEET NO 64 N/2,3,7 AND N



		<b>MUN MEC CONSULTANCY PVT. LTD.</b>	
CLIENT:		NEW DELHI, PH. 28534777, 28535881	
PROJECT:		SARAYA COAL BLOCK	
TITLE:		SUMMARY	
DRAWN BY:		CHECKED BY:	FIG. NO.
B.R. NATHAN		B.D. SHINHA	1
SCALE : AS SHOWN		DATE : 07-04-2010	

## 2.2 Reserve and Grades

In Sariya block, four regional seams (V to II) have been proved to exist besides one local seam (IIL) which is thin and impersistent. All the four seams i.e. V to II are planned to be mined by opencast method. Seam V is the thickest seam, but contains several dirt bands. The other three regional seams (IV, III and II) are thin. All the four seams incrop within the block. The coal grade is mostly G and is followed by D, E and F.

A total of 91.67 millions tonnes of net 'proved' reserves have been estimated for the seams II to Seam V. Out of 91.67 millions tonnes, 38.85 million tonnes of reserves have been estimated in seam V and remaining 52.82 million tonnes of coal reserves are in Seam IV, III, & II.

## 2.3 Mining

The total geological reserves of coal up to seam II is 91.67 MT. The northern part of the mining block is covered by surface features and a road is passing through the eastern part of the block. Some part of reserve is blocked under safety barriers and batter due to which, about 22.60 million tonnes of coal is blocked under them and remaining 69.07 million tonnes of coal reserve is mineable and amenable to opencast mining. The annual coal production will be 2.0 Mt. Dharamjaygarh-Kharsia State Highway (No.22) will have to be diverted for a part of the stretch on the NW corner.

Year wise production for the life of the mine is tabulated in Table 1.

**TABLE 1**  
**CALENDER PROGRAMME OF EXCAVATION OF SARIYA COAL BLOCK**

Year	Coal Progressive	Coal Cumulative	Total waste (OB) (Mcum) programme	Total waste (OB) (Mcum) Cumulative	Stripping ratio (cum/t) prog.	Stripping ratio (cum/t) Cumulative
1*	0.5	0.5	3.70	3.7	7.40	7.40
2	1.2	1.7	7.80	11.5	6.50	6.76
3	2	3.7	12.50	24	6.25	6.49
4	2	5.7	12.20	36.2	6.10	6.35
5	2	7.7	12.04	48.24	6.02	6.26
6	2	9.7	12.50	60.74	6.25	6.26
7-12	6X2	21.7	75.00	135.74	6.25	6.26
13-35	23X2	67.7	287.50	423.24	6.25	6.26
36	1.37	69.07	3.31	426.55	2.43	6.18
<b>Total</b>	<b>69.07</b>		<b>426.55</b>			

\* The 1<sup>st</sup> year of production will be 2011 – 12.

No washery envisaged as the ROM coal will be directly used in TPP.

## **2.4 Site Services**

It is imperative to develop core infrastructure like power, road, telecommunication, housing, service building viz. office, store, first aid centre, canteen etc. for a large number of employees of the project. The site office required at the proposed mine will be housed within the premises of the ML. The power requirement will be 5MVA, which will be arranged from the State Electricity Board. A standby DG set of 1 MW capacity will also be provided. Later, the power will also be available from their own CPP. The approximate industrial water requirement shall be 406 KLD, while the domestic requirement at pit head (including canteen) and colony shall be 335 KLD totaling to 741 KLD. The main source of water shall be mine seepage water, which will be used for sprinkling, workshop and even drinking after proper treatment.

## **2.5 Manpower**

At present 736 persons are employed in the mine. Since there is no increase in production, additional employment shall not be generated at the mine.

## **3.0 PRESENT ENVIRONMENTAL SCENARIO**

### **3.1 Topography & Drainage**

The Sariya block is characterized by undulating topography with elevation varying from 302 m to 330 m above the mean sea level. The highest elevation of 330m is in the south-eastern part of the block and the lowest surface value of 302 m is in the Dhanger nala.

Sariya block is mainly drained by Mand River. This river flows along the western part of the block. However, a small part of the block in the northwest is drained by Dhanger nala.

### **3.2 Climate & Micro-meteorology**

The climate of the study area is of subtropical type and is characterized by hot summer, mild winter and well distributed rainfall during the monsoon season. South-west monsoon season starts from June and extends up to September. Nearly 80% of the rain occurs between June and September. The average annual rainfall (1996-2005) was recorded to be 1216.4 mm at IMD, Raigarh. Maximum and minimum recorded temperatures for the same place and period are 42.08°C and 12.04°C respectively. The relative humidity varies from 27% to 86% and the wind speed ranges from 2.4 to 5.1 kmph.

Micro-meteorological survey was conducted during March to May, 2008. Temperature varied from 17.20 to 43.00°C with an average of 29.62°C,

relative humidity between 10.0% and 56.0% with an average of 32.38%, wind speed from calm to 24.30 km per hour with an average of 6.75 km/hour and predominant wind direction was NE for 15.36% of the readings.

### **3.3 Ambient Air Quality**

Six air sampling stations were established in the study area including one in core zone and five in buffer zone during the monitoring period. The observed values of SPM ranged from 84 to 156  $\mu\text{g}/\text{m}^3$ , RPM from 34 to 63  $\mu\text{g}/\text{m}^3$ ,  $\text{SO}_2$  from below detectable level to 6.8  $\mu\text{g}/\text{m}^3$  and  $\text{NO}_x$  between 6.1 and 9.1  $\mu\text{g}/\text{m}^3$ .

### **3.4 Water environment**

The study area is drained by Mand River and its tributaries. However, a small part of the block in the northwest is drained by Dhanger nala and southern part is drained by Sariya nala. There are no perennial water bodies or channels in the ML area. All the dry drainage channels are of first order.

The depth of water table over the study area varies between 5-12 m below ground. The studies carried out by Central Groundwater Board in the District reveals that seasonal water table fluctuation in the area varies between 3-5 m. The average seasonal fluctuation of water table in the area as per reports of C.G.W.B. is 4.4 m. The ground water in deeper aquifer is present in semi-confined to confined conditions. During the course of study the water table was observed at few locations. In the study area, annual ground water utilization is 4.185 MCM, annual groundwater recharge is 91.52 MCM and the balance groundwater resource is 87.33 MCM.

Water Quality tests were conducted for 8 ground and 2 surface water samples. The ground water quality of the study area is observed to be potable and the hardness of water is within the permissible limit of the drinking water standard.

### **3.5 Land use pattern and soil quality**

The total mining lease area is 693.326 ha. Out of this, 29.537 ha is govt. land, 393.963 ha is private land, 78.120 ha is Protected Forest and 56.731 ha is Chhote Jhad ke jungle.

The area is covered by black cotton soil. Samples were drawn from two locations. Nitrogen, phosphorus and Calcium are optimum in both the samples. S1 and S2 are rich in organic matter and iron. pH is slightly acidic in both the samples. Conductivity is normal in both samples.

### **3.6 Noise and Traffic Density**

Ambient noise levels were studied at ten locations and was found to be between 45.40 and 58.40 dB(A) during day and 37.60 and 48.20 dB(A) during night.

A traffic density survey was conducted at Dharamjaygarh to Raigarh road. Total number of vehicles was found to be 1324 including two/three wheelers.

### **3.7 Ecology**

The forest of the study area as per the revised classification of Indian Forest types, belongs to sub group 5B/C1 (Northern Tropical Dry Deciduous Sal Bearing Forests) and 5B/C2 (Northern Tropical Dry Mixed Deciduous Forests). The main species existing in the forest area are Sal, Tendu, Mahua, Palas, and Neem etc. The height of the dominant trees ranges from 6m to 12m.

The study area has 28.76% of the land covered by forest. The big animals, like Sloth bear as well as small sized fauna, like Jackal, Wild boar, Common Fox, Indian Hare, Langur etc. are found in appropriate number in the forest area. There is no schedule I animal found in the area.

### **3.8 Socio-economic condition**

There will be rehabilitation of 524 households from the villages of Dharamjaygarh, Dharamjaygarh colony, Medarmar, Bayasi and Taraimar on acquisition of the land.

Total population of the villages is 51478. The main workers, marginal workers and non workers constitute 69.55%, 30.45% and 54.55% of the total population respectively. The strength of schedule tribe is 57.46% and the schedule caste is 5.25%.

### **3.9 Industries**

There are few small scale industries around the project site. These are Sharda Rice Mill, Medarmar adjacent to ML (S), Sharda Poha (Rice Flakes) Mill at Dharamjaygarh at a distance of 1.8 km, NE, Groundnut Processing Unit at Dharamjaygarh at a distance of 1.1 km, S and Gersa Maa cashew nut Processing Unit at Gersa at a distance of 9.4 km, S.

### **3.10 Places of tourism/religious/historical interest**

Likhamada cave near Ungna village (5km, E) is the only archaeological site present around the project site. However, there are local places of worship at some village. There are 4 small scale industries present around the project site.

## **4.0 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION**

#### 4.1 Climate

**Impact:** The climatic conditions including temperature variations, wind direction and speed, rainfall and humidity are governed by regional factors and the monsoons. As such the mining and other allied activities will not tend to influence the climate.

**Mitigation:** The operations are to be carried out in a limited area, vertically below the ground surface; as a result no climatological impacts are anticipated. Implementation of Afforestation and rehabilitated plantation work in ML area will contribute in positive manner.

#### 4.2 Air environment

**Impact:** The opencast mining operations are prone to generation of higher levels of SPM and to a limited extent of SO<sub>2</sub>, NO<sub>x</sub> and CO due to blasting, fuel oil combustion, burning of coal etc. However, there is no point source emission due to the proposed activity. Moreover the transportation of coal by trucks from the mine site to the CPP may cause increased air pollution along the roads, if adequate control measure are not taken.

**Mitigation:** Air pollution control measures include providing drills with dust collector, suitable burden and spacing of blast hole, suitable charge per delay, controlled blasting using short delay detonators and non electric initiation system, dust suppression systems (like water spraying) at faces before and after blasting on haul roads and during loading, speed limit of various types of vehicles have been specified and are displayed at various locations, avenue plantation along the roads, provision of coal bunkers with water sprinklers etc.

#### 4.3 Water Environment

**Impact:** The mining activity causes accumulation of water through mine seepage as well as rainwater accumulation. The immediate impact of ground water movement is observed in the up gradient of water table. During heavy rains, washing from the coal handling plant and slimes would load the surface water with higher concentration of suspended solids, oil and grease. Uncontrolled releases of such water can cause siltation of reservoirs and reduced oxygen content of water and hence, adverse impact on the aquatic biota. The domestic waste has extra load of BOD and suspended solids, which will cause the adverse impact on surface and ground water quality.

**Mitigation:**

The mine water discharge is stagnated in a settling pond at surface. The domestic effluent from colony is treated by activated sludge process after removal of oil and grease by oil/water separator/trap. The oil and grease will be sold to CPCB authorized recycling vendors while the sludge will be stored in an impervious pit.

To control water pollution, measures like using leak proof containers for storage and transportation of oil/grease, Underground impervious drains for sewage waste, regular monitoring of water quality., providing proper garland drains around excavation and toe drains around the dumps, Provision of peripheral bunds and check dams along with catch pits will prevent solid from wash off, Workshops effluent is passed through oil water separator and re-circulated and reused etc have been implemented. The sewage treatment plant is designed to treat raw sewage, which will have floating particles and other organic pollutants.

Additionally, rain water harvesting has been proposed for the project.

#### **4.4 Noise, traffic density and ground Vibration**

**Impact:** During the proposed mining, the noise pollution can take place due to operation of machinery and blasting operation. The vibration due to blasting can cause damage to the nearby structures.

**Mitigation:** To prevent noise levels, peripheral plantation and greenbelt will be developed, periodic maintenance of machinery and vehicles, provision of air silencers in machines for noise reduction, reducing the exposure time of workers and providing ear muffs to them etc. will be practised.

#### **4.5 Topography and drainage**

**Impact:** Mining, waste handling, infrastructural facilities and transport action will affect the existing land surface over an applied area. Evacuation will change the physiography by digging of top soil and removing the vegetation.

**Mitigation:** The mining activities of block are not anticipated to cause any considerable adverse impacts on the drainage pattern. Hence no requirement is concerned for their management. Since the land degradation is restricted only to the mining area, the reclamation strategy must include the programme to reclaim the disturbed land.

#### **4.6 Land Environment**

**Impact:** Land degradation is inevitable during mining particularly in open cast mines, where the original soil ecosystem and structures are drastically destroyed within the core zone.

**Mitigation:** Out of total excavated area of 540.75 Ha, 424.93 Ha will be backfilled. Whole of the excavated area is proposed to be developed into a picnic spot due to the formation of water body created as a result of the left out void. The water body will be used for irrigation, watering the forest at earlier stages and it will also attract avifauna. The depth of the void will be reduced to 55m by backfilling the OB rehandled from the surface dump.

#### **4.7 Solid Waste management**

**Impact:** Displacement of soil will lead to the loss of its fertility. The solid waste will also lead to land degradation impact on topography and visual aesthetics. The sludge from sewage treatment plant and washing of vehicles as well as the oil and grease contribute towards degradation of quality of water and soil.

**Mitigation:** It is estimated that 0.39 MCum of top soil will be generated during the first five year of mining operation and 1.87 MCum at the conceptual stage. This top soil will be eventually re-used for reclamation and plantation. The overburden produced during the mining operations will be dumped partly in the external dumps and partly in the inside dump and in pit dump. The ultimate external dumps will be graded, leveled and finally afforested.

#### **4.8 Ecology**

**Impact:** Ecological impacts from open cast mining result in loss of vegetation by excavation and dumping thereby, affecting the species for which such vegetation was the host. This will also lead to the migration of animals to neighboring areas due to enhanced noise, vibration and light levels.

**Mitigation:** The precautionary measures taken for control and management of ecology include construction of boundary or fence along the mine perimeter, the roads leading to and from the mine shall be having caution or warning boards, drivers shall be sensitized not to hit stray animals on the road, the emissions from the mines shall always be kept within the norms, care shall be taken that no food or degradable waste is openly disposed.

#### **4.9 Socio-economics**

**Impact:** Over 500 houses and structures of part of six villages (Taraimar, Bayasi, Medarmar, Dharamjaigarh, Dharamjaygarh Colony) falling within the area earmarked for mining and related facilities will have to be demolished and rehabilitated. The total number of displacees will be 2709.

**Mitigation:** All the persons will be suitably compensated or rehabilitated as per their requirement and suitability. The resettlement and rehabilitation plan has been prepared on the basis of the "Ideal Resettlement Policy, 2007 of Chhattisgarh State. Compensation will be given to the land losers at market rates of approximately Rs. 6.18 lakhs per hectare. About 997 houses will be constructed and 0.1 acre of land will be allotted to each family. There will be overall positive effect on the social life of the local people as they will get job opportunities both direct and indirect. The facilities created for the project will benefit the local population.

#### **4.10 Occupational Health**

The medical facilities have been provided for all the employees of the mine and colony. All the employees and contractual workers are sent for regular health check up for the occupational diseases like Silicosis, Pneumoconiosis, etc., which are prevalent in the mining industry and tests like optometric, blood tests, chest X-rays, sputum test, audiometric test, lung test, cardio-vascular etc are done.

## **5.0 ANALYSIS OF ALTERNATIVES**

Mining industry is very much site specific and a mineral has to be mined at the place where it exists in economically feasible quality and quantity. It is an explored block allotted by Ministry of Coal to M/s D.B. Power Limited with known reserves. The coal block is in Raigarh district of Chhattisgarh. Opencast mining method is selected in view of workable thickness of coal seams and favorable overburden to coal ratio. Conventional mining technology of drilling, blasting, loading and transportation using Shovel Dumper Combination is being used. A coal washery with cyclone process is established to wash the ROM coal at pit head to avoid waste transportation.

## **6.0 ENVIRONMENTAL CONTROL AND MONITORING ORGANIZATION**

The management of DB Power Limited has formed an environmental cell for the mines and plant operating in the region. The same shall provide for Durgapur-II/ Sariya Coal Block. The organization chart is headed by a General Manager (Mine) and managed by the Project Manager Mines and supported by an Environmental Engineer.

Adequate budgetary provisions have been made by the Company for execution of Environmental Management Plan. The total investment on environmental improvement works is envisaged as Rs. 2237.42 lakhs and recurring expenditure during the stage of production is Rs. 448.46 lakhs per year.

## **7.0 DISASTER MANAGEMENT PLAN**

The following natural/industrial problems may be encountered during the mining operation are

- Inundation- Filling of the mine pit due to excessive rains.
- Disaster due to failure of PIT slope
- Disaster due to failure of waste dump
- Disaster due to surface fire/coal stack fires
- Possible dangers due to storage of explosives in the magazine

Since the diversion has been constructed for flow observed in Nala along with margin for safety, the risk to mine due to flooding of Nala is minimum. No high risk accidents like landslides, subsidence flood etc have been apprehended. All the statutory precautions should be taken for quick evacuation as per the Mines Act 1952, the Mines Rules 1955, Rule of MMR-1961 and the Rules of MCDR-1988.

## 8.0 PROJECT BENEFITS

The mine will create direct and indirect employment for the skilled, semi-skilled and displacees of the surrounding villages. The general social development of the area will be facilitated due to the improvements in infrastructure and communication system. Dainik Bhaskar group has already initiated some of the social and cultural activities, like foundation of 'Abhivyakti', a centre of fine arts and 'The Sanskaar Valley School'.

Corporate social activities proposed to be undertaken by the company include:

- To provide safe drinking water facility by providing bores, tanks & submersible pumps and deepening of existing ponds in villages.
- Construction of toilets and Boundary walls in schools.
- More teachers to be provided at local schools.
- Scholarship schemes to be launched for meritorious students.
- Bridges and culverts to be constructed as per the requirement of the local people and panchayat
- organizing health checkup camp & cleanliness awareness drive.
- Will organize state and district level game competitions in different schools in different villages.
- Maintenance of playgrounds and provision of sports item like cricket kit, Volleyball kit to interested players/team.

The company has proposed to invest an initial amount of Rs. 58.5 lakhs and a recurring amount of Rs. 59.25 lakhs per annum towards corporate social responsibility action plan.