

## **SUMMARY OF EIA/EMP OF BAROUD EXPANSION OPENCAST PROJECT (3.5 MTY) FOR PUBLIC HEARING**

### **P.1 PROJECT DESCRIPTION:**

The proposed area consisting of Baroud and Rai West geological blocks, fall in the Mand - Raigarh Coalfield of Raigarh district (Chhattisgarh) under the administrative control of Raigarh Area of South Eastern Coalfields Ltd. Baroud-Rai West Blocks will now be worked from Rai West Side. Rai West Block is located about 50 km NNW of Raigarh , the district headquarters, and 30 km SE of Dharamjaygarh town and can be approached through Dharamjaygarh-Raigarh State Highway No.1 connecting these two places. It is situated about 5 km north of this highway and can be approached by a metaled road branching off from the Highway at a distance of about 45 km from Raigarh and leading to Baroud village. Raigarh is the nearest rail head on the Howrah-Mumbai line of the South East Central Railway.

In Baroud OC Expansion (1.0 Mty) Seam XI and Seam XII incropping were envisaged to work. was prepared by CMPDI in March 2003 and approved by SECL on 29.5.2003 and environmental clearance obtained in March,2006 Based on the study of borehole data in Rai West Block, it is estimated that working of seams i.e. Seam VI to Seam X is economically viable in Baroud OC Expansion also, which is an on-going project. So, this Project Report is prepared combining Rai West and Baroud Geological Block.All seams from Seam VI to Seam XII in Rai West and Baroud Block will be worked.

The block covers an area of **(1111.40Ha) 11.11** Sq km.A mining block involving part of the above blocks covering an area of **8.81** sq.km. has been considered in the Baroud Opencast Expansion Project **(3.5 Mty peak)**.Occurrence of 9 nos. of coal seams have been proved in the block. These seams are Seam VI,VII,VIII,IX,X,XL,XIB,XIT and XII. The average grade of the coal is 'F'

The mine-able reserves & volume of OBR considered in this report have been **140.89 M Tes** and **553.66** Mcum . The life of the mine is **48** years.Both OB removal and coal production has been proposed to be done by outsourcing the equipment .The expansion project has provisions for pumping & drainage of mine water , coal handling , workshop, power supply , township with water supply & sewerage system and land area.Details have been given in CHAPTER II.

### **P.2 DESCRIPTION OF THE ENVIRONMENT**

#### **a). Socio-economic aspects**

A study of socio-economic profile in the study area ( 10 Kms. radius area from the project periphery including core zone ) based on 2001 census data)reveals that the total population of the area consists of about **47572** persons, of which **49.33 %** are male and **50.67 %** are female. Scheduled castes account for **7.39 %** of total population and Scheduled tribes **64.21 %**, whereas **55.67 %** population is literate. The data reveals that **38.92 %** of the population are main workers and **14.02 %** are marginal workers, the rest **47.06 %** are non-workers.

**b). Land requirement**

**Core Zone Area**

It is estimated that **1111.40** Ha. of land will be required for Baroud Opencast Project Expn. including land for quarry, external dumps, industrial and residential complex, road diversion, safety zone and rehabilitation colonies. This also includes **363.58** Ha. land already acquired for existing Baroud OCP and **747.82** Ha. additional land will be acquired for Baroud Exp OCP(3.5 MTY peak) . The break-up of land use is given below in **Table-3.8 b**.

**Table-3.8 b**

Purpose	Government		Private		Total
	Forest	Others	Agri.	Others	
1. Area to be excavated	318.86	96.10	466.69	Nil	<b>881.65</b>
2. Storage for top soil	Nil	1.25	Nil	Nil	<b>1.25</b>
3. Over-burden / Dumps	25.00	2.50	11.2	Nil	<b>38.70</b>
4. Mineral storage	Nil	0.15	Nil	Nil	<b>0.15</b>
5. Infra-structure (Workshop, Administrative building)	7.92	2.50	4.89	Nil	<b>15.31</b>
6. Roads	Nil	11.61	Nil	Nil	<b>11.61</b>
7. Green Belt	Nil	10.00	Nil	Nil	<b>10.00</b>
8. Effluent treatment plant	Nil	0.10	Nil	Nil	<b>0.10</b>
9. Township area / rehabilitation site	Nil	0.89	Nil	Nil	<b>0.89</b>
10. Other (specify) <i>Safety zone</i>	27.65	18.72	105.37	Nil	<b>151.74</b>
<b>TOTAL</b>	<b>379.43</b>	<b>143.82</b>	<b>588.15</b>	<b>Nil</b>	<b>1111.40</b>

**Study Area**

Census data of 1991 have been collected and utilised for knowing the landuse pattern. Village wise landuse pattern is summarised details are in **Table-3.8 c**:

**Table-3.8 c**

Sl.No	Particulars	Area (Ha.)	Value in (%)
1	Forest Area	4502.90	12.98
2	Irrigated agricultural Area	390.29	01.12
3	Un-irrigated agricultural area	19958.42	57.54
4	Culture-able waste area	7200.11	20.76
5	Area not available for cultivation	2635.25	07.60
	<b>TOTAL AREA</b>	<b>34686.97</b>	<b>100.00</b>

**c). Meteorological Trend**

The meteorological data with respect Temperature for 1984 to 2003 are available so far from the nearest Bilaspur Meteorological Observatory, which is situated approximately 90 km. from the project. The temperature varies from **5<sup>0</sup>C to 44.7<sup>0</sup>C** . The average rainfall as per as per raingauge station at Katghora for 1954 to 2000 is **1516** mm.

**d). Ambient air quality**

Ambient air quality data in & around Baroud project area shows maximum concentration. of SPM, RPM, NOx, SO2 in summer as **333, 105, 24 & 24** µg/cum respectively which is within the permissible limits.

**e). Water quality**

Water samples were collected and analysed from different locations representing surface water sources , ground water sources and adjoining mine discharge. The analytical result shows that the physical and chemical parameters are within prescribed limits of GSR : 422(E) and IS:10500 . Provision of settling tanks to arrest suspended solids from mine water, workshop water, surface run off have been made. Domestic Effluent will be treated in conventional Septic Tank & Soak Pit.

**f). Noise level**

The maximum noise level data recorded at Baroud mine site was **65.9** dB(A) which is within the prescribed limit value of 75 dB(A).

**g). Forest flora & fauna**

**1) Flora.**

There is **379.43** Ha. of forest land in mining area. The forest cover in buffer zone is about **4123.47 ha.**( **4502.90** in the study area). In order to confirm the survey status of flora and fauna, the Intensive Forest Management Plan for Raigarh Division of Forest Department, Chhattisgarh , was consulted. The Forest area is open, unclassified .

**2) Fauna**

Fauna are identified by forest officials adopting four methods viz., signs of faecal droppings, siting, appearance of pug marks on water holes/prints and signs of grazing/browsing. The migration of wild life from adjoining forest areas is not noticed as the area is open and disturbed by biotic factors already existing. Inventory of animals and birds is made in compartment history on the prescribed format of forest department. The details of existing environmental scenario have been given in CHAPTER III.

**h) Hydrogeology**

Yearwise static water levels from Kurumkela and Teram Hydrograph Stations during pre and post-monsoon as recorded by Ground Water Survey Unit, Irrigation Department

have been collected. The average fluctuation in GWL observed from the data of permanent observation wells is about **2.65** metres.

Rainfall is the principal source of recharge. The calculation of the ground water recharge has been done based on the GEC norms for rainfall infiltration index as 11.5% and for water level fluctuation method assuming specified yield as 8% for hard rocks. Based on the rainfall infiltration method the recharge works out to **35.68** M.cu.m. Discharge of the area works out to **7.184** M.cu.m. From this it is seen that the surplus water available in the area is **28.496** M.cu.m. The details are given in CHAPTER - III .

### **P.3 ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES**

#### **1). Socio Economic Impact**

The project will have on the whole a positive impact on socio-economic profile of the area due to increase in direct and indirect new employment opportunities, trade and business, community development, improved communication link, additional health care facilities etc. in the long term as the life of the mine is **48** yrs.

The project involves total **1111.40** Ha of land for quarry, industrial and residential complex, safety zone and external dumps etc. The **835** number of affected land oustees has been estimated and the number of families to be displaced from the villages namely Baroud, Bijari and Faguram (part of Oramunda) & Kurmi Bhavna falling within the quarry area, as **390**.

Chattisgarh Government will be benefited through financial revenues in crores of rupees by way of royalty, sales tax etc. from the direct and indirect operations in the project area. Central exchequer is also getting financial revenues by way of Income tax, Central Sales Tax etc.

#### **2). Impact on land use**

The premining land use of the project is as follows.

Forest land	:	<b>379.43</b> Ha.
Govt. land	:	<b>143.82</b> Ha.
Tenancy land	:	<b>588.15</b> Ha.
/ Agricultural land		
Total land area	:	<b>1111.40</b> Ha.

The land area would be utilized by the project for quarrying (**881.65** Ha.), External OB dumping (**38.7** Ha.) , infrastructures (**15.31**Ha.), colony site ( **0.89** Ha.), road (**11.61** Ha.) and safety zone & others (**163.24** Ha..). These activities will cause change in premining land use pattern by degrading **379.43** Ha of forest, agricultural and Govt. land affecting existing flora & fauna , existing surface drainage pattern , displacement of population.

#### **3). Impact on environment**

**Air environment**:- Air quality in respect of SPM, RPM, SO<sub>2</sub> & NO<sub>x</sub> within and around the project area are found to be within the prescribed limits of MOEF. These parameters

may increase their values if proper mitigative measures are not taken care of may cause pulmonary infections like pneumoconiosis, silicosis etc, irritation of eyes, poor visibility etc.

**Water environment** :- Untreated mine water, Workshop & Domestic effluent water could cause pollution to surface & ground water courses with excess of Suspended solids, Oil & Grease, COD and BOD, Dissolved solids, Sulphates, Chlorides, Bacterial contamination leading to serious problems to aquatic life & human health hazard.

Diversion of surface water courses and lowering of ground water table are the likely impacts on surface & ground water courses leading to water scarcity in the area..

**Noise environment** :- The impact of continued exposure of higher noise levels on humans and fauna are as follows:

- \* Annoyance and irritation
- \* Mental and Physical fatigue
- \* Interference in normal activities.
- \* Health hazards resulting from impaired hearing
- \* In extreme cases, cardio-vascular diseases etc.
- \* Task interference.
- \* Interference with communication i.e masking.
- \* Hypertension and higher blood cholesterol.

**Flora & Fauna** :- There are following identified impacts on flora & fauna .

- a) Removal of vegetation (379.43 Ha of forest, for which provision of compensatory afforestation has been made) due to mining activities.
- b) Pollution of surrounding water bodies due to leaching from overburden dump and pollutants from other activities. This affects the aquatic fauna. Plantation on dump surface and provision of foot & catch drains have been made to control this phenomena.
- c) Dust in atmosphere, contributed by mining and associated activities, when deposited on leaves of the plants in the surrounding areas may retard their growth. Provision of dust suppression system on haul roads, CHP etc have been made.

4) **Hydrogeological aspect** :- As mentioned earlier, because of the low permeability of aquifers, the impact of mining on local water regime will be marginal and the radius of influence will be limited to a small distance. So also, due to stratification, the individual permeable beds develop individual drawdown cones and the impact is usually limited to few hundred meters.

5). **Hazard assessment** :-

a) **Impact of Ground Vibration**

The main impacts due to ground vibration may be :

1. Development of cracks in the houses located in the neighbouring areas.
2. During blasting rock fragments fly up to a distance of about 150 m.

The habitat nearby opencast mine would be rehabilitated and hence no such hazard is anticipated.

**b) Coal fire**

No incident of coal fire is reported in adjoining mines of Raigarh area.

The details of environmental impact assessment have been given in CHAPTER IV.

**P.4 ENVIRONMENTAL MONITORING PROGRAM**

The implementation and monitoring of pollution control measures and for overall environmental management, environmental cell at the area and Corporate level will take all necessary care. It will look after the following aspects of environmental management.

- \* Generation of environmental data bank.
- \* Evolving micro environmental management plan for the project in collaboration with other agencies and consultants.
- \* Monitoring project implementation along with environmental control measures.
- \* Co-ordinate with other project activities to ensure timely implementation of the project.
- \* Co-ordination with Ministry of Environment & Forest, Central/State Pollution Control Board for prevention and control of water and air pollution.

Details have been discussed in CHAPTER VI

**P.5 ADDITIONAL STUDIES**

**1 Public consultation**

To ascertain the concern of local affected and others who have a plausible stake in environmental impacts of the project / activity public consultation will be done at project site or close proximity for local affected persons with the following activities .

- i) The process in which public would be directly involved or participate and indirect responses would be received through different modes of communications.
- ii) District Magistrate will preside over the Public Hearing process to get public concerns incorporated in the EIA report.
- iii) Videography of proceedings would be done and would be enclosed with the application for Expert Committee .
- iv) The proceedings will be signed by DM/ADM in the same day of hearing.
- v) The proceedings will be displayed in web site and other Govt. offices.

## 2 Risk assessment

Keeping in view of the events from abnormal developments in course of one's industrial activity leading to a serious danger to public or environment, the three basic principles i.e. prevention, preparedness (both pro-active and reactive) and mitigation of effect through rescue, recovery, relief and rehabilitation; a comprehensive blue print of risk assessment and management plan has been prepared for Baroud OCP incorporating the following :

- \* Identification and assessment of risks
- \* Recommendation of measures to prevent damage to life and property against such risks.

## 3 Social impact assessment

The project involves total **1111.40** Ha of land for quarry, industrial and residential complex, safety zone and external dumps etc. The **835** number of affected land oustees has been estimated and the number of families to be displaced from the villages namely Baroud, Bijari and Faguram (part of Oramunda) & Kurmi Bhavna falling within the quarry area, as **390**. Details are enumerated in CHAPTER VII.

## P.6 PROJECT BENEFITS

### 1. Improvement of physical infrastructures:

#### a) Rehabilitation & resettlement

The following facilities would be provided in R&R site

1. Road
2. Street light
3. School
4. Health Centre
5. Drinking Water Facilities.
6. Recreation
7. Ponds/Well
8. Playground/park
9. Shopping centre

#### b) Educational Facilities

#### c) Medical Facilities

### 2. Improvement in the social infrastructures:

#### a) Literacy Drive :

An action plan for achieving 100% literacy among workers in the SECL, was launched in the year 1992. Under the same scheme, workers of Baroud OC project will be covered to achieve 100% literacy level.

#### b) Socio-Economic Development

##### 1) Infrastructure Development in existing rehabilitation village

##### c) Community Development works in nearby village .

##### d) Vocational Training Programme for the village provided by Baroud OC project

### 3. Employment potential

#### a) In the project

There will be direct employment opportunities of 281 manpower of different categories of persons .

#### b) Secondary Employment opportunities

There will be spontaneous economic stimulus in the area with the commencement of expansion of opencast mine. Traders and private enterprises will grow in the area with this economic growth. Besides, the State exchequer will derive financial revenues through levy of royalty, sales tax etc. and Central Government will also be benefited by way of Central Sales Tax, Income Tax, Cess's etc.

### P.7 ENVIRONMENTAL MANAGEMENT PLAN :

#### a). **Socio Economic Measures :**

The project involves total **1111.40** Ha of land for quarry, industrial and residential complex, safety zone and external dumps etc. The **835** number of affected land oustees has been estimated and the number of families to be displaced from the villages namely Baroud, Bijari and Faguram (part of Oramunda) & Kurmi Bhavna falling within the quarry area, as **390**. The project affected families & persons will be benefited with the facilities provided at the new locality but their original cultural heritage may not be restored back.

#### 1) Secondary Employment opportunities

There will be spontaneous economic stimulus in the area with the commencement of expansion of opencast mine. Traders and private enterprises will grow in the area with this economic growth. Besides, the State exchequer will derive financial revenues through levy of royalty, sales tax etc. and Central Government will also be benefited by way of Central Sales Tax, Income Tax, Cess's etc.

#### 2) Educational Facilities

There are 49 primary schools and 11 middle schools as educational institutions managed by State Govt in the study area; however, there is no high school and college.

#### 3) Medical Facilities

There is one primary dispensary and one primary health centre caring of the population in the study area. These two are managed by the State Govt. However, such facilities are required to be increased by the project for their workers and the people of the area.

#### 5) Literacy Drive :

An action plan for achieving 100% literacy among workers in the SECL, was launched in the year 1992. Under the same scheme, workers of Baroud OC project will be covered to achieve 100% literacy level.

#### b). **Solid waste management & land reclamation:**

Out of total volume of **553.66** Mcum OB to be removed , only **9.5** Mcum will be dumped as external dump and the balance of **544.16** Mcum will be dumped in the de-coaled area as internal dump. **9.50** Mcum OB will be externally dumped for which **38.70** Ha of land will be required. External dump has been made in the rise side boundary of the mine after following considerations:



1) Reclamation

Technical reclamation involves backfilling of excavated area with overburden in a systematic manner, after levelling and grading, the dump slope and top. Then the top soil would be laid over dump surfaces. Then plantation will be done on dump surface.

2) Compensatory afforestation

About 379.43 Ha of forest land is involved within mine lease area of project. Compensatory afforestation is involved and will be carried out.

c). **Air pollution control measures :**

Considering anticipated affect on air quality due to advance in mining operations, following control measures will be implemented.

- \* Mobile water sprinkler and also fixed point water sprinkler for water spraying on haul roads, approach road, etc.
- \* Black topping of all service roads.
- \* Green belt around colony, along haul road, rail line, around industrial complex and other service centre.
- \* Automatic dust suppression system at specified points in proposed CHP.
- \* Dust extractors in drills.

d). **Water pollution control measures :**

1) Management of surface water drainage:-

Garland drains will be made around the periphery of the quarry, connecting to the local nalla which is not likely to be disturbed by mining operation. In the workings, heavy duty pumps will be deployed which will throw the accumulated water from the working face into these garland drains. For treatment prior to discharge effluent will pass through Oil & Grease traps & sedimentation tanks/ ponds.

2) Industrial Effluent Treatment

The mine waste water is collected at the face sump will be pumped to the settling tank where suspended solids will get settled. The clear water after sedimentation will be reused for water sprinkling, plantation etc. Workshop effluents will be treated in Oil and Grease trap and zero discharge will be attempted.

3) Domestic Effluent Treatment

Domestic effluent treatment will be performed by the conventional septic tank and soak pit arrangement. The quality of mine water and drinking water in the mine area is regularly monitored by CMPDI, an ISO-9001 company, and the analysis reports have been submitted to Regional MoEF and Chattisgarh Environment Conservation Board offices.

4) Water Conservation

The waste water recycling after due treatment for the purpose mentioned above will enable conservation of water. Storage of conserved water in mine pits will be given due emphasis to provide water round the year and quality of water will be maintained before and after storage.

d). **Noise pollution control measures :**

To minimise anticipated noise pollution, following control measures will be implemented.

- \* Provision of noise proof cabins for operators of drills, dumpers, shovels etc.
- \* Provision of earplugs, earmuffs as and when required.
- \* Routine maintenance of HEMM.
- \* Location of colony at sufficient distance from mine.
- \* Green belt around colony and industrial complex.

e). **Blasting Vibration Control Plan**

The following factors will be given special attention to minimise effects of blasting:

- \* Charge per delay
- \* Charge per round
- \* Over charging will be avoided
- \* Distance from the structures (Scaled distance)
- \* Type of initiation & sequence of delay
- \* Stemming material used will be moist.
- \* Blasting time ( safety aspect )  
The blasting will be done at a fixed time as far as possible.

- \* Warning

Before blasting is carried out , warning sound will be given so that people can move to safe place.

1) Vibration control

- \* As mentioned above, the mitigation measures will be implemented during blasting and it is expected that vibration will not cause damage to any structure or annoyance to the people in the colony area or neighbouring villages.
- \* Controlled blasting techniques will be implemented near the builtup structure in the vicinity of active face.
- \* A safe blasting zone as per DGMS norms would be kept around the periphery of the quarry.

f). **Green Belt Development**

Green belt around mine , Sides of haul Roads & all other roads , around infrastructures , colony are already in existence & will be augmented further..

The details of environmental control measures have been given in CHAPTER IV.

g). **Final decommissioning or rehabilitation of completed project**

Although, the mining activities may last a few decades, but they are liable to leave a long lasting impacts on the landscape, ecology and on local inhabitants. If not properly managed, effects can be detrimental for general welfare of most of the stake holders. Thus, any mining venture must have adequate closure plan, aimed at rehabilitation of disturbed area, which should be acceptable to local community as well as regulatory authority. CHAPTER – IV described the details about the mine closure planning.