

## CHAPTER – XI

### SUMMARY AND CONCLUSION

#### 11.1 INTRODUCTION :

##### 11.1.1 Purpose

The project report for Gevra opencast Project with an annual capacity of 6.0 MTY of coal was prepared by CMPDI in March'1979. This was to meet coal requirement by Korba Super Thermal Power Station (KSTPS) of NTPC (first stage) for 1100 MW, amounting to about 4.25 MTY. The excess capacity was envisaged to meet a part of the demand for expansion of KSTPS by 1000 MW. However, the Government approved the Project Report in December, 1979 for an annual capacity of 5 MTY at an estimated capital of Rs. 50.08 Crores.

After the approval of expansion of KSTPS for total capacity of 2100 MW the annual coal requirement was estimated at about 8 MTY. To meet this coal demand, a project report for Gevra Opencast Project (Expansion) was prepared in March, 1982 for an annual production of 10 MTY. This report was approved by Government of India on 18.09.85 for a total investment of Rs. 224.39 Crores.

The Gevra OCP achieved a production of 17.88 MT of coal in the year 1997--98. The project has been producing coal of more than the target capacity of 12 MTY for the last seven years(1991-92 to 1997-98). The expansion project has the target of producing 25 MTY of coal due to increasing demand and environmental clearance has been obtained for this capacity. The total capital investment was of Rs. 1757.44 crores (July.2007).

Working group/X Plan document had indicated the demand of non-coking coal for XI Plan as 580 Mt and indigenous supply of non coking coal from CIL as 445 Mt. The updated production of May 2005 have indicated the demand of non coking coal for the XI plan as 622 Mt and indigenous supply of non-coking coal from CIL as 508 Mt. Projection of total indigenous supply of non coking coal as 562.32 Mt leaves a gap of 59.68 Mt for which Emergency Coal Production Plan of CIL has been formulated. Gevra Opencast has been identified as one of the project in the Emergency Coal Production Plan of CIL.

The incremental capital for Project Report (25 to 35 Mty) has been conceived with a capital investment of **Rs. 780.11 crores (July,2007)**. The project will produce coal of Power Grade.

##### 11.1.2 Location

Gevra Opencast Block is located in the south-central part of Korba Coalfield in Korba District of Chhattisgarh. The Gevra mining Block having an area of about 19.03 sq.km., and of which Gevra Opencast Project forms a part, is located in the Central part of Korba Coalfield. It is included in the Survey of India Topo-sheet No. 64 J/11 and is bounded by latitudes 22<sup>o</sup>18'00" and 22<sup>o</sup>21'42" and longitudes 82<sup>o</sup>32'00" to 82<sup>o</sup>39'30" (ref. Plate No.I).

The block is well connected by rail and road. Gevra Road and Korba Railway Stations on Champa-Gevra Road branch line of S.E.C. Railway are at a distance of 10 km and 16 km respectively. Railway Siding has been extended upto and beyond Gevra OCP and coal is being transported from the pit head CHP through rail/MGR to the various consumers. SECL headquarters, Bilaspur, is at a distance of about 90 km by road.

### 11.1.3 Source of data & scope

NCDC had carried out scout drilling in and around Gevra Block in 1963-65 and 1972-74. CMPDIL took up detailed drilling in this block in 1977-78,98-99 &2000-2004. A total of 172 boreholes were drilled in the minetake area of 20.37 sq.km.

Baseline environmental data in respect of micro-meteorological data, air, water, soil quality data, noise-level data have been generated by Govt. recognised labs.

Meteorological data has been collected from Indian Meteorological Department at Bilaspur( Rainfall data from Katghora).

The socio economic data in respect of population statistics, economic profile, work force pattern, land use pattern, civic amenities etc. have been based on 2001 census data collected from Janganna Bhawan, Bhopal, M.P.

Data collected from Survey Department of the area and incorporated in the PR.

The ground water data has been collected from Ground Water Survey Unit of Bilaspur District for Banki village and Hardibazar village.

## 11.2 **PROJECT DESCRIPTION:**

The area of Gevra geological block is **20.37** sq.km. The entire area is under consideration for mining of Gevra Opencast Expansion Project (**35 Mty**).

Occurrence of 5 nos. of coal seams have been proved in the block. These seams in descending orders are 'D' Seam, 'E' & 'F', Upper Kusmunda, Parting coal and Lower Kusmunda. Lower Kusmunda Seam occurs as composite seam in the northern part of the block. However, it splits up in two sections, namely, Lower Kusmunda (Top Section) and Lower Kusmunda (Bottom Section) in South western part of the block. The average grade of the coal is 'F'.

The mine-able reserves & volume of OBR considered in this report have been **975 M** Tes and **1267** Mcum. The life of the mine is **29** years.

Considering the geo-mining parameters of the quarry, shovel-dumper mining system has been adopted to excavate OB, while extraction of coal will be done through **Surface Miner**.

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.

## 11.3 DESCRIPTION OF THE ENVIRONMENT

### 11.3.1 Study Area, Period, Components & Methodology

Study area is considered area within **10** km radius from the periphery of the project as all the base line data have already been studied and assessed within this definition of ambit of the study area.

#### 11.3.1.1 Study Area

The study area and period have been described in **Table-3.1** and **3.2** of which study has been carried out.

#### 11.3.1.2 Components

As mentioned herein before as in 11.3.1 and 3.1.1 .

#### 11.3.1.3 Methodology

Methodologies have been discussed in para 3.1.4 in CHAPTER III.

### 11.3.2 Establishment of baseline for valued environmental components as identified in the scope

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

A study of socio-economic profile in buffer zone including core zone (based on available census data) reveals that the total population of the area consists of about **308921** persons, of which **51.64%** are male and **48.36%** are female. Scheduled castes account for **12.48%** of total population and Scheduled tribes **24.16 %**, whereas **61.07 %** population is literate. The data reveals that **26.97%** of the population are main workers and **7.47%** are marginal workers, the rest **65.56%** are non-workers.

#### b). **Land requirement**

It is estimated that **4184.486** Ha. of land will be required for Gevra Opencast Project Expn. including land for quarry, external dumps, industrial and residential complex, road diversion, safety zone and rehabilitation colonies. This also includes **3584.671** Ha. land already acquired for existing Gevra OCP The break-up of land use is given below in **Table-3.8 a**.

**Table-3.8 A**

Activity	Types of land area in Ha.,			Total area in Ha.
	Forest	Tenancy/ Agricultural	Govt.	
Quarry	463.628	1273.426	300.196	<b>2037.25</b>
External OB dump	0	291.31	188.69	<b>480</b>
Infrastructures	515.434	504.509	73.169	<b>1093.112</b>
Road diversion	0	6.00	0	<b>6.00</b>
Rehabilitation site	0	134.28	0	<b>134.28</b>
Safety Zone	59.568	311.046	63.23	<b>433.844</b>
<b>Total land for the project</b>	<b>1038.63</b>	<b>2520.571</b>	<b>625.285</b>	<b>4184.486</b>
<b>% of total land</b>	<b>24.82</b>	<b>60.24</b>	<b>14.94</b>	<b>100</b>

**Study Area**

The detailed land use map is prepared based on topo-sheets and then supplemented by information collected from Forest Department, revenue department and mouza maps of the neighbouring villages as shown in *Plate-II*. Summarised details are in **Table-3.8 B**:

**Table-3.8 B**

PARTICULARS	AREA	% OF TOTAL AREA
<b>Total area</b>	<b>51852</b>	<b>100</b>
Forest area	17946	34.61
Irrigated Agril. Land	525	1.01
Un irrigated Agril. Land	22667	43.71
Culturable waste land	6495	12.53
Area not available for cultivation	4219	8.14

**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 2005 is **1516 mm**.

**d) Micro-meteorological Study**

Micrometeorological and microclimatic parameters were collected and recorded by installing station at Sirki village that represents micrometeorological aspects of the study area. During Summer 2006 (01.4.2006 to 30.6.2006), hourly reading of wind velocity, wind direction, temperatures, humidity, cloud cover, etc., were recorded and collected. Location is shown in **Figure -5**.

Parameters to be monitored, period and frequency of monitoring is given as in **Table-3.10 a**.

**e). Ambient air quality**

Ambient air quality data in & around Gevra project area shows maximum concentration. of SPM, RPM, NO<sub>x</sub>, SO<sub>2</sub> in summer as **418, 286, 12.9 & 9.4** µg/cum respectively which is within the permissible limits.

**f). 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 except for coliforms organisms which may be due to human/animal waste. Provision of settling tanks to arrest suspended solids from mine water, workshop water, surface run off have been made. Domestic Effluent Treatment Plant (DETP) has already been commissioned.

**g). Noise level**

The maximum noise level data recorded at Gevra mine site was **50.6** dB(A) which is within the prescribed limit value of 75 dB(A).

**h). Forest flora & fauna**

**1) Flora.**

There is about **1038.63** Ha of forest land in mining area most of which has already been acquired. The forest cover in buffer zone is about 16907.37 ha.( 17946 in the study area) In the absence of scientific management in the past, these forests have suffered from heavy fellings. Biotic pressure put exerted by human beings and domestic animals of surrounding areas is also tremendous. In order to confirm the survey status of flora and fauna, the Intensive Forest Management Plan for Katghora Division of Forest Department in Chhattisgarh , was consulted. Forest area is open, unclassified and not covered under any working plan.

**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.

**i) Hydrogeology**

Yearwise static water levels from Hardi Bazar and Bank Hydrograph Stations during pre and post-monsoon as recorded by Bilaspur District, Chhattisgarh have been collected. The average fluctuation in GWL observed from the data of permanent observation wells is about **3.79** 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 **69.47**M.cu.m. Discharge of the area works out to **24.52** M.cu.m. From this it is seen that the surplus water available in the area is **44.95** M.cu.m. The details are given in CHAPTER - III .

**11.4 ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES**

**11.4.1 Environmental Impact Assessment**

**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 **29** yrs.

The project involves total **4184.486** Ha of land for quarry, industrial and residential complex, safety zone and external dumps etc. The approximate no. of affected land oustees involved in the project is **7058** which includes **6158** land oustees in the additional minetake area. The no. of families involved in the project is **2420** including approximately **1920** families in additional minetake area . **968** families have already been rehabilitated. The remaining **1452** families are to be rehabilitated. Around **2081** land oustees have been given employment out of **7058** land oustees involved.

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>1038.63</b> Ha.
Govt. land	:	<b>625.285</b> Ha.

Tenancy land : 2520.571Ha.  
/ Agricultural land  
Total land area : 4184.486 Ha.

The land area would be utilized by the project for quarrying (2037.25Ha.), External OB dumping (480.00 Ha.) , infrastructures (1093.112 Ha.), road diversion (6.00 Ha.) and safety zone & others (578.124 Ha.). These activities will cause change in premining land use pattern by degrading 1038.63Ha 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 (1038.63Ha 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.

5) **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.

6). **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 Gevra area.

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

#### 11.4.2 Environmental Control Measures

a). **Socio Economic Measures :**

The approximate no. of affected land oustees involved in the project is **7058** which includes **6158** land oustees in the additional minetake area. The no. of families involved in the project is **2420** including approximately **1920** families in additional minetake area . **968** families have already been rehabilitated. The remaining **1452** families are to be rehabilitated. Around **2081** land oustees have been given employment out of **7058** land oustees involved.

1) Secondary Employment opportunities

There will be spontaneous economic stimulus in the area with the commencement of opencast patch. Some 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, Cesses etc.



2) Educational Facilities

There are several educational institutions of various standards managed by both public and private sectors/bodies in the area due to SECL, NTPC, BALCO, CGSEB etc.

Educational facilities provided are by Central School in Kusmunda by SECL and NTPC, Korba, Delhi Public School (Upto Class XIIth) by NTPC and DAV School in Gevra & Kusmunda Area by SECL. There are 100 primary schools, 40 middle schools and 16 secondary schools as educational institutions managed by State Govt in the study area.

3) Medical Facilities

There are well equipped Hospitals at Gevra, Korba and Kusmunda area of SECL. In addition there are 15 dispensaries, 4 primary health centres within buffer zone.

4) Preventive measures:-

The SECL authorities have adopted following measures to prevent occupational diseases and health hazards.

- \* Pre-employment, pre-placement and periodic medical examination of employees.
- \* Regular monitoring of working environment and implementation of safety and control measures, to prevent hazards.
- \* Use of protective equipments, clothing, helmets, Gas mask, shoes, etc.
- \* Periodical medical examination of every worker is done once in five years to detect preventable and curable diseases at an early stage.
- \* Cases suspected having Pneumoconiosis are examined by a Special Board constituted by the Chief Medical Officer. Established cases are suitably compensated and their job is changed if required.

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 Gevra OC project will be covered to achieve 100% literacy level.

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

The opencast mining of Gevra block involves removal of **1267 M.cum.** of Overburden. Out of this only **147.60 M.cum.** would be dumped as external dump and the balance **1119.40 M.cum.** would be dumped into the de-coaled quarry.

There will be final void of **659.25** Ha. which will be used as water reservoir if no further expansion of the mine at the dip side takes place.

Presently, internal backfilling is being done in the quarry and considerable volume of OB is also being dumped in the external dump. In coming years, major volume of OB will be internally backfilled and small volume of OB will continue to be dumped in the external dump. Volume of OB to be accommodated in external and internal dumps will be as given below:-

A location for the top soil dumping and preservation has also been identified beyond the western quarry limit. Here the top soil would be dumped and preserved before being reused on the external/internal dumps.

A location for the top soil dumping and preservation has also been identified beyond the western quarry limit.

The external dumps have been merged with internal dumps in order to reduce the area of the external dumps. The top R.L. of this dump would be + 370 m which is 50 m above the general topography.

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. In the initial stage emphasis will be given on growing legumes and grasses, which can provide quick soil enrichment and green cover and hasten soil stabilisation and thus reduce erosion. In later stage, various local species will be tried keeping in view the experience in the existing & nearby mines.

2) Compensatory afforestation

About **1038.63**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 are being implemented.

1. Water spraying by water Sprinkler (7 nos. of 28 KL and additional 3 to 6 nos. of 10 Kl ) are being done regularly on approach roads, coal transportation roads and within the mining area to minimise the dust generation.
2. 14.5 line kilometers of fixed water sprinklers already commissioned.
3. Surface miner to be deployed for coal mining to reduce dust levels.
4. Conveyor belts for movement of total coal mined from mine pit to surface will be installed to reduce dust generation due to transportation.
5. Mine plans, to dispatch total coal mined to consumers by rail to reduce dust levels.
6. About 36.98 lakh saplings planted in project area for dust suppression.

7. Adequate dust suppression system commissioned in Silo, Coal Bunkers, coal stockyards etc. to reduce dust levels.
8. Black topping of roads undertaken.
9. Drills have been fitted with dust extractors.
10. Conveyor belts provided with covers.
11. In- pit crushing of coal is at present being undertaken which will be discontinued after deployed of surface miner, thus generation of dust will be reduced.

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

1) Management of surface water drainage:-

Garland drains will be made around the periphery of the quarry. These garland drains will be connected to the local nalla which is not likely to be disturbed by mining operation. In the workings, heavy duty pumps will be deployed in rainy season which will throw the accumulated water from the working face into these garland drains. As the extraction of the quarry advances, the position of garland drain will also advance. Thus these garland drains will drain off the rain water away from the workings.

2) Mine Water Discharge & Industrial Effluent

1. Mine sump of 2.47 to 3.31 Mcum capacity will be established.
2. Settled mine effluent is being used for domestic & industrial consumption.
3. Settling tank to treat mine water has been commissioned.
4. Oil & grease trap for workshop effluent treatment has been commissioned.
5. Mine sumps will act as a water recharge structure.

3) Domestic Effluent Treatment:-

3.0 MGD capacity domestic effluent treatment plant for colony already commissioned to treat colony waste water of Gevra & Dipka projects.

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 :**

The following measures are adopted and will be continued :

1. About 36.98 lakh saplings already planted for noise attenuation.
2. High capacity machines like 42 Cum. Shovels & 240 tonne dumpers, to be deployed in mine. This will ensure reduced number of vehicular trips, there by reducing noise levels.
3. Reduced quantity of blasting will result in lower noise levels.
4. Lined chutes in Silo to reduce noise.

5. Surface miner deployed to eliminate coal crushing will reduce noise.
6. Provision of ear muffs/ear plugs to workers subjected to noise level above recommended limits.
7. Regular monitoring of noise level of project area.
8. Routine maintenance schedules for HEMM and other machineries to eliminate noise as far as possible.

**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.

**11.4.3 Irreversible & Irretrievable components of environmental components**

**a) Land use :**

There will be change in the surface topography from the original premining status ( 288-326 m above mean sea level ) to the scenario in post mining which gives external as well as backfilled dumps with 50 m high above ground and left out mine void as given in table 2.4 & 4.12 d A . The details have been discussed in para 4.5.1.

**b) Rehabilitation & resettlement of project affected families & persons:**

Although 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.

There are many educational , medical facilities and other civic amenities in the area have been developed for the benefits of the project employees as well as for the people residing around the project considered to be permanent & positive impacts.

Refer para 4.4.1 and table 4.11 for details discussion on R&R .

**11.4.4 Assessment of significance of impacts:**

Comparison of the impact on the socio-economic attributes and environmental factors by undertaking the mining scheme with and without remedial measures are taken up.

To understand the significance for such comparison, some of the important aspects for comparison are given in para 4.6. Though this method is considered subjective, still it will indicate a measure for assessment.

**11.4.5 Mitigation measures :**

Implementation of aforesaid mitigation measures in para 4.4 will improve the environmental conditions. The negative effects will get mitigated, while positive impacts may get absorbed on environmental measures. A statement showing the environmental matrix and various parameters with protective measures are furnished in table thereof.

## **11.5 ANALYSIS OF ALTERNATIVES**

The project has been planned with a high degree of mechanisation, in line with the present and forthcoming changes in neighbouring mines as well as in other parts of the country. The techno-economics have been worked out based on the prevalent norms of productivity, operating cost, spare consumption etc.

For meeting increasing demand of power grade coal in X Five Year Plan for upcoming thermal power houses, it is essential to approve and implement this project.

## **11.6 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

## **11.7 ADDITIONAL STUDIES**

### **11.7.1 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.

### 11.7.2 Risk assessment

Assessment of risk and its management is essential to guard against and mitigate the consequences of major accidents. The term, "major accident" means an unexpected and sudden occurrence of event from abnormal developments in course of one's industrial activity leading to a serious danger to public or environment, whether immediate or delayed, inside or outside the installation involving one or more hazardous substances.

Keeping in view 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 Gevra OCP incorporating the following :

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

### 11.7.3 Social impact assessment

Gevra Opencast Project of Gevra Area is situated in Korba District of Chhattisgarh, in the western part of Korba coalfields, the nearest railhead being Gevra Road station, Champa Gevra Road branch of South Eastern Railway. This project is captive to Sipat Super Thermal Power Station of National Thermal Power Corporation(NTPC).

The approximate no. of affected land oustees involved in the project is **7058** which includes **6158** land oustees in the additional minetake area. The no. of families involved in the project is **2420** including approximately **1920** families in additional minetake area . **968** families have already been rehabilitated. The remaining **1452** families are to be rehabilitated. Around **2081** land oustees have been given employment out of **7058** land oustees involved.

Details are enumerated in CHAPTER VII.

## 11.8 PROJECT BENEFITS

### 11.8.1 Improvement of physical infrastructures:

#### a) Rehabilitation & resettlement

The following facilities have been provided in R&R site

- (1) Electricity supply
- (2) Training centre
- (3) Weekly market
- (4) Public stage
- (5) Bus stop
- (6) Devsthal
- (7) Pond/Deepening of existing pond.
- (8) School Building
- (9) Bore Wells for drinking water supply

- (10) Dispensary Building/Panchayat Bhawan
- (11) Children Park./Play ground
- (12) Approach road, internal roads ,culverts and drains

### **11.8.2 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 Gevra OC project will be covered to achieve 100% literacy level.

b) Socio-Economic Development

- 1) Infrastructure Development in existing rehabilitation village of Nehru Nagar,Vijay Nagar and Ganga Nagar.
- c) Community Development works in nearby villages i.e. Amgaon, Bahanpat, Dipka,Dhurena and Pondi. by project.
- d) Vocational Training Programme for the village provided by Gevra OC project

### **11.8.3 Employment potential**

a) In the project

There will be direct employment opportunities of **3276** 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.

### **11.9 ENVIRONMENTAL COST BENEFIT ANALYSIS :**

MOEF while issuing TOR has not specifically indicated for carrying out ' Cost Benefit analysis ' , hence the same has not been carried out.



## 11.10 ENVIRONMENTAL MANAGEMENT PLAN :

### a). Socio Economic Measures :

The approximate no. of affected land oustees involved in the project is **7058** which includes **6158** land oustees in the additional minetake area. The no. of families involved in the project is **2420** including approximately **1920** families in additional minetake area . **968** families have already been rehabilitated. The remaining **1452** families are to be rehabilitated. Around **2081** land oustees have been given employment out of **7058** land oustees involved.

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 100 primary schools ,40 middle schools and 16 secondary schools as educational institutions managed by State Govt in the study area.

#### 3) Medical Facilities

There are well equipped Hospitals at Gevra , Korba and Kusmunda area of SECL. In addition there are **15** dispensaries, 4 primary health centre within buffer zone.

#### 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 Gevra OC project will be covered to achieve 100% literacy level.

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

Out of total volume of **1267** Mcum OB to be removed , only **147.6** Mcum will be dumped as external dump and the balance of **1119.40** Mcum will be dumped in the decoaled area as internal dump.

**147.6** Mcum OB will be externally dumped for which **480.00** 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

Abuot **1038.63**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 are being implemented.

1. Water spraying by water Sprinkler (7 nos. of 28 KL and additional 3 to 6 nos. of 10 Kl ) are being done regularly on approach roads , coal transportation roads and within the mining area to minimise the dust generation.
2. 14.5 line kilometers of fixed water sprinklers already commissioned .
3. Surface miner to be deployed for coal mining to reduce dust levels.
4. Conveyor belts for movement of total coal mined from mine pit to surface will be installed to reduce dust generation due to transportation.
5. Mine plans, to dispatch total coal mined to consumers by rail to reduce dust levels.
6. About 36.98 lakh saplings planted in project area for dust suppression.
7. Adequate dust suppression system commissioned in Silo, Coal Bunkers, coal stockyards etc. to reduce dust levels.
8. Black topping of roads undertaken.
9. Drills have been fitted with dust extractors.
10. Conveyor belts provided with covers.
11. In- pit crushing of coal is at present being undertaken which will be discontinued after deployed of surface miner, thus generation of dust will be reduced.

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

1) Management of surface water drainage:-

Garland drains will be made around the periphery of the quarry. These garland drains will be connected to the local nalla which is not likely to be disturbed by mining operation. In the workings, heavy duty pumps will be deployed in rainy season which will throw the accumulated water from the working face into these garland drains. As the extraction of the quarry advances, the position of garland drain will also advance. Thus these garland drains will drain off the rain water away from the workings.

2) Mine Water Discharge & Industrial Effluent

- (i) Mine sump of 2.47 to 3.31 Mcum capacity will be established.
- (ii) Settled mine effluent is being used for domestic & industrial consumption.
- (iii) Settling tank to treat mine water has been commissioned.

- (iv) Oil & grease trap for workshop effluent treatment has been commissioned.
- (v) Mine sumps will act as a water recharge structure.

3) Domestic Effluent Treatment:-

3.0 MGD capacity domestic effluent treatment plant for colony already commissioned to treat colony waste water of Gevra & Dipka projects.

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 :**

The following measures are adopted and will be continued :

1. About 36.98 lakh saplings already planted for noise attenuation.
2. High capacity machines like 42 Cum. Shovels & 240 tonne dumpers, to be deployed in mine. This will ensure reduced number of vehicular trips, thereby reducing noise levels.
3. Reduced quantity of blasting will result in lower noise levels.
4. Lined chutes in Silo to reduce noise.
5. Surface miner deployed to eliminate coal crushing will reduce noise.
6. Provision of ear muffs/ear plugs to workers subjected to noise level above recommended limits.
7. Regular monitoring of noise level of project area.
8. Routine maintenance schedules for HEMM and other machineries to eliminate noise as far as possible.

e). **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.

## 11.11 DISCLOSURE OF CONSULTANTS ENGAGED:

Central Mine Planning & Design Institute Limited. Briefly, it is generally called as CMPDI. It is an ISO 9001 Company and one of the subsidiary companies of Coal India Ltd..(CIL )

Its registered Corporate office is situated at Gondwana Place, Kanke Road, Ranchi-834 008, a capital city of Jharkhand state. It operates through seven strategically located Regional Institutes over six states territories of India. These Regional Institutes

are engaged in exploration , planning & design works of other subsidiary companies of CIL, mnamely , ECL, BCCL, CCL,MCL, NCL, WCL,SECL and NECL.

The company was formerly known as Coal Mines Authority Limited. And, the Central Mine Planning & Design Institute Limited (herein after called as CMPDI) is a planning & design division of Coal India Limited (hereinafter called as CIL) as per Memorandum of Association of the company. The CIL is a holding company since November 01, 1975, and the CMPDIL is one of its subsidiaries since then. It is under Ministry of Coal, Government of India.

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