

---

## Chapter- 7

### ADDITIONAL STUDIES

#### 7.1 PUBLIC CONSULTATION/HEARING

First affected persons for opening or closing of any type of industries are the local peoples. So, it is very necessary to inform the local people about the merit & demerit of the proposed project.

Basic requirement for any open cast mining is land and need large amount of land. Generally there are three type of land exist i.e Forest land, Govt. land and public land. Local environment and economics depends on land. Acquisition of public land means, displacement of large number of persons as well as degradation of large area of land. It will definitely disturb the local ecology and would affect the local habitants.

Hence, final opinion/consultation local persons should be taken in the presence of concern authorities.

- (a) **Date of Advertisement-** -----
  
- (b) **Newspapers in which the advertisement appeared –** -----
  
- (c) **Date of public hearing -** -----
  
- (d) **Public Hearing Panel chaired by & members present-**  
-----
  
- (e) **Nos. of people attended the public hearing meeting  
and number of people from the lease area-**  
-----

**(f) Summary/details of public hearing in tabular form.**

Issues raised by Public	Response/ commitment of Project proponents	Suggestions made by the Panel
-------------------------	--	-------------------------------

**7.2 RISK ASSESSMENT AND MANAGEMENT**

A comprehensive blue print for risk assessment and management has been drawn for the project incorporating the following:

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

With adoption of the preventive measures, the operation of this opencast mine will be safe as well as environment friendly.

**7.2.1 SLOPE FAILURE IN MINE PIT**

Slope of the final quarry batter varies from 45° to 37°. Height of the coal/overburden benches is proposed to be maximum 10 m, whereas, bench width of working and non-working benches is 25 m & 15 m respectively with a proposed cut width of 10 m. Slope of the bench will vary from 45° to 70° based on the nature of material. Overburden is to be stacked tier by tier and height of each such tier is proposed to be 30 m. 320 hp crawler dozers are provided to doze overburden dump benches to achieve compaction and proper drainage slope. Angle of repose of the overburden dump is assumed to be 37°. Lag between two tiers of overburden dump is proposed to be 40 m.

Mining system parameters are tabulated as below:

Particulars.	Unit	OB	Coal	Dump
Bench height	m	10	10	30
Working bench width	m	30	30	40
Non-working bench width	m	20	20	-
Bench slope	Deg	45-70	70	37

<b>Particulars.</b>	<b>Unit</b>	<b>OB</b>	<b>Coal</b>	<b>Dump</b>
Blast hole dia.	mm	160	Not req.	-
Inclination of blast holes	-	vertical		
Powder factor	Kg/cum	0.25	-	-

The general measures to deal with slope stability problem are-

- i) Vulnerable area may be identified and marked on quarry plan.
- ii) Observation of actual alignment of fault, its throw, joints, etc. may be recorded during the process of exploitation.
- iii) Water drainage system may be properly implemented to prevent accumulation of water in cracks. Also dumps shall be leveled to prevent accumulation of water over it. Proper drainage in dumps shall be also provided to prevent erosion of toe of dump.
- iv) Regular monitoring of tension cracks, horizontal and vertical movement of strata in critical area may be done.
- v) Rise side slope to be reinforced if required because it has to stand through out quarry life. No dumps/surface structures to be located within 15m of quarry edge as it will act as surcharge there by destabilizing the slope.
- vi) No undercutting of slopes to be done.
- vii) Proper hydrogeological studies to be done if water table is at level of slope it should be brought down by using submersible pumps to prevent hydrostatic pressure.
- viii) Proper selection of site for dumping to be done before dumping place shall be made free from loose material. Dumping shall not be done at an angle more than angle of repose of material being dumped.
- ix) After completion of dumping operations dumps to be stabilized by growing vegetation.
- x) Every person deployed by leaser of HEMM must be trained & briefed about aspects related to slope stability.

---

## 7.2.2 BARBED WIRE FENCING

Peripheral area of the quarry is surrounded by forest area. For all sides of the quarry except O. B. dump area (north-east part), safety zone area mentioned above will be acquired and will be used for plantation in addition to existing plantation. The periphery of the quarry working will be fenced by moveable barbed wire fencing. It will reduce the chance of animal etc, falling into the quarry. This fence will be moved as the production benches advance.

## 7.2.3 BLASTING

Controlled blasting techniques including muffled blasting will be adopted during blasting within 300 m zone but beyond 100m from the village, dwellings, surface structure, road etc. Total quantity of explosive to be detonated at a time will be so regulated that ground vibration which may affect the nearby surface structures, are kept within the stipulated limit. For proper blasting and minimizing the adverse side effects due to blasting, viz. noise, ground vibration, back-breaks, air blast, fly rocks, etc., the following precautions have been suggested to avoid dangerous situations:

- A safety zone for blasting has been provided around the quarry.
- Suitable drilling pattern.
- Before blasting is done, warning sound will be given so that people can move to safe places.
- Controlled blasting with site mixed slurry.
- Optimisation of maximum quantity of explosive in a blast hole.
- Blasting will be done during daytime. Frequency of blasting shall be influenced by the availability of the land (tenancy in particular), DGMS permission for use of explosive geo-mining conditions, method of mining and prevailing meteorological conditions.
- No blasting will be done during low cloud cover.
- Blasting shall be carried out with closer control of blasting parameters including desired fragmentation, permitted vibration, etc.

## **7.2.4 EXPLOSIVE HANDLING**

The present day technology of blasting with site mixed slurry (SMS) explosive shall be used with millisecond delay detonators that are initiated by shock tube initiation system. SMS is stored by the supplier as per GOI Notification. Further, transport and charging are also done by the supplier on the spot. Only priming will be done by the project authority.

## **7.2.5 SAFETY RULES**

Mining operations follow statutory mine safety rules administered by the Directorate General of Mine Safety (DGMS), Chief Controller of Explosives and others. Planning and design of electrical installations shall take into account the existing electricity rules to obviate the hazards due to use of electricity.

For creating safety awareness and imparting education on safe practices, the following steps shall be taken:

- Holding annual safety weeks.
- Imparting basic and refresher training to new and old employees respectively.

## **7.2.6 MINE INUNDATION**

The mine pit will receive water from three sources namely, direct precipitation over excavated area, surface run-off from the surrounding area and seepage from the strata. During heavy rainstorms, there may be a situation when the mine may get flooded due to ingress of water from the higher ground through natural drainage. This may cause loss of human life, equipment etc.

Sufficient pumping capacity has been provided to deal with any abnormal rain fall. Wherever, there is undulations on the working floor, cutting and filling of strata on the floor will be done, so that, smooth and proper passage of water towards sump can take place.

The planning of de-watering of the mine has been done in such a way that as far as possible the working faces and haul roads remain dry. The lay out of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self-drainage of water to the lowest level of the quarry.

The intake of rainwater to the opencast mine is non-uniform during the year. The maximum rainwater intake will be during the period of about four months (June to September) in a year. During dry season, seepage from strata is expected to be moderate and the same can be dealt by running a few number of pumps provided for monsoon pumping. During this period, repair & overhauling of the pumps will be done by rotation.

The main pumps will handle the quantity of water inflow during a day of peak rainfall in monsoon in excess of sump capacity and the accumulated water in the sump will be pumped in 4 - 5 days.

### **7.2.7 FIRE**

Adequate fire fighting arrangement shall be provided. While calculating total water demand for the project, provision for fire fighting has also been made.

### **7.2.8 ROAD ACCIDENTS**

Haul road for rear dumpers shall be designed with double lane and shoulders on both sides for movement of dumpers and ancillary equipment. Sharp turnings shall be avoided to reduce the chance of accidents. The haul road shall be designed at a gradient of 1 in 16. Sufficient arrangements for illumination of roads including haul roads shall also be made.

### **7.2.9 ILLUMINATION AND COMMUNICATION**

Sufficient lighting as per standards shall be provided at all the required places, i.e. working faces, OB dump area, haul road, coal transfer points, loading points, workshop, etc., to avoid accidents and to create efficient working conditions. Provisions for efficient communication systems (both internal and external) to allow

communication link amongst various work centers to help avoid accidents and handle emergencies shall be made.

### **7.2.10 OTHER MISCELLANEOUS MEASURES**

Following facilities shall be provided:

- Provision of workshops for maintaining HEMMs and other equipment properly for avoiding their failures as well as the risk of accidents.
- Provision of store for spare parts for quick maintenance.

### **7.2.11 TRAINING**

Coal industry has set up a number of training institutes for imparting training to its employees. These trainings are meant to raise awareness amongst workers for performing their duties properly with safety.

Further, the personnel directly responsible for handling emergencies will be given training for making them better equipped for discharging the responsibilities. Mock drills for checking the risk management preparedness will be carried out regularly.

### **7.2.12 MEDICAL AID**

For guarding against occupational and community health hazards, the following measures will be taken:

- Steps to control respirable dust, improve workplace environment and reduce noise nuisance.
- Periodic medical examination (PME) of workers.
- Rehabilitation and treatment of workers affected and suffering from early stages of occupational diseases associated with coal mining.
- Availability of improved medical facilities.

---

## 7.3 SOCIAL IMPACT ASSESSMENT & R & R ACTION PLAN

### 7.3.1 SOCIO-ECONOMIC IMPACT

#### SOCIAL IMPACT

- **Population growth**

Skilled manpower required for the project may not be available in the area. Only semi-skilled and unskilled workers will be available from the local population. So people will migrate to this segment both from within and outside the district as well as the state due to creation of new employment opportunities.

- **Educational facilities**

The migration of population may strain the local educational facilities already available. A number of educational institutes must be provided in the proposed project to cater to the need of increased population.

- **Healthcare facilities**

The coal company has to open healthcare centres/hospitals to cater to the need of employees of the proposed project and the local people .

- **Employment opportunities**

This project will create direct and indirect employment opportunities in the area.

- **Communication, marketing and other infrastructure facilities**

The regional social infrastructure will witness a change due to this project and other ancillary industries which are likely to come up in the area.

#### ECONOMIC IMPACT

The following are the economic impacts:

- General improvement of economy of the area
- Increase in revenue of the state exchequer

---

## **IMPACT ON VILLAGE HABITATION**

There is no village lying within mining leasehold area/ core zone. There are 95 villages having a population of 71,906 in the buffer zone of the proposed project. The proposed project will have no adverse impact on the villages of the buffer zone.

### **7.3.2 SOCIO-ECONOMIC CONTROL MEASURES**

#### **Community Development:**

In line with the community development policy of Coal India, the community facilities will be provided by NEC.

The approach for operation of community facilities would be flexible and if feasible, efforts will be made to involve the State and local self Government/Panchayat for operating the facilities. NEC will pursue with these agencies to ensure the same. The planning of the community facilities and their construction shall be undertaken in consultation with the local community.

#### **Peripheral areas to be covered:**

The radius of coverage would normally be within 8 kms. However, the Board of Directors may extend this radius or initiate specific projects of community development in a non-contiguous area, in special circumstances, such as natural disasters, epidemics, etc. Some activities in the district town of the mine or around the corporate headquarter can be taken up if recommended by the Welfare Committee of the subsidiary and/or approved by the Board of Directors. Expenditure on activities for society at large and environment extending beyond statutory obligation and mining projects / community areas a fund of 1% of the retained earning shall be utilized.

#### **Source of fund:**

The fund for the Community Development activities will be allocated by the corporate headquarters to different Areas based on the requirement proposed by the Area duly screened by the Welfare Board. To help the companies create a dedicated fund for the purpose, a sum of Re. 2.00 per tonne of coal produced may be set aside by NEC.

**Type of Programmes:**

Creation of community assets (infrastructure) like provision for drinking water, construction of school buildings, check dams, village roads / linked roads & culverts, dispensary & health centres, community centres, market place, etc.

- Skill development & capacity building like vocational training, income generation programs, and entrepreneurship development program.
- Literacy program, adult education, assist formation of Village Working Group (VWG), mahila mandal etc.
- Awareness program and community activities, like health camps, medical aides, family welfare camps, AIDS awareness program, immunisation camp, sports & cultural activities, plantation etc.
- NEC may adopt one village in every Area to develop as a model village. This village should be provided minimum infrastructure such as a school building, a health centre, a pond and adequate tree plantation.

The above list is illustrative and not exhaustive. The activities will be village specific depending on the need assessed for the people. As far as possible, efforts will be made to co-ordinate with similar developmental programmes that are taken up by the central or state Govt. in the areas of Coal India. All activities under the CD programme should be environment friendly and socially acceptable to the local people.

**Target Beneficiaries:**

The beneficiaries will include all communities. Special attention should be given to persons below the poverty line, SC/STs, women, handicapped and the aged.

**Institutional Arrangement:**

An Area Community Development Committee (ACDC) constituted for the purpose at the area level will take decisions regarding identifying the activities, preparation of budget, reviewing and approving the action plan and monitoring the activities during implementation.

- The committee will consist of Area Chief General/General Manager as Chairman assisted by the members from finance, Civil, and Personnel departments and the Area CGM/GM and/or the union representatives may nominate some other members. A committee of local people's representative would be constituted, in consultation with the District Collector. This committee may also be associated with identifying activities specific to village/area. The responsibility of actual planning and implementation will rest with the CD/R&R officers or officers of any other designation vested with the responsibility.
- At NEC headquarter level; the Welfare Board will oversee the CD activities.
- Assistance of NGOs may be sought, if necessary, for preparation of baseline data, CD plans and involvement of the local communities. For this purpose, only NGOs of national repute or with a good track record would be involved.

**Upkeep and maintenance of assets created:** Operation and maintenance of the infrastructural facilities / assets created shall be handed over to the village working groups (VWGs), local panchayats or similar local State bodies on completion.

Maintenance of these assets shall be the responsibility of the local community. Before any capital investment is made, an undertaking shall be taken from the local community that they will maintain the assets.

Annual audit of all activities undertaken by the company would be done by local auditors and a general write up of the work done as welfare should be included in the annual report of the company

**Concluding remarks:**

The above guidelines would form the framework around which the community development activities would be undertaken. Coal India will review the Policy after every five years and make suitable modifications, as may be necessary based on experience.