

4.7 Mine Closure Plan

Post-mining Land Use Planning

The mine closure planning with regard to for Nakarkonda B OCP will broadly involve the following aspects:

1. Technical Aspects
2. Environmental Aspects
2. Social Aspects
3. Financial Aspects

Technical Aspects: The following technical aspects would be reviewed in the final mine closure planning. Details can be worked in closure plans envisaged to be prepared within the second year of mine operation as the project life is of 4 years only.

Safety hazards including management of fire and subsidence: In the mine closure plan, action for control of likely fire areas of the mines will be discussed. Action will also be suggested to cover all the safety aspects.

Management of Pit Slopes: The final quarry slopes shall be so designed and then subsequently developed that after the closure of the mine, there is no likelihood of any slope failure. The final slope of the quarry has been designed with above consideration. However, strict compliance with the proposed final slope of quarry would be made as given in Quarry & Surface Layout Plan and subsequent slope stability studies.

Management of hydrology and hydro-geology: In the mine closure plan, the surface flow pattern of precipitation and mine water would be clearly developed and water channel suitably laid down so that it does not disturb the general hydrology of the area.

Details of decommissioning of the infrastructures: The decommissioning of the various infrastructures developed for the mine like office complex, roads, pipelines and transmission line etc. shall be planned in details so that the land occupied by these infrastructures are released. However, before such decommissioning, the possibility of re-use of these infrastructures for the neighbouring mines shall be explored.

Closure of entry to the open-cast mine : All entries to the mine must be planned to be effectively closed so that illegal mining from these openings and safety hazards by way of entry of fire and water etc. will be prevented in the abandoned mines.

Environmental Aspects: This would include the following

Management of final voids: In the mine closure plan, voids due to mining are to be dealt and the final land use plan will include filling of the voids for land reclamation where possible and for hydro reclamation where feasible.

The study on slope study will be made by some scientific agency and in final closure plan their suggestions will be incorporated. The backfilling as proposed in this report is shown in Final Stage Dump Plan (Plate-XIII).

Reclamation of forests/vegetation: It is to be ensured that in the final land use plan, all vacant land acquired for the project is afforested

Channelisation of available water: If the mine is having sufficient water and if on closure, the mine water flows into the surface water courses, channelising this water for surrounding community for their irrigational/domestic uses may be taken up. This can be planned by providing structures involving one time costing

Management of Recharge Areas: The pre-mining and post mining scenario on the hydrogeological recharge system would be included in the closure plan.

Acceptable Surface and Ground Water Flows: In the final closure plan of the mine, wherever the mine water is likely to flow out to surface and meet the surface water sources; the quality of water from such mines would be assessed and flow pattern designed in the final plan.

Land use during mining vs post-mining

Land Use During Mining		Post –mining Land Use (Conceptual)	
Particulars	Area (ha)	Particulars	Area (ha)
1. Area to be excavated (including haul/service roads)	78.30	Reclaimed and afforested	59.3
		Water body	19.0
2. Coal storage & handling	4.0	Afforested	4.0
3. Workshop/Store/Sub-station	2.0	Decommissioning and afforestation	2.0
4. Administrative Building	0.6	Community use/handed to State Govt	0.6

5. Land for road diversion	1.50	Diverted road	1.50
6. Green Belt & Safety zone	9.18	Green Belt	9.18
7. Effluent treatment plant (mine)	0.6	Afforestation	0.6
TOTAL	96.18	TOTAL	96.18

Alternative use of land: For internal OB dump, vegetation and afforestation has been planned as a final land use. However, for areas other than OB dumps and voids, the alternative land use would be deliberated in the closure plan. While agriculture is the best land use if it is supported by some irrigation facilities, vegetation will be second utility of the land which can be planned.

A comparative statement showing the post-mining vis-à-vis during-mining land use of the additional area to be acquired for the project is tabulated above.

Social Aspects: The social aspects of land use planning relating to mine closure would include the following:

Re-deployment of Workforce: The company employees will be gainfully engaged in the neighbouring projects after cessation of mining activities.

Management of Community Facilities: In view of the short life of the project no new community facility will be created. However, the existing facilities of adjoining areas will be strengthened.

Closure Action Plan

Following steps have to be undertaken in relation to Mine Closure Planning:

- (a) Prior to the surface demolition/restoration, a surface audit should be undertaken on all surface structures, spoil heaps, lagoons, etc. to access whether there are any hazardous materials that could cause problems viz; explosives, chemicals etc. A list of surface assets should be prepared and made available to potential purchasers, prospective purchasers could be invited and asked to submit sealed bids, this could ensure that the sale of assets give better financial gain.
- (b) The void of the mine can be proposed as a water resource to be utilized for aquaculture. Keeping in view the hard rock structure, the ground stability in the periphery of the mine boundary is not likely to be disturbed. This will also keep open the option of further deepening even after exhausting reserves upto proposed limits.
- (c) Work force on roll of NEC will be redeployed for their gainful utilization. The workforce on the roll of the contractor are also likely to be deployed in other outsourcing projects.

- (d) As a detailed component of the Closure Plan, a Decommissioning Plan is to be developed during the first year of the mine operation as the project life is of 14 years only.

Closure Cost

Progressive mine closure process is undertaken concurrently with mine development/production activities. The cost of progressive mine closure components is covered in the Conceptual Report.

Mine closure Corpus Fund will be created from revenue account as per detail given below :-

Annual Corpus Fund = AOBR x 0.10 x Rs. 2.00 per cum of OB. In the proposed Nakrakunda-B OCP average annual OB removal is around 6.52 m.cum. So Annual Corpus Fund that will be created by the above method is $6.52 \text{m}^2 \times \text{Rs. } 2.00 \text{ per cum} \times 0.10$, i.e. Rs. 1.30 million or Rs. 13.00 lakh per annum.

4.8 Road Diversion

A provision of Rs. 9.80 lakh has been made for the diversion of part of existing road falling within the proposed area. The proposed diversion of the road has been shown in the enclosed plan (Plate-VIII).

4.9 Diversion High Tension Power Transmission Line

A provision of Rs. 105.00 lakh has been made for diverting the existing H.T lines passing over the proposed area. The proposed diversion of the same has been indicated in the enclosed plan (Plate-VIII).

4.10 Impact on Flora and Fauna and Conservation Plan

The direct impacts of mining disturbances to land surfaces are usually significant, with the likelihood of destruction of biodiversity within natural ecosystems through the removal of natural soils, plants and animals. However, mining is a temporary land use because the mineral deposit is finite and eventually gets exhausted. The social and legislative context of mining in many parts of the world today means that some form of rehabilitation goals will have to be set for the post closure situation, and nowadays these are often determined prior to the granting of planning and operating permission for a new mine. In this context, ecological rehabilitation of mined land represents one of, if not the best approach to promote both sustainability and the safeguarding of biodiversity.

The area is not rich in biological diversity. No wild life population is present in the study area except the common type of birds and domestic animals in the adjoining villages. No significant long-term residual impacts on fauna due to mining are expected. The area mostly consists of agricultural land. Efforts will be made to return the mined out area to its original land use as far as possible.

Major Features in the Study Area (Core Zone)

Feature	Name/ Status
National Park / Sanctuary	Nil
Biosphere Reserve /Tiger Reserve/ Elephant Reserve /any other Reserve	Nil
Habitat for migratory birds	Nil
Corridor for animals of Schedule I & II of the Wildlife (Protection) Act, 1972	Nil

Flora & Fauna in the Core Zone

It has been observed in the flora & fauna study that no rare, endangered or endemic species of flora and fauna is found in this area.

Conservation Measures

Ecological restoration is about a broad set of activities (enhancing, repairing, or reconstructing degraded ecosystems and optimizing biodiversity returns). In essence, the restoration of mined land is based around ecosystem reconstruction. It is usually a question of the re- establishment of the capability of the land to capture and retain fundamental resources (energy, water, nutrients and species). With this in view, it is proposed to plant the trees and undertake development of green belt in the project area at all possible places.

As a trend, the faunal population is on decreasing trend in general. Arrangement of adequate funds has been made for enhancing, repairing, or reconstructing degraded ecosystems and optimizing biodiversity returns.

Development of Habitat

- **Technical Reclamation**

Because of the opencast mining, the topography of disturbed land will be suitably reclaimed by physical methods such as:

Easing of steep slopes
Terracing
Land leveling
Bunding
Contour trenching
Gulley plugging etc.

- **Reclamation of Back-filled Area**

The back-filled area will be biologically reclaimed by suitable means.

- **Green Belt Around the Mine**

In the North direction where the Jualbhanga Village is in close proximity, there is need for creating green belt (approximately 30m wide) to provide an effective dust, noise and sight curtain in the periphery of mining area. The trees to be planted in the green belt area shall act as buffers and shock absorber against dusts, noise and stone flying. Trees in the green belt will be tall, wind firm, broad leaved and evergreen.

- **Green Belt on the Sides of Other Road**

On the road from the mine to Purushottampur OCP, 3-4 rows of evergreen and dust resistant plants will be planted. This will also be raised in triple storey fashion.

- **Species for Plantation and Green Belt Development**

The species selected for plantation on the internal dump and also in the other areas will be of mixed type having a combination of fast and slow growing species with an ultimate aim to have triple storey plantation i.e. a combination of species of tall, intermediate and short height. A list of the species suggested for afforestation has already been indicated earlier in this chapter. However, in any case monoculture will not be adopted, because ecologically these are more unstable communities. The schedule and break-up of location for plantation is given earlier in this chapter.

Water Treatment & Water Quality

Water will be discharged only after suitable treatment. As such, mine discharge from the project is not likely to have any impact on the faunal species diversity within the terrestrial and aquatic habitats of downstream water course.

Implementing Agency

From the project proponent side, General Manager, Bankola Area, Project Officer Nakrakonda 'B' OCP and Environment Department, ECL (HQ) will be responsible for plantation and green belt development in the project. The work will be executed through State Forest Department.

Fund Provision

- Capital Rs. 30.00 Lakh
- Revenue Rs. 19.33 Lakh per annum

4.11 Effects of Traffic Movement

Suitable mitigation measures shall be taken to minimize the ambient air pollution on both sides of the road, noise nuisance, formation of ruts & potholes on the surface of the road besides road accidents.

4.12 Visual/Aesthetic Effects

Suitable mitigation measures are envisaged for this project to eliminate spots of eyesore due to excavation of coal and OB as well as transportation, water logging by provision of proper drainage, land reclamation (both technical and biological) and afforestation.

