CHAPTER 8
ENVIRONMENT MANAGEMENT PLAN

Rajpardi lignite mine has been operational since 1983; the mine is targeting to achieve an average production of 1 million tons with the acquisition of Amod block. The environmental impacts, due to mining have been assessed for air, noise, water, land, biological and socio-economic environments in order to ascertain the degree of vulnerability of each of these environments listed, in response to the mining in the region. The area as per the degree of fragility level of ecosystem is falling under the category VII, i.e., areas with active geological faults and seismic hazard. Following is a brief account on the environment management aspect of the project.

8.1 Status of the project

The initial leased block of Rajpardi mine is almost exhausted and the Amod lease is being planned for acquisition, the production is targeted to reach 10 million tons yearly by fourth year. The initial three years are going to witness lower production of lignite due to higher overburden removal.

8.1.1 Preparation of mining site

The undulations of ground surface need to be leveled, involving large earth work. The vulnerable slopes need to be stabilized by adopting scraping and reducing the surface slope by adopting proper techniques of slope stability suiting to the area. The mine area does not require much leveling and filling operations due to even topography.

8.2 Management of Air Environment

As observed in the impact assessment, SPM, SO_2 and NO_X are the main air pollutants arising out of mining activity. The study has revealed seasonal variability in these parameters. However, the level of SPM, SO_2, and NO_X are relatively low compared to the non-mining areas like the national highway and Jhagadia town. SPM is at times high

along the haulage roads and around the active mine area, but SO_2 and NO_X remain relatively low (Table 7.1b – c). The sources of SPM are lignite and overburden dust as well as vehicles and machineries used in the mine. SO_2 and NO_X are mainly contributed by the vehicles engaged in the mining operation.

To manage these pollutants following techniques are to be adopted,

(i) Dust extraction and suppression system are to be installed at lignite transfer points and stock pile areas.

(ii) Water sprinkling to suppress the dust. The frequency of water sprinkling should be decided based on the ambient conditions and seasons.

(iii) Lignite and dust particles of 5 – 10 micron easily get lifted and remain suspended in the air. These particles are harmful to the human health, so face masks should be provided to the personal working in such areas.

(iv) Point, line and area sources for the air pollution have to be identified and mapped for proper management of SPM, SO_2 and NO_X levels in the air.

(v) Replacing the mass transport of lignite by conveyor system, would cut down SPM, SO_2 and NO_X level as there will be considerable reduction in the vehicular traffic, the study has shown more contribution in the SPM, SO_2 and NO_X by vehicles operating in the mines than the mining.

(vi) Greenbelt around the overburden dumps will act as a screen for soil and lignite dust.

(vii) The overburden dumps, also need to be stabilized by growing vegetation. This activity of afforestation in the area would also facilitate the restoration of flora in the region.

(viii) Land reclamation in the mined areas should be undertaken simultaneously, to restrict large overburden dumps, causing slope failures and dust problems. This would serve the purpose of reclamation of the land and reduction in the air pollution.

(ix) Heavy machinery operations cause huge dust generation. During these events water sprinklers have to be diverted towards the movement directions of heavy machines.

8.3 Management of noise

Noise is not perceived as a serious problem for the population in the vicinity of mining project (Table 7.2). Only the active mine areas have high noise levels in the range of 53.2 to 85.5dB. The personal working in these noisy pockets should be properly equipped with ear muffs, etc. The mining machinery also needs to be serviced regularly in order to reduce noise pollution.

8.4 Management of water environment

8.4.1 Surface water management

The mine area does not have significant surface water bodies; as the Hakran stream flowing through the mining area is dry for most part of the year. During rainy season, the impounded water in the mine pit needs to be regularly pumped out, to prevent delays in the mining operations and to prevent increase in the volume of acid mine water. Garland drains around the overburden dump are effective in controlling the flow of water to the mine pit area. The drainage to carry accumulated mine pit water is Hakran stream (diverted course). Pumps of appropriate capacities are required to be installed to dewater the mine pit areas.

8.4.2 Groundwater management

The water table and the aquifer lie over the lignite seams. Due to the removal of overburden and mining of lignite, the ground water starts seeping into the mining areas due to the intersection of water table with the mine face. This ground water seepage would not only cause the water accumulation in the mine pit, but would gradually turn into the acidic water, as the dissolved sulfur species will come along with the ground water seepage. Best remedy to control ground water seepage is by lowering the water table in the mine lease area by pumping out the ground water directly into the Hakran stream.

8.4.3 Waste water management

There are two main source of waste water; (i) sewage water from mine colony and (ii) waste water generated due to mining activities mainly for dust suppression by sprinkling. The estimated 75 m^3/day of treated sewage water should be used for the purpose of sprinkling activity as well as for the green belt development in the project site.

8.4.4 Acid mine water management

The pits created due to mining should be back filled; otherwise they would serve as the accumulation zone of acid water over the period of time. The mine pit left in the earlier mining block has turned into acid water pond. The physical and chemical parameters of this acid mine water makes it unsuitable for direct use (Table 7.4 a – g). The proper treatment is by neutralizing the water by adding lime rich earth materials. This neutralized water is fit for sprinkling to suppress the dust as well as for providing water to the plantation on the overburden and reclaimed areas of the mine.

8.5 Waste and material management

In mining work, the machineries and vehicles employed run on diesel, these undergo wear and tear and need immediate repair for their proper functionality. This also reduces the NO_X and SO_2 emissions from these machines. The diesel depot location should be decided after evaluating the area and be maintained to avoid spillage and contaminations into the soils and ground water of the area.

8.6 Reclamation of the mined area

The general principle for reclamation is bringing the modified landscape to its near natural condition. To ensure this, one need to have information on pre mining land-use, topography, drainage system and settlement data, as well as details on ground water flow and wind directions.

The pre-mining air, noise, water, land, socio – economic data and future needs of the region are of great help in the mine reclamation planning. Understanding of the regional and local geology, soil types, flora and fauna and heritage sites etc., are also vital for the restoration of area.

8.6.1 Procedure for reclamation

The procedure for reclamation of the mined area is described below:

(i) The reclaimed landscape needs stable surface slopes, to achieve this there is need to design the landscaping for the area.

(ii) Drainage if it has got modified due to mining needs are to be evaluated for its long term stability, soil erosion vulnerability as well as other carrying capacities.

(iii) Top soil restoration is mandatory, which is possible by dumping the top soils separately. After back filling operation, the top soil dump needs to be spread over the reclaimed area. Such reclaimed areas are easy to stabilize as vegetation cover can be generated with ease.

8.7 Biological environment management

The inventory of local flora and fauna is very vital (Annexure 1, 2) based on this biological restoration is undergoing. The species coming under endangered category should be identified. Special efforts are needed to grow vegetation of rare type and saving the endangered animals by shifting them to the safer reserve forests. This process is referred as biological reclamation. In the case of the Rajpardi mine, as such no significant biological environment degradation has taken place. The measures like plantations, etc., have created additional biomass in the region.

8.8 Socio – economic environment management

The mining causes shifting of population. The compensation of property and social values should be planned so that the displaced population can start living life as normal as in the original settlement. This is very vital for the harmony in the social fabric of the

region. People from Amod village were shifted, relocated and were paid mutually agreed compensation.

The population suffering displacement may be given priority in the employment opportunities as a measure of social justice and economic wellbeing of the displaced. This approach has been adopted in the Rajpardi project. The effectiveness of resettlement is seen in non existence of conflict between the local population and the G.M.D.C Ltd.

8.9 Post mining environmental management

All the environments need regular monitoring even after the mining is over. The methodology and techniques of monitoring would be same as that for the regular pre-mining and mining stage. This monitoring should be maintained till it is realized that the area has acquired its "natural equilibrium" in the air, water and land environment system.