CHAPTER 9
SUMMARY AND CONCLUSIONS

The study has given an insight into the environmental issues related to the lignite mining. The impacts assessed in different domains are useful in deciding management strategies to mitigate and minimize the adverse impacts of mining.

9.1 Geological setup

The geological details of the area reveal that the lignite is associated with the Tarkeshwar formation of Tertiary sedimentary sequence. Apart from lignite, there is a good economic potential of silica sand and clays, associated with the lignite.

The ground water aquifer system overlies the lignite seams, well insulated by clay bands. This natural hydro-geological condition is advantageous as the ground water pollution due to mining is prevented by the natural setting itself. However, the ground water seepage into the mine pit requires application of proper techniques to prevent or control the seepage. Dewatering pumps installed are effective to a good extent in achieving this objective.

Water from various sources such as seepage from ground water, rain water and other surficial water bodies gradually accumulates in the mine pits. This accumulated water slowly turns into acidic water owing to the release of oxidized sulfur species from lignite. Oxidizing conditions also facilitate the leaching of heavy metals from the lignite deposits thus enhancing the heavy metal toxicity in the soils (Table 7.6 b).

9.2 Air environment

Study of air environment has shown lower levels of SPM, SO_2 and NO_x around the active mine area as compared to non mining areas like national highways, haulage roads, etc on account of heavy vehicular movement. These parameters (SPM, SO_2 and NO_X) have shown seasonal variations hence were monitored for all seasons at eight different

locations in the area. The minimum, maximum and average values of these parameters are well within the permissible limits (Table 7.1 b, c) and comply well with the National Ambient Air quality standards provided in Annexure 5. The high SPM values in the active mine area is due to the excavation and vehicular movement involved in haulage of lignite and overburden. However, SPM is brought down by sprinkling of water and complies well with the prescribed standards, contrary to this, SPM levels in the nearby location such as Jhagadia, GMDC colony, etc are higher compared to mine area this is on account of heavy vehicular movement at these locations.

Better mining practices and planning have also aided, in minimizing the adverse effects. The dump sites are covered with heavy plantation which has helped the stabilization of the dumps and thus indirectly minimized the SPM values.

The wind direction has almost remained uniform in the area. The wind speeds are also not high and thus lacking the capacity to lift and carry dust particles (Figure 7.2 a, b, c). Thus the overall impact of the mining is not adverse to the air environment of the region.

9.3 Noise environment

The analysis of Noise environment revealed that in the impact zone the noise values range between 55.2 to 81.5 db (A) in winter, 52.2 to 82.7 db (A) in summer & 53.2 to 82.7 db (A) in post monsoon (Table 7.2) and are complying well with Ambient Noise Standards (Annexure 6). The prime cause of high noise levels at mine site is mainly the machinery operations and heavy vehicular movements. The personnel working in the noisy part of the mine are properly equipped. The impact of mining on the noise environment of the area is marginal.

9.4 Land environment

This component of the environment has suffered due to mining and they are visible in terms of aesthetics or landscape changes due to creation of mine pits and waste dumps, loss of soil component.

To minimize these changes various mitigatory measures have been taken which include the stabilization of dumps by plantation, refilling of dump material in the sequential order. Thus in this way an attempt has been made to put minimum stress on land environment of the region. The active mining is going on agricultural land this has changed the landuse pattern of the area. However, the benefits of mining for the area are more than the losses caused by the changed land use on cost benefit terms. The overall impact of mining on the land environment of the area is not alarming as land is reclaimed after completion of mining.

9.5 Biological environment

The alterations in the land environment have direct influence on the biological environment. The biological environment has not been stressed till now as the mining has been centered within the agricultural lands, leaving aside the reserve forest area. The overall impact on flora and fauna is negligible. However, the additional plantation at the dump site has increased the biomass of the region. Various plant species used for reclamation of dump material are listed in Annexure 2.

9.6 Water environment

The impact of mining on the hydrogeology of the area has been studied by dividing water environment into subsurface and surface water components.

Ground water has shown good development, both in the core and buffer zones over the years (Table 6.5 c, Figure 6.3) due to good recharge conditions. The quality of ground water is also consistent with the Indian Standards specification of drinking water (Anon, 1991) (Annexure 4) and has not deteriorated due to the mining operations, reason for this is the favorable hydrogeological conditions and good mining practices. Physical and chemical parameters of water samples collected from various sources have been quoted in Table 6.2 a – e, also support this observation.

The state of surface waters is a bit different from the underground water. The water bodies which are situated on the periphery of mining block have shown lower pH due to

release of oxidized sulfur species, this water is called acid mine water. The physical and chemical parameters of acid mine water are given in Table 7.4 b and g, the acidity of this water is neutralized by treating it with calcareous sands and the treated water is used in sprinkling for suppressing the dust in the mine. The domestic waste water is treated properly in treatment plant and is utilized for watering plants in the colony. Thus the water environment of the region has not shown any adverse impact of mining, instead good water conservation practices are implemented as water resource management.

9.7 Socio-economic environment

There is a distinct elevation in the social and economic status on the population around Rajpardi. Though, Amod village has been relocated, a difficult social event for the native population; the mature and humane attitude of G.M.D.C., Ltd. has helped them settle in their new settlement. They have prospered economically and have better living standards. Mine has created opportunities of employment, boost in the local business as can be visualized from the following:

1. Infrastructure development of area has taken place as a result of which nearly all villages are well connected by roads, have proper drinking water facilities, are electrified and have at least primary education facilities. Community health centre has been set up at Rajpardi to provide medical assistance to local population.
2. Resettlement of Amod village has been done on mutually agreed terms between the villagers and G.M.D.C. Ltd., there has been an attempt to address to the problems of these relocated villagers.
3. The project apart from causing intermingling of migratory labors with the locals has also brought employment avenues of unskilled type to locals. Some educated persons from surrounding village around Rajpardi are employed by G.M.D.C. Ltd., in various cadres other than laborers. The economic prosperity of locals has boosted trade and commerce in the area. Thus the mining project has a positive impact on the socio-economic environment as it has enhanced the economic status of the local people.