

Executive Summary

Environmental Impact Assessment For The Proposed Production Of Dolomite Minerals, Its Crushing & Screening, (1.5 Lacks MTA) at Dumarpara Dolomite Mine District – Janjgir - Champa (C.G.).

1.0 Introduction

1.1 Preamble

Steel grade dolomite deposits are abundantly available at various places in Janjgir-Champa district of Chhattisgarh State. The lease area of 42.754 was previously granted in favour of the M.P. State Mining Corporation Ltd. (A Govt. of M.P. undertaking) Bhopal and mining operation were carried out from 1965 to 1999 and the M.P. State Mining Corporation Ltd., was supplying, Dolomite to various steel plants more than one Lac M.T.(SMS Grade) per year. Due to difference arisen between Union and Management, the M.P. State Mining Corporation Ltd., closed the Mine in the year 1999 & surrender the lease to M/s Star Ferro Alloys Pvt. Ltd., from whom the said lease has been transferred to Sri Balaji Metals & Minerals Pvt. Ltd., vide State Govt. Approval Order No. F3-18/12/2005 dated 10.06.2005 and transferred the lease in Form "O". It has been executed on 30.08.2005 and registered on 01.09.2005. As per the mining plan the area has the deposit of 11 Million M.T. The life of the mine has been worked out for 73 year at rate of 1,50,000 M.T. production per annum.

The mining operation will be carried out the as per the Approved Mining Plan by IBM vide letter No. JNG/DOL/MPLN/-677/NGP dated 23.10.2000. M/s Sri Balaji Metals & Minerals Pvt. Ltd., has received revised mining scheme vide letter No JNG/DOL/MPLN-677/NGP dated 10.01.2008.

SBMMPL has retained Anacon Laboratories Nagpur to undertake Environmental Impact Assessment studies of proposed increase in production of Dolomite ore 1.5 lakh Tonnes per year. The proposal envisages the collection of baseline data on the various environmental components viz. air, noise, water, land and socio-economic in order to prepare Environmental Management Plan (EMP).

The Expert Appraisal Committee for Mining project discussed the project during its meeting on November 12-14, 2007. Based on the consideration of the documents submitted and the presentation made by the project proponent, the committee has prescribed the Terms of Reference for preparing the EIA report:

2.0 Baseline Environmental Status

2.1 Air Environment

The quality of ambient air depends upon the background concentration of specific pollutants, the emission sources and meteorological conditions. The baseline studies on air environment include identification of specific air pollutants and assessing their existing levels in ambient air. In the present study air quality assessment has been done in the 10 km radial distance from the lease area of SBMMPL. The particulate matter, which is contributed by dust emissions are the major source of air pollutants during mining activities. The 12 sampling locations were identified keeping in view predominant wind direction prevailing during study period, sensitive areas and human settlements.

The ambient air quality was monitored for the month of Oct. 2007, Nov. 2007 and Dec. 2007. The concentrations of SPM, RPM, SO₂ and NO_x representing the criteria pollutants monitored during these three months were found to be less than NAAQS prescribed for rural & industrial areas by CPCB, New Delhi. (CPCB Std: SPM industrial area 500µg/m³, rural 200µg/m³; SO₂ industrial area 120 µg/m³, rural 80µg/m³; NO_x industrial 120µg/m³, rural 80µg/m³).

2.2 Noise Environment

Noise levels are monitored using sound level meter (Lutron SL – 4001) for the study area. It is observed that noise levels and noise equivalent levels of study area varied in the range 42–54 dB (A) in the day time and 30–40 dB (A) in the night time. These observations indicate that the ambient noise levels are within the prescribed standards in the impact zone. (CPCB Std. Industrial area; Day-75, Night-70; Commercial area; Day-65, Night-55; Residential area Day-55, Night-45; Silence area; Day-50, Night-40)

2.3 Water Environment

Baseline Status

The major surface water body in the study area is Borai River, Sone River and Nallahs. Bore wells are present in the lease area will be used for drinking and mining activities.

2.3.1 Baseline Data

The water quality in the impact zone was assessed through physico-chemical analysis of ground water samples collected during November 2007. The existing status of ground water and surface water quality was assessed by identifying 8 groundwater (Borewells) and 3 surface water samples in different villages.

It was observed that all the physico chemical parameter and heavy metals of water samples from surface and ground water are below stipulated drinking water standard. The data indicate low mineral content in terms of chloride and sulphate. Bacteriological examination of water indicates the absence of Total Coliform in all water samples except surface water.

2.4 Land Environment

Baseline Data

The physico-chemical characteristics of soils within the study area were examined by collecting seven samples from selected locations. In 10 km radius around the lease area in the month of December 2007 by using soil auger upto a depth of 20 cm. Data collected for chemical characteristics of soils by analysing soil samples through select parameters viz. pH, EC, soluble anions and cations and cation exchange capacity.

pH is an important parameter indicative of alkaline or acidic nature of soil. Variations in the pH of the soil in the study area are found to be in the range of 7.35 to 7.91 thus favorable for the growth of plant.

Electrical conductivity, a measure of soluble salt in the soil is in the range of 0.289 to 0.405 mmhos . It is observed that calcium and magnesium concentrations are in the ranges 0.168 to 0.212% and 0.128 to 0.148% respectively. Variations in CEC of the study area were found in the range of 34.58 to 37.02 meq/100g. Organic matter of soil is found in the range 4.92% to 6.20% showed high fertility status of the soil. The presence of organic matter enhances the metabolic activities of soil. The fertility status in respect of Nitrogen, P_2O_5 & K_2O shows moderate level of fertility, which indicates the supplementations of these fertilizers.

Terrestrial Ecology

Natural flora and fauna are important features of environment. They are organized into communities with mutual dependencies among their members and shows various responses and sensitivities to outside influences. Therefore, nature of developments and baseline characteristics of terrestrial flora and fauna around the site of the proposed lease area is required to be assessed. The data on flora and fauna was collected from the information available with forest department.

Flora

Terrestrial flora of the studied area has been distributed with number of herbs, shrubs and trees as well as grass lands. The study area has sparse vegetation, which includes fruit, ornamental trees, shrubs, grasses and agricultural crops.

Fauna

No national park or sanctuary & Wildlife exist in the study area. Common mammals, birds, reptiles found in study area.

Solid Wastes

The mine waste is in the form of: soil/murum, which is sandy in nature & loose form mixed with grit and small pebbles. The mine waste is also in the form of shale, loose in the shape of chips & lumps. The generation of the soil/mine waste during the development & production of the ore for the next 5 years are presented as under.

Details of Exploration and solid waste generation

Year	Development/exploration (m ³)	Re-handling of dump (m ³)	Dump No.
2008-09	10656	9000	D-1
		4620	D-2
2009-10	8856	Nil	-
2010-11	10680	Nil	-
2011-12	12080	1200	D-4
2012-13	8880	Nil	-

The area has been identified in Block A on the western site of the lease area. The dolomite deposit is covered with alluvial soil & murum. During next 6 years of mining operations there will be widening of the pits due to which there will be generation of overburden which will be stacked in along the lease boundary. There is some intercalation in the dolomite zone which can be considered as waste which will be used for making and strengthening of mine roads. There will be as such no generation of rejects during next six years of mining operation in the area. There is no processing unit in the lease area at present which will generate contaminated substance; the waste so generated is of non-toxic & non-hazardous in nature.

2.5 Socio-economic Environment

Baseline Status

Study area encompasses villages, under Tehsil: Sakti district Janjir-Champa.

Demographic data such as number of households, population, community structure, literacy and employment status of the villages in the study area are as follows:

- The total population is 36104 of the study area.
- The ratio of female/male is 1070/1000 for the study area as compared to national average of 929/1000.
- The percentage of Schedule Castes (SC) and Schedule Tribes (ST) population in the rural area is 25.15 % and 18.57 % respectively.
- The literacy rate in the study area is 41.87% respectively.
- The employment rate is 37.56 %.

3.0 Prediction of Impacts

3.1 Air Environment

In the semi mechanized open-cast mining operations such as mine area clearance, overburden removal, mining extraction, loading and unloading, into dumper/ trucks. Movement of dumpers on haul roads, backfilling and also drilling and blasting are expected to generate airborne fugitive dusts for which the EMP has been delineated and hence will not have any impact on air quality. Amongst various air pollutants mentioned above, the fugitive dust including Suspended Particulate Matter (SPM) are the major pollutants in mining activities which will be taken care off by implementing the EMP meticulously. The dust generation is generally very less in quantity and it is released very close to ground level which causes adverse impact in the immediate vicinity to very limited distance (about 600 to 800 meters) from the mine pit. The blasting operations are intermittent and the related impacts would be only momentary. Operation of diesel driven heavy earth movers including excavators, jack Hammers, Dumpers shovel, crusher etc. and DG sets are expected to release NO_x, CO and HCs (major pollutants) along with SO₂ and carbon soot through their exhausts. Among these the activities related to excavation (overburden as well as), piling, loading, movement of heavy earth movers machinery within mine area could be categorized as area sources with predominant fugitive dust emissions, whereas material (O.B. & ore) transport out of mining area falls in the category of line source with predominant pollutants from automobile exhausts (heavy duty vehicles).

Sources of Emissions

The sources of emissions at dolomite mines are expected from various opencast mining activities like mine area clearance, blasting operations overburden removal, loading, transportation & deposition / disposal, mine material excavation, loading into dumper/ trucks etc.

3.2 Noise Environment

Prediction of Impact due to the mining activities

The Director General of Mines Safety in its circular No. DG (Tech)/18 of 1975, has prescribed the noise level in mining occupations (TLV) for workers, in an 8 hour shift period with unprotected ear as 90 dBA or less. There will be some noise sources in mines, which may produce noise levels above 90 dBA, however, the workers are not expected to be exposed continuously for 8 hours. In any case, the workers close to this machinery are advised to use earmuffs.

Work zone noise level in the mining area shall increase due to excavation, transportation and blasting. The impacts due to the mining activities on the noise will be negligible, as all the precautions for the elimination of the noise levels will be taken. The mining activities will be undertaken during daytime only. The daytime equivalent noise levels when all the machineries are in operation will be negligible as the machineries will be provided with noise control equipment.

Prediction of Impact on Occupational Health

Equivalent sound pressure level, 8 hrs average (Leq-8 hrs) is used to describe exposure to noise in workplace. The damage risk criteria for hearing loss enforced by Central Pollution Control Board (CPCB), Occupational Safety and Health Administration (OSHA), USA and stipulated by other organizations is that noise levels upto 90 dBA are acceptable for eight hour exposure per day. Ministry of Labour, Government of India has also recommended similar criterion vide factories Act, Schedule No. XXIV (Government Notification FAC/1086/CR-9/Lab-4, Dated 8/2/1988). The Director General of Mines safety in circular No. DG (Tech)/18 of 1975, has prescribed the noise level in mining occupations (TLV) for workers, in a 8 hour shift period with unprotected ear as 90 dBA.

Prediction of Impact Due to Blasting

The blasting operations will also generate instantaneous noise levels, however these blasting operations will be designed in such a manner to generate noise level below 120 dBA at the nearest habitation from mine site. The peak particle velocity will be less than 50 mm/sec at the nearest habitation so as to avoid any damage to the property.

Impacts Due to Blasting Vibrations

The location of dolomite mines is an isolated one, with the nearest human settlement being at a distance of more than 2.0 km from the mining area. Ground vibration during blasting are not anticipated because mines are adopting scientific blasting pattern which will reduce the impact of blasting vibration on the surrounding area.

3.3 Water Environment

- The mining activity involves mining of naturally available dolomite. Mining is a physical process where water is mainly used for dust suppression and washing of heavy earth moving machines.
- Sanitary sewage generated from mine area will be treated in soak pit.
- The mining scheme proposed for the 5 years includes the excavations of minerals where bench height of soil will be about 1m; bench width of dolomite will be about 5m, & length of bench will be about 20m. These activities will not affect water table which is around the area ranges from 22 m bgl to 25 m bgl (Pre monsoon) to 10 m bgl to 12 m bgl (Post monsoon).
- As the ultimate depth of the mine is about 19 m bgl, it will not intersect the water table.
- No effluent generation is anticipated in the mining activity and hence ground water quality will remain unaffected. For mining operations water is required mainly for sprinkling haulage roads and at faces for suppression of dust.

Thus there will not be any impact of mining operation on surface and ground water quality, if EMP is properly implemented.

3.4 Land Environment

- Systematic reclamation and afforestation (1500 trees / ha) of mined out area shall be carried out to cover the entire worked out area before expiry of

mining lease area hence will not have any adverse impact on land environment and post mining land use pattern will be restored.

- The dust generated during blasting operation, ore handling and transport rate normally constitutes heavier particles that would easily settle within the mining area itself. Operation of grading the ore into different sizes, before loading to trucks would generate ore dust that would be deposited in nearby area. This will be taken care of by providing water sprinkler at various locations.
- The whole mined out area will be reclaimed by back filling and will be rehabilitated by afforestation to enhance the aesthetic beauty. Temporary top soil area will be stabilized by plantation using synthetic fertilizers, FYM and bio-fertilizer. As such there will be no impact on topography and drainage due to the proposed mining activities.
- The post-mining land use will be converted in to forested zone.
- Land Degradation due to mining activities would result in land locking, which will be due to the construction of roads, unscientific disposal of overburden, stacking of top soil on separate area and other facilities.
- Necessary control measures like simultaneous backfilling, plantation/afforestation are suggested in Environmental Management Plan to minimize the land degradation.
- In the rainy season, the pollutants may be carried by water through various channels along the available gradient and thus polluting the water of streams at the bottom. Possibility of spoiling of ground water and stream water due to leaching of pollutants also cannot be ruled out. Garland drains will be provided to arrest surface run off from the dump area.
- Impacts of Solid Waste; The Solid Waste Management Programme is planned to reduce land locking to the barest minimum. Besides, optimal physical and biological reclamation measures will be planned in respect of Internal over burden dumps. This will ensure that erosional effects of soil and clay washouts will be minimum. Mining activities will not affect the nearby agricultural fields and surface water bodies. The reclamation pattern will also insure that maximum land restoration measures are adopted for restoring the area.
- Biological Environment: The major portion of the vegetation in the study area contributes towards the sustenance of ecology of the area. The mining activities likely to affect vegetation which results in the reduction of photo-

synthetic activities. This situation will be overcome by spraying of water on vegetation.

- The adverse impact is not anticipated on the ecological environment in the study area as the felling of the trees belongs to indigenous species and do not fall under endangered variety.
- The other major impacts on the terrestrial ecosystems from mining activities and waste storage are the loss of habitat for flora and fauna, runoff and seepage from the waste storage sites and fugitive dust. The impacts will however be minimized due to implementation of mitigative measures recommended in EMP.
- Impact on Landuse: Impacts on the landuse pattern is anticipated during the operation of the mine which is insignificant.

3.5 Socio-Economic Environment

Critically analysing the baseline status of the socio-economic profile and visualising the scenario with the proposed project, the impacts of the project would be of varied nature.

There will be certain critical impacts on socio-economic environment due to:

- Immigration of population from nearby areas for jobs
- Strain on the existing infrastructure

Positive Impacts

- Increase in infrastructural resources due to the proposed mining activities by way of transport and communication and other basic requirements.
- The direct and indirect employment opportunities likely to be generated due to proposed expansion activities for local people.
- In addition to the opportunity of getting employment as construction laborers, the local population would also have employment opportunities in related services activities like commercial establishment, small contracts and supply of construction materials for building and ancillary infrastructure etc. consequently, this may lead to economic upliftment of the area.
- With increase in migration of the population from the other parts of the state there is a chance of dilution of ethnic culture in the region. People of close vicinity, shall enjoy positive changes in life style.
- The project is not going to influence the existing traditional agricultural practices significantly. It may help to improve agricultural production by way of providing additional income to the farmers from supplementary sources.

Negative Impacts

- Strain on the existing infrastructure.
- If proper sanitation facilities are not provided during mining activities it may cause unhealthy atmosphere in the area.
- Effect of surface run-off on water quality and also on the agricultural fields resulting in poor crop yields.
- Dust pollution due to transportation of ores may cause health ailments, poor yield of crops etc.
- However, the local inhabitants are not against the projects, provided their demands for job opportunities are met by the management.

4.0 Environmental Management Plan

4.1 Air Environment

The following control measures shall be adopted to minimize the adverse impact on the air environment:

- Dust is a measure source of SPM in the mines during drilling, blasting, handling of overburden/ore and operation of dumper/trucks on the haul road. Heavy machineries should be regularly maintained for optimum operation and minimum dust emission.
- The exhaust fumes from diesel powered machines shall be controlled by strict adherence to maintenance schedule as per manufacture guidelines.
- To control dust from drilling operations, drill speeds will be regulated as per manufacturers' guidelines. Drill operators will be provided with dust masks. Spread of dust from blasting will be checked by use of suitable explosives. Overcharging of blast holes shall also be avoided.
- Top soil and backfilled surfaces shall be periodically wetted to reduce fugitive dust generation by wind and grasses shall be immediately planted to stabilized the surface.
- A well-planned preventive maintenance schedule of mechanical and electrical machinery shall be undertaken.
- Proper maintenance of haul roads within the mining area. The roads should be built preferably on a raised surface and water spraying should be done regularly on kuchha roads.
- Dust resistant plant species for controlling the dust pollution is recommended.
- Ambient Air Quality should be monitored regularly.

- In-house training should be provided to the mine workers on environmental awareness.
- A good house keeping consisting of simple task of cleaning up spills, and removing accumulated material in small dump should be the part of normal operation and maintenance procedure.

4.2 Noise Environment

Noise exposure levels shall be maintained within 90 db (A) in the work zone (for 8 hours exposure). However following management plan shall be adopted during mining activities.

- The noise reduction measures of the individual machinery/equipment (likely to be procured for proposed expansion) should be thoroughly checked before procuring them at the time of placing the order. It should be ensured that they would not produce noise exceeding the Occupational Safety and Health Administration (OSHA) limit.
- Diesel powered machinery, which are the major source of noise, will be properly maintained as per maintenance schedule so that they do not generate excessive noise. Special care shall be given towards silencers of the diesel engines.
- The machineries should be maintained regularly by keeping the sound power levels, as per design specifications.
- Noise attenuating devices like earplugs and earmuffs will be provided to the workers exposed to high noise levels. The same may also be provided to drivers and operators working near the machines.
- Green belt developed around the mines shall help to minimise noise levels.
- Exposure to whole-body-vibration and higher noise level near spreaders and excavators may be controlled by proper maintenance of these machineries and job rotation of workers.
- Regular health check-up of workers should be maintained.

Blasting Vibrations

- The existing vibration level of 19.95 mm/s during blasting are well below the BIS: 6922 (1973) but shall be controlled to reduce it to a maximum 9 mm/s to comply with CMRI recommendation. This will be accomplished by restricting the charge value to maximum 90-100 kg/round.
- During blasting, proper blast pattern should be adapted.

- The controlled blasting shall be carried out to prevent the flying of rocks during the blasting process
- Number of holes blasted at any given time shall be as per Mettalliferous Mines Regulation, 1961 and special attention will be given to check over charging of the holes.
- Water shall be spread on the active benches before and after the blast which will help to reduce air born dust to settle quickly.
- The mining area shall be evacuated completely before blasting operations.
- The blasting team should be equipped with all safety equipments.

4.3 Water Environment

- The major source of water pollution in opencast mining is the surface run-off carrying the fine silt in rainy days from overburden at dumpsite. The following practices are recommended to arrest the solids escaping along with the surface run-off;
 - Catch dam should be provided to collect surface run off at the foot of the overburden dump which will prevent erosion of soil. The water collected in the storm water drains will be diverted to the diversion channels to be constructed in the mining site to avoid flow of water.
 - Earthen bunds should be constructed all around the outer edges of abandoned benches before reclamation so as to prevent carryover of solid material by the surface run-off.
 - Drains should be constructed to channelise the water in loose soil areas to prevent erosion.
 - Small grasses and bushes should be developed to hold back solid particles from draining away.
 - Small stone barriers across the drain shall check water current and arrest solids.
- It is necessary to regulate the drainage of the mining area in a manner so that impact on surface water bodies is minimized.
- The mine water should be used in the mining process for dust suppression.
- The water discharge should be through siltation tanks and check dams for the removal of suspended solids.
- Sewage from the toilets in the mining areas shall be disposed through soak pits.

4.4 Land Environment

The landscape of the mine area should be planned with natural features, economically, socially acceptable and environmentally stable. The solid waste generated in the open cast mining is OB. Reclamation activity will commence only after the ore deposit has been excavated. Prior to that whatsoever alluvial soil is generated will be stacked along the lease boundaries so that it can be used for reclamation / afforestation purpose. The thickness of the alluvial soil is less compared to the thickness of dolomite hence the use of alluvial soil for partial reclamation is suggested.

Top Soil Management

- In the opencast mining operation removal of Top soil is inevitable as a part of overburden excavation. Hence ample care should be taken for selective mining of top soil which is precious commodity from the environmental point of view.
- Top soil which cannot be used immediately, has to be initially removed separately and stacked properly for its reuse in the reclamation work.
- Top soil should be stabilized by planting suitable plant species. The species which will be raised on soil dumps should be such that they not only bind the soil but also contribute towards its enrichment. Fodder grasses or leguminous crops are suitable for this purpose.
- The space has been identified in the lease boundary as required under Metalliferous Mines Regulation Act 1961 and the dolomite will be locked in this zone which cannot be mined out due to statutory reasons. The space for the storage of top soil, sand, fines and sub grade minerals has been earmarked in Block- A western side of the Block-B. (Plate 2)

Solid Waste Management

- Quantities of solid waste (overburden) and top soil to be generated initially will be dumped on the pre identified areas near the active mining area. This will be stacked separately and maintained properly for future use. Similarly the reject of ROM during this period shall also be staked in identified area. None of the subsurface rocks contain any toxic minerals which otherwise would have required alteration of sequences of layers or deletion of toxic layer while backfilling.

Biological Reclamation of the waste disposal site

The heavy material should be soften/made lighter and enriched with nutrients for raising grass/shrubs/trees.

- The materials which contribute to the surface (15-30 cm) could be biological reclaimed with a suitable biofertilizer and organic manure. Species of trees, grasses and shrubs for various purposes are recommended.

Programme of Afforestation

- An extensive green belt will be developed.
 - To reclaim back filled areas.
 - To arrest fugitive dust.
 - To control noise.
 - To increase vegetation cover and bio-diversity.
 - To provide a means of livelihood to local tribals by cultivating saleable products after mine closure.
 - To increase aesthetic value.
- Efforts shall be made to develop a full forest over the reclaimed areas. The tree density will be 2000 trees / ha depending on the species planted.
- Most preferably locally available species with economic, aesthetic and ecological value will be planted. Plantations will be done over the reclaimed areas.
- Mixed plantations will be done but keeping in view the fact that Sal is the most predominant species of tree in the study area, Sal will be planted in maximum numbers. But since Sal is a very slow growing species, Custard Apple, Amla and Tendu will be planted in large numbers, as they are relatively fast growing and begin yielding valuable products very soon.

At present, the bio-diversity is low because most of the lease area is a grass-land/ agricultural land. Since some of these areas will be afforested with several species of trees, the biodiversity will actually increase after implantation of afforestation plan.
- The lease area is mostly covered with alluvial soil and there is no tree in the lease area. It is propose to have plantation surrounding the lease boundaries in phased pattern to minimize the land erosion. It is proposed to have plantation @ 40 saplings per year in following manner:

Year	Quantity	Area	Proposed rate of Survival
2007-08	40	400 m ²	80 %
2008-09	40	400 m ²	80 %
2009-10	40	400 m ²	80 %
2010-11	40	400 m ²	80 %
2011-2012	40	400 m ²	80 %

As per Mining Plan

- Maximum survival rate can be achieved when seedlings are planted preferably 2 weeks after commencement of monsoon. Seedlings planted in winter and spring will have to be watered. Seedlings planted in summer will have to be watered much more.
- It is suggested that young seedlings be regularly watered (especially during summer) and given organic fertilizers for the first 2-3 years to ensure high survival rate. Seedlings / young trees of Avenue plantations should be sprayed with water periodically to wash dust from their leaves, as accumulated dust on leaves hamper growth and even kill young plants. The plantations should also be protected initially from grazing by cattle. Weeding may also be done if it is seen that weeds are hampering the growth of the seedlings.

4.4.1 Mine Closure Plan

The mining operation is yet to attain optimum depth in the lease area. At this stage it is premature to consider closure operation as it can be envisaged after the exhaustion of the mineral deposit which is not foreseen during the plan period or in near future. However the stabilization of waste dump sites and rehabilitation of mined out land shall be achieved to its present use. Rehabilitation of the mine workers will not pose any problem after closing of mining activities because they will divert to their original profession of agricultural.

At present scenario it is also difficult to forecast closure operations due to uneconomic operations, natural calamity, directives from statutory organizations, court etc.

4.5 Socio-Economic Environment

In order to mitigate the adverse impacts likely to arise out of proposed activities and also to minimize the misapprehensions as well as some unfavorable opinion of the local people about the proposed project, it is necessary to formulate an effective

EMP for smooth initiation and functioning of the project. The suggestions are given below:

- The mining area comes under backward region. Main activity is agriculture, thereby posing unemployment problem. Job opportunities are the most demanding factor and employment to the local people should be considered.
- For smooth initiation and functioning of the proposed project activities the management should take steps to get local people into confidence so as to avoid any unpleasantness amongst the local people in future. The following measures are suggested:
 - Project Authorities shall do communication with the local community on regular basis.
 - Project Authorities shall undertake regular environmental awareness program to bring the beneficial aspects of the project and environmental management measures being undertaken for improving their quality of life.
- The social welfare activities to be undertaken by the Project Authorities, in collaboration with the local administration, gram panchayat, block development office etc. for the better co-ordination.

4.7 Occupational Safety and Health

- The main factors of occupational health in open cast mines are dust and noise. Safety of employees during blasting operation, maintenance of mining equipment and handling of explosive materials shall be priority of mine owner as per mines rules and regulations. To avoid any adverse effects on the health of workers due to dust, noise and vibration sufficient measures taken as follows;
 - Provision of rest shelters for mine workers with amenities like drinking water, fans etc.
 - All safety measures like use of safety appliances, safety awards, posters, slogans related to safety etc.
 - Training of employees for use of safety appliances and first aid.
 - Periodical medical examination (PME) of all workers by medical specialist, so that any adverse impact may be detected in its early stage.
- Organisation of First Aid camp in mines including training to the mine workers.