

## Executive Summary

# Environmental Impact Assessment for Ispat Dolomite Quarry, Capacity 2.0 MTPA at Baraduar Mining Lease in Janjgir–Champa District, Chhattisgarh (India)

Sponsor:

**Bhilai Steel Plant (BSP),  
Steel Authority of India Limited (SAIL),  
Chhattisgarh**



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## 1.1 Introduction

M/s Steel Authority of India Limited (SAIL), Bhilai steel Plant (BSP), a Government of India enterprise is engaged in manufacture of Iron and Steel as major a producer of structural. Bhilai Steel Plant has its own mines to fulfill the requirements of iron ore, dolomite and limestone. The dolomite requirement of BSP after its expansion of hot metal production from 4.5 MTPA to 7.5 MTPA will be 1.6 MTPA. Presently, the only the captive source of dolomite for BSP is Hirri Dolomite Mine which is operating at a production capacity of 1.0 MTPA (ROM) and will exhaust in 9 to 10 years. BSP management intends to develop a captive source of dolomite for reliable and constant supply of dolomite to BSP and SAIL Plants. Keeping the above facts in view, BSP management intends to reopen and develop the Ispat Dolomite Quarry at Baraduar in Janjgir-Champa district, Chhattisgarh (India) at the earliest to cater the future development need of SAIL. Dolomite mine area is situated by the side of metalled PWD all weather road, 8 km from Baraduar railway station and 275 km from Bhilai Steel Plant, Bhilai. SAIL has proposes to produce 2.0 MTPA ROM from Baraduar mine which will be used in Bhilai Steel Plant at Bhilai. The crushed ROM will be transported from Baraduar mine to BSP Bhilai by rail. The prospecting lease was executed on 14<sup>th</sup> October, 1969 for dolomite over an area of 2289.24 acres (926.817 ha) in favour of HSL, Rourkela Steel Plant. This mining lease deed was executed on 26<sup>th</sup> December, 1970 for Dolomite over an area of 1293.24 acres (523.35 ha) for a period of 20 years with effect from 26.12.1970 to 25.12.1990. The mining was stopped since June 1983 due to industrial unrest. One year prior to the expiry of the lease, the mining renewal application over an area of 523.35 ha was submitted on 19.12.1989. IBM approved mining plan of Ispat Dolomite Quarry, Baraduar was submitted to the Collector, Bilaspur on 01.05.1992 for the capacity of 0.5 MT. Power of Attorney obtained from Director (P) SAIL to ED (Mines), Bhilai Steel Plant for dealing with the lease matter of Baraduar Mine on 29.09.2008 as the area is in Chhattisgarh state. In view of the above, revised application for renewal of Ispat Dolomite Quarry, Baraduar was submitted to the Collector, Janjgir-Champa on 21.10.2008 by Bhilai Steel Plant. The consent for revival of mining lease of Baraduar was issued by the Government of Chhattisgarh in favour of SAIL on 24.09.2010 for a period up to 25.12.2010. The Mining Plan approved by IBM Nagpur on 21.09.11

With the objective of attaining sustainable development and environmental concerns related to 2.00 MTPA capacity of Ispat Dolomite Quarry at

Baraduar to plan and implement appropriate strategies for the protection of environment and maintenance of ecological balance in the region. BSP retained National Environmental Engineering Research Institute (NEERI), Nagpur for conducting Environmental Impact Assessment Studies encompassing baseline scenario with respect to different components of the environment viz. air, noise, water, land, biological and socioeconomic including parameters of human interest for evolving suitable cost effective Environmental Management Plan.

The EIA report is being submitted for the purpose of requirement of obtaining environmental clearance from statutory authorities. The EIA report will cover the identified impacts with elaborate EMP so as to prevent any damage to environment and ecological balance of the area.

## **1.2 Project Profile**

### **1.2.1 Location**

The Dolomite mine lies between Latitude - 21° 57' 32.53" N to 21° 58' 33.64"N and Longitude - 82° 50' 13.61" E to 82° 52' 27.05"E and falls within the Survey of India Toposheet No. 64J/16 and 64K/13.

Dolomite Mine Lease comes under Jaijaipur Tahsil in Janjgir-Champa District of Chhattisgarh State. It is located at a distance of 8 km from Baraduar railway station and 275 km from Bhilai Steel Plant, Bhilai on Howrah-Bombay broad gauge line of S-E railway. The entire mining lease area covers Chittapandaria Reserve Forest comprising of 432.69 ha and Chittapandaria village comprising of 90.66 ha out of which **86.833 ha** is government revenue land (forest), 1,790 ha. Is Govt land and 2.037 ha private land. The leasehold area is found to be devoid of trees and the land is barren. No public building places and monuments of national importance exist in the leasehold area or within a radius of 15 km.

### **1.2.2 Justification for Proposed Ispat Dolomite Quarry at Baraduar**

M/s Steel Authority of India Limited, Bhilai Steel Plant a government of India Enterprise is engaged in manufacturer of Iron and Steel including rails and heavy steel plates and major producers of structural. SAIL has embarked upon a massive modernization and expansion plan to sustain its present market share in future. As per Corporate Plan 2012, SAIL will witness a quantum jump in hot metal production from 15.1 to 26.2 MTPA. Therefore, the dolomite requirement of BSP after its expansion will be from 4.5 to 7.5 MTPA. Presently, the only captive source of dolomite to BSP is from Hirri Dolomite Mine. BSP requires minimum 1.6 MTPA of

consistent in future but presently there is only one mine for dolomite, which is operating at a production capacity of 1.0 MTPA (ROM) and will exhaust in nine to ten years. It is therefore, BSP desired to reopen and develop a captive source for reliable consistent supply of Dolomite Plants at Baraduar mine at the earliest to cater the future dolomite need of BSP/SAIL. It is therefore proposed to develop an Ispat Dolomite Quarry at Baraduar the mine activities of dolomite plant of 2.0 MTPA capacities.

### 1.2.3 Drainage System and Water Bodies

There are no major rivers in the study area. There are few seasonal streams or nalla which originate from the various hilly areas and drains the water into plain. They remain dry during non-monsoon season. There is only one seasonal Nala called Khatia Nalla passing through the middle of the leasehold area, flowing in North-West to South-East direction. There is no perennial source of water in the leasehold area. There are no irrigation facilities and also there are no ponds, lakes, rivers, streams nearby the mine leasehold area. At present the study area has five existing old mine pits filled with water having a maximum depth to about 100 feet. Bore wells drilled in the area and around and also open wells confirm the existence of water table at 211.40 mRL to 192.40 mRL depth from the surface with yield capacity of well from 7770 to 15000 L/hr.

### 1.2.4 Mining Process

The leasehold area has been proposed to be developed into a mining industry. Mining operations will be carried out departmentally by opencast method of working with three shift operation. The construction work includes crushing plant, loading bay, explosive magazine etc.

Mining operations consisting of drilling, blasting, excavation Crushing and transport of ROM to sizing plant

The waste arising out of rising of dolomite will also be transported to specified dumping yard.

The sized materials (-60) will be transported to the stockpile through conveyor and loading to wagon through stacker and reclaimer

The finished product will dispatched to BSP/SAIL through railway line by taking diversion from Baraduar railway station to the mine pit head

The entire produce of the mine will be consumed by BSP/SAIL.

Mining operations will be carried out departmentally by opencast method. The purpose of crushing and sizing plant is to produce calibrated products of size of 60 mm from the ROM (maximum size 800mm) by subjecting it to two stages of crushing purposes of different sizes of dolomite requirement is to be used in different steel plant. The 0-800mm material will be fed to the primary seizer through an apron feeder, where the material will be crushed to -200mm and then fed to a secondary crusher via a belt feeder for getting final output of -60mm. This crushed material will be sent to a single deck screen to separate at 0-60mm. The oversize will be resend to the second crusher for further crushing as per the requirement. These materials will be transported to the stockpile through conveyor for loading. There will be no beneficiation of the dolomite ore by washing, this finished product will be dispatched to BSP/SAIL units by rail wagon. A new railway line by taking diversion from Baraduar Railway Station to the mine pit head has been envisaged. It will involve laying of 9 km rail track, construction of bridges, level crossings (if required), one class 'A' Railway Station, houses for railway staffs, signalling and telecommunication system etc and three numbers of tracks ( at the loading yard) for loading a full rake. It will also involve acquisition of 45 hectares of public/Government land. No public buildings, places and monument of national importance exist in new railway line diversion rout from Baraduar railway Station to proposed mines loading point. The part of proposed project may be off loaded to contractual agency. But the Safety, Environment another statutory obligations will implement, supervise, monitoring and compile by Mines Officials of BSP.. The part of proposed project may be off loaded to contractual agency. But the Safety, Environment and other statutory obligations will implement, supervise, monitoring and compile by Mines Officials of BSP.

### 1.2.5 Manpower

It is considered that the manpower will be primarily sourced from the company's existing manpower from its mine. Certain workers will be on contract basis. The requirement of manpower has been envisaged as under:

| Manpower                                | Nos.       |
|---|------------|
| Executives                              | 18         |
| Non-executives (skilled/highly skilled) | 267        |
| Others (un-skilled)                     | 60         |
| <b>Total</b>                            | <b>345</b> |

### 1.2.6 Project Cost

The project cost including buildings, plant and machinery, operation and maintenance, electricity, furniture and fixtures are given below:

| S. No. | Particulers                  | Amounts (Rs. in Crores) |
|--------|------------------------------|-------------------------|
| 1.     | Buildings                    | 74.90                   |
| 2.     | Plant and Machinery          | 64.44                   |
| 3.     | Preliminary and Preoperative | 00.15                   |
| 4.     | Electricity                  | 00.30                   |
| 5.     | Furniture and Fixture        | 00.21                   |
|        | <b>Total</b>                 | <b>140.00</b>           |

### 1.3 EIA and EMP

For the environmental impact assessment studies, an area covering 10 km radial distance from the center of leasehold area (covering around 10 km area from the boundary of dolomite plant on all sides) was identified as impact zone admeasuring around 523.35 km<sup>2</sup>. Sampling points have been chosen from both the Impact zones.

The EIA study was carried out for each individual environmental component during summer season is briefly reported below and the details of which are presented in the report.

#### 1.3.1 Air Environment

##### Baseline Environmental Status

The micro-meteorological data was collected with respect to wind speed, wind direction, humidity, rainfall and temperature

The climate of the study area is subtropical characterized by hot summer and mild winters. The peak temperatures are usually reached in summer (42.7°C) and minimum 13°C in winter. Annual rainfall varies between 434.8mm to 2134 mm with a mean value of 1354mm. The 24 hourly wind roses diagram for summer season indicate that the predominant winds are West-North and North-West with speed ranging between 1.0 and 3.5 m/s. accordingly the impact zone will be spread over East, South and South-East direction during summer season. The calm condition was recorded 20.83%. The relative humidity varied in the range of 47%-66%.

Baseline data for air pollutants of significance to air environment viz. Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Ammonia (NH<sub>3</sub>),

Carbon monoxide. Particulate Matter of  $10\mu\text{m}$  ( $\text{PM}_{10}$ ), Particulate Matter of  $2.5\mu\text{m}$  ( $\text{PM}_{2.5}$ ), Benzene ( $\text{C}_6\text{H}_6$ ), Hydrocarbons (HCs), Volatile Organic Carbons (VOCs) and heavy metal content of  $\text{PM}_{10}$ , was collected by establishing requisite number of AAQM stations. In all 10 ambient air quality monitoring stations were selected

$\text{PM}_{10}$  concentration was observed to be below the stipulated standards for residential, rural or mixed area (rural and residential) as well as in for industrial/mining area ranged from 39 – 91  $\mu\text{g}/\text{m}^3$  during summer season (Standard Limits for  $\text{PM}_{10}$  is 100  $\mu\text{g}/\text{m}^3$ )

$\text{PM}_{2.5}$  was observed to be vary from 20 to 48  $\mu\text{g}/\text{m}^3$  and was below the stipulated standards Limits ( $\text{PM}_{2.5} = 60 \mu\text{g}/\text{m}^3$ )

Concentrations of  $\text{SO}_2$ ,  $\text{NO}_x$  and  $\text{NH}_3$  were recorded as 4-10  $\mu\text{g}/\text{m}^3$ ; 7-15  $\mu\text{g}/\text{m}^3$  and 12-49  $\mu\text{g}/\text{m}^3$  were below the stipulated standards (80  $\mu\text{g}/\text{m}^3$  and 400  $\mu\text{g}/\text{m}^3$  respectively)

Carbon monoxide varied from 0.52 to 1.0  $\text{mg}/\text{m}^3$  in the study area and was below the stipulated standard (2.0  $\text{mg}/\text{l}$ )

Total hydrocarbon varied from 0.50 to 0.99  $\text{mg}/\text{m}^3$

Total VOC content in ambient air ranged from 0.10 - 0.60  $\mu\text{g}/\text{m}^3$  (below the stipulated standard (5.0  $\mu\text{g g}/\text{l}$ )

The heavy metal concentrations in the dust samples were found to be well within the limits (Pb: ND-1.0  $\mu\text{g}/\text{m}^3$ ; Ni: 2-19  $\text{ng}/\text{m}^3$ ; As: ND) were below standard limits (Pb-1.0  $\mu\text{g}/\text{m}^3$ ; Ni 20  $\text{ng}/\text{m}^3$  and As 6  $\text{ng}/\text{m}^3$  respectively).

Major contributors for  $\text{PM}_{10}$ , are due to mining activity and transportation activity on semi-permanent road network

### Prediction of Impacts

The Fugitive Dust Model (FDM), a steady state Gaussian Dispersion Model was used for predicting GLCs of fugitive dust due to mining activity

Cumulative ground level impacts were predicted with respect to  $\text{PM}_{10}$  in terms of 24 hourly Ground Level Concentrations (GLCs) was predicted to be 43  $\mu\text{g}/\text{m}^3$  in the study area of dolomite mine

With EMP implementation, there will be decrease in incremental maximum  $PM_{10}$  concentration  $5\mu\text{g}/\text{m}^3$  during summer season due to the crushing activities of dolomite mines.

The particulate pollution due to transport activities would be very low considering the good environmental practice of dust suppression by using sprinklers in the mine lease area

The reduction level of emission was predicted considering water sprinkling and wind breaking by greenbelt

### **Environmental Management Plan**

Regular grading or stabilization of haul roads and service roads

Afforestation with dust filtering trees around dolomite Plant and Crushing Plant for control of dust

By water sprinkling on haul roads at regular intervals in the area

Wet suppression by water sprinkling on dust emitting surfaces

Water will be sprayed in the form of fine jet to suppress the dust generated while loading and unloading operations

The storage area will be provided with retaining wall and the material will be covered with polyethylene/canvas sheets

Dry fog system for dust suppression at all transfer points and tertiary crushing points at crushing plant will be provided

### **1.3.2 Noise Environment**

#### **Baseline Environmental Status**

Ambient noise monitoring was carried out in the study region at 17 locations including core zone and buffer zone around proposed dolomite plant.

The noise levels were monitored are given as below:

- Mining area noise : 37- 42 dB(A)
- Residential areas: 47-55 dB(A)
- Commercial areas: 47-51 dB(A)
- Silence zones: 25-39 dB(A)

- Traffic noise: Leq 56 - 62 dB(A)

Local transport and human activity are responsible for higher noise levels in residential and other areas

Equivalent noise levels for day-night are often used to describe community noise exposures. That Leq (day) and Leq (night) calculated for these areas is generally found to be well within the prescribed limits promulgated by CPCB.

There will not be any significant direct impact of noise due to the plant on the human settlements around it. It is observed that the noise levels due to plant operation can reach ambient noise levels at about 500m from the proposed plant site.

### **Prediction of Impacts**

The noise level in plant was estimated to be 90 dB(A). However, these noise levels will be further reduced due to building walls of plant and green belt around it

The predicted noise levels due to increase in local traffic on the main road would be 53 - 66 dB(A)

### **Environmental Management Plan**

Proper and regular maintenance of equipments, machinery, trucks, and dumpers etc.

Insulated enclosure for staff near noise generating machine, ear muffs for staff will be provided.

Scientific method of blasting and control charging will be arranged as worker's safety :

Green belt in and around dolomite plant will be developed

Development of avenue plantation to reduce noise due to traffic activities

### **Vibration and Noise Pollution**

Vibration can be characterized by various parameters such as Peak Particle Velocity, Peak Vector Sum, Peak Displacement, Peak Acceleration, Peak Sound Pressure Level and Zero Crossing frequency. Vibrations were monitored at proposed mine area.

The observed PSPL within the proposed mine premises and the residential areas around the mine ranges from 94 to 116.9 dBL which is well within the BIS standard.

The impact of vibrations generated from the existing activities on and nearby residential areas is expected to be insignificant.

With the uses of NOVEL technology and delay detonators, the danger of ground vibration due to blasting has been considerably reduced.

Periodic monitoring of noise levels at various points near the source of noise will be carried out to ascertain the noise levels and to take remedial measures for reducing noise levels or mitigating its effects.

Wherever the noise level exceeds the safe limit of 85dB, ear muffs and ear plugs will be provided to persons exposed to noise or operator cabin will be provided.

Personnel working near the vibrating machines in different units should be provided with well designed vibration resistant hand gloves / foot wares.

Training of personnel is recommended to generate awareness about damaging effects of excessive vibrations

Monitoring of the vibration levels is essential to assess the efficiency of maintenance schedules and vibration protection measures undertaken to reduce vibration levels. A good quality vibration analyzer will be essential for this purpose

### **1.3.3 Water Environment**

#### **Baseline Environmental Status**

Total 21 samples (4 surface and 17 ground water) were collected in the study area and analysed for physico-chemical, bacteriological and biological parameters

Physico-chemical and inorganic quality of surface water and ground water were observed to be good when compared with drinking water quality standards

However, nutrient demand and organic parameters indicate marginally polluted surface water sources with low productivity

The surface water and ground water sources in study area showed low concentrations of heavy metals except iron, which was recorded higher than standards at few places

The bacteriological and biological observations indicate that the surface groundwater quality is good

### **Prediction of Impacts**

Surface and groundwater quality will not be adversely affected due to proposed activities of dolomite mine plant

The baseline data did not show any impact on the surface water or groundwater due to dolomite plant

The runoff water from stockpiles and mine area will be collected and led to sedimentation pond for removal of sediments before disposal

The waste water will be collected in sump and will be reuse and will not be disposed off in water bodies to avoided water pollution

There will be a full scale sewage treatment plant for the treatment of domestic sewage and the effluent is utilized for irrigating plantation

### **Environmental Management Plan**

Overflow water recycled and reused in the plant to conserve surface water for domestic as well as wildlife uses

Overburdens in the mines will be stabilized, plantations will be developed, and check dams have been constructed in gullies to arrest silt in runoff water, so there would be negligible pollution due to activity in mine lease area

Public health will not be affected as the surface water is being treated before public water supply to remove the impurities from the water

### **1.3.4 Land Environment**

#### **Baseline Environmental Status**

Soil samples were collected from 16 sampling locations and analyzed for physicochemical quality. Predominant texture of soil is clay (44.2% - 50.2%) with porosity varying from 49.53% - 71.27% and water holding capacity ranged from 46.54% - 57.15% indicating good quality of soil. Soil porosity is a measure of air filled pore spaces and gives

information about movement of gases, inherent moisture, and development of root system and strength of soil. The bulk density of soils in the study area is in the range of 1.19 g/cm<sup>3</sup> – 1.29 g/cm<sup>3</sup> which, is considered as moderate good quality of soil.

Soils are strongly neutral with moderate soluble salts content and very high adsorption capacity but with poor fertility

The soils have micronutrients (trace metals) and moderate microbial flora in soil

Land use pattern of impact area shows 82.67% reserve forest area, 15.01% of revenue land (forest) and 2.32% private land showing predominance of forest land

The land use of lease area was studied using remote sensing data. Land use pattern indicates: 49.37% fellow land, 18.36% crop land, 14.68% scrub land, 11.25% vegetations, 2.62% waste land, 2.57% water bodies and 1.14% build-up land in the study area.

### **Prediction of Impacts**

The silt content in the runoff water from dump area will be removed in sedimentation pond by directing runoff water through grassland drains into sedimentation tank and construction of gully plugs and check dams to arrest sediments. The environment would not be affected by the wastewater pollution.

Good amount of afforestation will be carried out in mine lease area which would reduce soil erosion from mining lease area

No change in land use pattern in mine lease area.

### **Environmental Management Plan**

Soil erosion control and water conservation through afforestation in and around mine and afforestation in open areas

Greenbelt will be developed around leasehold areas of mine

Topsoil Management Plan will be prepared to save this non-renewable resource. The top soil will be carefully collected and this soil which harbours propagules of several species in the form of seeds, bulbs

or rhizomes will be spread out in an identified nearby area / degraded forest land to facilitate regeneration of herbaceous and micro-flora

Measures of control of soil erosion such as contour trenches on overburden slopes, gully lining, vegetated water ways, vegetative stabilization of overburden dumps

### 1.3.5 Biological Environment

#### Baseline Environmental Status

The Chittapandaria reserve forest falling in leasehold which is found to be devoid of trees and the land is barren.

The general topography is without any remarkable relief and forms more or less flat terrain.

A total of 196 plant species were recorded, out of these, 99 tree species, 35 shrub, 21 herbs, 26 species of bamboo and grass, 11 climber, 3 species of parasites and 1 species of epiphyte were recorded from the study area

*Eucalyptus sp.*, *Terminalia arjuna*, *Madhuca indica*, *Bombax ceiba*, *Acacia catechu*, *Jatropha sp.*, *Tamarindus indica*, *Ficus religiosa*, *Vitex negundo*, *Aegle marmelus*, *Azadirachta indica*, *Butea monosperma*, *Syzygium cumini*, *Ocimum sp.*, *Emblica sp.*, *Tectona grandis* are widespread in the area. *Acacia sp.* is often present indicating the relation to forest.

Wildlife animal species are represented by commonly occurring species like hyena, jackal, fox, monkey, barking deer, etc.

Fishing activity is not prominent in the area as there is no river

#### Prediction of Impacts

Mine activity will not affect the flora and fauna of the lease area

The biodiversity of plants will be increased due to plantation drive and bird population will be attracted towards the wetland of old water pits.

There will not be any discharge from the dolomite activities or domestic wastewater treatment plant so terrestrial and aquatic flora and fauna will not be affected.

The agricultural activity will be improved due to availability of infrastructure through social welfare activities of BSP/SAIL

Public health will not be affected as no pollutants are released in the environment from the mine plant

### **Environmental Management Plan**

Use of diverse local plant species in the green belt to increase plant biodiversity as well as to reduce dust and noise pollution

Avenue plantation of dust filtering and shade giving trees

Encouragement to villagers to undertake social forestry programme to develop village forests and village grasslands in collaboration with forest department to satisfy their demands and fodder

Strict curb on poaching and hunting and special protection to rare and endangered species

Development of nursery for raising plant seedlings for afforestation and greenbelt development

Protection and conservation for natural regeneration in the forest

Development of botanical garden for conservation of medicinal plants

An amount of Rs. 100 Lakhs will be allotted for capital investment and Rs. 10/- Lakh for recurring cost towards implementation of wildlife conservation plan

### **1.3.6 Socio-economic Environment**

#### **Baseline Environmental Status**

Total population of the villages of 5 tehsil in study area is recorded 54441 with 18.2% population of ST and 20.27% of SC.

Out of total population, main workers from 32.05%, marginal workers 14.41% and maximum people are non-workers i.e. 53.52%

Sex ratio (No. of females per 1000 males) is recorded to 1007 and therefore female ratio is found more as compared to male population

Literacy rate computed as poor (53.07%)

Agriculture activity is dominant in the area.

Public health facilities viz. education, transportation, power, medicinal are observed good in the study area

Almost all the respondents have positive opinion about this project

## **Prediction of Impacts**

### **Positive Impacts**

Primary and secondary employment opportunities are expected to be improved in the region.

Due to dolomite mining activity, it is expected that additional people will get employment hence job opportunities for the local people as well as immigrants from nearby areas would increase.

There would be increase in the commercial, business and shopping centre to cater the needs of existing population as well as the employment etc.

Due to CSR policy of SAIL, the life of local people will be happy due to proposed developmental plans could improve the quality of life

Other infrastructural facilities will be improved. It would also result in the appreciation of land values around these areas

### **Negative Impacts**

- No adverse impacts on socio-economic environment due to proposed Dolomite Plant is expected in the area.

### **Environmental Management Plan**

Preference will be given to local population for employment in addition to awarding contract work

Small scale industries will be promoted in the area

Improvement of infrastructural facilities like education, medical, transport

Economic up-liftment activities such as improving agricultural practices, dairy development, poultry and development of forest based income generating activities

Control of air and water pollution through scientific methods

Providing safe drinking water supply in the region

Schemes for women empowerment and cultural development

Development of low cost sanitation facilities in the villages

Development of rainwater harvesting methods to augment groundwater recharge; construction of ponds for rainwater harvesting in villages for domestic and agricultural use

Occupational Health and Safety

An ambulance van will be provided to meet any eventuality

First Aid station will be provided near the mining lease. Also first aid boxes are provided at the mine pits and on the shovel and dumpers

First Aid pouches would be made available with shift foreman

All those issues have been considered while making the EMP which is given in details in Chapter 1.

## 1.4 Conclusions

The development of dolomite mine at Baraduar lease area will be environmentally, technically and economically feasible

SAIL has envisaged developing dolomite mine to supply the finished product to BSP/SAIL which is required urgently

All the activities of mine are confined to the lease hold area, and management of minimum possible emissions are allowed to enter the environment. Thus, the environment will not be adversely affected in any way.

The development of plantation, green belt and wetland of old mine pits containing water will help to increase the biodiversity of plants and birds in the area

The environmental study indicates that the mechanization of all activities in of mine would be greatly helpful in reducing environmental pollution of air, noise, water and soil

Apart from this, the environmental management plan has delineated many measures to reduce pollution by ore crushing and operations

Rain water harvesting, recycling of water, passive enclosures / dust suppression method for dust generating machines, development of

green belt / plantation around the dolomite plant areas, water pits to reduce silts in runoff water

The CSR policy of BSP-SAIL would further bring out the development of the surrounding villages and the area and Quality of Life of local people will be improved

The annual cost of environmental control and monitoring measures are computed to Rs. 3160 lakhs.