



BHILAI STEELPLANT

(STEEL AUTHORITY OF INDIA)
Bhilai - 491001.

EXECUTIVE SUMMARY

**Environmental Impact Assessment and
Environmental Management Plan for the proposed
Kalwar - Nagur Iron Ore Mine (ML Area 938.059 Ha.)
for the production capacity of 1 MTPA of
Bhilai Steel Plant at Kalwar and Nagur villages,
Bhanupratappur taluk, Kanker district,
Chhattisgarh state**

Schedule 1 (a) – Mining of Minerals
QCI / NABET Accreditation Sl.No.2

Prepared by



As ISO : 9001, ISO : 14001 & OHSAS : 18001 Certified company



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EXECUTIVE SUMMARY

1.1 Preamble

Steel Authority of India Limited (SAIL) is the leading steel-making company in India. It is a fully integrated iron and steel maker, producing both basic and special steels for domestic construction, engineering, power, railway, automotive and defense industries and for sale in export markets. The company is ranked amongst the top ten public sector companies in India in terms of turnover, SAIL manufactures and sells a broad range of steel products, including hot and cold rolled sheets and coils, galvanized sheets, electrical sheets, structural's, railway products, plates, bars and rods, stainless steel and other alloy steels. Bhilai Steel Plant (BSP) is India's sole producer of rails and heavy steel plates and major producer of structural has won Prime Minister's Trophy for best Integrated Steel Plant in the country for Eleven –times. The growth of mining / industry significantly contributes towards economic progress of the country. However, any project progress brings along with it a number of environmental problems. Many of these problems can be avoided, if adequate environmental control considerations are thought of during conceptual stage of the project. In accordance with Mission and Objectives of M/s. Steel Authority of India Limited and National Steel Policy, SAIL proposes to develop Kalwar and Nagur villages with a rated production capacity of 1.0 Million Tonne per annum. The Mining lease area under is 938.059 Ha.

1.2 Project Details

Location

BSP proposes to develop Kalwar - Nagur Iron Ore Project, at Kalwar and Nagur villages, Bhanuprathappur taluk, Kanker district, Chhattisgarh state. The deposit is located in the Nos. 64 D/15 and 64 H/3 between longitude 80° 56' 44"^M to 81° 00' 48" E and between latitude 20° 25' 00" to 20° 27' 31" N. The

Kalwar-Nagur lease area is well connected by road lying at a distance of 111 kms. South-West of Bhilai Steel Plant. The Iron ore produced from this mine shall be transported by road to Dalli-Rajhara Iron ore Complex located at a distance of 23km.

Proposed Method of Mining

The mining lease area is 938.059 Hect. However the mining and allied activities are permitted by forest Deptt. With-in a block of 17 Hect. area located at the N E part of the lease area. The highest RL of the block area is 720 mRL and that of lowest is 630. The mine will be worked by conventional mechanized method with shovel tipper/dumper combination, with deep hole drilling. In order to reduce the oversize boulders generated during the primary blasting, secondary blasting will be practiced Jack hammer drills of 27 mm dia. will be deployed for this process. The blasting will be done by slurry explosives. The blasted mass will be done by 2.5-3.0 m³ bucket capacity shovel and will be transported directly to Crusher & Screening plant at Dalli/Rajhara. No reject sub-grade ore will be generated at the mine as the entire ROM ore will be sent to the Dalli/Rajhara plant. The overburden will also be loaded by 2.5-3.0 m³ bucket capacity shovel in to the 25-30 T tippers and will be stacked at the non-mineralized ground earmarked for waste dump at the northern part of the mining block.

Manpower requirement

The requirement of manpower at the rated capacity of 1.0 Mt of ore has been estimated as 38 numbers.

1.3 Description of Environment

Meteorology

Predominant wind was from South-west quadrant. Wind velocity was ranging from <1.0 to 28.5 Kmph. Temperature values were ranging from 18.5 °C to 44.0°C. The mean relative humidity value was found to be ranging from

30.0 – 64.0 %. Sky was clear during the study period. A total rainfall of 44 cm was recorded during the study period.

Air Environment

Pre Monsoon (March – May 2014)

Core-zone: PM₁₀ and PM_{2.5} values were ranging between 40 and 86 µg/m³ and 22 and 42 µg/m³ respectively. The SO₂ and NO_x values were ranging between 8.5 and 12.8 µg/m³ and 11.4 and 21.8 µg/m³ respectively.

Bufferzone : PM₁₀ and PM_{2.5} values were ranging between 38 and 83 µg/m³ and 18 and 40 µg/m³ respectively. The SO₂ and NO_x values were ranging between 6.5 and 16.8 µg/m³ and 8.2 and 18.5 µg/m³ respectively.

All CO & heavy metals values <114.5 µg/m³ were found to be below the detectable limit. Based on the above discussions, it may be concluded that air quality of the area is less susceptible with respect to seasonal variations.

Noise Levels

Core Zone: The Day and night time Leq Noise levels were ranging from 50.8 dB(A) to 52.9 dB(A) and 40.7 dB(A) to 40.8 dB(A) respectively.

Buffer Zone: The Day and night time Leq Noise levels were ranging from 48.2 dB(A) to 51.2 dB(A) and 36.6 dB(A) to 38.8 dB(A) respectively.

The Noise level values were found to be well within the CPCB limit prescribed by CPCB.

Water Environment

Ground water: While comparing with IS: 10500 – 1991 norms, all values except total coliforms were found to be well within the limits.

Surface Water: Low BOD/COD values and good D.O. content at these locations indicate that the natural restoration of water quality is maintained. While comparing with IS 2296 all values were found to be well within the norms for Surface water quality.

Hydrogeology

The Hydrogeology study reveals that the pre-monsoon water levels vary from 3.20 m to 9.45 m with an average of 5.73m and the post-monsoon water levels vary from 1.15 m to 4.50 m with an average of 3.09 m. The average water fluctuation in the area was found to be 2.62 m. As per, CGWA norms, the trends reveal that the groundwater exploitation in the study area is well within the acceptable limits.

Land-use Pattern

Remote sensing satellite Imageries were collected and interpreted for the 10 Km radius study area with project site as center. Based on the satellite data land -use / land cover maps have been prepared delineated in chapter III of EIA/EMP report .

Flora & Fauna

The environment has not supported foreign visitor birds since the entire zone (core and buffer) is devoid of large water bodies. There are no ecologically sensitive/fragile areas such as Wild life Sanctuaries, National Parks, and adjoining National Monuments, areas of cultural heritage, ecologically fragile areas, areas rich in biological diversity, gene pool, etc located on the proposed stretch. There are no known rare, endangered or ecologically significant animal and plant species. Except for a few wild species of plants and grasses and a few animals that are very commonly spotted in any rural environment, the study area does not have any endangered or endemic species of animals and plants.

Socio economic

As per 2001 census, the study area consisted of 14695 persons inhabited in 31 villages. The configuration of male and females indicates that the males constitute to about 49.23 % and females to about 50.77% of the study area population. The study area at an average has 1031 females per 1000 males. Majority of the people in the study area belong to Hindu religion. The study area also contains Scheduled Castes (SC) and Scheduled Tribes (ST).

1.4 Anticipated Environmental Impacts and Mitigation Measures

Impact on Land use

The topography within the mining area will have marked changes in the quarry area, the dump area and the mining equipment area. No appreciable change in the topography is anticipated outside mining area. Total scenario of landscape and land use pattern will undergo a stark change within the mining area. There will be a stark change in surface drainage and new pattern drainage will be developed within the mining area.

Impact on Air Quality

The maximum predicted concentration was found during Pre monsoon season in Core zone

Post project Scenario ($\mu\text{g}/\text{m}^3$)

Air Environment in Core zone - Post project Scenario ($\mu\text{g}/\text{m}^3$) 24 hourly concentrations	Suspended Particulate matter(PM10) (max)
Baseline Scenario(max)	86
Predicted Ground level Concentration(max)	11.2
Resultant concentrations	97.2
NAAQ standards	100

It is cleared from the predicted values that the concentrations of PM 10 are below the limits of NAAQS (for mines and residential & rural area).

Impact on Noise Level

Once the mine becomes operational, there would be various sources of noise in the area. These sources would be Drilling, Blasting, Operation of HEMM, Crusher and Workshop, Vehicular Movement and Belt Conveyor. Mining operations and the ore crusher would be the main sources of noise pollution. Noise due to vehicular movement will be intermittent, but will also add to the background noise level. It is being observed that at the mine site where heavy

earth moving machinery is in operation, noise level is more than the stipulated 90 dB (A) per DGMS Circular, No 18 (Tech) of 1975. The noise level is within the tolerance limit at a distance of 15 to 20 m or so. The sound pressure level generated by a noise source decreases with increasing distance from the source due to wave divergence.

Socio economical impacts and infrastructural developments

In terms of the major socio-economic impacts, the project will provide more direct and indirect job opportunities and better economic standards to the people and others, through improved infrastructural, community facilities etc. Development of residential colony, creation of civic and welfare amenities like primary health care, communications, educational institutes, recreational facilities, etc, that will develop along with the project will ensure better quality of life for the local population. The increase in income opportunities and -employment potentialities in this sector is anticipated as the mining activities increase, the other economic sectors starts gaining in momentum. With added educational, medical and communication facilities developed in the areas, the standard of living has improved. With ongoing of mining activities additional facilities for local population by way of better communication, postal services, educational facilities, advanced medical services etc. are on in the area. There is a marked change in social status of the area with opening of the project. State Government is benefited through financial revenues in crores of rupees by way of royalty, sales tax etc. from the -direct and indirect operations in the project area. Central exchequer is also getting financial revenues by way of Income tax, Central Sales Tax etc.

Impact on flora and fauna

There will be positive impact on flora and fauna due to the proposed plantation activities and the conservation plan proposed for the forest and wild life. The negative impacts are mainly due to Mining activities such as excavation for quarry, erection & development of plants, service & allied structures, colony,

roads, drains, culverts, etc. These activities will guide to forest degradation, lost of vegetation cover and ecological changes.

Mitigative measures

Secondary Employment opportunities

There will be spontaneous economic stimulus in the area with the commencement of opencast mine. Traders and private enterprises will grow in the area with this economic growth. Besides, the State exchequer will derive financial revenues through levy of royalty, sales tax etc. and Central Government will also be benefited by way of Central Sales Tax, Income Tax, Cess's etc.

Medical Facilities

The project authorities have adopted following measures to prevent occupational diseases and health hazards.

- Pre-employment, pre-placement and periodic medical examination of employees.
- Regular monitoring of working environment and implementation of safety and control measures, to prevent hazards.
- Use of protective equipments, clothing, helmets, Gas mask, shoes, etc.
- Periodical medical examination-of every worker is done once in five years to detect preventable and curable diseases at an early stage.
- Cases suspected having Pneumoconiosis is examined by a Special Board constituted by the Chief Medical Officer. Established cases are suitably compensated and their job is changed if required.

Literacy Drive

An action plan for achieving 100% literacy among workers to be implemented by establishing Educational Institutions / adoption with modern facilities.

Planning of OB dumps

The waste will be in the form of overburden and it will, be of laterite cupping, BHQ Shale etc. The waste generation during the next three years period will be 2, 50,000 tonnes. This waste will be dumped in the northern part of the mining block. Geologically it appears that this area of dumping is shale bearing area. However B/H R-I is proposed to be drilled for confirming the area barren for dumping.

Control measures for air pollution

Following air pollution control measures are being done and will be practiced within the mining area and at ore handling plants.

- Saplings planted on OB dump, road side and colony to arrest dust.
- Mobile water sprinklers deployed in mine.
- Stationary sprinkler installed in the mine haul road from mine entry.
- Overloading of trucks is strictly prohibited.
- Ore transportation through covered trucks
- Optimum blast hole geometry will be followed to reduce the dust during blasting.
- Regular monitoring of ambient air quality of the project area & its surroundings villages

Management of surface water drainage

Garland drains will be made around the periphery of the quarry. These garland drains will be connected to the local nalla which is not likely to be disturbed by mining operation. In the workings, heavy duty pumps will be deployed in rainy season which will throw the accumulated water from the working face into these garland drains. As the extraction of the quarry advances, the position of garland drain will also advance. Thus these garland drains will drain of the rain water away from the workings.

Control measures for Noise

- Innovative approaches of using improvised plant and machinery designs, with in-built mechanism to reduce sound emissions like improved silencers, mufflers and closed noise generating parts
- procurement of drill, loaders and dumpers and other equipment with noise proof system in operator's cabin
- confining the equipment with heavy noise emissions in soundproof cabins, so that noise is not transmitted to other areas
- blasting operations to be carried out only during daytime so as to avoid high noise intensity in night time
- thick green belt should be provided at the mine periphery

Blasting Vibration Control Plan

- Peak particle velocity or ground vibrations for safety of nearby structures and residential buildings should be well within 12.5 mm/sec
- to contain fly rocks, stemming column should not be less than the burden of the hole, and the blasting area should be muffled
- short delay detonators should preferably be used in blasting rounds rather than detonating fuse as trunk line
- detonating fuse, if used, should be covered at least with 150 mm thick cover of sand or drill cuttings
- blasting should be carried out in the daytime, as during the night time the sound intensity becomes higher

- blasting should not be carried out when strong winds are blowing towards the inhabited areas
- Each blast should be carefully planned, checked, and executed under the supervision of a responsible officer. Blasting data / observations should be recorded
- Bruggs mesh shall be provided as and when required for arresting any fly rocks and boulders from mining operation

Green Belt Development

Green Belt around Mine

In the directions where natural forest does not exist, there is need for creating green belt of adequate width as an effective dust and sight curtain in the periphery of mining area. A green belt of adequate width on either side of the haul road will be raised and the existing vegetation will be protected.

Mine closure plan

The extent of impacts due to mine closure and mitigation measures to prevent or minimize them are classified under the following heads Viz Environmental Aspects, Technical Aspects, Social Aspects and ,Safety Aspects which is explained in Chapter IV.

1.5 Environmental Monitoring Program

The Environment Management Department (EMD) of BSP will be entrusted with this responsibility. The officers of EMD will assess the progress and analyze the data periodically.

1.6 Risk Assessment

Risk assessment were carried out by considering the following aspects

- To identify the potential hazardous areas so that necessary design safety measures can be adopted to minimize the probability of accidental events.

- To identify the potential areas of environmental disaster which can be prevented by proper design of the installations and its controlled operation.
- To manage the emergency situation or a disastrous event, if any, from the plant operation.

1.7 Project benefits

There will be infrastructure development in the near by village which are as follows.

- Construction of Pond/Deepening of existing pond.
- Construction of School Building
- Construction of Bore Wells for drinking water supply
- Construction of Dispensary Building/Panchayat Bhawan
- Construction of Children Park.
- Construction of Road, culverts and drains

The requirement of manpower at the rated capacity of ore has been estimated as 37 numbers and secondary employment opportunities also expected.

1.8 Environmental Management plan

The objectives of the proposed EMP are aimed for meeting five basic requirements

- To integrate comprehensive monitoring and control of impacts.
- To comply with the environment protection regulations.
- To ensure that adverse environmental impacts on the baseline are minimized, and
- To plan for ecologically sustainable development (ESD) within the frame work of existing legislation and environmental management policies.

The detailed EMP is delineated in chapter IX.

1.9 Consultant Credentials

Richardson & Cruddas (1972) Ltd., Chennai

A Govt. of India undertaking under Ministry of Heavy Industries and Public Enterprises, one of the pioneers in the field of Environmental Engineering for the past three decades. R&C Laboratory is recognized as Environmental Laboratory by the Central Pollution Control Board (CPCB), Ministry of Environment & Forests (MoEF) under the Environmental Protection Act, 1986. Laboratory is accredited by **National Accreditation Board for Testing & Calibration Laboratories (NABL)**, New Delhi. Also recognized by various state pollution control Boards like TNPCB and KSPCB. The laboratory having **ISO :9001.2008, ISO 14001:2004 and OSHAS 18001:2007** certification.

ABC Techno Labs India Private Limited

ABC Techno Labs India Private Limited (Formerly ABC Environ Solutions Pvt. Ltd) has been involved in the development and execution of Environmental Impact Assessment, Environmental related studies and environmental testing services. We have worked on Environmental Health and Safety (EHS) studies for both private and public institutions, at the national level and are particularly strong with large infrastructure and industrial projects.

Accredited by **National Accreditation Board for Education and Training (NABET)**, a division of **Quality Council of India (QCI)** and it has recognized our organization as an Environment Consultant Organization to carryout Environmental Impact Assessment Study and environmental Management Plan based on the resources available with our organization including technical expertise of consultant, resource persons, their educational background, as well as experience and expertise.