

EXECUTIVE SUMMARY
OF
DRAFT
**ENVIRONMENTAL IMPACT ASSESSMENT/
ENVIRONMENT MANAGEMENT PLAN**

(As per para 2.2 APPENDIX IV, of S.O.1533(E) dated 14 September 2006)

OF
PAHADI IRON ORE MINE
Village: Pahadi, Tahsil: Katni , District: Katni, Madhya Pradesh
Mining Lease Area: 11.56 Ha
Production Capacity: 24,000 TPA of Iron Ore

Submitted To
MADHYA PRADESH POLLUTION CONTROL BOARD
(MPPCB)
for
Undertaking Public Hearing

Project Proponent
M/s. Ma Kali Iron & Steel Company Pvt. Ltd.
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EIA Consultant



SRUSHTI SEVA PRIVATE LIMITED
NAGPUR

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1.0 INTRODUCTION

M\S Ma Kali Iron & Steel Company Pvt Ltd Company belongs to a family who has vast experience in coal mining prior to nationalization of coal mining. Thus company is very well acquainted to open pit mining, mineral processing and significance of value addition.

In order to cater the need for Iron ore, the company applied for the Mining Lease in Pahadi Iron Ore Deposit at Village Pahadi, Tahsil Katni, District Katni, Madhya Pradesh. The applied ML area is 11.56 Ha and proposed production of Iron ore of 24000 TPA shall be carried out by manual opencast method of mining. As per the provisions in vogue it is mandatory to obtain Environmental Clearance from Ministry of Environment, Forests and Climate Change, New Delhi, prior to achieve proposed production in the present case by M/s. Ma Kali Iron & Steel Company Pvt. Ltd.

The mineral Iron ore produced from the mine will be used in the proposed mini steel plant of the area. Out of total lease area of 11.56 Ha, 1.07 Ha area is covered under Government Reserved Forest Land (G.R.F.L.) and 10.49 Ha is a part of Reserved Forest Range & Madhya Pradesh Division Katni.

The Stage-I Forest Clearance for the proposed Mining Lease Area has been granted vide Letter no. F-1/416/06/10-11/1125 dated 03/05/2014.

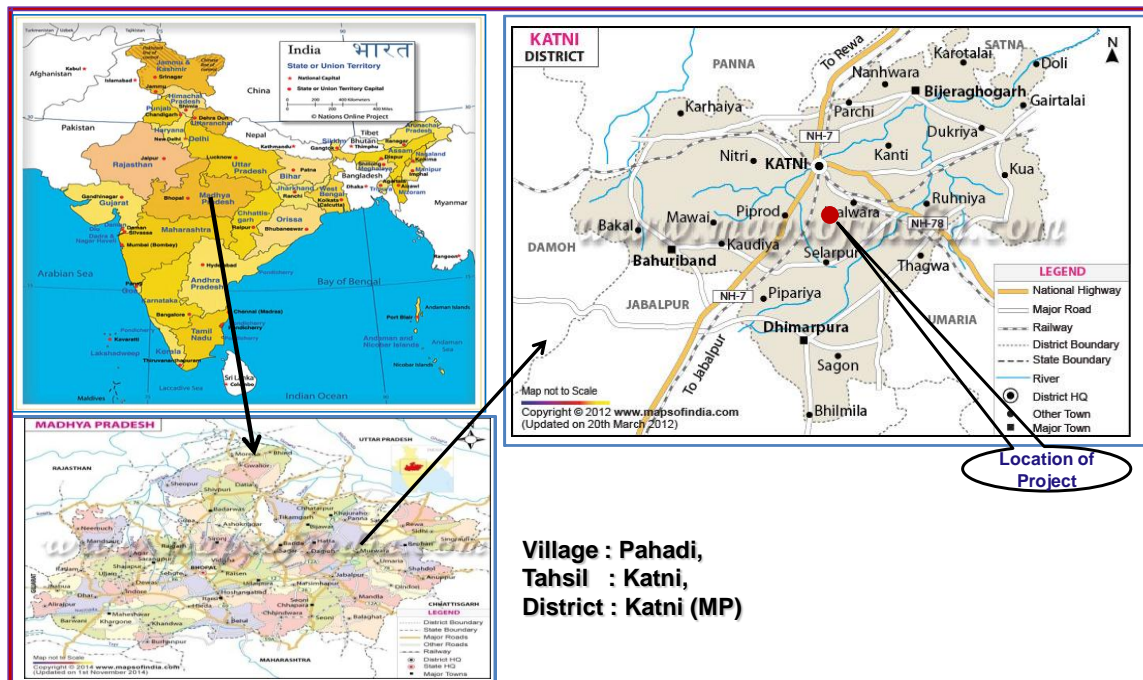
The project was appraised by State Level Expert Appraisal Committee, SEIAA, Madhya Pradesh during its 217th meeting held on 23.08.2015 and for determining Terms of Reference (TOR) for undertaking EIA study. SEIAA, Madhya Pradesh categorized this project in B 1 category as per the provisions of EIA Notification 2006. The committee has prescribed TOR during 23.08.2015.

2.0 PROJECT DETAILS

Location Details: The location of proposed Iron Ore Deposit along with roads and major towns of area is given below. The applied M.L. area over 11.56 hectares is covered within the Survey of India Toposheet No. 64 A/5 and 64 A/6 on a scale of 1:50,000 and is bounded by the latitude $23^{\circ} 42' 27''$ to $23^{\circ} 43' 00''$ N and longitude $80^{\circ} 23' 19''$ to $80^{\circ} 23' 58''$ E.

Accessibility: The area is approachable by Jabalpur-Katni road which is about 12 km away from Niwar Tigada phata. The distance between this phata and Pahadi village is approximately 7.0 km. Thus the total distance from Katni to Pahadi is about 19 km. The nearest railway station from the project site is at village Niwar which is about 2.0 km.

Geological formations & Ore Reserves: The regional geology of the area constitutes the Iron and Manganese ore which occur in the lower part of the Lora Group of Bijawar (Mahakaushal). The rocks consisting of Micaceous hematite variety



intercalated with bands of shale or phyllite. The succession in Jabalpur consists of phyllites mica-schists, calcitic and dolomitic marbles, banded ferruginous

quartzite/jasper with which Iron and manganese ores are associated. The whole assemblage has a remarkable similarity to the Iron ore series of the Gangpur series of Chota Nagpur.

The *in situ* proved reserves are estimated to be 0.54 million tonnes. The mineable reserves are comes to 0.36 million tones. As described in geological chapter, the investigation in the area proves the existence of sizeable reserves of Iron ore, suitable for its use in industrial sector. Iron ore comprises of massive compact nature with very little laterite/soil capping over the ore body. The geological parameters, topography etc., gives an opportunity to choose the low cost opencast mining for winning of Iron ore from this mine.

Topography: The lease area forms part of a hill, stretching East-West. It is located in the Southern slope of the hill. The highest elevation of the lease area is 412 m. in North-East part and lowest elevation of the area is 390 m.

Mine Drainage: The lease area forms part of a hill, stretching East-West. It is located in the Southern slope of the hill. Hence, there will not be any problem regarding drainage of rain water, which will be allowed to flow through the natural course of drainage of the area. The drainage system of the area will not be disturbed.

Surface water: There is no stream/nala passing through Mining Lease Area. The drainage of the area is controlled by physiographic settings. Various streams of first and second order which follows the natural gradient forming dendritic pattern can be observed within the study area. The drainage of the area is mainly is controlled by the Katni River. There are first order and second order streams flowing along with the slope in 2-3 km radius from ML area which finally drains to Niwar River flowing SE-NW direction . Niwar River flows at 2.8 km in west direction and Sumrar tank is at 1.7 km in East direction of ML area. There is canal located at a distance of 2.5 km in SW direction.

Ground water: From the hydrological conditions prevailing in the surrounding area the water level in the proposed area is about 7-10 m. Mining is expected up to 380m MRL, which will be 20 m. above water table by the end of Mining Plan period. Generally the parent rocks phyllite and quartz mica schist are not good aquifer hence the seepage of underground water in the mining pit will be less.

Arrangement for Dewatering : Water requirement for dust suppression, plantation and vehicle washing will be met from rainwater collected in mining pit.

Employment Potential: Around 32 persons will be required for this Project when it become fully operational. It is proposed to deploy local manpower meeting the eligibility criteria required for the job under consideration.

Landuse

Existing Land Use: As per the administrative records the Landuse of the Mine is as under.

Existing Land Use

Khasra No.	Area (Ha.)	Ownership & Land use
716/2 kha,3 kkh,4kha,5kha,6,7,8,9, 716/2 Gh	1.07	Government Forest Revenue Land
716/2th,3gh,4ga,6ga, 6ka, 7ka,8ka,9ka	10.49	Reserved Forest Range & Madhya Pradesh Division Katni
Total	11.56	

Proposed Land use: Land use plan of the mining lease area during pre-operational, operational & post-operational is shown at table given below.

Stage Wise Proposed Land Use

S. No.	Heads	Present Ha	At the end of 5yrs Ha	At the end of conceptual period Ha
1	Area under pits	0.09	1.22	3.38
2	Area under dumps	Nil	3.38	1.13
3	Area under road	0.04	0.08	0.07
4	Area under buildings etc.	Nil	0.015	-
5	Area under storage	Nil	0.16	-
6	Area under plantation	Nil	0.11	0.33
7	Undisturbed area	1.01	6.67	6.62
	TOTAL	11.56	11.56	11.56

Source: Mining Plan with Progressive Mine Closure Plan

Mining Method: The mining will be carried out by manual opencast method. During the process of mining the overburden/soil/rejects will be stored properly to the dumping site within lease area or on land purchased outside lease if required. The drilling and blasting will be carried out for mining of in-situ Iron ore bed. The blasted Iron ore will be sized manually. The sized Iron ore will be stacked properly. To avoid flying of rocks muffled /controlled blasting will be adopted. The blast holes will be drilled in single or multi rows depending on the geometry of the section taken up for blasting. The explosive will not be stored in the ML area. The Iron ore produced will not be subjected to beneficiation, except for manual dressing and sizing of the ore.

Waste Generation and Management: The generation of waste during conceptual period is estimated to be 10, 18,664 m³. The area required for dumping for first 5 years will be about 10920 Sq.m. with a height of about 8 m where as the total area for dumping for conceptual working is about 11340 Sq.m. with a maximum height of 10m. These dumps will be accommodated in South East lease boundary and on non mineralized area. Reclamation of the inactive dumps will be carried out as per

Mining Plan. Biological reclamation method will be adopted once the dump becomes inactive. Plantation of local grasses, shrubs and trees will be undertaken on these inactive dumps. The dumps will be properly dressed and shall be provided garland drain around the periphery in order to arrest wash off from the dumps.

The mining details are given in the following table.

Mining Details

Sr. No.	Particulars	Details
1	Method of Mining	Opencast manual
2	Production capacity per year	24,000 TPA Iron Ore
3	Total Mineable Reserves & Resources	0.36 Million Tonnes
4	Life of Mine	16 years
5	No. of Benches	2/3
6	Bench Height and width	3 m Height & 6 m width
7	Elevation Range	390 m - 414 m above MSL
8	Ground Water Table	2.0 m bgl during monsoon season 10.0 m bgl during pre-monsoon season
9	Ultimate Working Depth	20 m i.e. up to 380 mRL
10	Overall Pit Slope	45°
11	Stripping ratio	1: 1.22 (Max.)
12	Number of Working Days	300 days with one shift only
13	Total waste during plan years	Overburden : 62,655 Tonnes Mineral Reject : 2,009 Tonnes
14	Total waste generation at the end of life of mine(Conceptual Period)	Overburden : 9,62,655 Tonnes Mineral Rejects : 56,009 Tonnes

Source: Mining Plan with Progressive Mine Closure Plan

3.0 BASELINE ENVIRONMENTAL STATUS

The total project area (11.56 Ha) of the Pahadi Iron Ore Mine is considered as Core Zone while the 10 Km surrounding area of core zone is considered as Buffer Zone. Baseline environmental data was collected for all the components of environment

like meteorology, air, water, noise, soil, geology, hydrogeology, flora-fauna, demographic and socio-economics, industries, places of archeological and historical importance etc. Standard guidelines prescribed by Ministry of Environment & Forests & Climate Change and Central Pollution Control Board were used for this study. The EIA report incorporates the baseline data generated through primary surveys for three months during 1st October 2015 to 29th December 2015 representing post monsoon season.

Landuse of the Buffer Zone: As per census the total area estimated within 10 km radius of buffer zone (study area) around mine was 31400 Ha. The study area of the buffer zone mainly comprises of agricultural land with 61.07 % .In the southwest and west portion forest land which makes up to 17.05%. The waste land comprises of 15.39 %. The area covered under water body and river is 1.18% & 0.70 % respectively. Thus other classes occupy only 4.43 % of the area.

Water Quality: Total four surface & four ground water sampling stations were monitored in the study area. The analysis indicates that almost all parameters are within the prescribed limit.

Air Quality: The monitoring was carried out for 13 continuous weeks beginning from October 2015 to December 2015, as per norms stipulated by the Central Pollution Control Board. To assess the baseline ambient quality nine air quality monitoring location were selected on the basis of wind direction and other meteorological parameters in core and buffer zone area and also as per the conditions prescribed by SEAC, while presenting TOR.

Air Quality: The PM₁₀ PM_{2.5}, SO₂, NO_x values for all nine stations were below.

- **Particulate Matter PM₁₀:** The 24 hourly maximum concentration of PM₁₀ reported during the survey ranged from 44.9 to 52.7µg/m³. This is lower than the NAAQ permissible level of 100 ug/m³.
- **Particulate Matter 2.5 (PM_{2.5}):** The 24 hourly maximum concentration of PM_{2.5} reported during the survey ranged from 24.2 µg/m³ to 31.4 µ/m³. This is lower than than the NAAQ permissible level of 60 µg/m³.

- **SO₂**: The 24 hourly maximum concentration of SO₂ reported during the survey ranged from 9.4 to 13.2 µg/m³. This is lower than the NAAQ permissible level of 80 µg/m³.
- **NO_x**: The 24 hourly maximum concentration of NO_x reported during the survey ranged from 13.7 to 22.7 µg/m³. This is lower than the NAAQ permissible level of 80 µg/m³.

Noise Levels: Ambient noise levels were measured at 9 locations around the project site. Noise levels varies from 31.6 to 48.3 Leq dB(A) during day time and during night time noise levels ranges from 33.4 to 41.3 Leq dB(A). These are well within prescribed limit for residential areas as prescribed by the CPCB.

Soil Quality: Soil samples were collected at 4 selected locations in the study area to assess the existing soil conditions around the mine. Overall soils are moderately suitable for cultivation of arable crops and have moderate fertility.

Biological Environment: The core and buffer zones include the village settlements with their cultivated fields, forest areas as well as vast areas reduced to wasteland. The detailed inventory of floral and faunal assemblage of the core and buffer zone has been prepared. The details of flora and fauna are provided in EIA/EMP. There are no ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the buffer zone.

In 10 Km Study Area, , there are 3 Reserved Forests, and some patches of Reserved Open Mixed Jungle lakhapateri RF (~5.0 km in west direction), Bijhota RF (~ 10.7 km in South East direction), Jalsur RF (~ 8.0 km in west direction).

Human Settlement and Demography: The area selected for the study constitutes 13 inhabited villages. The population is distributed among 3751 households in the study area. The inhabited villages have a population of 17053 comprising of 8609 males and 8444 females. The number of females per 1000 males is 981. The overall literacy in the villages of the study area has 54.64 %.

Risk Assessment & Disaster Management Plan: In any mining project, work safety is taken care of as per provisions in the Mines Act, Rules framed there under. Inundation, fly rocks during blasting operations, risks associated with handling and use of explosives, during operations of equipment and movement of vehicles has been dealt. The risk management plan as per the directives of competent authorities will be Implemented strictly.

Environmental Impact Assessment: For the purpose of development and economic up-liftment of people, there is need for an establishment of mining industries but it should be environmental friendly. Therefore, it is essential to assess the impacts of mining on different environmental parameters such as change of land use, flora and fauna of the area, surface drainage, and change in air, water and soil quality and socio-economic environment before starting the mining operations, so that abatement measures could be planned in advance for eco-friendly mining in the area. Accordingly, Environmental Impact Assessment due to the proposed mining activities on each component of the environment and described in the Draft EIA report.

4.0 ENVIRONMENT MANGEMENT PLAN

Air Pollution Management :

- a) Haulage roads will be frequently sprinkled with water for which truck mounted water tankers with sprinkler arrangement have been provided.
- b) Ore will be covered by tarpaulins to prevent spread of dust from it during transportation.
- c) Regular maintenance of vehicles and machineries will be carried out in order to control emissions.
- d) The dust respirators will be provided to all the workers in dusty atmosphere
- e) Good house keeping and proper maintenance will be practiced which will help in controlling the pollution.
- f) Drilling machines shall be equipped with water injection or dust extraction system to prevent dust from getting air borne.

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- g) Controlled blasting shall be carried out in most scientific manner by use of non electric ignition system, use of millisecond delay detonators and optimizing the blasting parameters to control & prevent the dust to get air borne and to control the fly rock.
- h) Green Belt / Plantation are shall be carried out around the pit boundary , along the roads, office, workshop, etc.

Water Pollution Management: The mining project will require continuous supply of water for various purposes during mining, vegetation etc. apart from drinking water supply. The main source of water pollution in opencast mining is the surface run-off due to rainfall. There will not be any mine discharge during dry weather seasons. There may be small quantity of mine discharge during monsoon season, which contains fine silt. This will be treated in settling tanks followed by desilting tanks and the treated water (overflow) will be let into the natural nallahs during monsoon. While it will be stored and used for dust suppression and plantation during non monsoon season.

- ❖ Garland Drains shall be provided around the pit to prevent the entry of rainwater into the mining pit.
- ❖ Garland drain/ filtration bund shall be provided around dumps to retain the rain water percolating from waste dumps.
- ❖ Septic tanks and soak pits shall be provided for disposal of domestic waste water.
- ❖ Rainwater falling in the catchments area of mining pit shall be collected in sump of mines.

Rainwater Harvesting: Check dams with settling ponds will be provided to arrest the silt & suspended solids from surface run-offs along the nallahs at selected sites.

Noise & Vibration Management

- Control Blasting shall be carried out to minimize vibration.
- PPEs like earmuffs/earplugs shall be provided to all operators and employees working near the machinery.

- At the boundary of mining lease green belt of local trees will be planted which will act as acoustic barriers. Planting of bushy trees of rich canopy in and around the mine area to intercept noise transmission. A 7.5 m wide belt of trees of different heights will be useful to act as noise attenuator in the mining areas.
- Delay detonators millisecond delay interval will be used. For keeping the vibrations minimum.

Land Reclamation Measures: The mining will be done by slicing method the slope and removing all the ore available thus forming bench of 3 m height and similarly continue in subsequent lower horizons. The possibility of persistence of ore will be assessed during exploration programme and accordingly the reclamation will be decided. However the float area, after removal of float in first year will be back filled subsequently with waste/rejects material of subsequent year. The same will be reclaimed by plantation.

Plantation: It is proposed to select the local tree species with the help of forest department having 3 tier arrangements for implementation all along the mining lease in order to control dispersion of fugitive dust from the mining lease. About 4.0 ha area will be covered under greenbelt and plantation. Around 10000 trees (@ 2500 trees per ha) will be planted till the end of life of mine at different locations i.e. safety zone, around the quarry edge, along the roads, office, workshop etc. Plantation shall be carried out at a density of 2.0m x 2.0m (2500 plants/ha). Number of saplings and species proposed to be planted in next 5 years and at conceptual period are given in the following table.

Proposed Plantation Programme

Year	Total Area to be covered	No of trees to be
1.	0.4	1000
2.	0.4	1000
3.	0.4	1000
4.	0.4	1000
5.	0.4	1000
Total	2.0	5000
Conceptual period	4.0	10000

Proposed Social Responsibility Measures: A systematic approach for the implementation of the peripheral area development in selected villages in the buffer zone starting from the nearest village will drawn up with the help of local community based organization & in consultation with the villagers. Assistance in the field of health and sanitation, environment conservation, water conservation, literacy, self help groups, development of infrastructure. The project proponents are envisaging undertaking the following socio-economic measures.

- **Health Care:** These include family planning ,medical camps and aid to the existing and proposed hospitals. Awareness camps for hygienic habits and its importance in avoiding water and air borne diseases. Reproductive Child Health programmes, awareness programme on family planning, nutrition improvement with the help of medical practitioner will be arranged on regular basis.
- **Educational Facilities:** These include financial assistance for higher studies, sponsorship to vocational / professional training institution, computer education camps, vocation training for students and aid to existing/ proposed schools and colleges.
- **Civic Amenities:** These include support to community toilets, drinking water facilities, repairing of school buildings, Gram panchayat building and sanitation, etc.
- **Employment:** It is proposed to employ the local population wherever possible in the proposed project activities.

- Local grass species for village waste land will be promoted as controlled grazing grounds.
- Encouragement to the students from the village studying in higher studies. Free distribution of school books, uniform, raincoats, bags and stationary. Provision of scholarship for the needy children.
- Skill up gradation for unemployed youth will be arranged.
- Participation in Cultural activity, sports etc will also be made.
- Provision for street solar lamps at selected places in nearby village.

Occupational health:

- All the mine workers will be sent to Hospital which have the facilities for chest X-ray, pulmonary function test & audiometry, TB, Malaria, HIV etc. once in 5 year.
- A safety committee will be constituted to implement the proposed OSHA management plan and environment management programme and take proper mitigative measures as per EIA/EMP.
- Services of Occupational Health Specialist will be arranged regularly.
- The proponent will bear all the expenditure related to health check up and treatment of the mine workers.
- Individual health record of every worker will be maintained till the end of service or the end of mining operations.

Villages within the buffer zone will be benefited by direct and indirect employment opportunities created by the mining activities. A budgetary provision of Rs 13 lakhs as capital investment and recurring expenditure of Rs 7 lakhs/annum is made in the environment management plan.

The mitigation measures suggested above shall be implemented so as to reduce the impact on environment due to operations of proposed mining activities. In order to facilitate easy implementation, mitigation measures are phased as per the priority implementation. The monitoring of the pollution to know the effectiveness of the applied control measures will be carried out at regular interval.

5.0 AN EPILOGUE

In compliance with the environmental procedure the environmental clearance application is made. Necessary scientific studies have been undertaken as per the guidelines set by the Ministry of Environment and Forests (MoEF). The suggestions/recommendations of all the experts, competent authorities, and government officials are being sought for the impacts of the proposed project. Views and guidance of the local residents, community based organizations, social organizations are extremely important in order to devise a full proof Environment Management Plan for the proposed mining project and also mitigate the damages caused due to the project. Allocation of necessary funds, manpower and machinery will be made to for the protection and conservation of all the components of environment. It is ensured that all mandatory clearances will be sought from respective competent authorities before operating the proposed Pahadi Iron Ore Mine (11.56 Ha).

We at M/s. Ma Kali Iron & Steel Company Pvt. Ltd. are committed to implement the suggestions for the improvement of the environment and assure that every attempt will be made for the conservation and protection of the environment to the maximum extent. It is requested to support this project by providing your consent.