

EXECUTIVE SUMMARY (ENGLISH)

FOR

GUMGAON, KHODEGAON & TEGAI MANGANESE MINE

LOCATION: - NEAR VILLAGE(s) – GUMGAON, KHODEGAON AND TEGAI, TEHSIL – SAONER,
DISTRICT – NAGPUR, (MAHARASHTRA)

Total Production/ ROM: - 1,02,000 TPA of ROM; M.L. Area- 126.84 ha. (No Forest Land);

Lease Validity: - 50 Years from Grant of ML; Project Cost: -100 Crore

Study Period: - March, April & May 2018

Proposal No.: -IA/MH/MIN/67094/2017

ToR Issued vide Letter No.: - J-11015/74/2017-IA-II(M) dated 14.05.2018

FOR

ENVIRONMENTAL CLEARANCE (PUBLIC HEARING)

("A" under category 1(a) of EIA Notification dated 14.09.2006 and its subsequent amendment dated 14.08.2018)



**NABET Approved EIA
Consultant Organization;**
S. No. – 159 of list dated July
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Valid Till 19.04.2020)

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1.1 INTRODUCTION

Executive summary is the brief of report prepared for Environmental Impact Assessment of Gumgaon, Khodegaon and Tegai Manganese ore mine of M/s MOIL Ltd. (A Government of India Enterprise). It is fresh mining project in an area of 126.84 ha. and mining will be done by underground method with targeted production of 1,02,000 TPA (ROM).

1.1.1 Project Identification

The proposed project of manganese ore by underground method in the applied lease area of 126.84 ha., located near village – Gumgaon, Khodegaon and Tegai Tehsil - Saoner, District – Nagpur (Maharashtra).

The LOI was issued for an area of 126.84 Ha.in favour of MOIL Ltd. vide letter no MMN-0216/L. No. 20/Industry-9, Mumbai dated 06.04.2016.

Mining Plan along with PMCP under Rule 16 (1) of MCR 2016 and PMCP under Rule 23B of MCDR 1988 is approved by Regional Controller, Nagpur Region, IBM vide letter no. NGP/MN/MPLN-1174/NGP-2016 dated 03.10.2016. As per EAC suggestion Modified Mining Plan along with PMCP approved vide no. NGP/MN/MPLN-1174/NGP-2016/676 dated 22/24.07.2019. Proposed lease area is Private land (114.21 Ha.) & Revenue land (12.63 Ha).

1.1.2 Identification of Project Proponent

Table 1: Name and address of the Applicant

Applicant	Nominated Owner
M/s MOIL Limited (A Government of India Enterprise) 1A- MOIL Bhawan, Katol Road, Nagpur-440 013 Telephone: 0712-2590775 Fax: 0712-2592073 E-mail: moilind_ngp@sancharnet.in Website: www.moil.nic.m	Mr. Dipankar Shome Designation: Director (Production & Planning) Address: - MOIL Limited, MOIL Bhawan, 1-A, Katol Road Nagpur- 440013 (MS) Tel. No.: 0712-2592272 E-mail: - kishorchandraker66@gmail.com

1.1.3 Location of Project

Table 2: Details of Project Location

Particulars	Detail
Name of the applied mine area	Gumgaon, Khodegaon and Tegai Manganese Ore
Near village	Gumgaon, Khodegaon and Tegai
Tehsil	Saoner
District	Nagpur
State	Maharashtra
Toposheet no.	55 K/15 and 55 O/3

Latitude (N)	27 °54' 29.89" to 27 °53' 35.89" N
Longitude (E)	72 ° 49' 13.16" E to 72 °48' 17.95" E

1.1.4 NEED OF THE PROJECT

Manganese is the prime raw material required for any steel industry. At present company is largest producer of manganese ore in the country with a share of about 45% but still import large quantities of high grade manganese ore. This indicates enough gaps between demand & supply which provides opportunities for MOIL to increase its production.

1.2 PROJECT DESCRIPTION

Description of Applied Lease and Mining Process

Local geology: The manganese ore horizon of Gumgaon deposit belongs to Munsar formation of Sausar group.

Table 3: Available Reserves and Life of Mine

Reserves/Resources in T	11,34,086
Mineable in T	850864
Yearly Av Prod of ROM	102000
Life of Mine	13

Proposed Working - The vertical shaft will be sunk in the first Year after commencement of mine. The depth of the shaft will be 360 m from surface connecting 5 levels from -600' level to -1000' level. Each level will be having a vertical interval of 30 m. After the sinking of vertical shaft reaches the -600' level a haulage road will be developed on both eastern and western side to connect the ventilation shaft on both extreme ends of the lease. The two ventilation shafts will be sunk vertically from surface which is of 1.5 m dia. These ventilation shafts are sunk to maintain proper ventilation in the mine.

The development in the underground will consists of Haulage road, ore drive, x cut and winzes. The haulage road will be developed parallel to the ore drive. The ore drive will be developed along the contact of ore zone running along strike direction. The x cut are developed to connect both haulage road and ore drive. Vertical winzes at regular interval of 60 m will be sunk connect two levels.

Method of Stopping - Manganese orebody in Suasar series is overlying with phyllite, mica schist with weak to poor hangwall and footwall rock contact. Ore body is having varying dip with varying width. It is therefore to control the roof back and both the walls, all the underground mines of MOIL has adopted horizontal cut & fill method of stoping with back filling by hydraulic

sand stowing. Full column cement grouted cable bolts of varying length 12 m to 15 m and roof bolt of 1.5 m is an integral support system.

- An average RMR of hangwall contact is poor – 30-40,
- Ore body highly jointed with RMR 50-60 and foot wall around 40
- Av RMR for stope design is around 50

With this method of HCF maximum mineable manganese ore reserve is being extracted. This method helps for conservation of valuable manganese ore reserve/resources from underground.

Flat Back-Overhand-Cut and Fill Stopping Method

The width of the ore body is approx average 5 to 25 m, mining is executed by slicing the ore from lower to upper level. The slice thickness is not more than 2.5m. This method consists of 6 main operations, which are as follows

Drilling –Drilling with compressed air operated jack hammer drill machines having 800mm x 33mm or 1600mm x 33mm T.C. bit drill steels.

Blasting - Blasting with 25mm small dia explosives. Electric detonators will be used in underground blasting.

Dressing -The face or roof will be stabilized by clearing chunks of loose ore.

Supporting - As per proposed approved SSR, supports will be provided. Apart from the pre-mining support, such as cable bolting & Rock bolting, the stope back will be supported by leaving barrier pillar.

Transportation of Ore - Blasted ore will be transported manually to ore chute, from where the ore is drawn and filled in tubs and transported to main shaft bin by battery locomotive. The ore is hoisted through vertical shaft with cage.

Filling the excavated area - After extraction of ore the void so created is filled with either waste rock generated from development and by hydraulic sand stowing

Manpower - The proposed project will provide direct employment to 290 people besides creating many indirect employment opportunities. Local people will be given preference in employment for mine as per their eligibility

Machinery to be deployed - Detail of the mining machinery to be deployed is Locomotive, D. G. Sets, Compressor, Jackhammer, Drill machine etc.

1.3 DESCRIPTION OF THE ENVIRONMENT

The baseline environmental monitoring was carried out during summer season of year March 2018 to May 2018. The various environmental components which are thoroughly studied during the study period include:

BASELINE ENVIRONMENT STATUS

1.3.1 Meteorological condition

During summer season (March to May'2018 meteorological data has been collected). Maximum temperature recorded 47°C & Minimum temperature 23°C and predominant wind direction is NW during summer season. During study period total rainfall was 22mm.

1.3.2 Ambient Air Quality

PM₁₀ level in the Study Area

The maximum and minimum concentration for PM₁₀ was recorded 75.83 µg/m³ and 44.0 µg/m³ respectively. The maximum concentration was recorded at village Gumgaon (A4) and minimum concentration was recorded at Borgaon.

PM_{2.5} level in the Study Area

The maximum and minimum concentration for PM_{2.5} was recorded 44.0 µg/m³ and 17.96 µg/m³ respectively. The maximum concentration was recorded at village Gumgaon (A4) and minimum concentration was recorded at mine site.

SO₂ level in the Study Area

The maximum and minimum concentration for SO₂ was recorded 11.40 µg/m³ and 5.29 µg/m³ respectively. The maximum concentration was recorded at mine site (A1) and minimum concentration was recorded at village Garhegaon (A5).

NO₂ level in the Study Area

The maximum and minimum concentration for NO₂ was recorded 32.66 µg/m³ and 14.02 µg/m³ respectively. The maximum concentration was recorded at mine site (A1) and minimum concentration was recorded at village Borgaon (A8).

CO level in the Study Area

The maximum and minimum concentration for CO was recorded 0.67 mg/m³ and 0.22 mg/m³ respectively.

1.3.3 Ambient Noise Level

A preliminary survey was undertaken at different eight Locations during study period to identify the baseline noise level in the study area.

Summary of noise level data of different location are given below.

Conclusion: During the study period ambient noise level were monitored and observed maximum level was: 56.9 at Village Boregaon during day-time & minimum was 37.8 at Village Jamlapani during night-time.

From the baseline monitoring results, it is observed that ambient noise level is within prescribe limit.

1.3.4 Water Quality

Ground Water Quality

- It is observed that pH of the ground water samples are range of 7.17 to 7.62, which is between the acceptable pH limit for drinking water.
- Concentration of Total dissolve solids (TDS) & Total hardness observed in different ground water samples are in range of permissible category stipulated by Bureau of Indian Standards except village Yarandagaon, which is 8.3 km from mine site where Total dissolved solid & Total hardness is observed 2456 & 1060 mg/l respectively which are above permissible limit.
- Fluoride Concentration is in between 0.1 to 0.4 mg/l. The desirable limit of 1 mg/l and permissible limit of 1.5 mg/l.

Surface water quality

- Biochemical oxygen Demand - All surface water samples have BOD ranging 1.4 to 3.3 which indicate very low organic pollution load. All BOD values are within prescribed limit (<30.0 mg/lt as in IS 10500 :2012)
- Chemical oxygen demand (COD) - All surface water samples have COD values ranging from <5 to 45.5 which indicates low level of organic pollution load in term of COD.

From the analysis data it is observed all parameters are within permissible limit of drinking water standard.

1.3.5 Soil Characteristics

The pH values of the collected samples were in the range of 7.84 to 8.26, organic matter in the range of 0.786(%) to 1.96 (%), water holding capacity in the range of 5.56 to 7.70%, potassium in the range of 0.07 to 173, total nitrogen in the range of 0.012 to 0.013 %, bulk density in the range of 1.45 to 1.49gm/cc. These all parameter indicate that soil is not so fertile in this area.

TABLE 4: LAND USE PATTERN OF THE CORE AREA

Sr. No.	Head	Area put on use at start of plan	Additional requirement during plan period	Area considered as fully reclaimed & rehabilitated	Net area considered for calculation
1	Area to be excavated	NIL	1.00	Nil	1.00
2.	Storage for topsoil	Nil	0.25	Nil	0.25
3.	Overburden dumps	Nil	0.25	Nil	0.25
4.	Mineral storage	Nil	NIL	Nil	0.00
5.	Infrastructure	Nil	0.25	Nil	0.25
6	Roads	Nil	0.25	Nil	0.25
7	Railways	-	-	-	
8.	Green Belt	Nil	5.00	2.00	7.00

9.	Tailing pond	-	-	-	-
10	Effluent treatment plant	-	-	-	-
11	Mineral separation plant	-	-	-	-
12	Township area	-	Nil	Nil	Nil
13	Other to specify	-	-	-	-
	Total area				9.00 Ha

Note: About 5.0 ha area will be planted in next five year & 2.0ha are will be planted in 6th to 10th year.

TABLE 5: LAND USE PATTERN OF STUDY AREA

S. No.	Class Names	Area (Ha.)	% (Area)
i	Forest land	3595.47	7.89
ii	Habitation	1087.17	2.39
iii	Crop land	23307.32	51.4
iv	Fellow land	9903.45	21.73
v	River/water bodies	980.42	2.15
Vi	Open scrub land	3043.32	6.68
vii	Wetland/wasteland	3654.86	8.02
	Total	45572.01	100

1.3.6 Biological Environment

Flora - The study area is mainly dominated by Southern Dry Mixed Deciduous Forests & the study area vegetation is dominated by Aam, Teak & Neem etc.

Fauna - The faunal species commonly encountered during study within the study area are- Hare, Rat, Indian fox, etc.

No endemic endangered or threatened species of flora & fauna observed during study period.

1.3.7 Demography and Socio- Economics

As per Census of India'2011, study area consists of 68 nos. of villages with total population of 67,101 nos. The number of households in the study area is 15,450.

1.4 ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES

10.4.1 Impact on Air Quality- Mining activity which includes excavation, loading & unloading drilling blasting of material may increase the concentration of particulate matter in the air. However, this will be controlled by water sprinkling.

10.4.2 Impact on Noise Quality- Generation of noise due to operation of mining machinery and increased frequency of vehicular traffic in the area. However, these, impacts are short term, intermittent and temporary in nature & will be controlled by idling running of vehicles & plantation along lease boundary.

10.4.3 Impact on Water Environment- Mining activity will be done by underground method so no major impact will be anticipated on surface water sources. One seasonal nallah flows with in mining lease area & mining will strictly restricted below the nallah However surface water pollution may be occurred if waste dump on surface area will not properly stabilized the suspended matter likely to flow in nearby surface water.

Water table will be intersected through underground working. About 510 KLD water will daily seep in mine & will pumped out.

10.4.4 Impact on land Environment- It is underground mining project where most of the activities shall be confined to underground. So, no significant major impact will anticipate on the topography of lease area. The area affected on surface will be only the entry points to underground mine, facilities at surface and the dump area created for the disposal of waste generated from underground drifts/inclines in rock.

10.4.5 Impact on Biological Environment- As the mining process is underground so no direct impact will be anticipated from the mining process to surrounding flora and fauna. Practically there will very minor impact on terrestrial as well as aquatic ecology of the study area.

10.5. ANALYSIS OF ALTERNATIVES-

10.5.1 Site Alternatives- The mine must be located where the mineral exists in enough quantity to be economically extracted.

10.5.2 Technology alternatives- The mineral is present in deep deposits. So, selection of underground mining is contemplated.

10.6 ENVIRONMENT MONITORING PROGRAM

During the execution of the project activity, the sampling & analysis of various environmental attributes will be carried out as per guidelines of central pollution control board & State pollution control board Rajasthan. An environment management cell will be set-up to implement the said program.

10.7 ADDITIONAL STUDIES

10.7.1 Risk Studies- Hazard identification and risk analysis involves identification of undesirable events that leads to a hazard, the analysis of hazard mechanism by which this undesirable event could occur and usually the estimation of extent, magnitude and likelihood of harmful effects.

10.7.2 Disaster Studies

The objectives of Disaster Management Plan (DMP) is to describe the lessee's emergency preparedness organization, the resource availability and response actions applicable to deal with various types of emergencies that could occur at the mines with organization structure being deployed in shortest time possible during the emergency.

Thus, the overall objectives of the emergency plan are summarized as:

- Rapid control and containment of Hazardous situation.
- Minimizing the Risk and impact of event/accident.
- Effective prevention of damage to property.

10.7.3 Occupational Health and Safety

The main areas of concern for ensuring adequate occupational health and safety are:-

All working places will have safe means of access, safe working platform and exit. Persons working in hazardous dust prone area will be provided with dust mask.

Personal protective equipments like respirators, ear plug, noise muff, helmet etc. will be provided to the workers.

Proper unit design and engineering controls in order to protect workers, including by control of process and fugitive emissions.

Adequate arrangement of drinking water will be done.

Education & training will be provided to the workforce about facilities, protective equipment, risk associated, potential health effects, etc.

Display board will be provided showing the hazards associated and recommended precautionary measures.

10.7.4 Social impact assessment, R&R action plan

No human settlement exists within lease area no direct impact is envisaged due to mining however 298 families will be indirectly affected from mining for that compensation detail are as follows as per moil policy. Moil Ltd. will provide compensation 2 times of ready-reckoner rate for land acquisition and provide the permanent employment to 1 member of each affected family.

10.8 PROJECT BENEFIT

The proposed project will provide direct employment to 456 people & will be improve living standard of local people and PP will also work for social development in nearby villages. The proposed Social fund is 100 lacs/plan period.

10.9 ENVIRONMENT MANAGEMENT PLAN

The Environmental Management Plan has been developed with a view to bring down the levels of impacts within limits. In each of the areas of impact, measures have to be taken to reduce potentially significant adverse impacts and where these are beneficial in nature, such impacts are to be enhanced/augmented so that the overall adverse impacts are reduced to as minimal as possible. Measures to be taken for each of the impact areas are detailed in the following paras:

Environmental Issue	Management Measures	Implementation
Air Environment	The mine site has mechanical ventilator. Emanation of dust during working will be minimized by adoption of dust suppression system (like water spraying) at working faces before and after blasting and during loading. Wet drilling will be adopted in drill machines. Transport of material will be done by covered conveyor belt of km length to minimize the dust generation. The transfer points will be provided with sufficient water sprinkling system. Dust mask will be provide as safety measures to the workers ,engaged at dust generation points like drills, loading/unloading points, material handling etc.	Project authorities, through Regular monitoring of the roads, plantation sites, random checking of equipment.
Noise & Vibration	- Controlled blasting is a technique for the purpose to reduce the amount of over break and to control the ground vibration. - Additional sound-proof enclosures of fixed and mobile plant and mine ventilation fans. - Altering the blast drilling pattern and delay layout. - Regular checking of machineries.	Project authorities through Regular monitoring.
Water environment	- Septic tank followed by soak pit is already provided for the treatment of domestic wastewater. - Garland drain around dumps and sumps will be constructed to channelize rainwater on surface. - Development of ground water recharges system around ML area. - Implementation of recharge measures proposed in the hydrological and hydrogeological study. - Optimal use of water.	Project authorities through regular monitoring.

	Monitoring of ground water level and quality in and around the mine area.	
Biological Environment	- Mining method is underground so not much impact will be anticipated on surrounding flora & fauna. - Mining activities will be restricted to day-time so that fauna will not disturb at night. - Tar road will be used for transportation to minimise fugitive emissions. - Material will be covered with tarpaulin during transportation. - Plantation will be taken up in consultation with Forest department and species local to the area shall be planted as per findings during baseline environment which help maintain the regional ecological balance, soil and hydrological conditions. - Water sprinkling will be done on haul roads to control fugitive emissions. - The removal or picking of any protected/unprotected plant will not be permitted. - Proper traffic management including ban on use of pressure horns; restriction on use of music in vehicles at high volume as well as regular maintenance of vehicles shall be insisted to minimize disturbance from vehicular movement. - Educational and awareness programmes for mine workers will be arranged.	Project authorities through regular monitoring.
Occupational health & safety & public health & safety.	- Safety officer look after the safety aspects. - Dedicated safety & environmental committees in mine review the safety and environmental aspects. - Regular water sprinkling on haul roads. - Dust mask will be provided to the workers. - Periodical medical examinations will be carried out for the workers as per norms. - Medical records will be keep maintained. - Medical facilities to the workers. - Personal Protective Equipment's will be provided to the workers. - Vocational Training will be provided to workers. - Safety of the employee during mining will be taken care as per Mine regulations.	Vocational Training will be provided to the workers. A well-equipped first aid facility will be made available round the clock in ML area. By Project authority.
Socio economic environment	- Employment will be given to local people. - Regular medical camps will be organized. - Funds will be provided for development activities in nearby villages.	Regular monitoring by project authorities.

TABLE 6: COST ESTIMATES OF EMP IMPLEMENTATION

(Investment and recurring cost in Lacs INR)

S. No.	Particulars	Capital Cost	Recurring Cost
		Proposed	Proposed
1	Pollution Control & Conservation of natural resources (Garland Drain, Water sprinkler, septic tank, Rainwater harvesting structure)	55.00	20.00
2	Pollution Monitoring (Air, soil, Water, Noise)	20.00	10.00
3	Occupational Health	25.00	10.00
4	Green Belt	10.00	5.00
	Miscellaneous (Fencing, protection, regeneration and maintenance of safety zone)	10.00	5.00
Total		120.00	50.00

TABLE 7: PROPOSED CSR

S. No.	Initiatives	Budget (in lac) for Plan Period
1.	Construction of washroom in nearby schools	15.00
2.	Installation of solar street-light & solar pump in nearby villages	50.00
3.	Construction of community hall	10.00
4.	RO plants & maintenance for drinking water-nearby villages	15.00
5.	Arrange free medical camps in nearby villages.	10.00
Total		100.00

TABLE 8: MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

Particulars	Monitoring Frequencies	Duration of Station	Important Monitoring Parameters
Surface water / Tube well	Twice in a year	Grab	pH, SS, TDS, Iron, Hardness, Alkalinity Chlorides, Nitrates Sulphate & Fluorides
Ambient air monitoring	Twice in a year	24 hr.	PM ₁₀ , PM _{2.5} , SO _x and NO _x
Noise Pollution	Twice in a year	-	Level in dB(A) and dB(C)
Working environment	Once in a year	-	PH, Conductivity, Sulphate, Nitrate, Phosphates, Alkalinity & texture.
