

## EXECUTIVE SUMMARY (ENGLISH)

FOR

### KANDRI MANGANESE MINE

MINE LEASE AREA: 86.06 HECTARE

LOCATION: - NEAR VILLAGE(s) – KANDARI, TEHSIL RAMTEK, DISTRICT NAGPUR, MAHARASHTRA  
**(PROPOSED EXPANSION PROJECT)**

TOTAL PRODUCTION/ ROM: EXISTING - 63,000 TPA; AFTER EXPANSION – 2,00,000 TPA;

Lease Validity: - Up to 30.06.2042; Project Cost: - Rs.98.83 Crores

Study Period: - 1<sup>st</sup> March to 31<sup>st</sup> May 2023

**ToR Issued vide Letter No.: - No. SIA/MH/MIN/434592/2023 dated 28.06.2023**

FOR

### ENVIRONMENTAL CLEARANCE

("B1" under category 1(a) of EIA Notification dated 14.09.2006 & its subsequent amendments dated 14.08.2018)



**MOIL LIMITED**  
Formerly Maganese Ore(India) Limited  
A Government of India Enterprise

MOIL LIMITED

(A Government of India Enterprise)

Authorized Signatory: Mr. M. M. Abdullah

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## EXECUTIVE SUMMARY

### 1.1 INTRODUCTION

The present draft EIA EMP report has been prepared for Environmental Impact Assessment of proposed expansion of Kandri Manganese Mine of M/s MOIL Limited (A Government of India Enterprise), for production capacity from 63,000 TPA to 2,00,000 TPA using the mining methods of underground working in mining lease area of 83.6 Ha. It is an existing mining project. The Environmental Clearance was granted vide letter no. J-11015/408/2007-IA.II(M) dated 21/09/2007.

Presently, mining is being undertaken by underground method. However, after expansion, it is envisaged to continue the underground method with expansion in production.

#### 1.1.1 Project Identification

Kandri Manganese mine of M/s MOIL Ltd. is for the capacity expansion from 63,000 MTPA from underground to 2,00,000 MTPA. After grant of EC expansion, the total production from the underground is through vertical shaft located on footwall rock with the two shafts will be 2,00,000 MTPA.

The Lease grant of third renewal for Mining Lease has been issued to M/s MOIL over an area of 83.06 ha. in Village: Kandri, Tehsil: Ramtek, Distt; Nagpur, Maharashtra, by Government of Maharashtra vide letter number MMG-0921/C.R.93/Ind-9(A) Dtd. 27.04.2022 for a period of 20 years up to 30.06.2042.

#### 1.1.2 Identification of Project Proponent

**Table 1.1: Name and address of the Applicant**

<b>Applicant</b>	<b>Nominated owner</b>
M/s MOIL Limited. (A Government of India Enterprise) 1A- MOIL Bhawan, Katol Road, Nagpur-440 013 <b>Telephone:</b> 0712-2590775 <b>Fax:</b> 0712-2592073 <b>E-mail:</b> moilind_ngp@sancharnet.in <b>Website:</b> <a href="http://www.moil.nic.m">www.moil.nic.m</a>	Mr. M. M. Abdullah Nominated Owner & Director (Production & Planning) MOIL Limited, MOIL Bhawan, 1-A, Katol Road Nagpur- 440013 (MS) E-mail: <a href="mailto:envsafety@moil.nic.in">envsafety@moil.nic.in</a>

### 1.1.3 Location of Project

**Table 1.2: Location Based Details**

Name of the project		Kandri Manganese Mine
Promoter		Moil Limited
Location	Village	Kandri
	Tehsil	Ramtek
	District	Nagpur
	State	Maharashtra
Toposheet no.		5503, 5506 & 550/7
Coordinates		As given in Draft EIA EMP Report in Table No. 1.2.

### 1.1.4 NEED OF THE PROJECT

Manganese is the prime raw material required for any steel industry. India ranks 7<sup>th</sup> position in Steel production. The consumption of steel per capita is comparatively less with respect to developed country. Presently, India is producing approximately 55 MT steel per annum which has been envisaged in Steel Policy of Govt. of India to achieve 100 MT by 2015. Aiming the above goal, Government of India is encouraging steel sector. The reserves of manganese are found in limited areas. 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 Precambrian (Mesoproterozoic to Neoproterozoic) meta-sedimentary sequence of Sausar Group is well known for some of the largest manganese ore deposits in Central India. The Mansar formation which contains significant amount of manganese ore horizon associated with Gondite rocks is rich in mica schist and muscovite-biotite-schist. The underlying Lohangi formation is composed of Dolomite marble with lenses of manganese ore and Gondite rocks and rests over the Archean TBG basement.

**Table 1.3: Available Reserves and Life of Mine**

a)	Total Reserves (in situ)	30, 89,975 Tones
b)	Total Resources including Blocked Resource	8807750 Tones
c)	Proposed average rate of production	200000 Tones (U/G)
d)	Anticipated life of Mine	59.48 Years. Say 59 years

**Note:** As the entire deposit is yet to be explored, the life of mine may vary according to the reserves proved according to the future exploration program. As per the life of Mine is for 50 years but the lease is up to 2042. The mine will continue as per approval of lease extension.

**Proposed Working** - Presently, mining is being undertaken by underground method.

### 1.3 DESCRIPTION OF THE ENVIRONMENT

The baseline environmental monitoring was carried out during summer season of year 1<sup>st</sup> March 2023 to 31<sup>st</sup> May 2023. The various environmental components which are thoroughly studied during the study period include:

#### BASELINE ENVIRONMENT STATUS

##### 1.3.1 Meteorological Condition

The meteorological data generated at site during study period (1<sup>st</sup> March 2023 to 31<sup>st</sup> May 2023) is summarized below:

Month	Wind Speed (m/s)		Temperature (°C)		Relative Humidity (%)		Rain Fall (mm)	Predominant Wind Direction from
	Min	Max	Min	Max	Min	Max	Total	
Mar 2023	0.1	7.6	17.2	38.9	10	94	57.2	NW to SE
Apr 2023	0.1	7.6	20.0	42.2	14	95	11.9	
May 2023	0.1	9.4	20.0	43.9	10	96	48.2	

##### 1.3.2 Ambient Air Quality

**PM<sub>10</sub> level in the study area** - The maximum and minimum concentration for PM<sub>10</sub> was recorded 39.63 µg/m<sup>3</sup> and 68.40 µg/m<sup>3</sup> respectively. The maximum concentration was recorded at Khumari and minimum concentration was recorded at Project Site.

**PM<sub>2.5</sub> level in the study area** - The maximum and minimum concentration for PM<sub>2.5</sub> was recorded 19.12 µg/m<sup>3</sup> and 38.81 µg/m<sup>3</sup> respectively. The maximum concentration was recorded at Khumari and minimum concentration was recorded at Near ESZ Open Jungle.

**SO<sub>2</sub> level in the study area** - The maximum and minimum concentration for SO<sub>2</sub> was recorded 6.01 µg/m<sup>3</sup> and 15.13 µg/m<sup>3</sup> respectively. The maximum concentration was recorded at Ramtek and minimum concentration was recorded at Near ESZ Open Jungle.

**NO<sub>2</sub> level in the study area** - The maximum and minimum concentration for NO<sub>2</sub> was recorded 7.31 µg/m<sup>3</sup> and 18.27 µg/m<sup>3</sup> respectively. The maximum concentration was recorded at Ramtek and minimum concentration was recorded at Near ESZ Open Jungle.

**CO level in the study area** - The maximum and minimum concentration for CO was recorded 0.28 mg/m<sup>3</sup> and 0.83 mg/m<sup>3</sup> respectively.

**Conclusion:** From the baseline monitoring result, it is observed that monitored parameters (PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub> & NO<sub>2</sub>, CO) are within permissible limits of NAAQS, 2009.

### 1.3.3 Ambient Noise Level

A preliminary survey was undertaken at 10 locations during study period to identify the baseline noise level in the study area.

**Conclusion:** During study period maximum ambient noise level were observed during Night time: 42.8 at mine area & minimum 37.0 at Patgowari. During Day Time Maximum ambient noise level were observed: 59.8 at Mine area & & minimum 48.9 at Bhilewada.

### 1.3.4 Water Quality

#### Conclusion

- It is observed that pH of the ground water samples are in range of 7.14 to 7.72, which is between the acceptable pH limit for drinking water.
- Total dissolve solids (TDS) of the Ground Water samples are in range of 298 to 612.
- Total hardness observed in different ground water samples are in range of 140 & 376 mg/l which are above the range of permissible limit.
- Fluoride Concentration is in range of 0.3 to 0.5 mg/l. which is under permissible limit.
- Biochemical oxygen Demand - All surface water samples have BOD values ranging 1.8 to 2.2 which indicate very low organic pollution load. All samples have BOD values are within prescribed limit (<30.0 mg/l as in IS 10500 :2012)
- Chemical oxygen demand (COD) - All surface water samples have COD values ranging from 8.4 to 16.8 which indicates low level of organic pollution load in term of COD.

**Results & Discussion-** From the above data it is observed that all parameters are within permissible limit of drinking water standard except sample collected from village yarandagoan where TDS & Hardness in Ground water observed above the permissible limit which could be due to agricultural runoff, urban runoff, industrial wastewater etc.

### 1.3.5 Soil Characteristics

The soil pH ranges from 6.89 500m at D/W Mansar Mine to 7.88 at Ramtek.

The Organic matter content of soil varied from 0.36% at Khumari village to 0.62% at Mansar village.

Available nitrogen content in the surface soils ranges between 87.75 kg/ha at Khumari Village to Bijewada village is 126 kg/ha.

Total phosphorus content ranges between 32.24 Kg/ha Mansar village to 38.15 kg/ha at mine site.

**Table 1.4: Land Use Pattern of The Core Area**

Sl. No.	Type of land use (in ha)	Area at the beginning of the proposal period	Area proposed under activity	Actual Area utilized in the proposal period	Reasons for deviation
1	Mining	10.75	0.00	10.75	Area at the beginning of the proposal period is Area under Mining (Oldpits)
2	Mineral storage	1.72	2.24	1.72	Proposed area for Mineral storage was 2.24 Ha in 2022-23 is not utilized
3	Mineral Beneficiation plant	0.00	0.00	0.00	NA
4	Township	10.78	1.62	10.78	NA
5	Tailing Pond	0.00	0.00	0.00	NA
6	Railways	0.00	0.00	0.00	NA
7	Roads	2.70	0.00	2.70	NA
8	Infrastructure (Workshop, administrative building etc.)	2.75	1.80	2.75	NA
9	OB/waste dump	25.00	0.00	0.00	NA
10	Top soil preservation	0.00	0.00	0.00	NA
11	Others	0.00	0.00	0.00	NA
12	Total area put to use	53.70	5.66	59.36	NA
13	Excavated area reclaimed	0.00	0.00	0.00	NA
14	Waste Dumped area reclaimed	0.00	0.00	0.00	NA
15	Undisturbed area	29.36	77.4	23.46	NA
	<b>Grand Total</b>	<b>83.06</b>	<b>83.06</b>	<b>83.06</b>	<b>NA</b>

**Table 1.5: Land Use Pattern of Study Area**

Sl. No.	CLASSES NAME	AREA (IN HECT.)	% AREA
1	Study Area	83.0600	0.235
2	Built-Up	87.5692	0.247
3	Agriculture Land	22475.3303	63.484
4	River, Water Bodies & Nalla	1454.5965	4.109
5	Open Scrub / Stony Waste	2278.8732	6.437
6	Forest & Open Jungle	8646.5195	24.423
7	National Highway & Road	357.8140	1.011
8	Railway Line	19.2330	0.054
	<b>Total Area</b>	<b>35402.9957</b>	<b>100.00</b>



### 1.3.6 Biological Environment

There is no National parks, Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within core zone of the area. Mansinghdeo Wildlife Sanctuary falls at a distance of 5.16 Km in NNW direction. We have collected secondary data for seasonality data of whole year and analysis of primary data. It discussed with forest experts, field staff and locals persons. FGD's has been done for verification of secondary data along with concerned officials of Forest Department.

### 1.3.7 Demography and Socio- Economics

As per 2011 census the study area comprises 51 villages with population of about 64046 (Male- 32721 & female – 31325) and number of households are 14497. In the 10 km radius study area constitute 34 villages from Ramtek district of state Maharashtra and 17 Villages from Nagpur District Maharashtra.

## 1.4 ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES

**1.4.1 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.

**1.4.2 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.

**1.4.3 Impact on Water Environment-** There is No perennial river and little seasonal nallah flow in the lease area. Hence, during the course of mining, no Nallah/stream & water bodies have been diverted.

**1.4.4 Impact on land Environment-** Land area indicating the area likely to be degraded due to quarrying, dumping, roads, workshop, processing plant, tailing pond/dam, township etc. The total land required for mining in this lease area is 53.70 ha. out of the total lease area of 83.06 ha. This area will be utilized for dumping, infrastructure, plantation during the first five years of the modified mining plan period after commencement of mine. Plantation programme will be done as per approved mining plan and rainwater collected and used for plantation/agriculture purpose during life of the mine.

**1.4.5 Impact on Biological Environment-** There is no National parks, Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within core zone of the area. Mansinghdeo Wildlife Sanctuary falls at a distance of 5.16 Km

in NNW direction. The Particulate matters are the major pollutant which is generated by transportation of vehicles and underground mining activities in the M.L area.

## 1.5. ANALYSIS OF ALTERNATIVES

**1.5.1 Site Alternatives** - It is an existing mining area for mining of manganese ore. The mine must be located where the mineral exists in enough quantity to be economically extracted.

**1.5.2 Technology alternatives** - The proposed mining operations for expansion activity will be performed adopting existing Underground method (back overhand cut and fill method with hydraulic sand stowing). Keeping in view of geological parameters, mineable reserves & overburden, underground method of mining will be adopted and transportation of mineral shall be done through road by dumper.

## 1.6 ENVIRONMENT MONITORING PROGRAM

Environmental monitoring programme will be taken up after the grant of EC and half yearly compliance report in respect of the terms and condition stipulated in the EC letter will be submitted to the regulatory authorities.

Environment monitoring will be carried out at the site as per the CPCB guideline. Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by SEIAA Maharashtra & Consents to Operate issued by SPCB. Six monthly compliance reports will be submitted to SEIAA Maharashtra & SPCB.

## 1.7 ADDITIONAL STUDIES

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

**1.7.2 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.



**1.7.3 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.

**1.7.4 Social impact assessment, R&R Action Plan** - There is no hutment in the lease area. No human being displaced from the area so no person will be affected contrary local people will get job opportunity.

**1.8 ENVIRONMENT MANAGEMENT PLAN**

The Environmental Management Plan has been developed with a view to bring down the levels of impacts as discussed in the last chapter 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 low level 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	<ul style="list-style-type: none"> <li>Controlled blasting is a technique for the purpose to reduce the amount of over break and to control</li> </ul>	Project authorities through Regular monitoring.

	<p>the ground vibration.</p> <ul style="list-style-type: none"> <li>• Additional soundproof enclosures of fixed and mobile plant and mine ventilation fans.</li> <li>• Altering the blast drilling pattern and delay layout.</li> <li>• Regular checking of machineries.</li> </ul>	
Water environment	<ul style="list-style-type: none"> <li>• Septic tank followed by soak pit is already provided for the treatment of domestic wastewater.</li> <li>• Garland drain around dumps and sumps will be constructed to channelize rainwater on surface.</li> <li>• Development of groundwater recharges system around ML area.</li> <li>• Implementation of recharge measures proposed in the hydrological and hydrogeological study.</li> <li>• Optimal use of water.</li> <li>• Monitoring of ground water level and quality in and around the mine area.</li> </ul>	Project authorities through regular monitoring.
Biological Environment	<ul style="list-style-type: none"> <li>• As the mining method is underground so not much impact will be anticipated on surrounding flora &amp; fauna.</li> <li>• Mining activities will be restricted to day-time so that fauna will not disturb at night.</li> <li>• Tar road will be used for transportation to minimise fugitive emissions.</li> <li>• Material will be covered with tarpaulin during transportation.</li> <li>• 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.</li> <li>• Water sprinkling will be done on haul roads to control fugitive emissions.</li> <li>• The removal or picking of any protected/unprotected plant will not be permitted.</li> <li>• 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.</li> <li>• Educational and awareness programmes for mine workers will be arranged.</li> </ul>	Project authorities through regular monitoring.
Occupational health & safety & public health & safety.	<ul style="list-style-type: none"> <li>• Safety officer look after the safety aspects.</li> <li>• Dedicated safety &amp; environmental committees in mine review the safety and environmental aspects.</li> <li>• Regular water sprinkling on haul roads.</li> <li>• Dust mask will be provided to the workers.</li> <li>• Periodical medical examinations will be carried out for the workers as per norms.</li> <li>• Medical records will be keep maintained.</li> <li>• Medical facilities to the workers.</li> <li>• Personal Protective Equipment's to the workers.</li> </ul>	<p>Vocational Training will be provided to the workers.</p> <p>A well-equipped first aid facility will be made available round the clock in ML area. By Project authority.</p>

	<ul style="list-style-type: none"> <li>Vocational Training will be provided to workers.</li> <li>Safety of the employee during mining will be taken care as per Mine regulations.</li> </ul>	
Socio economic environment	<ul style="list-style-type: none"> <li>Employment will be given to local people.</li> <li>Regular medical camps will be organized.</li> <li>Funds will be provided for development activities in nearby villages.</li> </ul>	Regular monitoring by project authorities.

**Table 1.6: Cost Estimates of EMP (Investment and Recurring Cost in Lakhs)**

S. No.		Capital Cost (In Lakhs)		Annual Recurring Cost (In Lakhs)	
		Existing	Proposed	Existing	Proposed
1	Pollution Control Measures including: <ul style="list-style-type: none"> <li>Installation of Online AQM System</li> <li>Conservation of Natural Resources through Garland Drain, Water sprinkler, Septic tank, Rainwater Harvesting Structure etc.</li> <li>Protective works for waste dump management including construction of retaining wall/ water drains, terraces &amp; maintenance of check dams etc.</li> </ul>	51.0 5.0 3.0	8.0 5.0 3.0	6.0	10.0
2	Pollution Monitoring (Air, Water, Soil and Noise Monitoring on quarterly and half yearly basis)	6.0	10.0	2.0	5.0
3	Occupational Health & Safety	3.0	5.0	1.5	1.5
4	Green Belt Development	13.0	12.0	1.5	2.0
a	Mine	10.0	10.0	1.0	1.0
b	Township	3.0	2.0	0.5	0.5
5	Reclamation/ Rehabilitation of mined out area	5.0	10.0	Nil	1.5
6	Others (specify)	12.0	15.0	1.0	1.5
a	Awareness, training programme, celebration of safety & environment week, Hydrogeological study, Fencing and RH study.	10.0	10.0	Nil	Nil
b	Fauna management	As per WLCP			
c	Protective Equipment's	2.0	5.0	1.0	2.0
<b>Sub-Total</b>		<b>98.0</b>	<b>68.0</b>	<b>12.0</b>	<b>22.0</b>
<b>7. Activities under CER* will be part of EMP, in light of MoEF&amp;CC's OM dated 30.09.2020 and conducted public hearing, yet to be scheduled.</b>					

**Table- 1.7 Monitoring Schedule for Environmental Parameters**

Particulars	Monitoring Frequencies	Duration of Station	Important Monitoring Parameters
Surface water/ Ground water Sampling	Quarterly in a year	-	EC, PH, TDS, TSS, Iron, Hardness, Alkalinity, Chlorides, Calcium, magnesium, Nitrates, Sulphate, manganese & Fluorides
Ambient air quality monitoring	Twice in a year except monsoon period	24/8 hr	PM <sub>2.5</sub> PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>2</sub> .
Noise Monitoring	Twice in a year	8/1 hr	Level in dB (A). Day/Night
Soil Sampling	Twice in a year	-	PH, Conductivity, organic matter permeability, water holding capacity, Alkalinity & texture
Inventory of flora	Once in 3 years in project monitoring area.	-	Tree plantation and survival % etc
b) Growth of faunal species in the area	Once in year	-	Number and biodiversity
Socio-economic condition of local population, physical survey.	Once in five years.		

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