EXECUTIVE SUMMARY (ENGLISH)

FOR

CHIKLA MANGANESE MINE

MINE LEASE AREA: 150.65 HECTARE

(FOREST LAND: 70.07 Ha.; NON-FOREST LAND: 80.58 Ha.)

LOCATION: - NEAR VILLAGE(s) – CHIKLA, YEDURBUCHI & SITASAONGI;

TEHSIL – TUMSAR, DISTRICT – BHANDARA, STATE MAHARASHTRA

(PROPOSED EXPANSION PROJECT)

TOTAL PRODUCTION/ ROM: EXISTING - 1,80,000 TPA; AFTER EXPANSION – 4,00,000 TPA;

Lease Validity: - Up to 30.06.2042; Project Cost: - Rs.122.22 Crores

Study Period: - 1st October to 31st December 2020

ToR Issued vide Letter No.: - No.J-11015/46/2021-IA.II(M) Dated 03.12.2021

FOR

ENVIRONMENTAL CLEARANCE

("A" under category 1(a) of EIA Notification dated 14.09.2006 and 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. P. V. V. Patnaik
MOIL Bhavan, 1-A, Katol Road, Nagpur-440013, Maharashtra
Tel. No.: 0712-2592272; E-mail: - avmasade@rediffmail.com, moilind_ngp@sancharnet.in

NABET	Wolkem INDIA LTD.	
NABET Approved EIA Consultant Organization, NABET Certificate No: NABET/EIA/2124/RA 0216, Valid till 05/02/2024	**Wolkem India Limited (Consultancy Division) E- 101-102, Mewar Industrial Area, Madri, Udaipur – 313003 (Rajasthan) Phone No. 0294-2494600/2, E-mail – info.wcs@wolkem.com**	**NABL Accredited Environmental & Chemical Laboratory**

EXECUTIVE SUMMARY

1.1 INTRODUCTION

The present draft EIA EMP report has been prepared for Environmental Impact Assessment of proposed expansion of Chikla Manganese Mine of M/s MOIL Limited (A Government of India Enterprise), for production capacity from 1,80,000 TPA to 4,00,000 TPA using the mining methods of underground, opencast and dump working in mining lease area of 150.65 Ha.. It is an existing mining project. The Environmental Clearance was granted vide J-11015/84/2007-IA.II(M) dated 21/08/2007.

Presently, mining is being undertaken by underground method. However, after expansion, it is envisaged to continue the underground method along with open case and dump management.

1.1.1 Project Identification

Chikla Manganese mine of M/s MOIL Ltd. is for the capacity expansion from 1,80,000 MTPA from underground to 4,00,000 MTPA from underground, opencast & dump working. After grant of EC expansion, the total production from the underground with the two shafts will be 3,47,000 MTPA and from inclined and adit 15,000 MTPA total from underground 3,62,000 MTPA. It is also proposed in the conceptual plan to recover some part of the manganese ore body by opencast method, it will produce 11,000 MTPA and 27,000 MTPA by dump working.

The Lease grant of second renewal for Mining Lease has been issued to MOIL over an area of 150.65 ha in Village: Chikla, Yedurbuchi & Sitasaongi, Tahsil: Tumsar, Distt; Bhandra-Maharashtra State, by Government of Maharashtra vide letter number MMN-1004/C.R.665 /Industry-9, Mumbai dated 16/9/2004.

1.1.2 Identification of Project Proponent

Table 1.1: 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. P. V. V. Patnaik Designation: Director (Commercial) addl. charge Director (Production & Planning) MOIL Limited, MOIL Bhawan, 1-A, Katol Road Nagpur- 440013 (MS) Tel. No. : 0712-2592272 E-mail: envsafety@moil.nic.in

1.1.3 Location of Project

Table 1.2: Location Based Details

Name of the project		Chikla Manganese Mine	
Promoter		Moil Limited	
Location	Village	Chikla, Yedurbuchi and Sitasaongi	
	Tehsil	Tumsar	
	District	Bhandara	
	State	Maharashtra	
Toposheet no.		55 O/10 & 14	
Coordinates		21°32'13.61"N	79°44'54.82"E
		21° 33' 3.72"N	79° 46' 9.13"E
		21^{0}32’39.35”N	79^{0}46’06.17”E
		21^{0}32’40.50”N	79^{0}45’33.20”E

1.1.4 NEED OF THE PROJECT

Manganese is the prime raw material required for any steel industry. India ranks 7th 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 area surrounding Chikla deposits exposes rocks belonging mostly to the lower part of the Sausar sequence. The ore deposits are associated with gondites, a regionally metamorphosed manganiferous and non-calcareous rocks characterized by spessartite (a manganese almandine garnet) and quartz with or without manganese silicates, showing an essentially banded character.

The contact between Sitasaongi formation and the overlying Mansar formation is marked by the manganese ore horizon the ore horizons occurs as a thin discontinuous lensoidpatches fanning an anticline between the Chikla and Sitasaongi synclines, has been described.

In Chikla mines the manganese ore occurs as a persistent horizon of variable thickness. The hard and compact ore horizon crops out at the crest of Sitasaongi hill, Chikla hill and along the crest or northern slope of Chikla Extension range of hills.

The ore body is displayed in isoclinally folded structure, which has been locally disrupted by two vertical dip faults. The axial plane of these folds, strike in almost East-West direction with 70° dip due south. The mineral body is plunge controlled, which varies from 45° to 25° due East.

Table 1.3: Available Reserves and Life of Mine

Total **Reserves/Resources**	4890529 Tonnes
Mineable Reserves	3912423 Tonnes
Annual highest RoM production ((OC+U/G)	4,00,000 Tonnes
The life of Mine is	**9.78 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.

Proposed Working - Presently, mining is being undertaken by underground method. However, after expansion, it is envisaged to continue the underground method along with open case and dump management.

1.3 DESCRIPTION OF THE ENVIRONMENT

The baseline environmental monitoring was carried out during summer season of year 1st Oct., 2020 to 31st Dec., 2020. 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 (1st Oct., 2020 to 31st Dec. 2020) is summarized below:

Month	Wind Speed (kmph)		Temperature (°C)			Relative Humidity (%)		
	Mean	Max.	Mean	Highest	Lowest	Mean	Highest	Lowest
Oct 2020	1.1	6.13	26.20	35	18	70.17	98	23
Nov. 2020	0.9	5.2	22.63	33	11	57.7	94	18
Dec. 2020	0.8	4.1	20.21	30	9	55.9	94	16

1.3.2 Ambient Air Quality

PM_{10} level in the study area

The maximum and minimum concentration for PM_{10} was recorded 89.47 µg/m³ and 54.49 µg/m³ respectively. The maximum concentration was recorded at village Project site and minimum concentration was recorded at Yadurbuchi.

$PM_{2.5}$ level in the study area

The maximum and minimum concentration for $PM_{2.5}$ was recorded 50.66 µg/m³ and 36.0 µg/m³ respectively. The maximum concentration was recorded at village Project site and minimum concentration was recorded at Ganeshpur.

SO_2 level in the study area

The maximum and minimum concentration for SO_2 was recorded 12.12 µg/m³ and 6.95 µg/m³ respectively. The maximum concentration was recorded at Project site and minimum concentration was recorded at village Ganeshpur.

NO2 level in the study area

The maximum and minimum concentration for NO_2 was recorded 20.38 µg/m³ and 6.51 µg/m³ respectively. The maximum concentration was recorded at village Project site and minimum concentration was recorded at ML area Vertical sahfts.

CO level in the study area

The maximum and minimum concentration for CO was recorded 0.98 mg/m³ and 0.77 mg/m³ respectively.

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: 65.6 at Village project site during daytime & minimum 31.3 at Village Yedarbuchi during night-time.

1.3.4 Water Quality

It is observed that pH of the ground water samples are in range of 7.89 to 7.21, which is between the acceptable pH limit for drinking water.

The concentration of Total dissolve solides (TDS) & Total hardness observed in different ground water samples are in range of permissible category stipulated by Bureau of Indian standards Total dissolved solid & Total hardness is observed 1580 & 524 mg/l respectively which are above the range of permissible limit.

Fluoride Concentration is in range of 1.4 to 0.4 mg/l. which is under permissible limit.

Biochemical oxygen Demand - All surface water samples have BOD values ranging 1.6 to 1.8 which indicte very low organic pollution load. All samples have 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 8.2 to 15.6 which indictes 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 6.98 Rajapur Village (S5) to 7.32 Yedarbuchi village(S4).

The Organic matter content of soil varied 0.81 % Rajapur village (S5) to 1.11 % at Chikla village(S2).

Available nitrogen content in the surface soils ranges between 96.56 kg/ha at Sitasawangi Village (S3) to Project site (S5) 107.04 kg/ha.

Total phosphorus content ranges between 20.92 Kg/ha Sitasawangi village(S3) to 27.58 kg/ha at Yedarbuchi village(S4).

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
1	Mining	4.465	-	4.465
2	Mineral storage	3.6045	0.170	3.7745
3	Township	2.6	0.350	2.950
4	Tailing Pond	-	-	-
5	Railways	-	-	-
6	Roads	3.50	-	3.5
7	Infrastructure (Workshop, administrative building etc.)	3.00	-	3.00
8	OB/waste dump	5.808	-	5.808
	Total	**22.9775**	**0.52**	**23.4975**

Table 1.5: Land Use Pattern of Study Area

S. No.	Lu/Lc	Area In Ha.	% Area
1	Built-Up	872.77	2.130719
2	Agriculture Land	23408.30	57.14736
3	Forest	12227.89	29.8523
4	Natural /Semiannual & Grass Land /Grazing Land	2269.61	5.540864
5	Waste Land	1.38	0.003369
6	Wetlands	0.00	0
7	Water Body	1628.74	3.97629
8	Snow / Gl. Area	0.00	0
9	Others (Mining Area)	552.61	1.349103
		40961.30	**100**

1.3.6 Biological Environment

There is no National parks, Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within 10 km of the area. 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 49 villages with population of about 72494 (Male- 36217 & female – 36277) and number of households are 16346. In the 10 km radius study area constitute 35 villages from Bhandara district of state Maharashtra and 14 Villages from Balaghat District Madhya Pradesh.

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 idol 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 23.4975 ha out of the total lease area of 150.65 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 are no national parks, sanctuaries, notified biospheres, Tiger/Elephant Corridors, Birds migratory routes, etc. within 10 km radius.

The Particulate matters are the major pollutant which is generated by transportation of vehicles and Open cast 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 proposed Open cast and 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	• Controlled blasting is a technique for the purpose to reduce the amount of over break and to control the ground vibration. • Additional soundproof 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 groundwater recharges system around ML area. • Implementation of recharge measures proposed in the hydrological and hydrogeological study. • Optimal use of water. • Monitoring of ground water level and quality in and around the mine area.	Project authorities through regular monitoring.
Biological Environment	• As the 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	Project authorities through regular monitoring.

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

S. No.		Capital cost		Annual recurring cost	
		Existing	Proposed	Existing	Proposed
1	Pollution Control (Separately provide break-up)	40	80	Nil	20
a	Protective works for waste dump management including construction of retaining wall/ water drains, terraces & maintenance of check dams etc.	40	80	Nil	20
2	Pollution Monitoring (Separately provide break-up)	10	20	Nil	10
a	Staff Salaries	14	14	Nil	7
b	Environment monitoring studies	6	6	Nil	3
3	Occupational Health	15	30	Nil	15
4	Green Belt	25	50	Nil	15
a	Mine	20	40	Nil	12
b	Township	5	10	Nil	3
5	Reclamation/ Rehabilitation of mined out area	10	20	Nil	15
6	Others (specify)	30	60	Nil	20

a	Awareness, training programme, celebration of safety & environment week, Hydrogeological study, Fencing and RH study.	25	50	Nil	15
b	Fauna management	As per WLCP	As per WLCP	As per WLCP	As per WLCP
c	Protective Equipment's	5	10	Nil	5
Total		130	260	NIL	95

Table 1.7: Cost Estimates of EMP Implementation

S. No.	Particulars	Capital Cost (Lakhs)	Recurring cost (Lakhs)
		Proposed	Proposed
1	Pollution Control & Conservation of Natural Resources (Garland Drain, Water sprinkler, Septic tank, Rainwater Harvesting Structure)	80.00	20.00
2	Pollution Monitoring (Air, soil, Water, Noise)	20.00	10.00
3	Occupational Health & Safety	30.00	15.00
4	Green Belt Development	50.00	15.00
5	Miscellaneous (Fencing, protection, regeneration and maintenance of safety zone)	20.00	15.00
6	CSR	475	100
Total		675	175

Table 1.8: Budget for future village development programme

S. No	Description	Amount to be spent (Rs.in Lakhs)				
		22-23	23-24	24-25	25-26	26-27
1	Promoting Education (providing infrastructure like construction of additional class rooms, furniture, smart class facilities, Boys and girls toilets, support to special children education /theraphy etc. in nearby village)	20	20	20	20	20
2	Health Care (Performing free Cataract surgeries, Infrastructure support to area Govt. Hospitals like providing bed and equipment for treatment etc.)	10	10	10	10	10
3	Skill Development and Livelihood (conducting skill development/ vocational training programmes for unemployed youth /women of surrounding villages)	10	10	10	10	10
4	Sanitation & Drinking Water supply (supply of drinking water, construction/ installation community toilets, support for solid waste management in the communities etc.)	20	20	20	20	20
5	Environment care (taking up avenue plantation, Plantation in communities, providing solar	20	20	20	20	20

	power/ lights, rainwater harvesting etc)					
6	Rural Development (laying roads, construction of drains, community halls, other infrastructure for development of surrounding villages)	15	15	15	15	15
	G. Total	95	95	95	95	95

Corporate social responsibility (CSR) Budget towards capital expenditure in accordance to the MoEF&CC's Office Memorandum for Social Welfare i.e Promoting Education, Health Care, Skill Development and Livelihood, Sanitation & Drinking Water supply, Environment care and Rural Development.

Table- 1.8 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	$PM_{2.5}$ PM_{10}, SO_2 and NO_2.
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.		

* * * * *