PRE FEASIBILITY REPORT

Submitted to

MINISTRY OF ENVIRONMENT & FORESTS

GOVT. OF INDIA

Paryavaran Bhawan, CGO Complex

Lodhi Road, New Delhi-110 003

OF

MUNSAR MANGANESE MINE

Tehsil-Ramtek, Dist-Nagpur, Maharashtra

(Area 133.78 Ha; Production Capacity @ 0.125 MTPA Manganese ore)

PROJECT PROPONENT

MOIL LIMITED

MOIL Bhavan, A-1, Katol Road, Nagpur. Maharashtra

EIA CONSULTANT

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No.: NABET/EIA/127/SA02/0613 Dated 26.06.2013

November 2013

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1. EXECUTIVE SUMMARY

- This summary presents a brief summary of the Manganese Mine located at village(s); Munsar, Chargaon, Khairi, Parsoda and Kandri, Tehsil: Ramtek, Dist: Nagpur, Maharashtra.
- Mining operations in this lease were started by MOIL in early sixties. The production of Manganese ore from the underground was commenced in the year 1982 prior to that it was worked by opencast mine by MOIL and then British company, the CPMO.
- Existing Capacity 0.049997 MTPA Manganese Ore with mining lease area of 149.06 Ha. The environmental clearance under EIA Notification 2006 has been obtained vide Letter No. J-11015-429-2007 dated 26.12.2007. The 149.06 Ha ML consisted of 5 leases viz. 108.63 Ha (production of clean ore 48697 TPA), 25.15 Ha production of clean ore 400 TPA), 8.27 Ha production of clean ore 500 TPA), 5.7 Ha production of clean ore 320 TPA), and 0.97 Ha production of clean ore 275 TPA).
- Out of these five 8.27 Ha has been surrendered and there is no proposal for increase in production from 5.7 Ha and 0.97 Ha leases. Hence, the application is made for combined proposal of 133.78 Ha consisting of 108.63 Ha and 25.15 Ha. Scheme of mining is approved for this combined proposal from Indian Bureau of Mine (i.e. 133.78 Ha with a proposed production capacity of 125000 TPA clean manganese ore). Copy of the approval letter from IBM is enclosed as Annexure-1 of the Form-1.
- The region has good deposits of Manganese and has major demand in Steel industry. Geographically the mine is located in the center of India with well connected networks of Roads and Rail. The location advantage of the mine makes it possible to dispatch the Manganese in all the directions giving easy accessibility to the market.
- The manganese produced from this mine is used for blending purpose with different ores of Manganese ore based Ferro Alloys.
- The applied M.L. area over **133.78 hectares** is covered within the Survey of India toposheet No. 55 O/7 on a scale of 1:50,000 and it lies latitude and longitude of the center is $21^0$24’15”N and $79^0$16’45”E.
- MOIL Limited has initiated all the necessary steps for increase production of Manganese mining from Munsar Manganese Mine.
- The lease area is undulating with highest level 90 m high form general ground level of 315 m MSL towards south and east. The highest level is towards north-west. The hillock is having almost NW-SE trend.
- Considering the scale of operation, geological setting and the nature of deposit, it is proposed to adopt opencast/underground method of mining involving ripping / dozing,

drilling- blasting, manual sorting, sizing and stacking as well as mechanized loading and transportation.

- The Manganese mine (133.78 hectares) will be developed as Fully Opencast /Underground Mechanized Mine for the production of Manganese @ **0.125 MTPA**. It is also proposed to obtain recovery of ore from old dumps. Commercially exploitable Manganese deposits occur in this proposed mining lease.
- The manganese of the lease area has been classified under four grades based on Mn percentage availability. These are Mn-46 to 48%, 35-46%, 30 to 35% and 14-30%. Average Mn% in dump is 25.35%. The Manganese is of Ferro grade as well as LGHS grade.
- The mine waste is in the form of mica schist, quartzite, bed rejects comprised of gondite manganese quartzite and rejects below threshold value of 10% Mn. It is proposed to carryout simultaneous backfilling of the OB/Schist of exhausted pits.
- The water requirement of the project is estimated to be 100 m^3/day of the water is required for drinking/domestic purpose. Water requirement for dust suppression (within the lease and outside the lease in nearby villages), plantation and vehicle washing will be met from mine water and from rainwater collected in mining pit. Necessary permissions shall be obtained from the competent authorities.
- The power requirement will be met from adjoining from State electricity board.
- Ground water table is expected to be at more than 2 to 11 m depth from surface level.
- The mining will be carried out as per the approved mining scheme. During Mining Plan period, the mining operation will be done by development of mechanized opencast/underground method. The plantation program will be taken up in the areas in future in a systematic manner and plantation will be carried out, starting with soil binding grasses and shrubs followed by larger trees species. Local varieties of plants shall be given predominance along with introduction of some exotic species.
- Uncontaminated topsoil, will be meticulously removed and transported to the non mineralized zone for future plantation.
- Estimated project cost is Rs. 17.38 Crores. The capital budget for environmental protection measure is estimated to be Rs 1.14 Crores.
- A site of archeological importance exists near the mine. In addition there are various places of worship/ tourist place and historical places exists in 15 Km radius of the project.
- There is no National Park, Wildlife sanctuary, defense installation or sensitive area located within 15 km radius of the proposed mine.
- The enhance production shall be carried out after obtaining all statutory permissions and shall be carried out as per approved mining scheme.

2. INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION.

i) Identification of Project and Project Proponent

- A Miniratna PSU was originally set up in the year 1896 as Central Province Prospecting Syndicate which was later renamed as Central Provinces Manganese Ore Company Limited (CPMO), a British Company incorporated in the UK. In 1962, as a result of an agreement between the Government of India and CPMO, the assets of the latter were taken over by the Government and MOIL was formed with 51% capital held between the Govt. of India and the State Governments of Maharashtra and Madhya Pradesh and the balance 49% by CPMO. It was in 1977, the balance 49% shareholding was acquired from CPMO and MOIL became a 100% Government Company under the administrative control of the Ministry of Steel.

  At present, MOIL operates 10 mines, six located in the Nagpur and Bhandara districts of Maharashtra and four in the Balaghat district of Madhya Pradesh. All these mines are about a century old. Except 3, rest of the mines are worked through underground method. The Balaghat Mine is the largest mine of the Company. The mine has now reached a mining depth of 309 meters from the surface. Dongri Buzurg Mine located in the Bhandara district of Maharashtra is an opencast mine that produces manganese dioxide ore used by dry battery industry. This ore in the form of manganous oxide is used as micro-nutrient for cattle feed and fertilizers. MOIL fulfills about 50% of the total requirement of dioxide ore in India. At present, the annual production is around 1,093,363 tonnes which is expected to grow in the coming years. MOIL has set up Ferro Manganese Plant (10,000 TPY) and Electrolytic Manganese Dioxide (EMD) Plant (1000 TPY) as per its diversification plan for value addition to manganese ore. MOIL has also set up a Captive Power Plant and is further considering, expanding the capacity of ferro manganese plant and setting up a new Silico Manganese Plant by means of joint ventures entered into with Rashtriya Ispat Nigam Limited and Steel Authority of India Limited.

- Mining operations in Munsar Mine of leases under consideration were started by MOIL in early sixties. The production of manganese ore was commenced in the year 1982 prior to that it was worked by opencast mine by MOIL and then British company, the CPMO, with an objective to carry on the business of manufacturing Manganese. The

Company is having its Registered Office at A-1 MOIL Bhavan, Katol Road, Nagpur, Maharashtra – 490 001.

- The Mining plan of Munsar Mine for the leasehold area of 108.93 Ha and 25.15 Ha, was approved on 06.05.2003, under rule 24A of MCR 1960 for lease period 2002 - 2022.
- The composite 1st scheme of mining for both the mining lease has been approved upto 2011-12 on dated 14.12.2010 under the rule 12 of MCDR 1988. The Company has already submitted the Copies of 2nd Mining Scheme with Indian Bureau of Mines, Nagpur for approval for the period of 2012-13 to 2016-17 and necessary approval obtained from IBM (A copy of approval is attached as Annexure-1 of Form-1).

ii) Brief description of nature of the project

- M/s. MOIL Limited has proposed a Manganese plant at village: Munsar, Tehsil: Ramtek, Dist: Nagpur, Maharashtra.
- In order to cater the need for Manganese the company applied for the mining lease near the same village. The proposed Manganese mine (133.78 hectares) will be developed as Fully Mechanized Mine by a combination of OC/UG mine (also recovery from ore) for the production of Manganese @ 0.125 MTPA . Commercially exploitable Manganese deposits occur in this proposed mining lease.

iii) Need for the project and its important to the country and or region.

Manganese is one of the major mineral deposits occurring in the Indian sub-continent. It has played a great role in development of civilization and industrialization. The occurrence of Manganese ore in the proposed area is proved by the way of exploration and its production has important role in the steel industries. The M.L. area over 133.78 hectares is covered within the Survey of India toposheet No. 55O/7. The capacity of the proposed Manganese mine to cater the need of Manganese plant is 0.125 MTPA. The region, where the project is situated is mostly dependant on agriculture and other mining industry. The development of mining in the area is directly and indirectly going to contribute in increasing employment, infrastructure, communication, and socioeconomic infrastructure.

iv) Employment Generation (Direct and Indirect) due to the project.

The mine will directly employ about 684 workers. There will be also employment generation in secondary and tertiary sectors. It is proposed to employ the local population wherever possible in the proposed project activities.

3. PROJECT DESCRIPTION

i) Type of project including interlinked and Interdependent project, if any.

The proposed enhance of production of Manganese by opencast/underground mining and dump mining @ 0.125 MTPA fully mechanized mine. There is no interlinked project with this mine.

ii) Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.

Figure 1 gives the general and specific location of Munsar Manganese Mine**.** The area can be approached from Nagpur by NH-7 upto Munsar village. The Munsar mine is at the distance of 3 km from Munsar on Munsar-Tumsar SH. The nearest Rly station is Ramtek which is about 1.5 km.

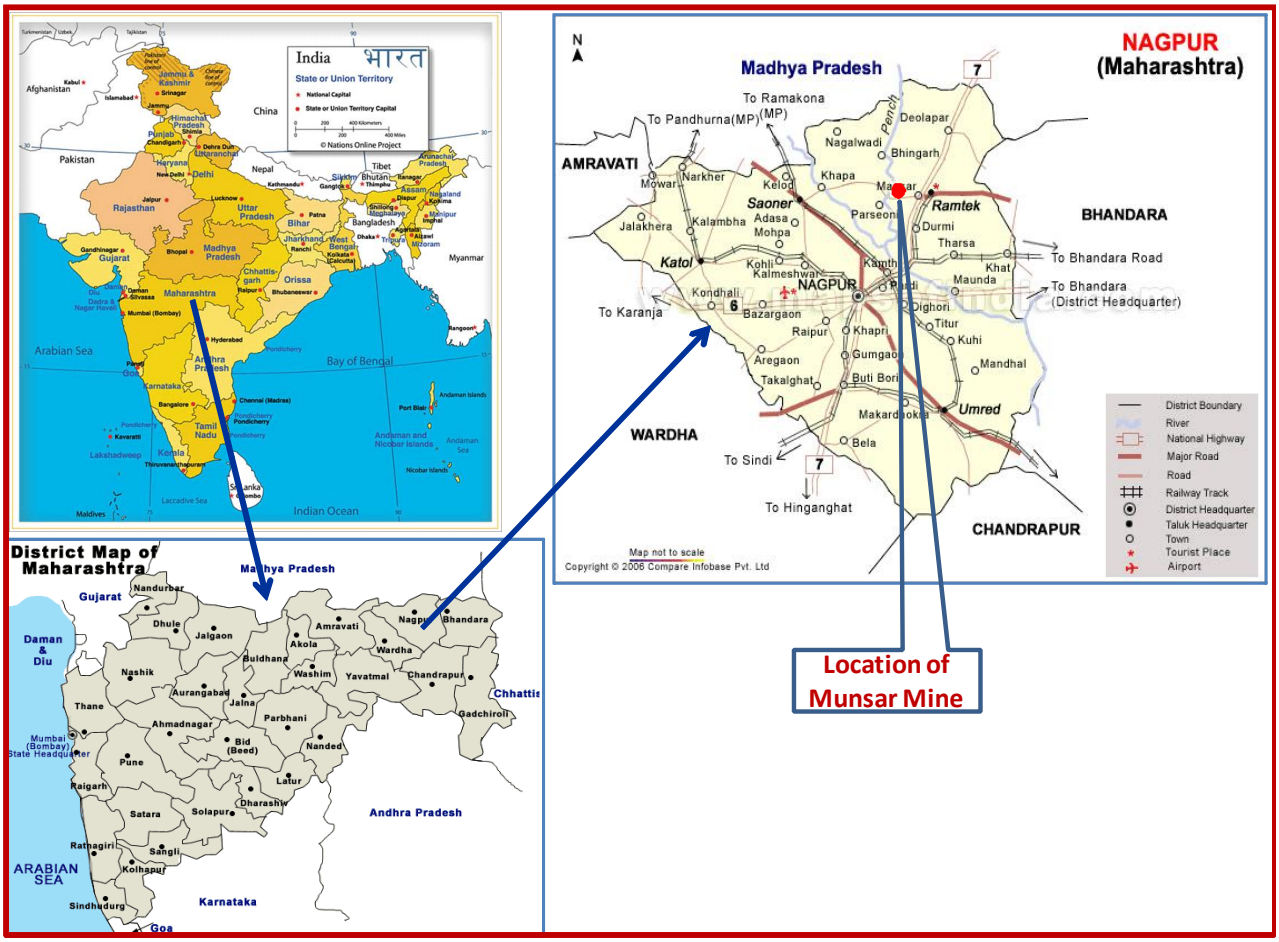


Figure 1 : Location of Mine

The area proposed for mining lease is 43 Km. away from Nagpur district head quarter. It falls in Survey of India Toposheet no. 55 O/7. The latitude and longitude of the center is $21^0$23’22”N and $79^0$17’14”E”.

Village	Khasra No.	Lease Area Ha.	Ownership/ Occupancy
Village(s) Munsar, Chargaon, Khairi, Parsoda, Kandri Ramtek Tahsil, Dist Nagpur, Maharashtra.	As per list enclosed at **Annexure – I**	108.63	Pvt. Land - 15.75 Ha. Govt. land - 80.73 Ha. Forest Land - 12.15 Ha.
		25.15	Pvt. Land - 19.67 Ha. Govt. land - 2.08 Ha. Forest Land - 3.40 Ha

Map 1A & **Map1B** gives the project boundary of 108.63 Ha & 25.15 Ha respectively. **Map 2** gives site Layout/Surface Plan of 133.78 Ha. The coordinates of the boundary are given in **Annexure II.**

iii) Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental consideration gone into should be highlighted.

Mining is a site specific and has to be undertaken at the place of the occurrence of the mineral and hence no alternative sites explored.

iv) Size or magnitude of operation.

The proposed mining Lease Area is 133.78 Ha with Production capacity of Manganese 0.125 MTPA.

v) Project description with process details (a schematic diagram/ flow chart showing the project layout, components of the project etc. should be given).

Geology of the area as dealt in mine plan has been considered for the study and relevant portions are reproduced below

- **Regional Geology :** The general geology and succession of the region is as follows :

Bichua Formation	:	Dolomitic, serpentine-bearing marbel:cale- silicate granulites : occurs in all areas except south and east.
Junewani Formation	:	Muscovite-biotite quartz schists, granulites and gneisses : index minerals are granuated staurolote, sillimanite. And kyanite : widespread. Lenticular, locally interbedded with Bichua Formation.
Charbaoli Formation	:	Quartzites' micaceous and feldspathic quartz schist and local autoclastic quartz conglomerates sporadic garnet. Sillimanite; kyanite widespread except in center of belt.
Munsar Formation	:	Micaceous schist and phyllites' commonly with garnet; most widespread Formation in Sausar Group: contains Manganese

ores' including gondites.

Lohangi Formation	:	Three interdigitating members; pinches out to south and east into Sitasaonggi Formation; contains Manganes ores.
Lohangi Member	:	Calcitic and dolomitic marbles.
Utekata Member	:	Calc-silicate granuites and gneisses.
Kadbi Khera Member	:	Quartz/biotite granulite and gneiss.
Sitasaongi Formation	:	Quartz-muscovite-feldspar schist and intercalated quartzites; local kyanite and garnet.
Tirodi Formation	:	Biotite gneiss with minor amphibolite **calcareous** gneisses and schist garnet common. Locally prophyrolnastion. Mainly in center of belt.

Local Geology of the Mine: The manganese ore of this area is associated with the rocks of Sausar series. The ore bed in this area occurs in the Munsar formation of the Sausar rock belongs to the Dharwar metasediments and comprises of 'various types of schists and gneisses, dolomitic marble' calcgranulites Biotite gneiss is found at the base of the lower most Sausar formation' and it is involved in the movement with rocks of the same group. During this movement it might have developed some fracture which makes it difficult to identify. The hanging wall formation occurring to the north of the ore body consists of quartz-mica schist which changes to schistose gneiss due to textural composition and different mineralogical assemblages caused due to metamorphism. The constituent minerals' as megascopically examined appears as quartz feldspars mostly pink colour [Microcline] muscovite; biotite with or without specks of iron ore [specularite].

Structure : The general strike of the ore bed in the Munsar mine area is N60" W-S-60" E which is changed to about NW-SE in K.L. Pit area and NNW-SSE in extreme in Parsoda area. The dip in general is towards north in the area between Durga pit and K.L.Pit

Joints : About 6 Nos. at joint sets have been observed and noted in the area of which N60 degree West – S 60 degree East & N 30 degree East – S 30 degree West are the prominent sets of joints.

- **Reserves** :

Insitu Ore reserves and resources (Tonnes)		
Reserve	Resources	Mineable reserve
2159165	2478080	2906000

- There are two type of dumps in the lease area. One is OB dump/White dump and other is mineralized dump/back dump with recovery of low grade manganese ore (Mn 25%). The overall recovery from dump is about 21%. Often it has been observed in the ML area that after removal of schist at top from white dump, ore has been recovered as if schist and mineralized dump has been stacked in layers. This is all based on past experience of mining in ML area. Hence about 7,25,004 T of reserve has been assessed from dumps in 108.63 hects area.
- Dump Reserves as on 01.04.2012 for lease area 108.63 Ha are 725004 tonnes and for the lease area of 25.15 Ha lease are 21830 tonnes. Anticipated life of the mine is 23 years.
- The sinking of vertical shaft at 108.63 Ha lease area is in progress. The shaft will be sunk upto -330' L, drive will be driven on either side of the shaft for complete exploitation of the ore. So far the exploration has established the ore up to -230' L. It is proposed to explore this area to its full potential.
- **Quality of Manganese -:** Detailed exploration has been carried out by DGM, by means of Core Drilling prior to this while Geological Mapping surface sample were collected to ascertain the quality and grade of Manganese. In addition MOIL Limited has also carried out exploration on regular basis and samples were collected and analysed and analyzed for their chemical quality.

  Chemical constituents

The ore body of the lease area has following chemical constituents.

Chemical Constituents	Ferro Grade Ore (%)	L.G.H.S. (%)
Mn	43-45	30-35
Silica	15-16	25-30
Phos	0.26	0.30
Fe	7.5-8.0	8.0

Mining Method : The leasehold area of 108.63 ha was acquired by CPMO, a British company. The mining activities were commenced by way of boulder mining. The opencast activities were commenced with depletion of boulder ore. As market was gaining momentum, the underground sections at different R.L. were opened.

Salient Feature of Present Mining Method : Munsar has a long strike length ranging from chainage (-) 1200 to chainage 8400, It is about 2.90 Kms. in length. Average width of ore bed on out crop is about 7 mtrs. In early years of mining float ore was mined in the FW & HW side of out crop along all over ore bed, it was at shallow depth. Subsequently same was converted in to opencast mining. There are number of old opencast pits all along the strike length of ore bed, and they are named as under.

Details of different mines

Pit	Extent From Chainage	To Chainage	Pit Bottom level (R.L. in Metres)
Durga Pit	(-) 1200	00	335
Main Pit	0	900	306
Main hill pit	900	3800	385
Bunglow pit	3800	4700	300
K.L. Pit	5400	6800	300
Parsoda Pit	7600	8400	300

Presently, opencast working of KL pit are discontinued. Working at Bunglow Pit area in between Chainage 4000 to 4600 is proposed during next five years.

The underground workings were started in early sixties. Two levels were opened through Adits, the one at 270 ft level (356 MRL) and the other at 170 ft level (330 MRL). These two levels were worked extensively and exhausted during the beginning of eighties. A third level at 70 ft L (303 MRL) was opened through an Incline shaft. Presently this level is being worked between Ch. 1650 to Ch. 2650 in a number of stopes. This level is developed upto ch. 3050.

Underground Working : The underground mining activity is confined from Ch. 200 to Ch. 3050 Three levels are developed namely 270 ft L (357 MRL) 170 ft L (333 MRL) and 70 ft L (303 MRL). 270 ft L & 170 ft L are opened up by adit while to reach 70 ft L an Incline shaft has been sunk at Ch. 200 The two upper levels (270 ft and 170 ft L) are already exhausted and the working closed after proper filling, and presently underground mining activities are confined to 3rd level i.e. 70 ft level. The mining activity at this level is carried on between chainage 1650 to 2650 and the lateral development will be extended to Ch. 3650.

Opencast Working : Previously mining done by opencast method workings were spread at over Durga Pit (Chainage – 1200 to Chainage – 00). Main pit (Chainage 00 to Chainage – 900) Main hill pit. (chainage – 900 to chainage 3000) K.L.Pit (Chainage 5400 to chainage 6800), and Parsoda (chainage 7600 to chainage 8400).

Presently Opencast working is discontinued as it has crossed the economic limit. During the year 2002-03 it was proposed to start O/C working at Parsoda area in between Ch 8000 to 8400 on experimental basis by deploying shovels and dumpers on contractual basis. Initially 550000 m^3 on waste rock will be removed from this area the ore body is proved by borehole in this area and if the result of O/C workings are encouraging the O/C working shall be continued here.

Dump Mining : Low grade siliceous ore consisting 25% - 30 % Mn are recovered from the various old mineralized dumps. The ore removed are lumpy and fines (+1.5 mm size)

Sinking of vertical shaft at Munsar mine

Vertical Shaft details ;

Location	Ch. 2600
Coordinate	N14585-E15460 (GRL-342)
Diameter	4.5 m (Finished)
Depth	156 m
No. of levels	4(70'L, -30'L, -130'L & -230L)
Winder	Double drum, Balanced Double Cage, Approximate Motor H.P. 250 D.C. with PLC based Thyristaiered control
Speed of winding	3 m/sec.

Sinking vertical shaft

Sinking of vertical shaft has been stated on 20.05.2010 at Ch. 2600, shaft collar is located at 347 MRL the finished diameter of the sinking shaft is 4.5 m. it is proposed to hoist 1,60,00 Tones ROM per year. The shaft will be sunk to open -30'L , -130L and -230'L. The estimated depth of the shaft will be 156 m. the RLs of the shaft at various points will be as under;

RL of shaft collar	342 m
RL of +70 level	306 m
RL of -30 level	276 m
RL of -130 level	246 m
RL of -230 level	216 m
RL of shaft bottom	186 m

It is proposed to hoist the ore through cage by tubs only. Since, it is proposed to sink the shaft in foot wall, the main shaft cross cut will be extended to hang wall with approx. length of 130 m at each level. Sinking & development work carried out upto 1.4.2012 is given below ;

a. Vertical shaft : Sinking upto 102 m; lining upto 92 m
b. Insect excavation & Insect Lining at 70' L – Completed
   Insect excavation & Insect Lining at -30' L – Completed
c. Horizontal development at 70 'L-138.15 m from shaft inset
   Horizontal development at -30 'L-35 m from shaft inset

   Details are given in underground development.

Additional new vertical shaft :

It is also the sink afftional new vertical shaft in the property of 108.93 Ha area. It will be located in between the Ch. 5100. Pre-feasibility work is undergoing. Feasibility and other rock mechanical studies will be undertaken during the year 2012-13. Anticipated depth of the shaft will be around 150 m from the surface

High speed winze :

It is also proposed to deepen the additional winze from the surface near vertical shaft, which is nearly 44 m in depth. This will be used for secondary outlet as well as for hoisting the ore/waste from 70'L, before commencing of the vertical shaft. This work will be undertaken during the year 2012-13.

The Proposed Production Programme:

Thus the total production of ROM ore is as follows :

Year	**ROM Manganese in tonnes**
Ist	70000
II nd	80000
III rd	80000
IV th	80000
V th	100000
Total	**410000**

The rated capacity of the mine is proposed @ 0.125 MTPA. Considering the mineable proved and probable reserves 2.906 million tonnes, the life of the mine will be 2.906/0.125 = 23.24 years (say 23 years). After completion proposed exploration, the present reserve will converted to proved category and get increased with increase in anticipated life of mine. The life of the mine will get enhanced after the completion of proposed boreholes in the area, when the probable reserve and possible resources will be converted into the proved category. During the conceptual stage, if any extra boreholes are needed, will be planned during the next scheme of mining.

Conceptual plan: The mining operation by means of underground/opencast method will be continued till conceptual period. The proved reserves will be fully utilized during the estimated life span of mine. Thus over all 2.906 MT mineable reserves will be generating 1.5 Mm^3 (both from dump mining and opencast).

Conceptual mine development : In this mining scheme 133.78 Ha area will be developed and as per Proved and Probable reserves about 2.906 MT.

Waste Generation and Management: During this mining plan period, simultaneous back filling of the OB will be done. After leveling the dumps, plantation will be carried out for stabilization of all the OBS dumps in the mining lease area.

- **Final slope angle at the close of the mine:** Construction of parapet walls/bund is proposed at toe of dumps to avoid siltation towards sloping side of the ML area due to dumps. No toxic and hazardous element is present in the OB as well as in the ore body. Hence no toxic contamination is expected and protective measure is required. The non-active sides of the dump will be vegetated and stabilized by fast growing grasses.

- The proposed method of mining will be of opencast/underground mechanized method. In this mining lease area. The salient feature of mining are described below;

  i) The mining lease area there is no soil cover. The OB soil will be removed by Dozer cum scrapper. The OB soil will be dumped by shovel dumper combination to the specified location marked on Year-wise Development & production plans separately. For removal of OB one bench will have to be made depending on the thickness of OB. The required slope of 45^0 will be maintained for this bench.

  ii) After excavation of the OB the exposed Manganese bed will be mined out. The targeted production of Manganese will be achieved by making benches of specified dimension of 6m height and width 10 m., the average slope of bench will be maintained at 60^0.

  iii) For the purpose of making of benches the Manganese bed will be drilled by wagon drills (100mm. dia.), up to the required 6.0 m depth to obtain a bench of 6 m height. The drill holes will be then blasted by using prime gel cartridges.

  iv) The blasted material will be loaded into the trucks by the excavator / shovel and the over sized boulders if any, will be reduced to loadable size by hydraulic rock breaker for loading into dumpers and transported to the plants /hopper. The broken ROM of loadable size will be loaded by 1.4 cum bucket capacity excavator/shovel into 12 to 15 tonne capacity dumpers and transported to the Plant and the graded sized Manganese (+10 mm) will be transported the proposed Manganese plant.

  v) The clayey material filled in cavities in Manganese along with finer fraction of Manganese (-10mm) will get separated out during screening which will be stacked

near to the Plant at the specified sites for future blending in required proportion with graded Manganese.

vi) The sub-sequent benches of similar dimension will be formed. The haulage road will be constructed in 1:16 gradient and sufficiently wide for to and fro movement of dumpers.

- **Processing**

Mineral drawn on surface is sent to OCF for appropriate sizing and grading. This is a manual process. The -25 mm fraction is screen for +10 mm fraction. With change in demand for lower fractions, a screen has been installed for recovery of fines + 3 mm. The mineral dumps will be re-cleaned for + 3 mm. + 10 mm and + 25 mm fractions through double deck screen.

- **Marketing /End Use**

From OCF the ore is brought to siding by tubs pushed manually from siding the ore the ore is transported to its final destination by railway wagons as well as by trucks depending upon the convenience and choice of buyers.

- **Mine Drainage**

The Munsar has both old opencast and u/g. workings. There are separate arrangements for drainage of both working areas. The surface rainy water is carried away from the mine by drains. Drainage in old opencast workings : The accumulated water from the Durga pit and main pit are pumped out so as to avoid seepage in U/G two 50 HP pumps one each in either pits are provided for pumping.

- **Drainage of underground mine water :**

In u/g. 70 ft. level, two water pumps having capacity 50 H.P. each, with yielding capacity 1350 L.P.M. each are installed to cope up in rush and seepage water. There is one sump having capacity of 15,55,000 Lits which is situated between chainage 650 and chainage 850. Above mentioned pumps are draining out water which is accumulated in this sump. In normal days average accumulation of seepage water is 30,000 lits. Per day. Whereas in monsoon it goes upto 5 lakhs liters per day. In addition to this there is also a small sump at ch. 200 near incline pit bottom. This has capacity of 35000 lits. Two 15 H.P. each pumps are connected to this sump.

vi) Raw material along with estimated quantity, likely source marketing area of final products, mode of transport of raw material and Finished product.

From OCF the ore is brought to siding by tubs pushed manually from siding the ore the ore is transported to its final destination by railway wagons as well as by trucks depending upon the convenience and choice of buyers.

vii) Resource optimization / recycling and reuse envisaged in the project, if any, should be briefly outlined.

Not envisage in this project.

viii) Availability of water its source, Energy / power requirement and source should be given.

The water requirement of the project is estimated to be 100 m^3/day of the water is required for drinking/domestic purpose. Water requirement for dust suppression (within the lease and outside the lease in nearby villages), plantation and vehicle washing will be met from mine water and from rainwater collected in mining pit.

The power requirement will be met from MSEB grid.

ix) Quantity of waste to be generated (liquid and solid) and scheme for their Management /disposal.

There is no liquid effluent generation from the proposed mine. There will be hardly any waste rock during the mining. If at all any waste material/rock is encountered during mining upto ultimate depth, the quantity the same will be negligible. It will be dumped on the non mineralized area and shall be biologically reclaimed.

x) Schematic representation of the feasibility drawing which give information of EIA purpose.

The EIA will include an assessment of the potential impacts envisaged as an effect of the project, during the operation of the mine. The assessment will be based on a consideration of the individual components of the project.

4. SITE ANALYSIS

i) Connectivity.

The area can be approached from Nagpur by NH-7 upto Munsar village. The Munsar mine is at the distance of 3 km from Munsar on Munsar-Tumsar SH. The nearest Rly station is Ramtek which is about 1.5 km.

ii) Land use and Land ownership.

As per the administrative records the Land use of the Mine is as given below.

Village	Lease Area Ha.	Ownership/ Occupancy
Munsar Parsoda, Khairi, Chargaon and Kandri, Tahsil Ramtek, Dist Nagpur, Maharashtra	108.63	Pvt. Land - 15.75 Ha. Govt. land - 80.73 Ha. Forest Land - 12.15 Ha.
	25.15	Pvt. Land - 19.67 Ha. Govt. land - 2.08 Ha. Forest Land - 3.40 Ha.

iii) Topography (along with map).

The lease are is undulating with highest level 90 m high form general ground level of 315 m. MSL towards south and east. The highest level is towards north west. The hillock is having almost NW-SE trend. The layout map showing contours is enclosed as **Map 2**.

iv) Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forest, national park, wild life sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the Gazette notification should be given.

A key plan showing landuse and shortest distance from forest and other features is enclosed as **Map 3.** A brief summary of the features in 10 Km buffer zone is tabulated below;

Sr. No.	Description	Detail
1	Reserves Forest	• Junewani RE - 8 Km • Ghuksi RF - 6 Km
2	Nearest National Highway	NH –7 -3 Km
3	Nearest State Highway	Munsar – Tumsar SH - 0.5 Km
4	Nearest Railway Station	Ramtek - 2 Km

5	Nearest Airport	Nagpur - 45 km
6	Nearest Major city	Nagpur - 40 Km
7	District Head Quarter	Nagpur - 40 Km
8	Nearest River / Dam	Sur Nadi 7 Km / Khindsi Dam – 7 Km
9	National Park, Wild Life Sanctuary, Eco Sensitive areas	None within 15 Km

v) Existing Infrastructure.

Water supply in most of the villages is available. Latrine facility, Waste Water disposal, garbage disposal were available is some villages. While educational facilities & health facilities are available in most of the villages. There is well established road connection.

vi) Soil classification.

Soil is the most important feature of physiography, the formation of which largely depends upon the topography rock types and drainage. The cropping pattern in the area is governed by the thickness of soil mantle, its texture and constancy. The soils of Ramtek tehsil are of various types. Each type covering a well-defined tract which displays cropping pattern of totally different level. The soil of the tehsil is well defined and conductive for growing crops of various kinds. The numerous varieties of soils known by many local names they are grouped under the representative classes.

vii) Climatic data from secondary sources.

The climate of the area is tropical. The rainfall data has been collected from Nagpur Tehsil Office. The temperature and humidity has been collected from Nagpur Meteorological Station. The climate of this district, which is similar to neighboring districts of north Deccan, is characterized by a hot summer and general dryness except during the southwest monsoon season. The cold season from December to February is followed by the hot season from March to May. The period from June to September is the southwest monsoon season and October and November form the post monsoon period.

Rainfall : The normal annual rainfall at Ramtek is is 1158 mm. The heaviest rainfall in 24 hours recorded at Ramtek station was 288 mm on 17th July 1985.

Temperature : The data of the meteorological conditions in the district in general. The cold weather commences towards the end of November and December is usually the coldest month with the mean daily maximum temperature at about 28^{o}C and the mean daily minimum temperature at about 13^{o}C. In the wake of western disturbances which pass across north India in the cold season, the district is sometimes affected by cold

waves when the minimum temperature may go down to 4^{o}C. From the beginning of March, temperatures begin to rise rapidly. May is the hottest month with the mean daily maximum temperature at about 42.5^{o}C. The heat during the summer season is severe during the day, the nights being comparatively cooler. The afternoon heat is sometimes relieved by thundershowers. The onset of the southwest monsoon by about the second week of June brings welcome relief from the heat, with a considerable drop in temperature. With the withdrawal of the southwest monsoon by about the beginning of October, the day temperature show a slight increase in October and thereafter begin to fall, while the night temperatures decrease after September.

Humidity : Except during the monsoon season when the humidity is high (70-80%) the air is generally dry. The summer season is the driest part of the year when the relative humidity may go down to 20% or less particularly in the afternoons.

Winds : Winds are generally light to moderate with some increase in speed in the latter part of the summer season and the monsoon months. During the monsoon season winds are mostly from directions between southwest and northwest. In the period from October to December the winds are mainly northerly to northwesterly in the mornings and northeasterly to easterly in the afternoons. In January winds from directions between north and northeast are common in the mornings and from northeast, east and southeast in the afternoons. While the winds in the mornings in February and March are as in January, the afternoon winds become variable. In the rest of the summer season winds are mostly from directions between west and northwest.

viii) Social Infrastructure available.

Education : Education is a basic requirement for every human being. The governments should utilize its entire recourses in a rational manner to encourage people to become literate to some extent since educated persons are assets ho help in proper development of the country. In the Ramtek Tehsil, there are number of primary, middle and Higher secondary school and colleges.

Hospital : There are number of Hospital, dispensaries, primary health centre and Sub primary health centre available in that tehsil.

Transport : The transport facilities in the tehsil are well developed and wide spread. State or national highway link most of the urban areas.

Communication: Communication facilities go a long way in information collection and its dissemination in an effective and speedy manner. In the modern society, the roll of the facilities in the socioeconomic development of the society is very well recognized.

Communication facility help in the flow of information from one place to another in shortest time, thus helping administration and corporate managers to take crucial decisions relating to daily functioning of administration and business dealings in shortest possible time. The importance of developed communication network for the common men judged from the fact that in rural areas. All communication facility like as phone, fax, printer, scanner, computer etc are available in Ramtek tehsil.

5. PLANNING BRIEF

i) Planning Concept (type of Industries, facilities, transportation etc) Town and country planning/ Development authority Classification.

The mining will be carried out as per the approved mining plan. During Mining Plan period, the mining operation will be done by development of mechanized opencast method. The statutory provisions for the development of mine shall be followed to ensure safe mining practices and conservation of mineral. During the course of mining protection and conservation of natural resources and protection of environment will be ensured.

ii) Population Projection.

The mine will provide direct employment to nearly 684 workers besides direct employment opportunities for 500/600 workers in company's adjacent Manganese plant during construction/operation phase. The local persons will be given preference in employment for mine and Manganese plant as per their eligibility. Necessary training will be given to train the unemployed youths of the nearby villages. The indirect employment opportunities will automatically created with the click of Manganese plant and mining industry in the region.

iii) Land use planning (breakup along with green belt etc.).

The landuse for the mining lease will be strictly followed as per the approved mining plan.

iv) Assessment of Infrastructure Demand (physical & social).

The proposed mining will require roads for the transport of the mineral besides it will require manpower to operate the proposed mine.

v) Amenities/Facilities.

These include community toilets, drinking water facilities like public stand posts.

6. PROPOSED INFRASTRUCTURE

i) Industrial area (processing area).

No processing of manganese is proposed.

ii) Residential Area (Non processing Area).

None

iii) Green Belt.

Plantation and its maintenance is a regular activity carried out by MOIL ltd on regular basis. It is proposed to undertake plantation of local tree species within these leases also.

iv) Social Infrastructure.

Under Corporate Social Responsibility (CSR) the felt needs of the nearby villages are identified and accordingly social infrastructures are developed as per the CSR policy of the MOIL Ltd.

v) Connectivity (Traffic and Transportation Road/Rail/Metro/Water ways etc.)

Well established

vi) Drinking Water management (Source & Supply of water)

Drinking water for the workers will be met from the borewell within the mining lease. Drinking water arrangement for the nearby villages under Corporate Social Responsibility (CSR) will be also made.

vii) Sewerage System.

None proposed

viii) Industrial Waste Management.

Not required

ix) Solid Waste Management.

None

x) Power Requirement & Supply / Source.

Through electricity board

7. REHABILITATION AND RESETTLEMENT (R & R) PLAN

i) Policy to be adopted (central/state) in respect of the project affected person including home oustees, land oustees and landless laborers (a brief outline to be given.)

Not Applicable

8. PROJECT SCHEDULE & COST ESTIMATES

The capital budget for environmental protection measure is estimated to be 1.14 Crores. Environment Management Plan is given in **Annexure-III.**

i) Likely date of start of construction and likely date of completion (Time schedule for the project to be given.)

The mining operations shall be carried out after obtaining all statutory permissions and shall be carried out as per approved mining plan.

ii) Estimated project cost along with analysis in terms of economic viability of the project.

The cost analysis in terms of economic viability of the project is presented at **Annexure IV.**

9. ANALYSIS OF PROPOSAL FINAL RECOMMENDATIONS)

i) Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area.

The liberalization of the Indian economy has catapulted the Indian industry into new realms of development through global thinking and related progress. The policies of Government on economic development have given various subsidies like slashing import duties and provisions for the Indian industry to grow indigenously, also there are clearly spelled guidelines for environmental management. The project under consideration aims to contribute in the national objective of economy and ecology developing hand in hand. The region, where the project is situated is mostly dependant on agriculture forest and mineral resources where Manganese has a major share. The development of mining in the area is directly and indirectly going to contribute in increasing employment, infrastructure, communication, and socioeconomic infrastructure. It is proposed to employ the local population wherever possible in the proposed project activities directly or indirectly. The proposed Manganese mine would naturally have implications on the neighborhood with reference to socio-economic aspects of society, environmental attributes such as land, water, air, aesthetics, flora and fauna. In assessing the environmental impact, collection, collation and interpretation of baseline data is of prime importance. Environmental impact analysis and assessment, which is required for every industrial project, should preferably be carried out at the planning stage itself.

In compliance with the environmental procedure the environmental clearance application is made. Necessary scientific studies will be undertaken as per the guidelines set by the Ministry of Environment and Forests (MoEF) and prescribed Terms of Reference. 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 Manganese Mine.

Annexure I

KHASRA WISE DETAILS FOR THE PROPOSED MANGANESE MINE

Area 108.63 Ha

VILLAGE	KH.NO.(OLD)	KH.NO.(NEW)	AREA IN AC.
CHARGAON	P.O.6	74	98.01
	P.O.7	89	1.22
	P.O.102	ROAD	1.47
	P.O.105	61	2.09
	P.O.106	73,72	20.27
	W.O.108	71	2.18
	W.O.110	69	3.29
	W.O.111	68	1.19
	W.O.112	62	2.07
	P.O.115	67	1.10
	P.O.116	67	2.43
TOTAL			135.32 AC.
KHAIRI	P.O.1	82	31.24
	P.O.17	78	6.40
	P.O.19	75,77	5.54
	P.O.20	76	0.92
TOTAL			44.10 AC.
MUNSAR	W.O.11	24	9.98
	W.O.12	27	45.72
	W.O.13	26	0.77
	W.O.16	26	1.78
	W.O.17	26	0.30
	W.O.18	30	0.74
	W.O.19	30	0.28
	W.O.20	28	3.46
TOTAL			63.03 AC.
PARSODA	P.O.7	104,105	2.20
	P.O.30	OLD30	1.30
	W.O.31	95	3.81
	P.O.32	97	0.56
	P.O.35	OLD35	0.48
	P.O.36	OLD36	0.01
	W.O.71	96	7.92
	P.O.72	94	8.28
	P.O.78	92	0.44
TOTAL			25.00 AC.
KANDRI	294	298	1.00 AC.

SUMMARY

1. CHARGAON	135.32 AC	54.762 Ha.	
2. KHAIRI	44.10 AC	17.846 Ha.	TOTAL AREA
3. MUNSAR	63.03 AC.	25.507 Ha.	268.45 AC.
4. PARSODA	25.00 AC.	10.117 Ha.	108.636 Ha.
5. KANDRI	1.00 AC	0.404 Ha	

CERTIFIED

Area 25.63 Ha

VILLAGE	KH.NO (OLD)	KH.NO. (NEW)	AREA IN AC.
CHARGAON	P.O.3	82	0.25
	P.O.4	82	3.50
	P.O.7	89	0.10
	P.O.8	90	2.04
	P.O.9	91	2.66
	P.O.10	92	0.68
	P.O.11	92	1.24
	P.O.12	92	1.55
	P.O.13	88	0.45
	P.O.14	87	0.36
	P.O.15	92	0.85
	P.O.16	92	0.35
	P.O.17	93	8.46
	P.O.18	86	3.52
	P.O.19	83	5.20
	P.O.20	94	5.25
	P.O.95	96	0.92
	P.O.96	55	1.10
	P.O.99	58	2.00
	P.O.101	56	1.40
	P.O.103	60	0.08
	P.O.104	59	0.20
	P.O.105	61	3.35
	P.O.113	66	2.28
	P.O.115	67	7.67
	P.O.116	67	6.70
	TOTAL		62.16 AC / 25.15 Ha

Annexure II

MUNSAR MINE BOUNDARY PILLAR LOCATION STATEMENT (AS PER DGPS)

MOIL LIMITED
MUNSAR MINE
NATIONAL GRID CO-ORDINATE BY GPS INSTRUMENT (108.93 Ha.)

BOUNDARY PILLAR NO.	LATITUDE N	LONGITUDE E
F8	21° 24' 19.8"	79° 14' 27.7"
12	21° 24' 23.9"	79° 16' 39.3"
11	21° 24' 21.3"	79° 16' 41.4"
10	21° 24' 22.0"	79° 16' 41.5"
9	21° 24' 21.9"	79° 16' 44.6"
7	21° 24' 25.9"	79° 16' 49.9"
12	21° 24' 9.2"	79° 17' 12.4"
12A	21° 24' 6.9"	79° 17' 14.10"
13A	21° 24' 00"	79° 17' 20.1"
14	21° 23' 57.4"	79° 17' 23"
48	21° 23' 55.2"	79° 17' 23"
47	21° 23' 55"	79° 17' 27.9"
46	21° 23' 55"	79° 17' 27.9"
45	21° 23' 53.6"	79° 17' 31.2"
39A	21° 23' 38.8"	79° 17' 13.5"
39	21° 23' 39.9"	79° 17' 13.4"
38	21° 23' 39.8"	79° 17' 13.9"
37	21° 23' 40"	79° 17' 27.1"
36	21° 23' 38.5"	79° 17' 26.7"
35	21° 23' 38.6"	79° 17' 25"
34	21° 23' 19.8"	79° 17' 24.3"
29	21° 23' 59.8"	79° 17' 7.2"
27	21° 23' 58.5"	79° 16' 54.4"
26	21° 23' 59.5"	79° 16' 51.30"
20	21° 24' 5.9"	79° 16' 38.5"
18	21° 24' 8.5"	79° 16' 34.4"
F2	21° 24' 10.2"	79° 16' 34.10"
F1	21° 24' 17.8"	79° 16' 33"
93	21° 23' 38"	79° 17' 42.5"
94	21° 23' 36.8"	79° 17' 43.3"
95	21° 23' 35.4"	79° 17' 35.20"
96	21° 23' 37.50"	79° 17' 35.0"
82	21° 23' 34.2"	79° 17' 35.1"
84	21° 30' 30.2"	79° 17' 35.1"
85	21° 23' 26.6"	79° 17' 36"
88	21° 23' 23.3"	79° 17' 47.5"
90	21° 23' 35.50"	79° 17' 47.4"
91	21° 23' 34.2"	79° 17' 45"
54	21° 24' 4.6"	79° 16' 38.8"
55	21° 24' 4.5"	79° 16' 38"
56	21° 24' 2.3"	79° 16' 41.5"
57	21° 23' 59.5"	79° 16' 40.3"
58	21° 23' 57.4"	79° 16' 57.4"
60	21° 23' 50.8"	79° 16' 41.5"
62	21° 23' 52.4"	79° 16' 50.7"
66	21° 23' 57.9"	79° 16' 50.6"

MOIL LIMITED
MUNSAR MINE
NATIONAL GRID CO-ORDINATE BY GPS INSTRUMENT (25.15 Ha.)

BOUNDARY PILLAR NO.	LATITUDE N	LONGITUDE E
1	21° 23' 39.6"	79° 17' 36.6"
2	21° 23' 40.1"	79° 17'42.1"
3	21° 23' 44.1"	79° 17' 42.0"
4	21° 23' 48.20"	79° 17' 38.3"
5	21° 23' 50.7"	79° 17' 36.2"
6	21° 23' 53.2	79° 17' 30.9"
7	21° 23' 46.4"	79° 17' 40.3"
8	21° 23' 44.8"	79° 17' 40.4"
9	21° 23' 54.9"	79° 17' 31.1"
10	21° 23' 55.7"	79° 17' 32.4"
11	21° 23' 57.6"	79° 17' 34.5"
12	21° 23' 57.8"	79° 17' 32.8"
13	21° 23' 58.8"	79° 17' 28.8"
14	21° 23' 57.8"	79° 17' 29.6"
15	21° 23' 53.8"	79° 17' 26.0"
16	21° 23' 58.4"	79° 17' 27.8"
17	21° 23' 59.9"	79° 17' 27"
18	21° 24' 1.7"	79° 17' 27.5"
19	21° 24' 4.3"	79° 17' 24.9"
20	21° 24' 3.6"	79° 17' 26.1"
21	21° 24' 5.7"	79° 17' 26.8"
22	21° 24' 8.3"	79° 17' 21.5"
23	21° 24' 9.8"	79° 17' 19.3"
24	21° 24' 7.2"	79° 17' 12.3"
25	21° 24' 7.3"	79° 17' 27.1"
26	21° 24'18.5"	79° 17' 31.4"
27	21° 24' 24.2"	79° 17' 16.9"
28	21° 24' 16.8"	79° 17'19.1"
29	21° 24' 12.3"	79° 17' 20.4"
30	21° 24' 13.9"	79° 17' 33.3"
31	21° 24' 12.9"	79° 17' 34.6"
32	21° 24' 13.2"	79° 17' 34.8"
33	21° 24' 14.7"	79° 17' 39.7"
34	21° 24' 15.3"	79° 17' 34"
35	21° 24' 7.6"	79° 17' 32.9"
36	21° 24' 9.7"	79° 17' 33.6"
37	21° 24' 10.4"	79° 17' 31.6"
38	21° 24' 8.5"	79° 17' 31"
39	21° 24' 4.7"	79° 17' 28"
40	21° 24' 7.2"	79° 17' 32"
48A	21° 23' 54.5"	79° 17' 27.7"

Annexure III

ENVIRONMENT MANAGEMENT PLAN

1.1 For Water Environment

Surface water is in the form of seasonal rain fall. It takes normal course and flows out of the area along natural slope. No impact on surface or ground water is expected as no chemical processing is involved.

1.2 For Air Environment

The proposed mining operations are mechanized and shall be done through deployment of mining machineries. The dust from the haul roads and drilling is expected to pollute the air to some extent. However, considering the production and nature of proposed mining operations particulate matter level will not be more than the permissible limit.

However, on the haulage road water will be sprinkled to minimize the raising of dust in the area.

Further, for minimizing dust generation during drilling & blasting and loading following measures are proposed:

- Wet drilling of blast holes
- Muckpile will be wetted before loading.
- The drillers will be given protective appliances to be used during drilling operations.

1.3 For Noise Environment :

Noise Level is likely to increase due to movement of machineries, drilling, etc. The measures will be taken to maintain the noise levels within limits. Periodical maintenance of equipment will be carried out. Moreover, the building of green belt that would be continued along lease boundary, dumping yards, haulage roads will help in restricting noise level. Noise due to blasting is controlled by using NONEL.

1.4 For reducing ground vibrations :

Ground vibrations caused by blasting will be monitored in order to know their degree and to build safe guards. The ground vibrations would be mainly at the point of blasting and further away the vibrations will decrease and becomes imperceptible.

To reduce the ground vibrations multi-row blasting will be adopted and charge per delay to be kept within limit. Blasting shall be carried out by using NONEL detonators, which controls air blast and ground vibration effectively.

Blasting will be done preferably in the afternoon. This will minimize vibration due to blasting and check noise pollution. Ground Vibration monitoring will be done regularly.

1.5 Stabilization of Overburden Dumps :

The stabilizations of dumps will be undertaken by means of terracing of dumps wherever necessary.

The dumps will be pitched from the slope side to a suitable height. Further, suitable vegetation / grass shall be planted on the dumps for making it biologically stable.

1.7 For Socio -Economic Environment

The proposed mining activity is expected to have a positive impact on the socio-demographic profile of the area. The local people shall get opportunities of employment in the unskilled semi-skilled category. The overall standard of living in the area is expected to improve due to coming of Munsar Manganese Mining Project.

MOIL LIMTED has already engaged an Environmental Consultant for undertaking detailed Base Line Monitoring Studies and for preparation Environmental Impact Assessment (EIA) and Environmental Management Plant (EMP).

Annexure IV

ESTIMATED PROJECT CAPITAL COST & PRODUCTION COST

Project Capital Cost

The total project cost for Munsar Manganese Mining Project has been estimated at Rs. 17.38 Crores. The break-up of the total estimated capital cost for the project is presented in following table:

All figures in Rs. Crores

Sr. No.	Investment Head	Estimated Capital Investment
1	Consultancy Charges	0.50
2	Land	1.06
3	Buildings & Structures	0.90
4	Additional Exploration/Investigation	9.67
5	Departmental Plant & Machinery including Crushing Plant	3.28
6	Office Furniture & Fixtures	0.10
7	Office Vehicles	0.73
8	Quality Control & Environment Protection	1.14
	Total	**17.38**

The basis of estimates for different investment heads are presented below:

Consultancy Charges : This includes the fees to be paid to technical consultants for preparation of Mining Plan, Environmental Impact Assessment / Environmental Management Plan, Project Report etc. It is estimated that Company has to incur Rs 0.50 crores towards payment of Consultancy Charges.

Land : The land has already been acquired by MOIL Limited. The capital cost is estimated to be 1.06 crores.

Buildings & Structures : This cost includes cost of office & other service buildings. The cost is on the basis of standard structures that are likely to be constructed. The prevailing rates have been taken. The cost estimated under this head is Rs 0.90 crores.

Additional Exploration : Additional drilling and trenching shall be carried out for further detailing about the geology and reserves. Some part of the expenditure to be incurred for additional drilling needs to be capitalized which is estimated as 9.67 crores.

Departmental Plant & Machinery : This includes opencast and underground equipments, consisting of drills/ excavators along with accessories, etc. Further, certain machineries like DG Sets etc may be required to be procured by the company.

All the other equipment required for overburden removal & Manganese mining including jack hammers, compressors etc will be arranged on "Hire Basis" through contractors. A number of contractors with required equipment available with them are already working in the area. The capital cost for departmental machinery has been estimated at Rs. 3.28 crores

Office Furniture, Fixtures and Vehicles : The cost of the Furniture & Fixtures, has been estimated from the available information. The total capital cost estimated under these heads is Rs 0.10 crores.

Quality Control & Environment Protection Cost : This includes expenses towards establishment of site laboratory for quality control during operation of the mine. Expenses towards procurement of the laboratory equipment, equipment for monitoring air, noise and water environment etc are included in this cost. The cost towards this head has been estimated at 1.14 crores.

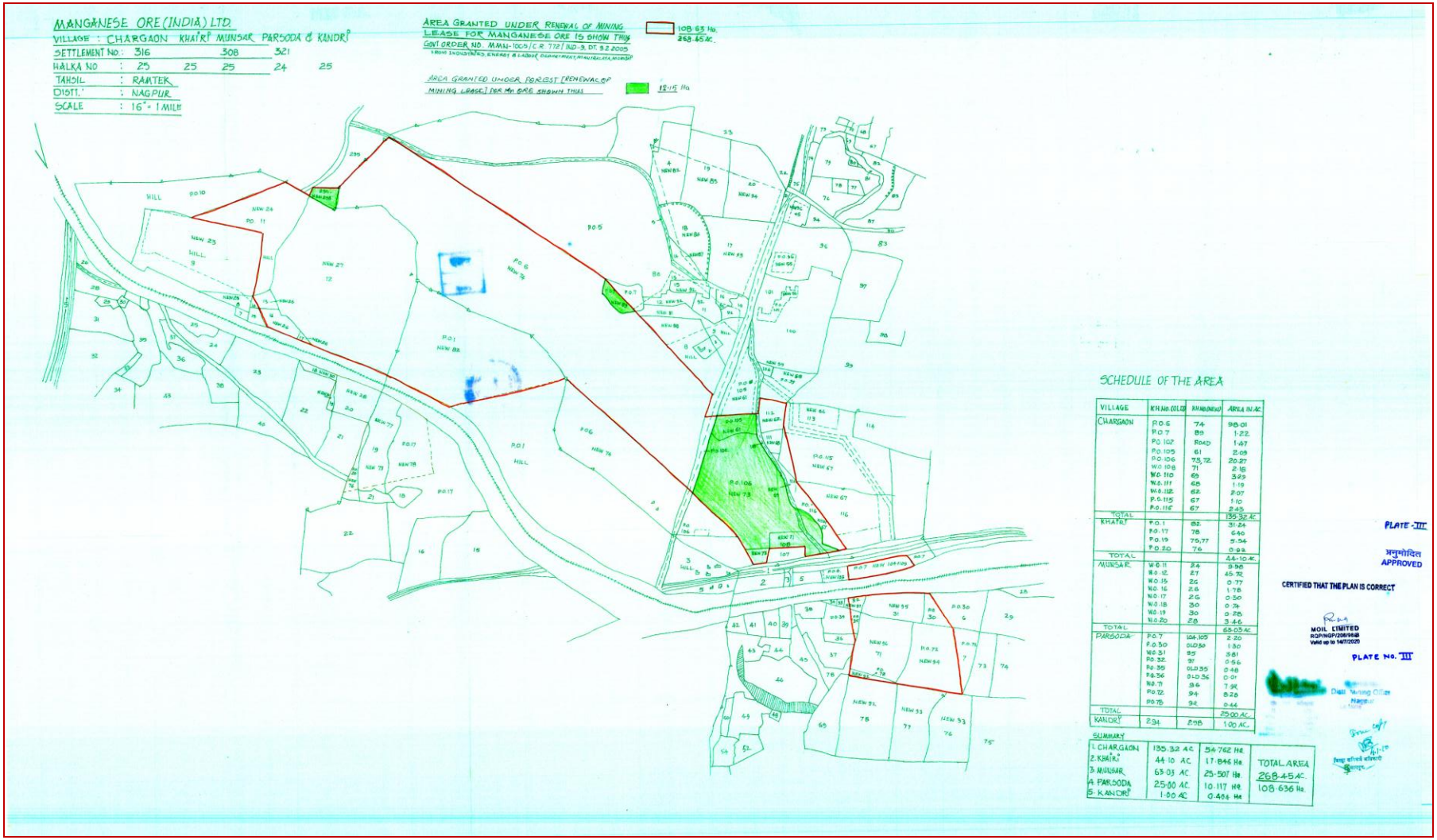
Thus, the basic Project Cost has been estimated as Rs 17.38 Crores.

Production Cost : The Munsar Manganese Mining Project has been planned with capacity of 0.125 million tonnes per annum.

The production of Manganese will be by opencast/underground mechanized method by using excavator/shovels, wagon drills, jackhammers, compressors, dumpers, dozers, tippers, etc. The cost of production for Manganese mining includes overburden removal, drilling & blasting, environment management, salary, wages, interest, royalty etc based on the estimate of provided approved scheme of mining the present cost of production is Rs. 2370/tonnes. Considering the provision of enhancement in production as per the approved scheme of mining the cost of production for the next five years has been estimated to be in the range of Rs. 2406/tonne to Rs. 3527/tonne. Inspire of this increase in the cost of production the revenue generation is much more than the expenditure to be incurred during this period. Thus, it can be inferred the approved scheme of mining for enhancement in production from 49992 TPA to 125000 TPA for this mining project is economically viable.

Map 1A

PROJECT BOUNDARY MAP : 108.63 Ha

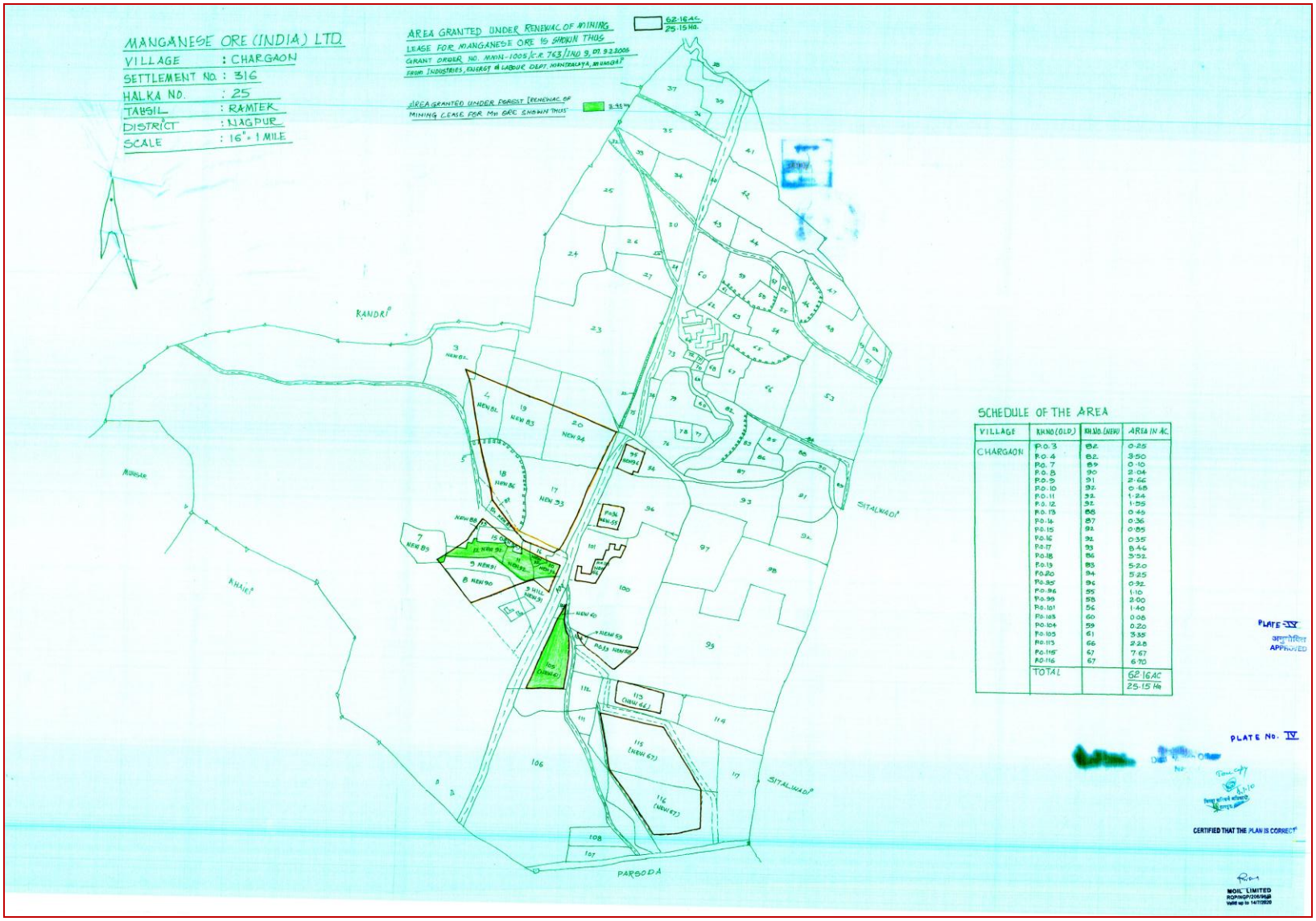


VILLAGE	KH.NO./OLD	KH.NO./NEW	AREA IN AC
CHARGAON	P.O.6	74	98.01
	P.O.7	89	1.22
	P.O.102	ROAD	1.47
	P.O.105	61	2.09
	P.O.106	73,72	20.27
	W.O.108	71	2.18
	W.O.110	69	3.29
	W.O.111	68	1.19
	W.O.112	68	2.07
	P.O.115	67	1.10
	P.O.116	67	2.45
TOTAL			135.32 AC
KHAIRI	P.O.1	82	31.24
	P.O.17	78	6.40
	P.O.19	76,77	5.54
	P.O.20	76	0.98
TOTAL			44.10 AC
MUNSAR	W.O.11	84	9.98
	W.O.12	27	45.72
	W.O.15	26	0.77
	W.O.16	26	1.78
	W.O.17	26	0.50
	W.O.18	30	0.34
	W.O.19	30	0.26
	W.O.20	28	3.46
TOTAL			63.03 AC
PARSODA	P.O.7	104,105	2.20
	P.O.30	OLD 30	1.30
	W.O.31	95	3.81
	P.O.32	97	0.56
	P.O.35	OLD 35	0.48
	P.O.36	OLD 36	0.01
	W.O.71	96	7.91
	P.O.72	94	8.28
	P.O.75	92	0.44
TOTAL			25.00 AC
KANDRI	P.34	208	1.00 AC.

SUMMARY			
1. CHARGAON	135.32 AC	54.762 Ha.	TOTAL AREA 268.45 AC. 108.636 Ha.
2. KHAIRI	44.10 AC.	17.846 Ha.	
3. MUNSAR	63.03 AC.	25.507 Ha.	
4. PARSODA	25.00 AC.	10.117 Ha.	
5. KANDRI	1.00 AC.	0.404 Ha.	

PROJECT BOUNDARY MAP : 25.15 Ha

MAP 1B



Map 2

SITE LAYOUT /SURFACE PLAN (133.78 Ha)

MAP 3

KEY PLAN