REGISTERED A/D

भारत सरकार
GOVERNMENT OF INDIA
खान मंत्रालय
MINISTRY OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
नागपुर क्षेत्रीय कार्यालय
NAGPUR REGIONAL OFFICE

छटवी मंजील,
बी एच सी भवन,
इंदिरा भवन,
सिविल लाइन्स
नागपुर - 440 001
6TH Floor, 'B' & 'C' Block
Indira Bhavan, Civil Lines
Nagpur– 440 001
दूरध्वनी/Telephone 2562794,
2565089 (Tel/fax)

No. NGP/MN/MPLN-1177/NGP-2019/961 Dated- 18/09/2019

To

M/s Shanti G.D. Ispat & Power Private Limited,
504, Rajiv Gandhi Complex,
Bal Ashram Compound,
Kutchery Chowk,
Raipur-492001
Chhattisgarh

Subject: Approval of Mining Plan along with Progressive Mine Closure Plan in respect of **GUGULDOH MANGANESE ORE DEPOSIT** over an area of **105 hectare** situated in Village- Guguldoh, Tehsil- Ramtek, District- Nagpur in Maharashtra State in favour of M/s Shanti G.D. Ispat & Power Private Limited under Rule 16(3) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

References:
i) Your letter number nil, dated 17/06/2019.
ii) This office letter of even number, dated 02/08/2019.
iii) Your QP's letter number nil, dated 12/08/2019.
iv) This office letter of even number, dated 04/09/2019.
v) Your QP's letter number nil, dated 07/09/2019.

Sir,

In exercise of the power conferred by the Clause (b) of Sub-section (2) of Section 5 of the Mines & Minerals (Development & Regulation) Act, 1957 read with Government of India Order No. S.O. 1872 (E) dated 18th May, 2016, I hereby **APPROVE** the above said Mining Plan.

This approval is subject to the following conditions: -

1. The Mining Plan is approved without prejudice to any other laws applicable to the mine area from time to time whether made by the Central Government, State Government or any other authority and without prejudice to any other order or direction from any court of competent jurisdiction.
2. The proposals shown on the plates and/or given in the document is based on the lease map /sketch submitted by the applicant/ lessee and is applicable from the date of approval.
3. It is clarified that this approval of the aforesaid Mining Plan does not, in any way, imply the approval of the Government in terms of any other provisions of the Mines & Minerals (Development & Regulation) Act, 1957 or the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 and any other laws including Forest (Conservation) Act, 1980, Environment Protection Act, 1986 or the rules made there under, Mines Act, 1952 and the rule & regulations made there under.

4. It is further clarified that this approval of the aforesaid Mining Plan is subject to the provision of Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981 and other relevant statutes, order and guidelines as may be applicable to the lease area from time to time.
5. The Indian Bureau of Mines has not undertaken verification of the mining lease boundary on the ground and does not undertake any responsibility regarding correctness of the boundaries of the leasehold/applied area shown on the ground with reference to lease map & other plans furnished by the applicant/lessee.
6. At any stage, if it is observed that the information furnished, data incorporated in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.
7. The provisions of the Mines Act, 1952 and Rules and Regulations made there under including submission of notice of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.
8. The execution of the said Mining Plan shall be subject to vacation of prohibitory orders/notices, if any.
9. If anything found to be concealed as required by the Mines Act, 1952 in the contents of the above said Mining Plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
10. Yearly report as required under 26(2) of Mineral Conservation & Development Rules, 2017 setting forth the extent of protective and rehabilitative works carried out as envisaged in the approved Progressive Mine Closure Plan and, if there is any deviation, reasons thereof shall be submitted before 1st July of every year to the Regional Controller of Mines, Indian Bureau of Mines, Nagpur after opening of the mine.
11. Your attention is invited to the Supreme Court interim order in W. P.(C) No. 202 dated 12.12.1996 for compliance. The approval of Mining Plan is therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.
12. The copy of the order for the grant of mining lease, as issued by the State Government, whenever such an order is passed, may be intimated to the Regional Controller of Mines, Indian Bureau of Mines, Nagpur. Further the copy of the mining lease as executed and registered with the State Government corresponding to the issue of relevant Government order, may be submitted to this office.
13. This approval of Mining Plan is given for the received prospective proposals for five years, subject to all other statutory clearances. The first year will be considered from the financial year in which the lease will be executed and registered.
14. This approval of proposed mining operations and associated activities is restricted to the mining lease area. The mining lease area as shown on the statutory plans under rule 32 of Mineral Conservation and Development Rules 2017, as per the authenticated lease plan by the concerned State Government.

...3

15. The approval is subject to the compliance of CCOM's Circular 2/2010 regarding submission of Geo-referenced Cadastral Map as per IBM Manual on Appraisal of Mining Plan 2014 issued vide letter number R-11011/1/IBM-M.A-MP/2012-CCOM, dated 21/11/2014 for area under reference i.e 105 hectares showing disposition of lease area certified the Competent Authority of State Government within six months from the date of registration of said mining lease, failing which the approval of Mining Plan shall be treated as withdrawn.
16. The applicant/lessee shall submit the signed copy of the Mine Development and Production Agreement with the State Government as prescribed under Sub Rule (4) of Rule 10 of the Mineral (Auction) Rules, 2015.
17. The applicant/lessee shall also provide a copy of performance security as prescribed under Rule 12 of the Mineral (Auction) Rules, 2015.
18. A copy of Environment Impact Assessment -Environment Management Plan (EIA- EMP) as approved by Ministry of Environment & Forest (MOEF) shall be submitted to Indian Bureau of Mines immediately after approval by MOEF alongwith a copy of their approval letter. Further the copy of the Forest Clearance after getting clearances from MOEF & CC may also be submitted to the office of Regional Controller of Mines, Nagpur Regional Office of Indian Bureau of Mines.
19. This approval of Mining Plan is given for the yearwise proposed production as well as cumulative production for the mining plan period which will not exceed the limits prescribed in existing Environmental Clearance unless the fresh Environmental Clearance is obtained by the competent authority and submitted in this office.
20. This approval is subject to comments of the State Government received, if any, which will be binding on you for implementation.

Yours faithfully,

18.9.19.

(Abhay Agrawal)
Regional Controller of Mines

Encl.: One copy of Approved Mining Plan (Text & Plates)

Copy for kind information to:

1. The Director, Directorate of Geology & Mining, Government of Maharashtra, Khanij Bhawan, 27, Shivaji Nagar, Cement Road, Nagpur- 440010 (MS) along with one copy of Approved Mining Plan (Text & Plates) **by <u>REGISTERED PARCEL</u>**.
2. Shri. M.S. Waghmare, QP, 33, Gedam Layout, Trimurty Nagar, Nagpur-440022.
3. The Controller of Mines (CZ), IBM, Nagpur.
4. The Director of Mines Safety, Nagpur Region, CGO Complex, Nagpur – 440001

(Abhay Agrawal)
Regional Controller of Mines

MINING PLAN
GUGULDOH MANGANESE ORE BLOCK

Lease Area : Revenue – 5.05 ha
Lease Area in Forest – 99.95 ha
Total Lease Area – 105.00 ha

Lease Period - 50 Years from the date of registration of executed Mining Lease deed
Village:Guguldoh, Tehsil : Ramtek
District: Nagpur, State : Maharashtra
Mineral – Manganese Ore
Proposal Period –5 Years
Category - 'A'
Submitted to

Indian Bureau of Mines
Under Rule 16(1) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016

Preferred Bidder: M/s. SHANTI G.D. ISPAT & POWER PVT. LTD.
Corporate Office: 504, Rajiv Gandhi Complex , Bal Ashram Compound, Kutchery Chowk, Raipur- 492001

Phone: 0771-4243000/01/02, Fax: 0771-4243031, Mobile No. 9425204308
Email: sgdiplmining@gmail.com

Prepared by:
M.S. Waghmare, Qualified Person
Address: 33, Gedam Layout, Trimurti Nagar, Nagpur 440022 (M.S.),
Phone: 8055157799, Fax: None, Email: mswaghmare60@gmail.com

MINING PLAN

GUGULDOH MANGANESE ORE BLOCK

Lease Area : Revenue – 5.05 ha

Lease Area in Forest – 99.95 ha

Total Lease Area – 105.00 ha

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VILLAGE : GUGULDOH, **TALUKA :** RAMTEK

DISTRICT: NAGPUR, **MAHARASHTRA STATE**

Category : A Mechanized

Lease Period - 50 Years from the Date of Registration of Executed Mining Lease Deed

UNDER RULE 16 (1) OF M C R 2016

पत्र संख्या द्वारा
VIDE LETTER No. NGP/MN/MPLN-1177/NGP-2019 दि 18/09/2019

PREFERRED BIDDER

M/s. SHANTI G.D. ISPAT & POWER PVT. LTD.

Corporate Office: 504, Rajiv Gandhi Complex , Bal Ashram Compound, Kutchery Chowk, Raipur- 492001

Phone: 0771-4243000/01/02, Fax: 0771-4243031, Mobile No. 9425204308

sgdiplmining@gmail.com

18.1.19.
क्षेत्रीय खान नियंत्रक (प्र. वे.)
Regional Controller of Mines (N. R.)
भारतीय खान ब्यूरो नागपुर
Indian Bureau of Mines, Nagpur

QUALIFIED PERSON

M. S. WAGHMARE B.E.(Mining Engg.)
33, Gedam Layout, Trimurti Nagar
Nagpur 440022 (M.S.)
Cell: 80551 57799

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3	Certificate from Qualified Person	3

ANNEXURES

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S.No.	Description	Annexure No.
1	Copy of Letter of Intent from Govt of Maharashtra	1
2	Copy of challan showing payment to state Govt. of 1st instalment	1.1
3	Copy of Board Resolution on declaration of 'Nominated Owner'	2
4	Photo ID and Address proof of the Nominated Owner	3
5	Company's Memorandum and articles of Association	4
6	Details of Bore hole data drilled by GSI with bore hole logs.	5
7	Calculation of Resource and Geological Report by GSI	6
8	Re-estimation of Resource by State DGM	7
9	Summarized details of Litho logs with analytical results	8
10	Statement on calculation of Development & Production for ensuing and conceptual period.	9
11	Letter showing qualification and experience of QP	10
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PLATES

Plate No.	Description	Scale
1	Khashra Plan	1:3960
2	Key Plan	1:50,000
3	Surface Geological Plan	1:2000
4	Geological Sections	1:2000
5.	Surface Plan	1:2000
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7	Conceptual Plan	1:2000
7A	Conceptual Sections	1:2000
8	Environment Plan	1:5000
9	Reclamation Plan with section	1:2000
10	Progressive Closure Plan	1:2000
11	Copy of DGPS map certified by DGM	1:11000

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MINING PLAN
GUGULDOH MANGANESE ORE BLOCK
LESSEE: M/S SHANTI G.D. ISPAT & POWER PVT. LTD.
TAHSIL: RAMTEK, DIST: NAGPUR (M.S.)

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0.00 INTRODUCTION

M/s Shanti G.D. Ispat & Power Pvt. Ltd, Raipur, is engaged in power generation since 2004, and the Bio mass Power plant is located in Champa in Chhattigarh state. It has a generation capacity of 15 megawatts per hour. Apart from this, M/s Shanti G.D. Ispat & Power Pvt. Ltd, Raipur, has other businesses such as logistic, Real estate, and Hospitality. Now the applicant is a new entrant to the mining industry.

The Company has decided to diversify the business and wish to enter in mining business and got the mining lease through auction in Guguldoh area for manganese ore in Ramtek - taluka, Nagpur district for an area 105.00 ha vide. The Letter of Intent has been issued by the Govt. of Maharashtra vide their letter no.MMN-0518/C.R.30/Industry-9 dated 5.6.2018 and is placed as Annexure 1 with a direction to obtain approval/permits required for opening the mine in a time frame of three years. The applicant entered in auction held in the month of May 2018 for which minimum premium price was fixed 5% of value of mineral dispatched, however, the applicant became the preferred bidder at a bid price 56.5% of value of mineral dispatched. Consequent to preferred bidder, the applicant has paid the upfront payment to the State Govt of Maharashtra as first instalment amounting Rs. 6,14,218/-. vide GRN. MH001158590201819M dated 03-05-2018 (Annexure 1.1).

As per rule 16(1) of MCR 2016, every applicant has to prepare the Mining Plan for lease grant and submit to the approving authority of IBM. Accordingly, this Mining Plan has been prepared as per formats and guidelines of IBM incorporating production proposals for five year and put for approval. in compliance to or to satisfy the condition specified in Rule 10 (1) (d) of mineral (Auction) Rules'2015 to be considered as a "Successful Bidder" for the Guguldoh Manganese Ore mineral block.

1.0 GENERAL:

a) Name of the Preferred bidder:: M/s Shanti G.D. Ispat & Power Pvt.Ltd.
Corporate Office: 504, Rajiv Gandhi Complex
Bal Ashram Compound
Kutchery Chowk
Raipur-492001
Phone: 0771-4243000/01/02
Fax: 0771-4243031
Email: Sgdiplmining@gmail.com
Mobile: 9425204308, 9131422230

Nominated Owner: Shri Prakash Kumar Agrawal,
PAN: BARPA5160M
AADHAR: 992946501244
PASSPORT: G7857021
IBM Registration No. as per Rule 45 of MCDR'17: In Process

b) Status of lessee:
Other (Please specify): Private Limited Company

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Board of Directors

S. No.	Director's Name	Address	Identity proof
1	Shri Anup Agrawal	B-3, Behind Shyam Plaza, Ravi Nagar, Raipur – CG 492001	PAN:ACJPA2587K AADHAR: 281757095567 PASSPORT: G9521078
2	Shri Kamleshwar Agrawal	B-18, Near Shyam Plaza, Ravi Nagar, Raipur – CG 492001	PAN:ACPPA2743P AADHAR: 434488714718 PASSPORT: G9621237
3	Shri Harshit Agrawal	B-3, Behind Shyam Plaza, Ravi Nagar, Raipur – CG 492001	PAN:BVOPA6221M AADHAR: 327403856648 PASSPORT: L6342432
4	Shri Prakash Agrawal	Agrawal Dharam Shala Road, Saraipali, Mahasamund – CG 493558	PAN:BARPA5160M AADHAR: 992946501244 PASSPORT: G7857021

c) Mineral which is included in the prospecting license (For Fresh grant): Not Applicable

Mineral for which the block has been auctioned: Manganese Ore
d) Mineral which is included in the letter of Intent: Manganese Ore
e) Mineral which is the lessee intends to mine: Manganese Ore
f) Name of Qualified Person under rule 15(1) of MCR,2016 who prepared Mining Plan:
Shri M. S. WAGHMARE, B. E. (Mining)
Address: 33, Gedam Layout, Trimurti Nagar, Nagpur 440022 (M.S.),
Phone: 8055157799, Fax : None, Email: mswaghmare60@gmail.com

Details are attached in Annexure-10

2.0 LOCATION AND ACCESSIBILITY:

Lease Details (fresh grant/ through Auction of Mineral Block)

Name of mine: Guguldoh Manganese ore Mine
Lat/Long of lease area: Lat from 21° 25' 53.06" to 21° 26' 19.36"
: Log from 79° 24' 04.29" to 79° 25' 31.55"

Date of grant of lease: Not yet executed.

Period of lease: Shall be 50 years from the date of registration of lease deed

Name of Preferred bidder: M/s Shanti G.D. Ispat & Power Pvt. Ltd.
504, Rajiv Gandhi Complex
Bal Ashram Compound
Kutchery Chowk
Raipur-492001
Phone: 0771-4243000/01/02
Fax : 0771-4243031
Email: Sgdiplmining@gmail.com
Mobile: 9425204308
Shri Prakash Kumar Agrawal, Nominated Owner

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Details of area allotted with location map (fresh area):

Forest		Non-forest	
Forest (specify)	Area (ha)		Area (ha)
	99.95.00	(i) waste land, (ii) grazing land, (iii)Agriculture land, (iv)others(Private)	5.05 0.00 0.00 0.00

Total lease area: 105.00 ha

Occupancy/ Ownership of land: It is as below:

Name of Person/Company	Survey No.	Area Under Guguldoh Block (Ha)	Area in ha.
M/s Shanti G.D. Ispat and Power Pvt. Ltd. Raipur	107	2.60	5.05 Hectare
	144	2.45	
	145	46.50	99.95 Hectare (Protected Forest)
	148	2.83	
	149	42.54	
	150	1.00	
	151	7.08	
		105.00 Hect.	105.00 Hect.

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District & State: Nagpur, State: Maharashtra

Taluka : Ramtek, Village: Guguldoh .

Whether the area falls under Coastal Regulation Zone (CRZ)? if yes, details thereof: No

Existence of public road/railway line, if any nearby and approximate distance.

Area has well communication and transport facilities. Village Guguldoh is situated about 18 Km from Ramtek town and connected by all weathered road. The mine in question is located to a distance of about 5.00 km from Guguldoh village and can be approached by tar road going to village from Ramtek. From Nagpur to Ramtek can be approached by NH – 6, which is about 50 Km from Nagpur. The nearest railway station is Ramtek about 20 Km away from the mine. Nagpur airport is the nearest airport situated at 75 Km from the lease area.

Toposheet No. with latitude & longitude of all corner boundary point.

Topo-sheet No. : 55 O/7

CO-ORDINATES OF BOUNDARY PILLARS

Boundary Pillars	LATTITUDE	LONGITUDE
BP-1	21°-26'-18.82"	79°-24'-06.57"

BP-2	21°-26'-11.55"	79°-24'-33.67"
BP-3	21°-26'-15.74"	79°-25'-04.74"
BP-4	21°-26'-19.36"	79°-25'-31.55"
BP-5	21°-26'-06.40"	79°-25'-27.36"
BP-6	21°-26'-0.08"	79°-25'-04.98"
BP-7	21°-25'-53.06"	79°-24'-40.10"
BP-8	21°-26'-7.38"	79°-24'-15.07"
BP-9	21°-26'-10.94"	79°-24'-04.29"
BP-10	21°-26'-16.56"	79°-24'-07.27"

Before auction the State Govt has carried out the DGPS survey and demarcated the area as per CCOM's circular 2/2010. The above mentioned co-ordinates of boundary pillars are provided by the State Govt. along with the Tender Document.

c) Attach a general location map showing area and access routes. It is preferred that the area be marked on a Survey of India topographical map or a cadastral map or forest map as the case may be. However, if none of these are available, the area may be shown on an administrative map.

Topo-sheet as Key Plan showing Plate 2 is enclosed.

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3.0 DETAILS OF APPROVED MINING PLAN / SCHEME OF MINING (if any):

3.1 Date and reference of earlier approved MP/SOM:

None

3.2 Details of last modifications if any (for the previous approved period) of approved MP/SOM, indicating date of approval, reason for modification

None

3.3 Give review of earlier approved proposal (if any) in respect of exploration, excavation, reclamation etc.

None

PART – A

1.0. GEOLOGY & EXPLORATION

(a) Briefly describe the topography, drainage pattern, vegetation, climate, rainfall data of the area applied.

i) Topography: The lease area lies in the hilly region north of Ramtek Township. It has an elevated hill with steep slope having highest contour 438 m and lowest is 335 m. The hill trends E-W and is covered under the forest.

ii) Drainage pattern: Drainage of the area is controlled by seasonal gullies and streams flowing NE-SW or E-W direction and finally merge with Khindsi Lake. Since the slopes are formed all along the edge of the hill, various seasonal drains are formed at number of places depending on the local topography of the slope. There are numerous such drains, but none of them is perennial in nature.

iii) Vegetation: It is a forest land and has thick vegetation.

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iv) Climate: The area is characterized by tropical climate. Summer season starts from April and lasts till May. The average temperature in summer varies from 36° to 45° C but on some days during peak of summer in May it rises beyond 46° C. The average minimum temperature in winter varies from 12.2° to 14° C but as low as 6° C is also recorded as cold winter nights in December-January.

v) Rainfall: The monsoon season starts off in the month of June and stays till September with an overall rainfall of 12.02 to 14.4 cm., highest amount of rainfall of 340mm was recorded in the month of July.

b) Brief descriptions of Regional Geology with reference to location of lease area

Regional Geology:

Sausar group of rocks having NE-SW trend, extend from Balaghat District in Madhya Pradesh in the east to Nagpur District in Maharashtra in the west. The manganese bearing ore belt which is a constituent of the Gondite formation of Sausar series of rocks stretches over a length of 200km and about 25 to 30 km in width in the central portion.

These deposits of Manganese belong to the lower part of sequence of meta-sedimentary formations of rocks of Sausar series of Pre-cambrian age. The area falls under the eastern part of the manganese ore belt in between Balaghat to Bhandara which is located almost middle of the belt. The litho units of this formation

are quartzite, quart muscovite schist, phyllite, conglomerate and felspathic grit. Further, eastwards the Sausar group of rocks is covered with Deccan Trap.
The Manganese deposits of this area are syngenetic meta-sedimentary type. The deposition is in the form of alternating layers of chert and Manganese ore occurring as small detached lenses and also stratified in nature. These stratified deposits occur in three different stratigraphic positions in the 'Sausar Series'. The Manganese ore deposits and Gondite formations are restricted to the Schists and Quartzites of the Mansar and Chorbaoli stages. The other rock types met within this belt are biotite schist besides granitic rock with associated pegmatite and quartz vein.

The regional stratigraphic sequence of the Manganese bearing deposits in the area as given by Fermor (1926) and West (1936) is as follows:

Formation	**Rock Types**
Late Cretaceous-Eocene	Deccan trap, Basalts and other dyke rocks
Lameta formation	Sandstone and fresh water Limestone
---------- Unconformity----------	
Sausar Series	
Bichua Stage	Dolomitic marble, calc gneisses and schist, actinolite schist, tremolite and anthrophyllite.
Junewani Stage	Biotite Muscovite schist and Quartz biotite granulite.
Chorbaoli Stage	Quartzites, Quartz Muscovite Schist and Felspathic Muscovite schist. Manganese ore and Gondite Horzon I
Mansar Stage	Musocovite schist, Muscovite biotite schist, Phyllite, commonly garnetiferous. Manganese ore Horizon-II within Mansar schist, Low grade sericite schist & phyllite.
Lohangi Stage	Manganese ore and Gondite Horizon III Pink and white calcitic marble, partly also Dolomitic at places
SitaSaongi Stage	Quartz Muscovite schist and felspathic

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	muscovite schist with inter-calated quartzites
Older Metamorphics	Ortho and Para gneisses, amphibolites Lenses, Epidiorites, quartziotes with
	pegmatites and quartz vein.

c) Local Geology:

The Guguldoh manganese lease area forms the eastern continuity of the manganiferous sediment forming the entire Manegaon-Guguldoh belt of Mn ore. The rock type found in this area are muscovite schist with sillimanite, garnet magnetite, quartzite, manganiferous quartzite, auto-clastic conglomerate, quartz muscovite schist, gondite, pegmatite, Mn ore, deformed granite, and impure dolomitic marble. The rocks in this area swerve in strike from WNW-ESE to ENE-WSW and E-W with dips to the south often reaching vertical. Structurally Mn ore bearing horizon in Manegaon–Guguldoh belt represents a tight syncline with an easterly plunge. The keel of the synclinal fold represented by hill 403m north- east of Musawadi. The lease area was explored by the GSI through core bore holes and geological mapping too was done. Based on the exploration, lithology observed is as follow:

The tentative litho-stratigraphy as inferred from borehole intersection and geological mapping:

	Soil and overburden
Intrusives	Vein quartz
	Pegmatite
	Intrusive granite
Chorbaoli	Auto clastic brecciated conglomerate
	Quartzite/Mn ferrous quartz
Mansar	Mn ore
	Quartz mica schist
	Mica schist/with impure dolomite

bands

The foliation and bedding strike N 70° E to S 70° W and dip steeply towards south. The cleavage (crenulations cleavage) strikes NE-SW with southerly dip of 55°

ABANDONED MINES PIT

There are number of rectangular deep pits in ENE -WSW direction for over a length of 2.5 km. These are mostly the ancient abandoned mines and trial pits and trenches. Low-grade ore is exposed in these pits. Numerous ore dumps are also found in and around the abandoned pits. The Central block has the largest abandoned quarry for over 700 m in length. The western block has 3-abandoned quarries indicating lateral extension of the ore for 200m, and in the eastern block, there are numerous small quarries arranged in a linear fashion indicating lateral extent of the ore for more than a km in length.

MANGANESE ORE HORIZONS

Manganese ore horizons are represented by manganiferous quartzite, gondite and low grade Mn ore. Mn ore horizon is 4 to 6 m thick and is traceable for a strike length of 900 m in Central block. Four conformable Mn bands were identified, during detailed mapping and drilling. From south to north the bands have a strike length of 250m, 720m, 640m, and 50m respectively. They define an arcuate pattern with strike ranging from NW-SE to E-W to ENE-WSW with steep to sub vertical dip to south. The abandoned quarries discontinuously extend both to east and west for over a strike length of 1.9 km. Lithologically, Mn ore occurs at the interface of garnetiferous mica schist and quartz mica schist as well as within the quartzite. The Mn ore band has a southern convexity due to N-S trending F4 fold.

In eastern block, Mn ore occur discontinuously over 900 m strike length in ENE direction. Two conformable stratified Mn ore band have been mapped. In western block two bands have been identified based on the presence of two abandoned Mn quarry. The strike length is about 100 m with widths varying from 1 to 3 m. Detailed mapping of the area has revealed that the different Mn ore bands in the block belong to the same stratigraphic horizon and repeated due to folding.

d) i) Name of prospecting /exploration agency: By Geological Survey of India, Central Zone, Nagpur 440 001

e) Details of prospecting/exploration already carried out:

i) Number of pits and trenches indicating dimensions, spacing etc along and across the strike/ foliation with reference to geological plan.

None

ii) Number of boreholes indicating type (Core/RC/DTH), diameter, spacing, inclination, Collar level, depth etc with standard borehole logs duly marking on geological plan/sections:

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EXPLORATION:

GSI drilled eighteen core bore holes. The details of exploration are furnished below:

The abandoned quarries discontinuously extend from Manegaon to Guguldoh village for about 2.4 km in WNW-ESE direction, the individual quarry diameter is roughly 40m x 40m and depth is about 20 m. The abandoned quarries were mapped on 1:2000 scales. Drilling commenced in Guguldoh block on 15th November 1999 and the investigation was closed end of September 2001. A total of 1586.45m was drilled in eighteen boreholes. The entire exploration block is divided into 3 blocks namely western block, eastern block and central block. The geological report and surface geological map prepared based on cross sections attached as Annexure 5 by the GSI is enclosed as Annexure 6 and Plate 3 A.

EASTERN BLOCK

Abandoned quarries of Mn ore occur discontinuously over a strike length of 900 m in eastern block. Two conformable Mn ore bands within mica schist have been identified. Eight boreholes (MNG-9-MNG-16) have been drilled in this block. MNG-12 was abandoned; hence borehole MNG-12A was drilled adjacent to it. No significant Mn mineralisation was intersected in any of the boreholes; MNG-9, 10,12A, 13 and 14 intersected minor Mn ore bands and Gondite, rests of boreholes were barren.

CENTRAL BLOCK

Work was initially taken up in the central block which has huge abandoned quarries, based on detailed mapping and surface exposures, eight bore holes have been drilled (MNG-1-MNG-8) spaced at 100 m interval. Seven boreholes intersected Gondite, manganese ore with thickness ranging from 20 cm to 13.14 m. Borehole No MNG-5 was barren; 4 conformable Mn bands have been traced based on surface mapping and bore hole intersection. The strike lengths of these bands range from 50 m to maximum 720 m. A total of 748 m has been drilled in 8 boreholes in this block.

WESTERN BLOCK

Mapping in Western block indicated presence of two level of abandoned Mn quarry for a total strike length of over 220 m. Two conformable stratified Mn ore bands have been mapped at the interface of quartz-mica schist and quartzite. Northern band extends for over 125 m in strike length while southern band is about 120m in strike length located 40 m to south of northern band. Widths of individual band vary from 1 to 3 m. To confirm the strike and dip extension of ore horizon exposed in old working, drilling machine was deployed. Boreholes were planned and drilled to intersect the ore body at expected depth. Based on the attitude of the ore horizon boreholes were drilled vertical or inclined, so as to intersect the ore horizon around its true width. Generally the angle ranges from 40° to 60°, borehole are spaced at equal interval depending on the strike continuity of ore zone. Two boreholes have been drilled (MNG-17-MNG-18) in this block. Both the boreholes have not intersected any of the Mn ore horizons except for streak and thin bands of Mn ore

CORE LOGGING

The recovered cores from each borehole are placed in the core box either in book pattern or staggered pattern. The core is studied run wise and they are logged in a register noting down its lithological description, depth wise mineralisation and structural features if any. The length of core recovered, is measured and recovery percentage is calculated. In this way run wise logging is carried out for all the boreholes drilled. Run wise litholog of all the 18 boreholes have been furnished in Annexure 5 and summarized litholog in annexure 8 with chemical analysis.

MANGANESE ORE HORIZON

Out of 18 boreholes drilled in Guguldoh block, quantifiable manganese ore with Gondite and manganiferous quartzite were intersected in six bore holes viz MNG1, MNG2, MNG3, MNG6, MNG7 & MNG8 in central block upon which GSI estimated the Mn resource. Annexure 5 shows the depth wise intersection of Mn ore, manganiferous quartzite, Gondite in each borehole.

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Details of Drilled Boreholes

Sr. No.	Drilled Bore holes	PBH Collar mRL	Northing	Easting	Depth (m)	Type of Hole
1	MNG-1	347.6	2371061.44	335621.83	125.0	45^0 Inclined
2	MNG-2	344.2	2371069.42	335405.79	79.50	------ do-----
3	MNG-3	353.8	2371087.74	335510.39	80.25	------ do-----
4	MNG-4	363.22	2371182.26	335311.50	80.50	------ do-----
5	MNG-5	361.5	2371296.24	335112.95	100.00	------ do-----
6	MNG-6	348.2	2371213.55	335113.10	100.00	------ do-----
7	MNG-7	341.02	2371031.00	335310.00	75.15	------ do-----
8	MNG-8	342.0	2371115.09	335210.87	108.50	------ do-----
9	MNG-9	353.165	2371125.00	335710.00	90.00	------ do-----
10	MNG-10	360.4	2371188.78	335790.46	76.5	------ do-----
11	MNG-11	350.045	2371231.31	335879.97	70.0	------ do-----
12	MNG-12A	361.53	2371328.94	336178.76	78.65	------ do-----
13	MNG-13	382.295	2371392.70	336280.33	85.00	------ do-----
14	MNG-14	369.8	2371385.46	336402.85	107.10	60^0 inclined
15	MNG-15	361.2	2371401.13	336502.46	80.55	45^0 Inclined
16	MNG-16	352.6	2371274.71	336104.93	80.55	------ do-----
17	MNG-17	344.565	2371395.48	334562.77	88.00	------ do-----

18	MNG-18	370.88	2371489.62	334402.39	85.20	------ do------

iii) Details of samples analysis indicating type of sample (Surface/sub-surface from pits/trenches/borehole etc). Complete chemical analysis for entire strata for all radicals may be undertaken for selected samples from a NABL accredited.

Sampling

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Sampling was carried out for mineralized core and also bedrock. Using a core splitter core was split longitudinally into two half. One half was preserved and other half was crushed to -200 mesh size. Conning and quartering was carried out for getting the minimum amount required for sampling.

Minimum length of sample was 4 cm while maximum length was 60 cm. Depending on the nature of ore and width of barren zone sample spacing was decided. Table below shows the number of samples drawn and analyzed from each borehole. Similarly bedrock samples were split into two. One half was powdered and same sampling procedure was adopted and the other sample was kept as a duplicate.

Table showing number of samples drawn bore hole wise

Borehole no.	No. of sample	Total no. of samples generated from borehole
MNG-1	27	243
MNG-2	24	
MNG-3	55	
MNG-4	20	
MNG-6	58	
MNG-7	20	

MNG-8	19	
MNG-9	8	
MNG-10	3	
MNG-12A	9	

All the 243 samples were analyzed and its results are furnished below in table:

Bh .no	No of sample	Mn%	P%	SiO_2	Fe_2O_3
MNG-1	27	6.5 - 40.72	0.05 - 0.38	20 - 59	3 - 17
MNG-2	24	1.22 – 40	0.09 -0.52	9 - 45	4 - 12
MNG-3	55	5 - 40	0.1 - 0.7	23 - 80	1.5 - 16
MNG-6	58	30	1.08	11-38	4.5-12
MNG-7	20	26	0.3 - 1.5	20-42	5-11
MNG-8	19	32	1.12	25-37	6-9
MNG-9	8	-	-	-	-
MNG-10	3	25.55	1	21-25	10-12
MNG-12A	9	26.6	0.6-1.7	21-50	7-12

iv) Expenditure incurred in various prospecting operations:

Information not available

The analysis report is enclosed as Annexure 8.

f) The surface plan of the lease area may be prepared on a scale of 1: 1000 or 1: 2000 with contour interval of maximum of 10 m depending upon the topography and size of the area duly marked by grid lines showing all features indicated under Rule 32(1)(a) of MCDR 2017:

Surface plan of the lease area on scale 1:2000 is enclosed as plate 5.

g) For preparation of geological plan, surface plan prepared on a scale of 1: 1000 or 1: 2000 scale specified under para 1.0 (f) of Part A of the format may be taken as the base plan. The details of exploration already carried out along with supporting data for existence of mineral, locations of proposed exploration, various litho units along with structural features, mineralized/ore zone with grade variation if any may be marked on the geological plan along with other features indicated under Rule 32(1)(b) of MCDR 2017.

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Surface Geological plan prepared on scale 1:2000 is enclosed as plate no. 3

h) Geological sections may be prepared on natural scale of geological plan at suitable interval across the lease area from boundary to boundary.

Geological sections prepared on scale 1:2000 are enclosed as plate no. 4 and geological cross sections prepared by GSI are enclosed as Annexure 5.

i) Broadly indicate the future programme of exploration with due justification(duly marking on Geological plan year wise location in different colours) taking into consideration the future tentative excavation programme planned in next five years as in table below:

The GSI explored the deposit by drilling 18 bore holes and established the resource in G2 category. However, majority of lease area remained un-explored. It is now proposed to explore the probable mineralized area in dip site of the existing Mn ore bands. The details of these proposed bore holes are given below:

Details of Boreholes Proposed

Sr. No.	Boreholes proposed	PBH Collar mRL	Northing	Easting	Depth	Type of Hole
1	PBH 1	345	2371235.43	335061.52	125m from surface	45^0 Inclined,
2	PBH 2	346	2371178.29	335153.71	125m from surface	60^0 Inclined,

3	PBH 3	346	2371149.59	335194.64	-----do-----	---do---
4	PBH 4	346	2371109.70	335239.46	125m from surface	45^0 Inclined,
5	PBH 5	346	2371064.64	335267.17	-----do-----	---do---
6	PBH 6	347	2371070.84	335346.93	125m from surface	60^0 Inclined,
7	PBH 7	347	2371048.91	335451.39	-----do-----	---do---
8	PBH 8	351	2371032.72	335529.05	125m from surface	45^0 Inclined,
9	PBH 9	353	2371080.77	335689.80	-----do-----	---do---
10	PBH 10	348	2371100.60	335813.36	-----do-----	---do---
11	PBH 11	349	2371138.36	335878.36	-----do-----	---do---
12	PBH 12	352	2371205.06	335976.08	-----do-----	---do---
13	PBH 13	354	2371243.95	336066.03	-----do-----	---do---
14	PBH 14	357	2371309.70	336215.00	-----do-----	---do---
15	PBH 15	360	2371311.03	336290.87	-----do-----	---do---
16	PBH 16	379	2371361.13	336344.82	-----do-----	---do---
17	PBH 17	367	2371367.82	336440.54	-----do-----	---do---
18	PBH 18	372	2371272.44	336643.03	-----do-----	---do---
19	PBH 19	371	2371231.29	336526.86	-----do-----	---do---
20	PBH 20	382	2371182.95	336420.37	-----do-----	---do---
21	PBH 21	385	2371156.87	336285.66	-----do-----	---do---
22	PBH 22	366	2371078.88	336021.61	-----do-----	---do---
23	PBH 23	356	2371040.64	335917.98	-----do-----	---do---
24	PBH 24	347	2371012.31	335783.95	-----do-----	---do---
25	PBH 25	345	2370926.19	335511.97	-----do-----	---do---
26	PBH 26	343	2370907.35	335425.80	-----do-----	---do---

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27	PBH 27	338	2370925.97	335286.24	-----do-----	---do---
28	PBH 28	338	2370978.14	335164.58	-----do-----	---do---
29	PBH 29	341	2371167.56	334972.77	-----do-----	---do---
30	PBH 30	340	2371253.93	334853.18	-----do-----	---do---
31	PBH 31	340	2371311.16	334776.29	-----do-----	---do---
32	PBH 32	346	2371428.06	334828.38	-----do-----	---do---
33	PBH 33	344	2371389.70	334703.13	-----do-----	---do---
34	PBH 34	346	2371400.15	334623.75	-----do-----	---do---
35	PBH 35	350	2371453.50	334659.01	-----do-----	---do---
36	PBH 36	366	2371487.99	334555.22	-----do-----	---do---
37	PBH 37	384	2371508.79	334486.19	-----do-----	---do---
38	PBH 38	387	2371521.99	334430.04	-----do-----	---do---
39	PBH 39	357	2371447.46	334419.18	-----do-----	---do---
40	PBH 40	348	2371400.88	334466.66	-----do-----	---do---
41	PBH 41	360	2371378.98	334947.20	-----do-----	---do---
42	PBH 42	430	2371309.67	335473.37	-----do-----	---do---
43	PBH 43	390	2371409.69	335783.74	-----do-----	---do---
44	PBH 44	390	2371321.97	335809.51	-----do-----	---do---
45	PBH 45	394	2371450.46	336159.28	-----do-----	---do---
46	PBH 44	382	2371503.9	336541.43	-----do-----	---do---

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All the 46 proposed bore holes will be drilled during the five year plan period for total meterage 5750 in compliance to the provisions of Rule 12(3) of MCDR'2017, to explore the entire potentially mineralized area under G-1 level, within a period of five years from the date of opening of the mine after execution of the mining lease; and as per the conditions/procedures laid down in the MEMC Rules'2015.

Explored & unexplored area in Ha

Explored by GSI in G2 category	Probable mineralised area to be explored in G 2 category in Plan period	Unexplored area, as per state DGM (ha)	Total lease area (ha)	Mineralized Area as per DGM, Maharashtra Notification
Area under the influence of MNG-1 to MNG-8, No demarcation done in the map (Central Part of the Mineral Block Auctioned)	Exact data not available. Thus 46 core bore holes are proposed to be drilled in the Plan period	30.00	105.0 अनुमोदित APPROVED	Approximately 75 ha (marked on Geological Plan)

Note:- In the Prospecting Report as obtained during the time of auction, clear demarcation of G-2 area has not been done by GSI; but DGM, Maharashtra has demarcated approximately 75 ha area under mineralized zone. However, resources have been estimated for MNG-1 to MNG-8 only. Thus, the area under influence of MNG-1 to MNG-8 only has been considered for five years production proposals and 46 core boreholes have been proposed in the mineral block to clearly demarcate mineralized area in the mineral block. After the results of exploration in the five year plan period, the document may be modified, if required.

j) Reserves and Resources as per UNFC with respect to the threshold value notified by IBM may be furnished in a tabular form as given below: (Area explored under different level of exploration may be marked on the geological plan and UNFC code for area considered for different categories of reserve/resources estimation may also be marked on geological cross sections).Submit a feasibility/pre-feasibility study report along with financial analysis for economic viability of the deposit as specified under the UNFC field guidelines may be incorporated.

Resource estimated by the GSI & re-estimated by State DGM is reproduced below:

i) GSI

Resource based on bore hole data were estimated by the GSI for the bore holes that encountered Mn mineralization. The GSI on resource estimation has stated as below:

As seen from analytical report, MNG-8, MNG-2, MNG-3, MNG-1, MNG-6, and MNG-7 has intersected the same Mn ore horizon at different depth and these Mn value ranges between 25 to 30% which can be categorized into Low grade high silica ore (LGHS). They also have low phosphorous content. MNG-10 and MNG-12A 300m west of MNG 1 have also intersected Mn horizon. They are also categorized as Low grade high silica ore and has low phosphorous. Cross section of the entire above borehole was drawn to estimate the reserves. From the borehole plan the strike influence of each borehole was calculated. The boreholes have intersected the ore horizon at about 30 to 35m vertical depth from ground level and below the bottom of the quarry. Up dip wise extension was defined on the basis of correlation with surface / old working. Down dip direction being half of the up dip length, strike extension was considered on the basis of positive intersection in adjacent bore. In this way area of influence was calculated for each borehole and reserves estimated. From the bore hole logs it is observed they had estimated resource only in central part of the deposit up to RL 260m from RL 382.295m which accounts for a depth of 122.295m. The average dip of ore body is 70^0. For each borehole true thickness of the ore body was calculated from apparent thickness. Average specific gravity of manganese was taken as 3.1 gm/cm^2

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Estimation of the ore reserve is summarized and furnished in Annexure 3. APPROVED

The resource estimated by GSI = 2,18,700.0 tonnes, grade 29.28% Mn, G2 category.

ii) REVISED ESTIMATION BY DGM

The resource for the Guguldoh mine was estimated by GSI taking into consideration 20% as the cut off for Mn. As the IBM has revised the threshold value for Manganese as 10%, the resource was re-estimated by DGM. Thus, the total resource for Guguldoh Manganese block is 0.440 million tonne (indicated resource 332) with an average grade of 22.70% Mn. A total of 18 bore holes were drilled in the Guguldoh area, out of 18 boreholes, 6 boreholes were drilled in central part are considered for resource estimation which have mineralisation. Rest of the bore holes intersected minor Mn ore bands and Gondite. While estimating the resource, the DGM enhanced the width of ore body up to threshold value of 10% Mn content. The calculation is furnished in Annexure 7.

The resource re-estimated by DGM = 4,40,185.0 tonnes, grade 22.70% Mn, G2 category

SUMMARY: Updated Resource as per DGM as on 1.4.2019

Resource	Total, tonnes	Grade	Category
Proved Category Mn ore	4,40,185.0	22.70% Mn content	G2
Total	4,40,185.0		

Blocked resources:

i) Ore blocked in ultimate pit slope due to benches: Nil

ii) Ore blocked in 7.5m barrier: Nil

Total blocked Resource: Nil

Mineable Reserve: 4,40,185 t Code:122

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This mineable reserve has been considered for production planning.

Application of UNFC guideline:

It is a three digit code base system, the economic viability axis representing the first digit, the feasibility axis the second digit and geologic axis the third digit. The three categories of economic viability have codes 1,2 & 3 in decreasing order. Similarly, the categories of feasibility study have also codes 1,2 & 3 while the four stages of geological assessment are represented by four codes, 1) Detailed exploration, 2) General exploration, 3) Prospecting & 4) Reconnaissance. Thus the highest category under UNFC system will have the code (111) & lowest category the code (334).
The details of application of various class/code of UNFC to this deposit are discussed below:-

(i) Economic Axis E1:

The lease area was earlier granted for mining and there are remnants of old pits. However, being low grade, no market was available, the lease was surrendered. The lease area falls in forest. To assess the mineralization of Mn ore, the GSI drilled 18 core bore holes. Low grade Mn ore was discovered in central part of the mine and established the resource. The Manganese ore bed has been fully delineated & exposed in old pits. Mapping of the Manganese ore has also been done by GSI. Manganese ore mineralization has been proved to a maximum depth of 122.295m by core bore holes. The end use of Manganese ore has already market &

Manganese ore is saleable with profit though it is a low grade. Because of downward revision of threshold value of Mn content in ore, the DGM re-estimated the resource utilizing the data of bore holes drilled by GSI. This has enhanced the quantum of resource but Mn content reduced to 22.70%. Feasibility report has been prepared and annexed to this mining plan elucidating mining profitable venture. Thus, quantities of Manganese ore resource of proved category qualifies for E-1 code.

(ii) Feasibility Axis F2:

The deposit is on elevated hill with steep slope. It is proposed to mine Mn ore by open cast method of mining, fully mechanized which is feasible. Mining plan is being prepared for lease grant. There is a mineable resource to the tune of 4,40,185 tonnes with an average grade 22.70% Mn content. Lease is being granted through auction mode, a legal platform for obtaining the lease. There has been no legal problem. It is a forest land and its clearance will be sought earliest and it will not be a hurdle in opening the mine. Feasibility report has been prepared and enclosed to this mining plan that reveals the mining profitable. Thus, resource of proved category is eligible for F2 code.

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(iii) Geological Axis G2:

The deposit has been explored by GSI by drilling 18 inclined core bore holes to a depth of 125m. There are old pits as deep as 20m in which Mn ore body is exposed. GSI has also done geological mapping and ore bodies have been delineated on geological plan on the basis of data generated through core drilling. Resource has been estimated with standard cross sectional method. Mining plan is being prepared for grant of mining lease. There is a mineable reserve of 4,40,185 tonnes with saleable grade. The ore has been estimated with standard method with core bore hole drilling data, the proved resource is thus, eligible for G2 category.

k) Furnish detailed calculation of reserves/resources section wise (When the mine is other than fully mechanized and deposit is of complex nature with variation of size , shape of mineralized zones, grade due to intrusion within ore zone etc, an attempt may be made to estimate reserves/resources by slice plan method). In case of deposits where underground mining is proposed, reserve/resources may be estimated by level plan method, as applicable, as per the proposed mining parameters.

Resource calculation furnished by GSI and re-calculation of resource by DGM is given in Annexure 6 & 7 respectively.

i) Mineral Reserves/Resources:

Mineral Resources: (Mineral resources may be estimated purely based on level of exploration, with reference to the threshold value of minerals declared by IBM)
Mineral Reserves/Resources:

Mineral Resources: (Mineral resources may be estimated purely based on level of exploration, with reference to the threshold value of minerals declared by IBM)

Level of Exploration	Resources/Reserve in tonnes	Grade in%
G1 - Detailed Exploration		
G2 - General Exploration Mn ore:	4,40,185.0	Mn: 1.22 to 40.72% SiO_2 : 9.0 to 59.0% Fe: 1.50 to17.0% P : 0.05 to1.70% Avg. grade: Mn 22.70%
G3 - Prospecting	00	---
G4- Reconnaissance	00	---

Resources and reserves within the lease may be arrived after applying results feasibility/prefeasibility study and economic evaluation of deposit based on various factors such as:

	UNFC Code	Quantity in tonnes	Grade
A. Total Mineral Resource	122	4,40,185.0	
Proved Mineral: Mineable Mn ore Reserve,	122	4,40,185.0	Mn: 1.22 to 40.72% SiO_2 : 9.0 to 59.0% Fe: 1.50 to17.0% P : 0.05 to1.70% Avg. grade: Mn 22.70%
Probable mineral Reserve, blocked ore	121 and 122	0.0	
B.Total Remaining	---	0.0	

Resources			
Feasibility mineral Resource	211	---	
Prefeasibility mineral resource	221 and 222	---	
Measured mineral resource, Blocked	331	--	
Indicated mineral resource	332	---	
Inferred mineral resource	333	---	
Reconnaissance mineral resource	334	---	
Total Reserves + Resources		4,40,185.0	

Note: It may not be possible to quantify grade wise reserves, as normally there is considerable variation in size and grade distribution within the ore zone, which results variable recovery factor and bulk density. Thus, tonnages arrived are tentative.

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2.0 MINING

A. OPEN CAST MINING:

a) Briefly describe the existing as well as proposed method for excavation with all design parameters indicating on plans /sections.

Present Method of Working: Not Applicable

No mining activities are going on in lease area and it is under grant. However, there are fourteen abandoned old mining pits. The length & breadth with depth of these pits are given below:

Dimensions of existing pits

S.No.	Length, m	Width, m	Depth, m	Area, m^2
1.	40.46	9.99	14.58	404.20
2.	41.22	20	9	824.40
3.	68.52	21.40	13.13	1466.33

4.	24.73	13.65	4.25	337.56
5.	413	37.34	28.39	15421.42
6.	46.13	14.34	14.33	661.50
7.	88.20	29	24.07	2557.80
8.	206.88	21.67	18.54	4483.09
9.	81.63	30	22.66	2448.90
10	150.13	37.63	20	5649.39
11.	9.51	12.46	2.75	118.49
12.	32.94	28.85	8.67	950.32
13.	13.30	9.24	2.57	122.89
14.	13.30	9.29	3.57	123.56
Total Area				35569.86

The area occupied by these old pits amounts to 35569.86 m^2.

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Proposed Method of Working:

The mineralization is on steep slope and amenable to opencast method of mining. The mining will be by A category mechanized operation commencing from highest altitude of mineralized area and subsequently descending downward forming systematic benches of six meter high and width not less than the height i.e. six meter and slope of individual bench to 60^0 from horizontal. The width of the working bench shall not be less than three times the maximum width of dumper plying on haul road.

There is infertile soil of about two meter thick and it will be removed separately by forming two meter high bench and stacked to its designated place. The overburden being hard, it will be drilled and blasted. The bench height in OB will be maintained six meter. For drilling in over burden, spacing will be 3.0m & burden 2.5m. Drilling will be carried by Wagon drill 100mm dia. The 6.0m bench will be sliced in one go. Thus, maximum depth of hole will be 6m excluding sub grade drilling. Sub grade drilling will be kept to 10% of hole depth i.e.0.60m to maintain bench floor avoiding toe formation. Total depth of blast hole will be 6.60m. The blast holes in overburden will be charged with slurry based cap sensitive Solar gel of five cartridges weighing each 2.75kg. Nonel system will be used for controlled blasting. The powder factor in OB will be 3.27m^3 per kg of

explosive or about 6.54t. Overall slope of hanging and foot wall will be maintained at 60°. In a bench height of six meter in ore, and average true width 2.49m wide; hence it will be sliced four times by drilling Jack hammer 32mm dia to a depth of 1.5m with spacing 1.0 m and burden 0.75 m. The holes will be charged with explosive slurry based gelatin 80% strength with 0.5kg in each hole in conjunction and fired with Nonel. At a time maximum 20 blast holes will be fired.

Approach roads and haul roads of proper gradient will be formed and inter benches will be connected by ramps of gradient 1:16.

Blasted OB and mineralized muck will be loaded by the loader on to dumpers of 16 tonnes capacity. OB will be dumped to its dump site and Mn ROM to its stack yard. At stack yard the ROM will be sorted out as per grade and size. Low grade will be subjected to jigging.

The winning of Mn ore will be carried out as shown in production and development plates 6.1 to 6.5. A garland drain 1 m x 1 m will be provided at top bench. No loose boulder or trees will be kept within three meters from the edge of the top bench. Proper steps for men and material working will be formed. The year wise production proposals are discussed below and its calculation is furnished in Annexure 9.

First Year: Excavation will commence from west end simultaneously for both C1 & C2 Mn ore bodies for eight benches of six meter high each and mined forming systematic benches both in H.W. &F.W. Width of bench will not be less than the height of the bench. Both the ore bodies will be mined from 385m RL up to 337. The cross sectional area to be mined constitutes 10.84m^2 & 10.30m^2 for C1 & C2 ore bodies respectively with lateral distance 33.87m & 45.0m. This will achieve the targeted production 25966.0 tonnes. OB benches will be sliced in one go and Mn ore body four times of 1.5m each high by Jack hammer drill holes. Blasting, loading & hauling of blasted OB & muck will be done as discussed above.

Second Year: During the year, production will be achieved from C1,C2, C4, A1, A2 & B1 ore bodies. Production from C1,C2, will come from ninth bench for a cross sectional area 11.51 &15.29m^2 and lateral distance 33.87 & 45m respectively. Similarly, C4 ore body, from 355m RL for a single bench to a lateral distance139.9m and cross sectional area 32.27m^2 will be mined. A1, A2 & B1 ore bodies too will be mined for a lateral distance 33.43m, 14.48m & 231.22m with cross sectional area 24.31m^2, 11.50m^2 & 11.91m^2. This will achieve the targeted production 28909.0 tonnes. OB benches will be sliced in one go and Mn ore body four times of 1.5m each high by Jack hammer drill holes. Blasting,

loading & hauling of blasted OB & muck will be done as discussed above.

Third Year: During the year, production will be achieved from C4 ore body alone for a lateral distance 139.9m & cross sectional area 32.27m^2 from bench 2, 3 & 4 from RL 349 to 337m. This will achieve the targeted production 34244.0 tonnes. OB benches will be sliced in one go and Mn ore body four times of 1.5m each high by Jack hammer drill holes. Blasting, loading & hauling of blasted OB & muck will be done as discussed above.

Fourth Year: During the year, production will be achieved from C4, C5 & B2 ore bodies. Production from C4,& B2, will come from fifth & sixth bench for a cross sectional area 26.32 &13.64m^2 and lateral distance 139.9 & 106.74m respectively. Similarly, C5 ore body, from 346m RL for two benches to a lateral distance 228m and cross sectional area 12.95m^2 will be mined. This will achieve the targeted production 43494.0 tonnes. OB benches will be sliced in one go and Mn ore body four times of 1.5m each high by Jack hammer drill holes. Blasting, loading & hauling of blasted OB & muck will be done as discussed above.

Fifth Year: During the year, production will be achieved from C1,C2, C4, C5, A1, A4 & B1, B2 ore bodies. Production from C1,C2, will come from 325 to 301m RL for a cross sectional area 11.51 &15.29m^2 and lateral distance 33.87 & 45m. Similarly, C4 ore body, from 319m to292m RL for a lateral distance139.9m and cross sectional area 26.32m^2 will be mined. A1,& A4 ore bodies too will be mined from RL 325 to 289m A1 and A4 from RL 331 to 301m for a lateral distance 33.43m, 5.78m with cross sectional area 30.21m^2,& 9.0m^2. Also B1,& B2 ore bodies too will be mined from RL 325 to 295m B1 and B2 319 to 292m for a lateral distance 231.22106.74m, with cross sectional area 14.80m^2,& 14.27m^2. Besides, C5 ore body too will be mined from 334m RL to 271 m RL for a cross sectional area 13.58m^2 for a lateral distance 228.0m. This will achieve the targeted production 3,06,065.0 tonnes. OB benches will be sliced in one go and Mn ore body four times of 1.5m each high by Jack hammer drill holes. Blasting, loading & hauling of blasted OB & muck will be done as discussed above.

Haul roads and steps with proper gradient would be formed. The Manganese ore brought to stack yard will be sorted according to size and grade. The area under pits at the end of ensuing plan period is given below:

Area in m^2	Hill slope Depth in m.
89551.83	114

b) Indicate year-wise tentative Excavation in Cubic meters indicating development, ROM, pit wise as in table below:

I **In-situ Tentative Excavation (Annexure 9)**

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Year	Total tentative Excavation (Cum)	Soil (Cu m)	OB/SB/IB (Cum)	ROM (Cu m)	ROM Tonnes	Mineral reject (Cum)	Mineral Reject (tonnes) 10%	Ore /Waste Ratio t/m^3
1	3	4	5	6		8	9	10
I Year	91822.13	5917.0	77533.0	8376.13	25966.0	837.61	2596.6	1:3.213
II Year	39230.47	1401.0	28454.0	9325.47	28909.0	932.54	2890.9	1:1.032
III Year	82643.44	8142.0	63454.0	11046.44	34244.0	1104.64	3424.4	1:2.090
IV Year	101205.32	2942.0	84233.0	14030.33	43494.0	1403.03	4349.4	1:2.004
V Year	3888170.64	85211.0	3704500.0	98730.66	306065.0	9873.06	30606.5	1:12.382
Total	**4203072.00**	**103613.0**	**3958174.0**	**141509.03**	**4,38,678**	**14150.9**	**43867.8**	**1:9.259**

NOTE: For tonnage of the ore, bulk density is considered 3.1t per m^3 as per GSI report.

पत्र संख्या द्वारा NGP/MN/MPLN-1177/NGP-2019 दि 18/09/2019
VIDE LETTER No.

Summary of Year Wise OB Removal and ROM Mn Production

Year	Mn ore Production, ROM tonnes	Soil m^3	OB removal, m^3
I	25,966.0	5917.0	77533.0
II	28,909.0	1401.0	28454.0
III	34,244.0	8142.0	63454.0
IV	43,494.0	2942.0	84233.0
V	3,06,065.0	85211.0	3704500.0
Total	**4,38,678.0**	**103613.0**	**3958174.0**

II Dump re-handling (for the purpose of recovery of mineral):

Estimated available material (Cum): Nil

18-1-19
क्षेत्रीय खान नियंत्रक (मा. खे.)
Regional Controller of Mines (N. R.)
भारतीय खान ब्यूरो नागपुर
Indian Bureau of Mines, Nagpur

c) Enclose Individual year wise development plans and sections showing pit layouts, dumps, stacks of mineral reject, if any, etc in case of 'A' category mines. Composite development plans showing pit layouts, dumps, stacks of mineral reject, if any, etc. and year wise sections in case of 'B' category mines.

Individual year's development plan is enclosed as plate no. 6.1 to 6.5 & sections as Plate 6A.

d) Describe briefly giving salient features of the proposed method of working indicating Category of mine.

Excavation will be done by category A mechanized mode. Drilling & blasting in OB will be carried out by Wagon drill 100mm dia with bench height 6m and width not less than the height of bench. The OB benches will be blasted six meter high in one go. Drilling and blasting in ore will be done by small dia Jack hammer drill. Ore and OB will be loaded by deploying loader into 16 tonnes tippers. The ore will be brought to sorting yard and waste to its waste dumping yard.

e) Describe briefly the layout of mine workings, pit road layout, the layout of faces and sites for disposal of overburden/waste along with ground preparation prior to disposal of waste, reject etc. A reference to the plans and sections may be given. UPL or ultimate size of the pit is to be shown for identification of the suitable dumping site.

It is shown in plate 6.1 to 6.5 & sections in Plate 6A. Further, it is described briefly as below:

Top soil: There is no top soil that supports crop where the excavation of Mn ore is proposed during the ensuing mining plan period. Hence, top soil will not generate during the plan period, therefore, its careful removal and separate stacking is not needed.

Soil: In lease, infertile soil not suitable for crops is available for a two meter thickness from surface. This soil will be scrapped meticulously and stacked to its designated place for which an area of 23733.35m^2 has been earmarked. The dump will be temporarily in nature as this soil will be used for plantation. There will be generation of 103613m^3 of soil during the plan period. To avoid erosion and siltation it will be provided with retaining wall.

Layout of Mine workings: Manganese ore mineralization is delineated on surface geological plan plate 3. The Mn ore will be mined from west direction of the proposed area advancing towards east following the Mn bands forming systematic benches of six meter high. During the mining of Mn ore, infertile soil will encounter in all year of operation. Hence, it will be removed and stacked as waste. At 385m RL, first bench

will be opened to a height of 6m during the first year of operation. In second year, mining of Mn ore will proceed in east direction from RL 355m. The mining will be descending order along hill slope, mining all Mn ore bodies in central part of the lease. Mn ore & OB being hard will be drilled by Wagon drill 100mm dia hole and blasted with slurry explosive. Blasted muck will be loaded by the loader in to 16 tonnes tippers to be transported at crusher site for making saleable size.

The recovery of Mn ore will be 100% by volume from pit and reject will be 10% while sorting. This reject will be stacked to its designated place.

Pit road layout: Approach road from hill bottom will be formed as shown in Development & Production Plates 6.1 to 6.5. This road will be made up to 385 m RL i.e. the area from first year production will start. A ramp with gradient 1:16 will be formed to reach the tippers and excavator at pit bottom of bench floor.

Layout of Faces: Mining will start from the C1 ore body which is at the highest level compared to other ore bodies. The faces of the benches will be along strike of the ore body and height of bench to be along dip of ore body. Foot wall will follow the dip of the ore body. The benches will be in descending order along dip of ore body.

Site for disposal of OB/waste: OB/Waste generation excluding soil will be in the form of quartzite, mica schist amounting to 3958174m^3 during five year period. For stacking, a separate dump will be created for which 149084m^2 of area has been earmarked. The waste will be dumped from foot hill in steps along hill slope 10high 20m wide. As per the exploration done by GSI and state DGM, the land chosen is non-mineralised. Further, to avoid wash off from dump, it will be provided gabion wall at toe of the dump.

Rejects: There will be generation of reject due to winning of Mn Ore which will be 14150.9m^3 during five year period. Reject will constitute less than 10mm in size and also which contain +10 to -20% Mn. This will be stacked separately.

Details on Drilling and Blasting, Mining Machinery.

(1) Drilling:- Drilling operations to be done by Wagon drills in over burden and by Jack hammer in Manganese ore body.

Parameters for drilling in over burden and ore body:

Drilling in Ore Body		Drilling in Over Burden	
Depth of hole	1.5 m	Depth of hole	6.6 m
Burden	0.75 m	Burden	2.5 m
Spacing of holes	1.0 m	Spacing	3.0m
Dia. of Hole	32 mm	Dia of hole	100mm

(A) Requirement of Jack hammer drill machine.

(i) Manganese ore blasted by each hole: 1.5m X 1.0m X 0.75m=1.125m^3
(ii) Maximum Manganese ore handling in a shift:3.06.065.0t/3.1 =98730.64m^3/300=329.10m^3
(iii) Average meterage drilled by 1 drill machine in a shift: 30m
(iv) No. of drill holes required for Manganese ore production in a shift: 329.10/1.125=292.53
(v) Drill meterage required in a shift: 292.53 x1.5= 438.80m
(vi) One Jack hammer can drill 30m in a shift, hence Jack hammer required 438.80/30 = 14.63 or say 15nos

(B) Requirement of Wagon Drill machine.

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(i) Overburden blasted by each hole: 6.6m X 2.5m X 3.0m=49.5 m^3
(ii)Maximum overburden handling in a shift: 37,89,711.0m^3/300=12632.37m^3
(iii)No. of drill holes required for overburden removal in a shift: 12632.37/49.5=255.19
(iv) Drill meterage required in a shift: 255.19x 6.6= 1684.25m
(v) One drill machine can drill 50m in a shift, thus, no of drill machine required = 1684.25/50 = 33.68 or say 34

(C) Requirement of Tipper Trucks

(i) Maximum Manganese ore handling in a shift: 3,06,065.0t /300= 1020.22 t
(ii) Maximum OB handling in a shift: 37,89,711.0m^3/300=12632.37m^3 or in tonnes x1.8BD=22738.26 t
(iii) Total handling of OB & ore in a shift: 1020.22 +22738.26= 23758.26 t
(iv) No. of effective working hours in a shift: 7
(v) No. of trips by 1 tipper in one hour: 3
(vi) No. of trips by 1 tipper in a shift: 7 X 3=21
(vii) Total tonnage transported by one tipper in a shift: 21 X 16 t=336T
(viii)No. of tipper trucks required: 23758.26/336=70.70 say 71
(ix) No of spare tippers:1
(x) Total no. of tippers required: 71+1= 72

D) Loading Equipment:

Calculations for Loading Equipment

i) Maximum handling of Mn ore in a shift : 329.10m^3

ii) Maximum OB handling in a shift = 12632.37m^3

iii) Total handling of OB & Mn ore in a shift : 329.10m^3 +12632.37m^3 =

12961.47m^3

iv) Mn ore handling in a shift in terms of tonnage = 329.10x3.1BD =1020.21 t

v) OB handling in a shift = 12632.37m^3x1.8BD = 22738.26 t

vi) Total Mn ore & OB handling in a shift (1020.21t +22738.26 t) = 23758.47 t

vii) Average bucket capacity = 2.1m^3

viii) Fill factor =80%

ix) Broken ore density = 2.0 t /m^3

x) Tonnage handled/Bucket (2.1x0.8x 2.0) = 3.36 t

xi) Average Cycle time/bucket = 45 seconds

xii) No of buckets /hour (60x 60/45) = 80

xiii) TPH of excavator (80 x 3.36) = 268.80 t

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xi) Effective TPH to be considered (80%) = 268.80 x 0.80 = 215.04 t
(For shifting, waiting, face preparation etc.)

x) Total time required for loading materials in a shift (23758.47 t /215.04 t) = 110.48 hours

xi) No. of effective working hours in a shift = 7

xii) Percentage Equipment utilization = 70%

xiv) Percentage Equipment availability = 75%

xv) Hours available per excavator in a shift (7x0.75x 0.70) = 3.67

xvi) No of Excavators required (110.48/3.67) = 30.10 or say 31

(2) Blasting:

Based on parameters of drilling and blasting discussed above and powder factor arrived at, the requirement of explosive in a year will be as below:

Small dia for blasting in Manganese ore:

(i) Maximum quantity of Manganese ore to be blasted in a year: 3,06,065 t

(ii) Powder Factor: (1.5mDx1.0m Spacingx0.75m Burden)=1.125m^3 in 0.5kg explosive
(iii) Therefore, in one kg explosive 1.125m^3x2 =2.25m^3 or 2.25x 3.1=6.97t
(iv) Hence maximum requirement of explosive in a year=3,06,065 /6.97=43911.76 kg or 43912 kg

Large dia explosive for blasting Overburden:

i) Maximum quantity of Overburden to be blasted in a year: 37,89,711m^3
(ii) Powder Factor: (6.0mDx 3.0m Spacing x 2.5m Burden)=45m^3 in 13.75kg explosive
(iii) Therefore, in one kg explosive 45.0m^3/13.75 =3.27m^3
(iv) Hence maximum requirement of explosive in a year = 3789711m^3/3.27 = 1158933.02 or say 1158933.0 kg.
The drilling and blasting will be done through Govt. registered contractor.

The workers will be provided with protective appliances to avoid dust problem at the time of drilling & blasting & wet drilling will be adopted

Deployment of Machinery:

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List of Machineries & Equipment

Sr. No.	Type	Nos.
1.	Self Propelled portable air compressor	15
2.	Compressed air operated Jack hammer drills	15
3.	Exploder	1
4.	Water pumps: 10HP	1
5.	Wagon drill 100mm	34
6.	Tractor, 45 HP	1
7.	Water tanker, 10,000 Litre capacity	1
8.	Tipper trucks, 16 tonnes	72
9.	JCB & Backhoe Loader, 2.1m^3 bucket capacity	31
10.	Rock Breaker	1
11	Dozer 400 HP	1
12	Road Grader	1

The lessee will deploy the above mentioned machineries on contract basis as per requirement.

f) Conceptual Mine planning up to the end of lease period taking into consideration the present available reserves and resources describing the excavation, recovery of ROM, Disposal of waste, backfilling of voids, reclamation and rehabilitation showing on a plan with few relevant sections.

The lease has been granted through auction and under process of obtaining various permits / approvals. It will be executed after securing all approvals. As per the amended Act, the lease will be executed for the period fifty year. There shall be nine conceptual periods during lease period.

There is a mineable reserves of 4,40,185 tonnes as per DGM's re-estimation. The preferred bidder now intends to mine 4,38,678.0 tonnes during the ensuing mining plan period, leaving balance 1507 tonnes for conceptual period. Thus, due to meager reserve left out for conceptual period, there will be no conceptual mining. However, due to proposed exploration, if proved additional reserve, it will be modified accordingly.

The land use as per the present exploration status will be as below:

Sr. No.	Land use Pattern	Land use at the stage of conceptual stage,m^2
1	Area under Pit	89551.83
2	Waste Dump	213478.70
3	Soil dump	23733.35
4	Roads	4500.00
5	Mineral storage	1775.00
6	Reject stack	895.00
7.	Structures	4924.00
8	Plantation	20,000.00
	Total	358857.88

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Excavation: There will be no excavation.

Recovery of ROM: None

Disposal of waste: None

Reclamation and rehabilitation:

Pit will be converted to water reservoir after conceptual period. It is shown in reclamation plan, plate 9. Conversion to water reservoir, the area fall under reclamation and rehabilitation will be to the tune of 53982.15m^2.

B UNDERGROUND MINING: None

3. MINE DRAINAGE

a) Minimum and maximum depth of water table based on observations from nearby wells and water bodies.

Groundwater condition in the plain area appears to be quite good as seen in the nearby existing wells. The water table in dug wells varies from 10 to 20 meters from winter to summer season from general ground level 329m RL.

b) Indicate maximum and minimum depth of workings.

The working will be on hill slope from 385m RL to 271m RL for a depth of 114m and it may go below 58m from surface level.

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c) Quantity and quality of water likely to be encountered, the pumping arrangement and places where the mine water is finally proposed to be discharged.

The working will intercept the water table because; excavation will be below the ground water table. The water will be pumped out by deploying 10 HP water pumps. The water will be allowed to join natural drainage system after passing through settling tanks. The necessary approvals shall be taken from the competent authorities for the working below the ground water table.

d) Describe regional and local drainage pattern. Also indicate annual rain fall, catchments area, and likely quantity of rain water to flow through the lease area, arrangement for arresting solid wash off etc.

Drainage of the area is controlled by seasonal gullies and streams flowing NE-SW or E-W direction and finally merge with Khindsi Lake. Since the slopes are formed all along the edge of the hill, various seasonal drains are formed at number of places depending on the local topography of the slope. There are numerous such drains, but none of them is perennial in nature.

4. STACKING OF MINERAL REJECT/ SUB-GRADE MATERIAL AND DISPOSAL OF WASTE

Existing Waste Dumps:

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Presently there are eleven old waste dumps of the following capacity & quantity within the lease area. Details of existing waste dumps are given below in tabular form:

S.No	Waste Dump No	Area, Top of the Dump m^2	Area, Bottom of the Dump m^2	Average area of Dump m^2	Height of Dump m	Quantity in Dump m3
1	D1	224.60	670.90	447.75	15.98	7155.05
2	D2	658.65	1313.72	986.19	9.655	9521.62
3	D3	20362.95	31577.00	25969.98	16.979	440944.21
4	D4	748.21	1776.66	1262.44	4.272	5393.12
5	D5	3372.78	5895.39	4634.09	8.21	38045.84
6	D6	719.30	1693.32	1206.31	9.707	11709.65
7	D7	4287.53	8426.34	6356.94	5.32	33818.93
8	D8	2970.50	6152.20	4561.35	20.801	94880.67
9	D9	853.35	2944.98	1899.17	10	18991.69
10	D10	2084.91	3381.45	2733.18	14	38264.52
11	D11	133.82	562.26	348.04	7.448	2592.20
		36416.60	64394.22	50405.44	Total	701317.50

The area occupied by these waste dumps constitutes 6.4394ha. No sub grade or reject stack is in the lease area.

Re-handling of dump: The dumps which are falling within the mining area, will be re-handled. The waste generated due to re-handling will be dumped at the waste dump site. As these are very old dumps and due to growth of natural plantation, it has been subsumed in the surface topography, instead of dump re-handling, it has been considered under overburden handling.

a) Indicate briefly the nature and quantity of top soil, overburden / waste and Mineral Reject to be disposed off.

There is no top soil in the area which supports crops; however it has a layer of infertile soil. Hence, no top soil will be generated. The soil intermixed with waste amounting to 103613m^3 will be stacked separately in southern side of the lease and mineral reject as shown in plate no. 6.1 to 6.5 (Development & Production Plan).The reject generated will be stacked separately. During the ensuing plan period, waste/OB removal would be 3958174.0m^3 during First to fifth year and would be dumped NE corner of the lease area in a single dump. The area earmarked for this purpose is 149084m^2. The waste dumping will be in a retreating manner.

The details about quantity of reject are shown in table below:

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Year	Soil (cum)		Mineral Rejects (cum)			
	Reuse/spreading	Storage	Backfilling	Storage	Blending	Beneficiation
I	0.00	5917.0	0.00	837.61	0.00	0.00
II	0.00	1401.0	0.00	932.54	0.00	0.00
III	0.00	8142.0	0.00	1104.64	0.00	0.00
IV	0.00	2942.0	0.00	1403.03	0.00	0.00
V	0.00	85211.0	0.00	9873.06	0.00	0.00
Total	0.00	**103613.0**	0.00	**14150.9**	0.00	0.00

b) The proposed dumping ground within the lease area be proved for presence or absence of mineral and be outside the UPL unless simultaneous backfilling is proposed or purely temporary dumping for a short period is proposed in mineralized area with technical constraints & justification.

The proposed dumping ground is within the lease area and non mineralized as per the documents provided by the state DGM for auction. It is also outside the present known UPL. No simultaneous back filling is proposed as the mineral exists in depth. These existing dumps that fall in proposed excavation site will be re-handled. To avoid siltation from dump, a retaining wall at toe of dump will be provided. It will be one meter high above surface and half a meter beneath the surface as foundation. Its width will be kept one meter at top and on ground level it will be 1.5m wide. In addition to that plantation will be done on dead dumps.

c) Attach a note indicating the manner of disposal of waste, configuration and sequence of year wise build up of dumps along with the proposals for protective measures.

The waste will be disposed in retreating manner. In this process, the waste will be first dumped at the one end of the dump and with 10m high retreating towards other side of the dump. In this process it will get time for stabilization and will have minimum erosion.

d) Protective measures to be taken in plan period.

As a step towards environment protection, the proponent shall do the following protective measures.

i) Retaining wall: To prevent any wash-off and degradation of land in the adjoining areas, it will be constructed along the toe of proposed waste dump/soil and reject stacks during the plan period. It will be one meter high above surface and width one meter.

ii) Garland drain: It will be 1.0m wide and 1.0m deep to arrest the siltation and is proposed to be constructed along the retaining wall.

iii) Settling Tanks: Two settling tanks are proposed in the downstream direction of natural drainage, one each in the SE and SW direction of the proposed working area to arrest siltation, if any, prior to discharge of mine water.

5.0 USE OF MINERAL AND MINERAL REJECT

The following are to be furnished in the interest of mineral conservation.

a) Describe briefly the requirement of end-use industry specifically in terms of physical and chemical composition.

The consuming industry in general demands the chemical composition of more than 25% Mn content. As per the GSI's chemical analysis, the ore has about 30% Mn content; therefore, the ore mined will be in demand fetching good price for at least the 50% of the saleable ore. The balance 50% saleable ore may be in the range of 22 to 25% Mn content as per DGM's analysis. This grade too may fetch good price on account of depleting manganese ore resources. It will be sold to such traders who offers highest price to a particular grade.

The reject constitutes +10% - 20% Mn content material. The cut off grade has been considered based on present market scenario that may change upon actual start of mining operations.

b) Give brief requirement of intermediate industries involved in up gradation of mineral before its end-use.

No industry is involved in up-gradation of mineral before its end-use.

c) Give detail requirements for other industries, captive consumption, export, associated industrial use etc.

It is not for either captive consumption or export.

d) Indicate precise physical and chemical specification stipulated by buyers

Not applicable

e) Give details of processes adopted to upgrade the ROM to suit the user requirements.

Sorting of ROM, grade wise, by manual means for dispatches as per different grade requirement of user will be done.

6.0 PROCESSING OF ROM AND MINERAL REJECT

a) If processing / beneficiation of the ROM or Mineral Reject is planned to be conducted, briefly describe nature of processing / beneficiation. This may indicate size and grade of feed material and concentrate (finished marketable product), recovery etc.

No processing / beneficiation of the ROM or Mineral Reject are planned. However, the lessee will install the crusher to make the size saleable. Besides, a jigging facility is proposed for washing and segregating gangue mineral from low grade ore. This will improve the recovery and grade of the ore.

b) Give a material balance chart with a flow sheet or schematic diagram of the processing procedure indicating feed, product, recovery, and its grade at each stage of processing.

Not applicable

c) Explain the disposal method for tailings or reject from the processing plant.

Not applicable.

d) Quantity and quality of tailings /reject proposed to be disposed, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailings dam.

Not applicable

e) Specify quantity and type of chemicals if any to be used in the processing plant.

Not applicable

f) Specify quantity and type of chemicals to be stored on site / plant

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Not applicable

g) Indicate quantity (cum per day) of water required for mining and processing and sources of supply of water, disposal of water and extent of recycling. Water balance chart may be given.

Not applicable

(h) Monitoring of Dust, Water, Noise & Ground vibrations:

Monitoring schedule

1. Air: It will be monitored as per CCOM's circular no 3/92. The monitoring will be at quarry edge in summer season for two days per week for two weeks. There will be two samples per day of 8 hours totalling 8 samples in each station. Further, at drilling site and near haulage road, it will be monitored in post monsoon season. Parameters to be monitored will be RSPM, PM10, PM 2.5 and NO_x, SO_2, CO

2. Water: Mine water samples will be collected in winter, summer and monsoon seasons. Three spot samples per season at the rate of one sample each on 3 different days. Parameters to be monitored will be as per IS:2490 (Part-1) 1981.

3. Noise: It will be monitored in dry season i.e. summer at near quarry edge. One reading will be taken showing instantaneous values in dB(A).

4. Vibration: Blast induced vibration will be monitored near the human settlement or public road for three heavy blasts on three different days measuring peak PPV with frequency.

Along with the above details, specific conditions, if any, imposed at the time of grant of Environmental Clearance, and Consents from CPCB/MPCB in respect of location, number and schedule for monitoring of various environmental parameters, shall be complied with. The cost on monitoring of environmental parameters will be about Rs two lac per annum.

These monitoring stations are shown on Plate 8 i.e. environmental plan.

7.0 OTHER:

Describe briefly the following:

a) Site services:

The following site services will be provided at mine site.

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i) Office
ii) Stores Shed
iii) Rest Shelter
iv) Blasters Sheds
v) Bore well for drinking water

These site services are considered to be adequate at the proposed scale of operation. Additional facilities would however, be provided as and when required and statutory provisions in this regard would be complied with.

b) Employment potential:

Existing Manpower:

The mining operations have not yet commenced, however, the lessee has appointed the following personnel for overseeing the operation.

Highly Skilled (Geologists)	3

Proposed Manpower: The following manpower will be deployed for achieving the targeted production.

Mines Manager with I class Certificate & Mining Engineer	1
Mine Foreman (R)	1
Mine Mates	1

Blaster	1
Supervisors/ Office Staff	3
Mechanical Supervisor	1
	8

There shall be the manpower as below:

Highly Skilled	7
Skilled workers	5
Un-Skilled workers	30
Total	42

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8.0 PROGRESSIVE MINE CLOSURE PLAN UNDER RULE 23 OF MCDR'2017

8.1 Environment Base line information: Attach a note on the status of baseline information with regard to the following.

Existing land Use pattern:

The mining activity for exploitation of Manganese ore has not yet commenced. However, due to old workings, there are14 pits and 11dumps of waste material. The existing land use pattern is as under.

No.	Head	Present Land use pattern m^2
1	Area under pit	35569.86
2	Overburden dumps	64394.22
3	Structures (old magazine)	24.00
	Total	99987.90

Water regime: The lease area is a steep hill having slope towards south direction. The rain water is mostly drained through adjoining drain ultimately joining to the main nala which goes to Khindsi tank. Groundwater condition in the plain area appears to be quite good as seen in the nearby existing wells. The water table in dug wells varies from 10 to 20 meters from winter to summer season.

Flora & Fauna: It is a forest land and has thick vegetation. The trees such as Neem, Tamarind, Babul, Teak, Bijja, Mango, Behda, etc. are naturally grown in core zone.

As it is a forest land, there is ample fauna in the core zone. The fauna such as fox, wild animals are seen in the core zone. Rabbits too are commonly seen. Common birds like doves, koel, seven sisters, wood pecker, maina are seen. There is a forest land of 99.95ha on which grown up trees are 35,703 in number which requires felling. Thus, density of trees on forest land is 367.21trees/ha or 0.0367 trees/m^2. In respect of revenue land there are 1261grown up trees on 5.05 ha area which requires felling. Thus, density of trees on revenue land is 249.70trees/ha or 0.0249 trees/m^2.

Climatic Conditions: The area is characterized by tropical climate. Summer season starts from April and lasts till May. The average temperature in summer varies from 36° to 45° C but on some days during peak of summer in May it rises beyond 46° C. The average minimum temperature in winter varies from 12.2° to 14° C but as low as 6° C is also recorded as cold winter nights in December-January.

Rainfall: The monsoon season starts off in the month of June and stays till September with an overall rainfall of 12.02 to 14.4 cm. Highest amount of rainfall of 340mm was recorded in the month of July.

Human Settlement: There is no human settlement in the lease area. The nearest human settlement is in the village Manegaon which is about 0.5 km due S of the area. Villages with in 5 km have been furnished in the following table. The villagers are middle to lower class and generally earn their livelihood from agriculture and other local industries including mines.

Sr. No.	Name of the village	Distance in km.	Direction
1.	Manegaon	0.5	S
2.	Sonegaon	1.0	SE
3.	Mandri	1.5	SW
4.	Panchala Buzurg	3.5	S
5.	Mahadula	4.0	S
6.	Panchala Khurd	5.0	S
7.	Bhandarbodi	5.0	SE
8.	Bhimtola	2.5	SE
9.	Guguldoh	2.0	E
10.	Musewadi	2.0	W
11.	Gudhegaon	2.5	W

12.	Mangli	4.0	W
13.	Nohabi	5.0	W
14.	Maharajpur	4.5	NW
15.	Umri	2.0	NW
16.	Nayagaon	2.5	NW
17.	Chichda	3.0	NW
18.	Maharpeth	4.0	NW
19.	Murda	2.5	N
20.	Ghoti	5.0	N
21.	Ramjan	4.5	N

Public building, Monuments, Worship place, etc.: None.

Quality of Air : Around the Mn lease in the vicinity of 5km radius, no industrial activity which produces SPM exists. Deposit is surrounded by agricultural fields /Forest Land which are devoid of SPM of appreciable quantity. Thus, quantum of total SPM and RSPM in ambient air in buffer zone remains much below the permissible limit.

Sanctuary:

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No sanctuary is located in the vicinity of lease area.

8.2 Impact Assessment: Attach an Environmental Impact Assessment Statement describing the impact of mining and beneficiation on environment on the following:

i) Land area indicating the area likely to be degraded due to quarrying / pitting dumping, roads, working, processing plants, township, etc.

Land area likely to be degraded due to quarrying / pitting, dumping, roads, working etc at the end of review plan period, at conceptual plan period is given below in tabular form.

Sr. No.	Land use Pattern	Present Land use m^2	Additional land use in Plan period	Total Land degraded at the end of plan period, m^2
1	Area under Pit	35569.68	53982.15	89551.83
2	Waste Dump	64394.22	149084.48	213478.70
3	Soil Dump	0.00	23733.35	23733.35
3	Roads	0.00	4500.00	4500.00
4	Mineral storage	0.00	1775.00	1775.00
5	Reject stack	0.00	895.00	895.00
6	Structures	24.00	4900 .00	4924.00

7.	Plantation	0.00	20,000.00	20,000.00
	Total	99987.90	258869.98	358857.88

Total area degraded due to mining activities at the end of plan period amounts to 35.8858ha.

ii) Air Quality: As stated above, it is A category mine; it may generate SPM but not to a noticeable level. Level of SPM in air is raised by the operation of machinery, drilling and blasting. EIA is being prepared by the EC consultant. Those data will be submitted to the IBM for record. During mining plan period, mining machineries of medium capacity will be deployed hence; SPM generation shall be less and shall always be kept within permissible level. Haul roads will be sprinkled with water to suppress SPM generation. Dust suppression or extraction techniques shall be used during drilling operations to control the pollution at source level. Regular monitoring will be done as per the CCOM's circular and as per the conditions of EC/ Consent to operate.

iii) Water Quality: No toxic elements are present or detected in the samplings done in the area that may cause toxicity in the water. Further, no toxic fluid shall be discharged from any source during the course of mining and allied operations. Water will be drawn for drinking purpose, sprinkling on haul roads and watering the plants. The proponent has proposed garland drains and settling tanks to arrest the siltation in the mine water. These channels shall be regularly maintained. Water quality shall also be regularly monitored, as per the MoEF & CC guidelines, at prominent locations in the upstream and downstream directions and parameters of monitoring shall be kept within the permissible limits. The proponent shall take necessary approvals for working below the water table from the competent authority and also monitor the quality of ground water, as per the conditions laid down in the approval so obtained.

iv) Noise Levels: The mining machineries, movement of vehicle and blasting are the main sources of producing noise in any mine. This mine being A category, it may produce the noise level due to operation of small capacity machineries and blasting, the latter a onetime operation for fraction of second. By operation of machineries, the generation of cumulative noise levels may not be alarming and may not be carried to a nearest dwelling house beyond the permissible level raising back ground noise levels. The noise levels will be monitored at source and nearest residential houses as per CCOM's circular and mitigative measures shall be taken in case of any indications of noise pollution.

v) Vibration Levels: Small dia Jack hammer drill holes to a depth of 1.5 m and blast hole 100mm dia to a depth of 6.6 meter will be drilled and blasted. This may not generate higher PPV level beyond the permissible levels fixed by the DGMS. To

avoid ground vibration levels beyond the permissible limits, Nonel is proposed to be used as initiation system for blasting. Also, by adopting proper blast design and using delays down-the-hole as well as in surface, blast vibrations shall be kept minimal. Regular monitoring of ground vibrations shall be done to check the levels of vibration due to operations of heavy earth moving machineries and blasting.

vi) Water Regime: No subsurface or surface water will be used for mining activities or for beneficiation of ore. In ensuing mining plan period; there is no proposal to use water for any activity except drinking for workers, dust suppression and watering plants. It will be a mining on hill slope and also it will intercept the water table requiring its pumping. The, ground water level will be lowered. Permission for water abstraction will be taken from the CGWB.

vii) Socio-economics: Carrying out mining activities in the area by the lessee will have positive impact. It will create employment opportunities to local people, enhancing their income and standard of living. The demographic profile of the area will not change as there will be no influx of people from outside. No colony of workers will come up in the area. In respect of occupational health hazards, the impact will be positive as manganese does not create any health hazards to the workers or local people as it is non-toxic.

vii) Historical Monuments: It does not exist within lease area or nearby lease area. Hence, these will not be impacted due to proposed mining operations.

8.3 Progressive reclamation Plan:

To mitigate the impacts and ameliorate the condition, describe year wise steps proposed for phased restoration, reclamation of lands already/to be degraded in respect of following items separately for 5 years period.

8.3.1. Mined-Out Land: Describe the proposals to be implemented for reclamation and rehabilitation of mined-out land including the manner in which the actual site of the pit will be restored for future use. The proposals may be supported with yearly plans and sections depicting yearly progress in the activities for land restoration/ reclamation/rehabilitation, afforestation etc, called "Reclamation Plan".

At the moment, mining operations are based on present level of exploration (G-2 level), there is no plan to reclaim the mined-out area by back filling due to depth persistency of Manganese ore body as observed in the boreholes that shall be proved (G-1 level) after further drilling in the area. The proposals will be discussed in detail in subsequent Review of Mining Plan to be submitted to IBM for approval. The mined out land will be converted to water reservoir after conceptual period, considered as reclaimed and rehabilitated.

8.3.2 Soil Management: The soil available at the site and its utilization may be described.

The lease area has a thick vegetation and also bestows soil cover about two metre thick from surface. This soil contains less nutrients, however, it will be removed carefully i.e. by dozer and will be stacked separately for which an area 23733.35m^2 has been earmarked. It is calculated that there would be generation of 103613m^3 of soil in five year period. Part of this soil will be used for proposed plantation.

8.3.3 Tailings Dam Management: The steps to be taken for protection and stability of tailing dam, stabilization of tailing material and its utilization, periodic desilting measures to prevent water pollution from tailings etc, arrangement for surplus water overflow along with detail design, structural stability studies, the embankment seepage loss into the receiving environment and ground water contaminant if any may be described.

No beneficiation of ore will be carried out and there is no proposal to erect the beneficiation plant. Hence, tailings dam will not come up and no question of its management arises.

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8.3.4 Acid mine drainage, if any and its mitigative measures.

The proposed area does not contain the ore/mineral/waste which helps to produce acid thus, there will be no acid mine drainage and hence no mitigative measures are required.

8.3.5 Surface subsidence & mitigation measures through backfilling of mine voids or by any other means and its monitoring mechanism. The information on protective measures for reclamation and rehabilitation works year wise may be provided as per the following table.

It is furnished in table below:

SUMMARY OF YEARWISE PROPOSAL FOR ITEM NO. 8.3, YEAR WISE

Items	Details	I	II	III	IV	V
Dump management	Area afforetation (ha)	0	0	0	0	0
	No of saplings to be planted planted	0	0	0	0	0
	Cumulative no of plants	0	0	0	0	0
	Cost including watch and care during the year	0	0	0	0	0

Management of worked out benches	Construction of Retaining wall, m	1656.43	1656.58	1656.58	1656.58	1656.58
	Area available for rehabilitation (ha)	0	0	0	0	0
	Afforestation to be done (ha)	0	0	0	0	0
	No of saplings to be planted in the year	0	0	0	0	0
	Cumulative no of plants	0	0	0	0	0
	Any other method of rehabilitation (Specify)	0	0	0	0	0
	Garland drains, m	55.7	0	154.3	199.5	0
	Cost including watch and care during the year	0	0	0	0	0
Reclamation and rehabilitation by back filling	Void available for Backfilling (LxBxD) pit wise/stope wise	0	0	0	0	0
	Void to be filled by waste/tailings	0	0	0	0	0
	Afforestation on the backfilled area	0	0	0	0	0
	Rehabilitation by making water reservoir	0	0	0	0	After vth year reservoir
	Any other means (specify)	0	0	0	0	0
rehabilitation of waste land within lease	Area available (ha)	0.4	0.4	0.4	0.4	0.4
	Area rehabilitated	0	0	0	0	0
	Method of rehabilitation (Plantation)	400 nos	400 nos	400 nos	400 nos	400 nos
Settling tank	Construction, nos	2	0	0	0	0
Check dam	Construction, nos	2	0	0	0	0
Others (Specify)	Cost including watch and care during the year including environmental monitoring,	5.0 lac	5.0 lac	5.0 lac	5.0 lac	5.0 lac

Benches are dynamic in nature; hence, rehabilitation will not be possible in the plan period. However, after proposed exploration, surface geological plan will be updated and based on it reclamation will be decided in subsequent Review of Mining Plan

8.4 Disaster Management and Risk Assessment: This may deal with action plan for high risk accidents like landslides, subsidence flood, inundation in underground mines, fire, seismic activities, tailing dam failure etc. and emergency plan proposed for quick evacuation, ameliorative measures to be taken etc. The capability of lessee to meet such eventualities and the assistance to be required from the local authority may also be described.

The natural disasters likely to be as given below:

1.0 Geological disasters
- 1.1 Avalanches and mudslides
- 1.2 Earthquakes
- 1.3 Sinkholes
- 1.4 Volcanic eruptions

2.0 Hydrological disasters
- 2.1Floods
- 2.2 Limnic eruptions
- 2.3 Tsunami

3.0 Meteorological disasters
- 3.1Blizzards
- 3.2 Cyclonic storms
- 3.3 Droughts
- 3.4 Thunder storms
- 3.5 Hailstorms
- 3.6 Heat waves
- 3.7 Tornadoes

4.0 Wildfires

5.0 Health disasters
- 5.1 Epidemics

6.0 Space disasters
- 6.1 Impact events and airburst
- 6.2 Solar flare

All the above stated disasters are not applicable to this mine as it is a shallow mine. The disasters likely to occur at mine may be as stated below:

1 Landslide: This may occur due to seismic activities or due to manmade, steep slope not following the rules. Slope of walls are proposed as per rule and it is not likely to occur.

2 Fire: It is surrounded by the forest and there is a chance of fire in lease area. In case of eventualities, firefighting equipment will be provided at mine site.

3. Tailings dam: There is no ore processing plant within or outside lease area. No tail water will be generated hence, no tailing dam will come up or there is no proposal to erect in future. Thus, due to its collapse, no disaster is anticipated.

4.0Inundation: It is an opencast operation not surrounded by the dams, lakes or rivers. Hence, flooding of opencast workings are ruled out

5.0 Subsidence: It does not have underground operation. Thus, there shall be no surface subsidence.

In case of eventualities such as fire etc. mines manager will be empowered to take immediate decision. He shall contact concerned state government offices for help if needed. The applicant has developed capabilities to seek assistance from local authorities.

8.5 Care and maintenance during temporary discontinuance: An emergency plan for the situation of temporary discontinuance due to court order or due to statutory requirements or any other unforeseen circumstances may indicate measures of care, maintenance and monitoring of status of discontinued mining operations expected to re-open in near future.

During the plan period, there is no proposal to discontinue the operation temporarily, however, if emergency arises, plan will be prepared according to need and implemented. Since the mining will be an opencast, no rigid emergency plan is required. The excavated area will be guarded round the clock so as no one falls in excavated pit inadvertently. Besides, untoward entry will be strictly prohibited in lease area. The workers, who are engaged on emergency work such as safe making of benches, dewatering of pits will be allowed. The notices as envisaged in the statute will be given to the Govt. departments.

8.6 Time Scheduling for Abandonment: Mineable reserves will be mined up to five year period. As per the proposed exploration, it is expected that there would be addition of resource. That resource will be mined during subsequent years. Before abandonment, FMCP will be prepared and get approved from the IBM and as per approved proposals; the action will be taken up.

8.6 Financial Assurance:

The financial assurance can be submitted in any encashable form preferably a Bank Guarantee from a Scheduled Bank as stated in Rule 23(F)(2) of Mineral Conservation and DevelopmentRules,1988 for five years period expiring at the end of validity of the document. The amount calculated for the purpose of Financial Assurance is based on the CCOM's Circular no. 4 dated 2006 as below.

Table indicating the break-up of areas in the Mining Lease for calculation of Financial Assurance

The area required for different mining activities at the end of modified Mining Plan period is tabulated below:

पत्र संख्या द्वारा
VIDE LETTER No. NGP/MN/MPLN-1177/NGP-2019
दि 18/09/2019

SNo	Head	Area put on use at start of Plan (in Ha)	Additional Requirement during Plan Period (in Ha)	Total (in Ha)	Area considered as fully reclaimed & rehabilitated (in Ha)	Net area Considered for Calculation (in Ha)
1.	Area under Mining	3.5570	5.3982	8.9552	0.00	8.9552
2.	Storage for soil	0.00	2.3733	2.3733	0.00	2.3733
3.	Waste dump site	6.4394	14.9084	21.3478	0.00	21.3478
4.	Mineral Storage	0.00	0.1775	0.1775	0.00	0.1775
5	Infrastructure Office etc.(blaster shade	0.0024	0.4900	0.4924	0.00	0.4924
6	Roads	0.00	0.4500	0.4500	0.00	0.4500
7	Railways	0.00	0.00	0.00	0.00	0.00
8	Tailings Dam/pond	0.00	0.00	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00	0.00	0.00
11	Township area	0.00	0.00	0.00	0.00	0.00
12	Others to specify Plantation: Reject:	0.00 0.00 0.00	0.00 2.0000 0.0895	0.00 2.0000 0.0895	0.00 0.00 0.00	 2.0000 0.0895
	Grand Total	9.9988	25.8869	35.8857	0.00	35.8857

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The lease has been granted through auction. As per rule 27(1) of MCDR 2017, Financial Assurance is not applicable to this mine. Hence, FA is not calculated.

18.9.19
क्षेत्रीय खान नियंत्रक (ना. क्षे.)
Regional Controller of Mines (N. R.)
भारतीय खान ब्यूरो नागपुर
Indian Bureau of Mines, Nagpur

9.0

FEASIBILITY REPORT
GUGULDOH
MANGANESE ORE MINE

0.0 GENERAL:

For a mining venture, to arrive its economic viability, feasibility study is a must. As per Minerals (Evidence of Mineral Contents) rules 2015, every lessee has to prepare feasibility report to know its economic viability and for estimation & reporting of Mineral reserves based on a Geological report. In view of this, feasibility report of Guguldoh Manganese ore mine area 105.0ha; taluka: Ramtek, Dist: Nagpur, preferred bidder M/s Shanti G.D. Ispat & Power Pvt. Ltd, Raipur, has been prepared based on available technical data as per contents of feasibility report given in Minerals (Evidence of Mineral Contents) Rule 2015.

0.1 INTRODUCTION:

M/s Shanti G.D. Ispat & Power Pvt. Ltd, Raipur, has been granted a mining lease through auction for over an area 105.0 ha. for manganese ore in Taluka Ramtek, Dist Nagpur M.S. in village Guguldoh by the State Govt. The LOI has been received and it is annexed to this mining plan report. The Company has its office at 504, Rajiv Gandhi Complex, Bal Ashram Compound, Kutchery Chowk, Raipur-492001. The lease has not been executed yet but it will be executed after obtaining all approval/ permits.

1.0) <u>Mineral Resource estimate for conversion to Mineral Reserves:</u>

Resource estimation: Resource estimated by the GSI & State DGM is reproduced below:

i) GSI

Resource based on bore hole data were estimated by the GSI for the bore holes that encountered Mn mineralization. The GSI on resource estimation has stated as below:

As seen from analytical report, MNG-8, MNG-2, MNG-3, MNG-1, MNG-6, and MNG-7 has intersected the same Mn ore horizon at different depth and these Mn value ranges between 25 to 30% which can be categorized into Low grade high silica ore (LGHS). They also have low phosphorous content. MNG-10 and MNG-12A 300m west of MNG 1 have also intersected Mn horizon. They are also categorized as Low grade high silica ore and has low phosphorous. Cross section of the entire above borehole was drawn to estimate the reserves. From the borehole plan the strike

influence of each borehole was calculated. The boreholes have intersected the ore horizon at about 30 to 35m vertical depth from ground level and below the bottom of the quarry. Up dip wise extension was defined on the basis of correlation with surface / old working. Down dip direction being half of the up dip length, strike extension was considered on the basis of positive intersection in adjacent bore. In this way area of influence was calculated for each borehole and reserves estimated. The average dip of ore body is 70°. For each borehole true thickness of the ore body was calculated from apparent thickness. Average specific gravity of manganese ore was taken as 3.1 gm/cm^2

Estimation of the ore reserve is summarized and furnished in Annexure 3.

The resource estimated by GSI = 2,18,700.0 tonnes, grade 29.28% Mn, G2 category

ii) REVISED ESTIMATION BY DGM

The resource for the Guguldoh mine was estimated by GSI taking into consideration 20% as the cut off for Mn. As the IBM has revised the threshold value for Manganese as 10%, the resource was re-estimated by DGM. Thus, the total resource for Guguldoh Manganese block is 0.440 million tonne (indicated resource 332) with an average grade of 22.70% Mn. A total of 18 bore holes were drilled in the Guguldoh area, out of 18 boreholes, 6 boreholes drilled in central part are considered for resource estimation which have mineralisation. Rest of the bore holes intersected minor Mn ore bands and Gondite. While estimating the resource, the DGM enhanced the width of ore body up to threshold value of 10% Mn content.

The resource re-estimated by DGM = 4,40,185.0 tonnes, grade 22.70% Mn, G2 category

SUMMARY : Updated Resource as per DGM as on 1.4.2019

Resource	Total, tonnes	Grade	Category
Proved Category Mn ore	4,40,185.0	22.70% Mn content	G2
Total	4,40,185.0		

Sampling:

Sampling was carried out for mineralized core and also bedrock. Using a core splitter, core was split longitudinally into two half. One half was preserved and other half was crushed to -200 mesh size. Conning and quartering was carried out for getting the minimum amount required for sampling.

Minimum length of sample was 4 cm while maximum length was 60 cm. Depending on the nature of ore and width of barren zone sample spacing was decided. Table below shows the number of samples drawn and analyzed from each borehole. Similarly bedrock samples were split into two. One half was powdered and same sampling procedure was adopted and the other sample was kept as a duplicate.

Table showing number of samples drawn bore hole wise

Borehole no.	No. of sample	Total no. of samples generated from borehole
MNG-1	27	243
MNG-2	24	
MNG-3	55	
MNG-4	20	
MNG-6	58	
MNG-7	20	
MNG-8	19	
MNG-9	8	
MNG-10	3	
MNG-12A	9	

All the 243 samples were analyzed and its results are furnished below in table:

Bh .no	No of sample	Mn%	P%	SiO_2	Fe_2O_3
MNG-1	27	6.5 - 40.72	0.05 - 0.38	20 - 59	3 - 17
MNG-2	24	1.22 – 40	0.09 -0.52	9 - 45	4 - 12
MNG-3	55	5 - 40	0.1 - 0.7	23 - 80	1.5 - 16
MNG-6	58	30	1.08	11-38	4.5-12
MNG-7	20	26	0.3 - 1.5	20-42	5-11
MNG-8	19	32	1.12	25-37	6-9
MNG-9	8	-	-	-	-
MNG-10	3	25.55	1	21-25	10-12
MNG-12A	9	26.6	0.6-1.7	21-50	7-12

MINERAL RESERVE: Mineral reserve is that reserve which is mineable with known method of mining out of mineral resource. Thus, resource blocked in various pillars and ultimate pit slope is subtracted from resource to arrive at mineral reserve.

Blocked resources:

iii) Ore blocked in ultimate pit slope due to benches: Nil

iv) Ore blocked in 7.5m barrier: Nil

Total blocked Resource: Nil

Mineable Reserve: 4,40,185 t Code:122

This mineable reserve has been considered for production planning.

v) From the bore hole logs it is observed they had estimated resource only in central part of the deposit up to RL 260m from RL 382.295m which accounts for a depth of 122.295m .

Feasibility study report has been considered to convert mineral Resource to Mineral Reserves. Besides, from geological sections, the ore that will be blocked in ultimate pit slope while mining has been calculated, considering the existing legislation for safe mining.

2) Cut off Parameters:

The average Mn content in ore is 22.70% i.e. above the threshold value limit of 10% Mn content. Other contents of deleterious elements in Mn ore are within acceptable level. Ore even containing above 18% Mn content, a low grade, is also saleable. However, analysis of Mn core elucidates values of average Mn content about 22.70%. The sorting of ore will be done as per grade, thus, cut off parameters considered here is threshold value limit.

3) Mining Factors or assumptions:

The shape, size & content of Mn in ore body is amenable to opencast mode of operation where in-situ recovery of ore is 100% and less gestation period. Ore to OB ratio is economically mineable. There will be no dilutions of ore in opencast workings. It will be mined by forming systematic benches as per the size of benches and degree of mechanisation considered in mining plan.

4) Metallurgical Factors or assumptions.

No metallurgical process as required for base metal is required for making Mn ore saleable. Hence, no metallurgical test work was undertaken or metallurgical recovery factors applied. No bulk sample or pilot scale test was done.

While excavating Mn ore from pit, the whole ROM will be excavated and loaded into tipper and brought to surface at sorting yard where sorting is done as per Mn content in ore. Low content Mn ore is subjected to jigging to remove impurities.

The deleterious elements like Phosphorous is within acceptable level in ore itself by the consuming industry. No metallurgical process is required for its removal from ore before sale.

5.0 Cost and Revenue Factors: It is furnished separately in tabular form.

Year wise cash flows in Rs

I Year: = 22,448,940.66

II Year:= 26,894,826.63

III Year= : 35,345,593.93

IV Year = 51,927,356.52

V Year = 422,202,174.14

I) Internal Rate of Return (IRR): = 30.52 %

Considering the same rate of production and profitability as stated above, the NPV for the mineable reserve is as below:

J) Net Present Value: Rs = **156,854,256.79** at 12% Discount Rate

Sensitivity Analysis: As per the GSI's report, it is basically a low grade deposit. The GSI in their report stated average Mn content of 29.28 %. This finding is based on the data generated by the core bore hole drilling. In such event, the proponent is optimistic to get Mn ore about 30% during the course of mining. This grade of ore may not be hundred percent but at least fifty percent is likely to get. The ore of plus 25% Mn content is likely to get higher price and project becomes viable. The grade that is declared by the DGM on auction platform is 22.70% enhancing the quantum of resource. Whole resource is not likely to get this grade. These are not based on bore hole data but by simple averaging the grade. While mining, grading of ore will be done. To make the price fetching grade at least 30% Mn, if needed, the high grade ore will be purchased from other mines for blending with low grade so as it is a price fetching grade.

6) Market Assessment:

Manganese ore is always in demand as it is being used in basic industry i.e. steel manufacturing. Consumption of Manganese ore is in tune with the consumption/demand of steel. However, demand/supply position do not affect the selling of Mn ore indigenously due to high production capacity of steel industry. Profitability ratio is more in Mn ore mining due to low production cost. To find the market, the lessee may reduce the sale price of Mn ore sacrificing the profitability. The consuming industry even due to depleting resources, the ore will always be in demand.

Evaluation of Manganese Project

	Particulars		0	1	2	3	4	5
A	**Production**			25,966.00	28,909.00	34,244.00	43,494.00	306,065.00
B	**Salable Production**			23,369.40	26,018.10	30,819.60	39,144.60	275,458.50
a	Grade <22%			11,684.70	13,009.05	15,409.80	19,572.30	137,729.25
b	Grade 27% - 30%			11,684.70	13,009.05	15,409.80	19,572.30	137,729.25
C	Revenue per ton <22%			2,161.00	2,377.10	2,662.08	3,064.79	3,620.96
D	Revenue per ton 27%-30%			6,234.00	6,567.40	7,503.49	8,374.01	10,220.11
E	Total Revenue	(Ba*C)+(Bb*D)		99,261,536.50	131,663,067.72	163,276,301.22	233,566,644.27	1,606,320,658.58
	Cost of Production Per Ton							
a	Direct Costs							
b	Exploration	9.27		9.27	9.73	10.22	11.73	11.27
c	Mining	194.82		194.82	211.38	229.15	248.84	269.99
d	Beneficiation/Upgradation	4.40		4.40	4.62	4.85	5.09	5.33
e	Over head	3.15		3.15	3.07	3.05	3.04	2.17
F	**Subtotal (Per Ton)**	**211.64**		**211.64**	**228.80**	**247.47**	**267.71**	**288.78**
G	**Subtotal**	F*A		5,496,444.24	6,614,471.71	8,474,804.78	11,643,613.81	68,385,133.16
H	Operating Profit	E-G		93,766,082.26	114,048,596.02	153,801,596.46	221,922,030.76	1,537,935,525.42
	Other Expense							
a	Royalty	5% of Rp		4,963,076.53	6,076,153.39	8,063,825.06	11,778,332.21	95,316,032.93
b	Payment to dmf	10% of a		496,307.68	607,615.34	806,382.51	1,177,833.22	9,531,603.29
c	Payment to NMET	2% of a		99,261.53	121,523.07	161,276.50	235,566.64	1,906,320.66
d	Payment to govt	55.9% of BW		55,190,408.73	67,599,065.66	89,669,734.58	130,973,034.21	1,059,914,286.17
e	Others			54,954.44	58,144.72	84,795.05	116,436.14	863,851.33
I	**Subtotal**	(a+b+c+d+e)		**60,803,008.46**	**74,462,742.16**	**98,785,963.80**	**144,283,222.43**	**1,167,512,094.38**
J	Total Expense	G+I		66,299,452.70	81,077,213.87	107,260,468.58	155,926,836.24	1,235,897,227.54
K	Total EBITDA	H-J		27,467,629.36	33,871,382.14	45,541,527.88	67,996,194.82	561,998,297.88
L	Depreciation			6,237,500.00	5,025,625.00	4,054,343.75	3,275,626.56	2,651,045.23
M	**EBIT**	K-L		**21,230,129.36**	**28,845,757.14**	**41,487,184.13**	**64,720,568.26**	**559,347,252.65**
N	Interest			1,155,374.58	939,535.08	703,448.34	445,215.05	192,757.68
O	**PBT**	M-N		**20,074,754.78**	**27,906,222.07**	**40,783,735.79**	**64,275,353.21**	**559,154,494.97**
P	Taxes			5,018,688.70	6,976,555.52	10,195,933.95	16,068,838.30	139,788,623.74
Q	PAT	O-P		15,056,066.08	20,929,666.55	30,587,801.84	48,206,514.91	419,365,871.23
R	Depreciation			6,237,500.00	5,025,625.00	4,054,343.75	3,275,626.56	2,651,045.23
S	Interest			1,155,374.58	939,535.08	703,448.34	445,215.05	192,757.68
T	Cashflow after tax shield	Q+R+S		22,448,940.66	26,894,826.63	35,345,593.93	51,927,356.52	422,209,674.14
U	Capital Employed	183,411,483.00						
	Adjustments of Amounts Refundable/Adjustable							
	Less : FD for BG for BID	1,228,436.00						
	Less : Upfront payment	6,142,180.00						
	Less : FD for BG for Performance security	6,142,180.00						
	Net Capital Employed	169,898,687.00	169,898,687.00					
	Repayment of Debt			3,456,266.15	3,456,266.15	3,456,266.15	3,456,266.15	3,456,266.15
	Cashflow for Equity Share holders		(169,898,687.00)	18,992,674.12	23,438,560.48	31,889,327.79	48,471,090.37	418,753,408.00
	Internal Rate of Return (IRR)		30.52%					
	NPV @ 12% Discount Rate		136,804,356.79					

17381130.73

There are several small Mn ore mine owners and a few large scale producers in the country. These large scale producers are the competitors for small mine owners but demand pattern does not affect the selling of ore. In case of competition, sale price may be reduced, but Mn content in ore being marginal there may not be a problem in marketing the ore from this deposit due to depleting resources of high grade. Mn ore produced will be sorted out as per customer specification by sizing. Analysis will be done before supply of ore to buyers.

7) Other Modifying Factors:

Mn ore will be mined by the opencast mode of operation with a shallow depth of about 114m from surface. Natural risk in mining is reduced compared to underground mining. No major infrastructure is required or it may not be a hurdle in project viability. Environmental Clearance may be obtained without hurdles as degradation of environmental parameters will be practically nil except land degradation which can be resorted after cessation of mining activities. No beneficiation of ore, consuming toxic chemicals is required at site. Legal hurdles may not come in way as mining activities will start after obtaining all legal permits. Due to demand, sale has no problem. For instance, if there is no market, Mn ore can be stacked for longer duration as it is non deteriorating material. No social problems are likely to face as the preferred bidder has cordial relation with the land owners and land belongs to Govt. No hurdles either from public or Govt. are likely to put in operating the mine as lessee will not violate the rule as the lease is granted in auction.

The GSI has proved the reserves by core bore holes with a high confidence level on occurrence of Mn ore. Analysis of core established the average quality of Mn ore in ML area. Reserves are estimated with standard method of cross section. The procedure used for estimation of reserves may not jeopardise the availability of mineable reserve affecting the viability of mining.

Execution of mining lease will be done after obtaining all permits. LOI has been issued by the Govt. There will be no hurdles for granting further permits from Govt. and it will not be a factor for viability of project. No environmental liabilities are expected to come in way of operating the mine due to nature of mining operation.

8 Classifications:

Mineral reserves are estimated with the maximum depth of 122.295m and reserves are mineable with known method of opencast mining. The reserves are classified as G2 category applying UNFC criteria. The reserves estimation is based on the core drill data as per UNFC classification. Mineral resource and mineable mineral reserve have been clearly demarcated. The known grade of Mn ore is acceptable to

consuming industry. All necessary approvals/contracts are being obtained within a reasonable time frame. This is not going to jeopardize the economic viability of the project. Environmental Clearance will also be sought at the earliest for the production proposed in mining plan. There shall be long term contracts with the buyers which will not be affecting its economic viability. As far as possible, short term contracts will be avoided. The UNFC code for the deposit is 122.

Place: Nagpur

Date: 8.8.2019

(M.S. Waghmare)
Qualified Person

xxxxxxx

CERTIFICATES

CERTIFICATE: 1

Part B

9.0 Certificates /Undertaking/Consents (As detailed Below)

CONSENT LETTER/UNDERTAKING/CERTIFICATE FROM THE LESSEE:

The Mining Plan in respect of Guguldoh Manganese ore Mine over and area of 105.00 Hectare in Guguldoh - Village, Taluka: Ramtek; District: Nagpur, State- Maharashtra under rule 16(1) of MCR 2016 has been prepared by Qualified person shri M.S. Waghmare.

This is to request the Regional Controller of Mines, Indian Bureau of Mines, Nagpur Region, to make any further correspondence regarding any correction of the Mining Plan with the said qualified person at his address below:

MANOHAR SHRIRAM WAGHMARE
33, Gedam Layout, Trimurti Nagar
Nagpur 440022 (M.S.),
Cell:8055157799
Regd. No. RQP/BNG/285/2011-A
Vaild up to 04.12.20121

We hereby undertake that all modifications / updating as made in the said Mining Plan by the said qualified person be deemed to have been made with our Knowledge and consent and shall be acceptable on us and binding in all respects.

Place: Raipur

Dated: 14.06.2019

Prakash Kumar Agrawal
Nominated Owner:

CERTIFICATE: 2

CERTIFICATE

It is certificate that the Progressive Mine Closure Plan of Guguldoh Manganese ore Mine Over an area of 105.00 Hectares in Guguldoh – Village, Taluka: Ramtek; District: Nagpur, State-Maharashtra Complies with all Statutory rules, Regulations, orders made by the Central or state Government, Statutory Organization, Court etc. which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities. The information furnished in the Progressive Mine Closure Plan is true and correct to the best of our knowledge and records.

The provisions of Mines Act, Rules and Regulation made there under have been observed in the Mining plan over the area of 105.00 hectare in Nagpur District in Maharashtra State belonging to M/S Shanti G.D. Ispat and Power Pvt. Ltd. Raipur and where specific permissions are required, the lessee will approach the D.G.M.S. Further, standards prescribed by D.G.M.S. in respect of miner's health will be strictly implemented.

Place: Raipur

Date: 14.06.2019

SHANTI G.D. ISPAT & POWER PVT. LTD.

Prakash Kumar Agrawal
Nominated Owner: