MINING PLAN WITH PROGRESSIVE MINE CLOSURE PLAN

LOHARADONGRI IRON ORE BLOCK

Lease Area : Revenue – 0.00 ha
Lease Area in Forest – 35.73ha
Total Lease Area – 35.73 ha

Lease Period - 50 Years from the date of registration of executed Mining Lease deed

Village: Loharadongri, Tehsil : Bramhapuri
District: Chandrapur, State: Maharashtra
Mineral – Iron 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. SUNFLAG IRON & STEELCO. LTD.
Regd Office: 33, Mount Road
Sadar, Nagpur 440 001

Fax: 0712-2520360; PH: 0712-2524661,2520356
Email: admin@sunflagsteel.com

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

MINING PLAN WITH PROGRESSIVE MINE CLOSURE PLAN

LOHARADONGRI IRON ORE BLOCK

Lease Area : Revenue – Nil

Lease Area in Forest – 35.73 ha

Total Lease Area – 35.73 ha

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VILLAGE : LOHARADONGRI, **TALUKA :** BRAHMAPURI

DISTRICT: CHANDRAPUR, **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

20/11/2020
क्षेत्रीय खान नियंत्रक (ना. क्षे.)
Regional Controller of Mines (N. R.)
भारतीय खान ब्यूरो नागपुर
Indian Bureau of Mines, Nagpur

PREFERRED BIDDER

M/s. SUNFLAG IRON & STEEL CO.LTD.

33, Mount Road, Sadar, Nagpur- 440 001

Fax: 0712-2520360, Phone : 0712 2524661; 2532901

E-Mail : admin@sunflagsteel.com

QUALIFIED PERSON

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

पत्र संख्या द्वारा
VIDE LETTER No. CND/FE/MPLN-1183/NGP-2020 dt 20/11/2020

INDEX

ANNEXURES

S.No.	Description	Annexure No.
1	Copy of Letter of Intent from Govt of Maharashtra	1
2	Consent letter to prepare mining plan	2
3	Undertaking from applicant on implementation of Rules	3
4	Copy of letter showing registration under rule 45 of MCDR	4
5	Copy of Company's Resolution showing Nominated owner of the Company.	4.1
6	Copy of Challan showing payment of 1st instalment through GRAS	4.2
7	Copy of PAN card showing Photo identity of Shri S.K. Gupta	4.3
8	Summary of mineral block	5
9	Copy of index map showing location of Lohara iron ore deposit prepared by DGM	6
10	Copy of map showing regional geology of Lohara iron ore deposit prepared by DGM.	7
11	Copy of Prospecting report prepared by DGM in 1963 together with analysis of borehole samples.	8
12	Details of Bore hole drilled by DGM with bore hole logs.	9
13	Copy of analysis report of iron ore done by preferred bidder.	10
14	Copy of maps showing land use status prepared by DGM.	11
15	Copy of maps showing cross sections prepared by DGM	12
16	Copy of maps showing geology of Lohara prepared by DGM	13
17	Statement on calculation of Development & Production for ensuing and conceptual period.	14
18	Certificate from Qualified Person	15

अनुमोदित
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PLATES

Plate No.	Description	Scale
1	Cadastral Map	1: 10000
2	Key Plan	1:50,000
3	Surface Geological Plan	1:2000
4	Geological Sections	1:2000
5	Surface Plan	1:2000
6.1 to 6.5	Year wise Development & Production Plans	1:2000
6A	Sections of Development & Production Plans	1:2000
7	Conceptual Plan	1:2000
7A	Conceptual Sections	1:2000
8	Environment Plan	1:5000
9	Reclamation Plan with section	1:2000
10	Copy of DGPS map given by DGM	1:5000

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MINING PLAN WITH PROGRESSIVE MINE CLOSURE PLAN, LOHARADONGRI IRON ORE BLOCK, PREFERRED BIDDER: M/S SUNFLAG IRON & STEEL COMPANY LIMITED; AREA 35.73HA, TALUKA; BRAHMPURI, DIST: CHANDRAPUR (M.S.)

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0.0 Introduction

M/s Sunflag Iron & Steel Company Limited (SISCO) is a limited company, having its registered office at 33, Mount Road, Sadar Nagpur, is a renowned Sunflag Group. It has put up Indian's most modern steel plant, at Warthi, Bhandara, the first integrated steel plant of its kind in the country with a capacity of 0.5 million tonnes of high grade alloy steel per annum, comparable to the best in the world. It has a sound financial background and industrial experience in the field of mining for coal, iron ore and limestone.

The Warthi steel plant near Bhandara, has a manufacturing route of Sponge Iron Plant, Mini Blast furnace, Power plant, Electric Arc Furnace, Vacuum Degassing, Continuous Casting Machine, Rolling Mills, Garret Coiler and Wire Rod Mill, Annealing and Bright Bar facilities.

To have the assured supply of raw material i.e. iron ore to their steel plant and also considering commercial aspects, the preferred bidder, entered in to auction process and became the preferred bidder for Loharadongri iron ore block in taluka: Brahmpuri district: Chandrapur, Maharashtra State for an area 35.73ha. The block was earmarked for non-captive purpose i.e. for commercial purpose by the Govt.

The Letter of Intent has been issued by the Govt. of Maharashtra vide their letter no.MMN-0719/C.R.42(Part-8/IND-9 dated 13.09.2019 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 preferred bidder entered in auction held in the month of May 2019 for which minimum premium price was fixed 9.0% of value of mineral dispatched, however, the applicant became the preferred bidder at a bid price 90.20% 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. 21,45,753/- through GRAS System dated 28-05-2019 (Annexure 4).

As per rule 16(1) of MCR 2016, every applicant has to prepare the Mining Plan with Progressive Mine Closure Plan for lease grant and submit to the approving authority of IBM. Accordingly, this Mining Plan with Progressive Mine Closure Plan has been prepared as per formats and guidelines of IBM incorporating production proposals for five year and put up 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 Loharadongri Iron Ore mineral block.

1.0 General:

a) Preferred bidder:

M/s Sunflag Iron & Steel Company Limited
Registered office: 33, Mount Road, Sadar
Nagpur – 440 001
PH: (0712) 2524661,2532901,2520356, 2520358
Fax: 0712 -2520360
Email: admin@sunflagsteel.com
Website:www.sunflagsteel.com
CIN:L27100MH1984PLC034003

IBM Registration No. as per Rule 45 of MCDR'17: IBM/560/2011

b) Status of preferred bidder:

Other (Please specify): Public Limited Company

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Board of Directors: It is tabulated below:

Sl. No	Name of Director	Address	DIN	PAN
1	Mr. Ravi Bhushan Bhardwaj, Non-Executive Chairman	P.O.Box No..41627 – 00100,Nairobi KENYA	00054700	AAMPB1229N
2	Mr. Pranav Bhardwaj Managing Director &KMP	18, Jor Bagh, opp. Lodhi Garden, Lodhi Road, Central Delhi, New Delhi 110003	00054805	AESPB2780E
3	Dr. E.R.C. Shekar, Independent, Non-Executive Director	Villa No. 415, ADARSH Palm Retreat, Devarabisanahalli,Bellundur Post Bengaluru 560103	00013670	AKPPS5177F
4	Mr. Kumar Jitendra Sigh Independent, Non-executive Director	Plot No.1, MOIL Vatika,Chicholi Road, Fetri, Katol Road, Nagpur 441501	00626836	AIMPS9257K
5	CA Neelam Kothari, Independent, Non-executive Director	2601 / 2602, 26th Floor, Orbit Heights, J.D. Marg, Nana Chowk, Grant Road(West), Mumbai 400 007	06709241	ADUPK4991P
6	Mr. Suhrit Ravi Bhushan Bhardwaj, Non-Executive, Non-Independent Director	P.O.Box No..41627-00100,Nairobi KENYA	02318190	AUNPB5842Q

7	Mr. Sajiv Dhawan, Independent, Non-executive Director	J-213,W-15A, Sainik Farms, Khanpur, New Delhi 110062	00160085	AADPD1376K
8	Mr.Anand Sadashiv Kapre, Additional Director – Independent, Non-executive	A-805, Harshvardan CHS Saki Vihar Road. Opp.Hotel Gurukripa, Sakinaka, Mumbai 400 072	00019530	AAEPK1573E
9	Mr. Surendra Kumar Gupta, Deputy Managing Director &KMP	Pushpa Sadan, Plot No. 598, Chitnavis Ngar, Byramji Town, Nagpur 440 013	00054836	ABPPG5613D
10	CAR. Muralidhar, Whole-time Director & KMP	105,Laxmi Niwas, K.T.Nagar, Gittikhadan, Katol Road, Nagpur 440 013	00982212	AAMPR4451N
11	Mr. Rmchandra Vasant Dalvi, Whole-time Director & KMP	A/6 Navshilpvani CHS Ltd,Gaothan Road, IRLA, Nr. Surya Hospital, Vile Pale (West) Mumbai 400 056	00012065	AAAPD4056D

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c) Mineral which is included in the prospecting license (For Fresh grant)?

Not Applicable

Mineral for which the block has been auctioned: Iron Ore

d) Mineral which is included in the letter of Intent: Iron Ore

e) Mineral which is the preferred bidder intends to mine: Iron 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-16

2.0 Location and accessibility:

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

Name of mineral block: Loharadongri Iron ore block

Lat/Long of lease area: Lat from 20^0 23' 15.54" to 20^0 23' 37.17"
: Log from 79^0 43' 58.97" to 79^0 44' 22.11"

Note: The above Co-ordinates are as per 'Mineral Block Summary' given by MSTC. It is enclosed as Annexure 5.

Date of grant of lease: Date of grant of LOI -13.09.2019

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

b) Name of preferred bidder: M/s Sunflag Iron & Steel Company Limited
Registered office : 33, Mount Road, Sadar
Nagpur – 440 001
PH: (0712) 2524661,2532901,2520356, 2520358
Fax: 0712 -2520360
Email: admin@sunflagsteel.com
Website:www.sunflagsteel.com
CIN: L27100MH1984PLC034003

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

Forest		Non-forest	
Forest (specify)	Area (ha) 35.73*	(i) waste land/ Govt. land, (ii) grazing land, (iii)Agriculture land, (iv)others(Private)	Area (ha) 0.00 0.00 0.00 0.00

Note: *These figures are as per "Summary of the Mineral Block" given by MSTC

Total lease area: 35.73 ha

Occupancy/ Ownership of land: It is given below as per the 'Mineral Block Summary' given by MSTC. It is enclosed as Annexure 5.

Forest Dept.	439	35.73
	Total area	35.73

District & State: Chandrapur, State: Maharashtra

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Taluka : Brahmpuri, Village: Loharadongri

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

Details of other leases held by the preferred bidder:

Sr. No	District	Taluka	Village	Mineral	Lease area, ha
1	Bhandara	Mohadi	Nawegaon (Rithi)	Manganese ore	15.90

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

Lohara iron ore deposit situated about 1.5km south of Lohara village in Brahmpuri taluka, Chandrapur district is located on a hill of 314m RL. The deposit is about 4km NE of Alewahi village which is also a railway station on Nagbhir – Chandrapur broad gauge line of the south central eastern railway. It can be approached from Nagpur via Umred, Bhiwapur, Nagbhid, Mul road up to Palasgaon village. From Palasgaon village to Alewahi and from Alewahi to Lohara can be approached by fair weather road. From Lohara to site is a kachha road. From Nagpur the distance is about 130km. The nearest railway station is Alewahi at about 4km distance. The nearest Airport is at Nagpur at a distance of 130km.

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

Topo-sheet No. : 55 P/11

DGPS CO-ORDINATES OF BOUNDARY PILLARS

Boundary Pillars	Latitude	Longitude
BP-1	20°-23'-37.17"	79°-43'-58.97"
BP-2	20°-23'-18.79"	79°-43'-58.73"
BP-3	20°-23'-17.65"	79°-44'-18.31"
BP-4	20°-23'-31.55"	79°-44'-22.11"
BP-5	20°-23'-37.29"	79°-44'-16.10"

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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.

3.0 Details of Approved Mining Plan / Review of mining Plan (if any):

3.1 Date and reference of earlier approved MP/SOM:

Not applicable as it is a case of fresh grant under auction.

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

Not applicable

3.3 Give review of earlier approved proposal (if any) in respect of exploration,

Not applicable

3.4 Give status of compliance of violations pointed out by IBM;

No violation was pointed out by the IBM as the mine has not yet come in existence.

3.5 Indicate and give details of any suspension /closure/ prohibitory order issued by any Government agency under any rule or Court of law

Not Applicable

3.6 In case the MP/SOM is submitted under rules 17(3) of the MCDR' 2017 for approval of modification, specify reason and justification for modification under these rules.

Not applicable

PART – A

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1.0. Geology & Exploration

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

i) Topography: The lease area is a hillock falling in Kachepar reserve forest, the lowest and highest contours that pass from the lease area is 250 and 314m respectively rising to 64m above the ground level. It is situated about 1.5km away south of the village Loharadongri.

ii) Drainage pattern: Drainage of the area is controlled by seasonal gullies and streams flowing southerly and finally to Alewahi water tank. Besides, there are few other small ponds at Loharadongri, Heti, Wadhona and Kitari villages which are mainly used for irrigating small fields. Since the slopes are formed towards Alewahi water tank, 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: Core zone being a dense reserve forest, there is a thick vegetation of tendu, teak. neem, mango, jamun etc. In buffer zone too, there is thick vegetation.

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 35.5° 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 12.7° to 20.5° C but as low as 10° C is also recorded as cold winter nights in December-January. In the last few years Brahmapuri town has been listed among the top five hottest cities in India.

v) Rainfall: The monsoon season starts off in the month of June and stays till September with maximum rainfall 1388mm in a year, the highest amount of rainfall is recorded in the month of July.

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

Regional Geology:

Regionally the rock of the area falls in Sakoli group. This Sakoli group is a southern strip of Chilpi Ghat. The rocks of the Sakoli group occur in a Triangular belt which is situated in the Nagpur- Bhandara and Chandrapur districts. The Sakoli group is made up of low grade metamorphic rocks, such as chlorite-schist, sericite-schist, quartzite, slates and phyllites. This group does not contain manganese ore. The strata of the Sakoli group dip generally to NNW.

On the basis of structure, the Sakoli group has been considered older than the Sausor group (Sarkar and Saha, 1982). The age of the Sausor and Sakoli groups together is Early and Middle Archaean. Hence, they may be considered equivalent to the Dharwar succession of South India.

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c) **Geology of the area:**

The geology of the Iron ore block under grant of lease is described below:

The geological formations that occur in the area have the following stratigraphical sequence.

IV. Alluvium
III. Laterite
II. Intrusive Granite with associated quartz veins and basic dykes
I. Iron ore series i) Quartzites
ii) Banded Hematite Quartzite with iron ore

Iron ore series

The iron ore deposit occurs in the hillock which rises to a height of about 64 m from the general ground level, associated with B.H.Q. and surrounded by Granitic intrusion with an aureole of composite and injection Gneisses.

Banded Hematite Quartzite: The B.H.Q. is a tough, compact and hard rock with characteristic alternate bands of quartz and iron ore (Hematite). The bands are at many places closely foliated. They are very irregular and do not show any

consistency in width thinning down at places to fine laminations. Close folds, slips and shearing are observed in the rocks.

The main outcrop of Banded Hematite Quartzite is seen on the south-eastern slope of the iron ore hill striking roughly NW-SE and dipping about 50^0 towards SW. Outcrops of this rock are also seen in hillock south of Lohara hill and also intermittently as far as Alewahi village.

Quartzite: Half a furlong to the north of embankment of Alewahi tank, exposures of quartzite are seen showing about 34^0 dip in N 25^0W direction. This outcrop further continues north wards and forms the hillock to the west of Lohara hill which rises about 45m above the general ground level. On this hillock Quartzite's are seen striking in a NNE-SSW direction with varying dips of 50^0 to 60^0 due west and south-west at different places B.H.Q. exposures are also noticed on this hillock.

The rocks of the iron ore series, with iron ore body, described above are surrounded by intrusive granite. Quartz veins and some basic dykes are also occasionally associated with Granite.

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Occurrence and nature of the iron ore body.

Careful geological mapping of the Lohara area has indicated that the iron ore body strikes in general N30^0 E – S30^0W and shows steep dips 60 to 80^0 both towards east and west but predominantly towards south east. The north-south base length of the ore body is about 406.24m. The width varies greatly at different places along the strike of the ore body. The outcrops of iron ore body consist of sub rectangular, massive and compact boulders of crystalline hematite and at place both hematite and magnetite.

Along the eastern and western slopes of the hill large boulders of iron ore are seen resting above the float ore which extends for long distance along the slopes on either side of the outcrops of the reef ore. A considerable portion of the iron ore at the southern end of the hill is seen to have been completely spoiled by intrusive granite.

The reason for the iron ore boulders showing variable dips both towards east and west directions is due to their dislocation, tumbling and displacement from the original in-situ position by the forces of granitic intrusion. The sub-rectangular shape of the boulders appears to be due to the original joint pattern of the iron ore body, in three directions and subsequent widening apart of these joints by the intrusive granitic material. This granitic intrusion is seen right on the hill surface in between the joint planes of the ore outcrops.

Granite: The granite is intrusive granite. This intrusive granite is highly weathered and is highly quartzose in nature with some iron stained reddish clay (altered from

feldspars). Most of the clayey material has been washed away making the rock rather friable in the top portion of the hill, where this intrusive material has absorbed and assimilated the iron ore it forms a composite gneissose rock. This rock is fairly compact and shows bands of iron ore and intrusive quartzose material as observed in the southern portion of the hill.

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Structure and genesis of the iron ore deposit

The iron ore deposit is associated intimately with the Banded Hematite Quartzite rock formation which occurs as in liar surrounded by the younger granite in the Lohara area. The deposit is formed as result of leaching away of the silica by circulating waters and residual concentration of iron ore oxide in the form of hematite in the parent B.H.Q. rocks. Structural conditions such as faulting and fracturing of the B.H.Qs. must have localized the formation of the iron ore deposit by providing channels for the circulating waters. The iron ore body has a general strike of $N30^0E$ – $S30^0W$ and shows steep dips of 60^0 to 80^0 both towards east and west. The ore body is highly jointed and intruded by granitic material all along its entire length. The intense intrusive activity of the granite has caused considerable dislocation of the original strike and dip of the BHQ formation and the ore body enclosed within it. By granitic material all along its entire length, the intrusive granitic material is seen to have permeated the joint planes in the ore body and the joints have been widened and huge blocks of ore have been dislocated. The ore body is now so to say floating on the intrusive granite and considerable portion of it particularly in the southern part is assimilated in the intrusive granite to give rise to mixed gneisses litparlit injection gneisses containing bands of iron ore and granitic material. Apart from disturbing the original attitude of the BHQ and the ore body, the iron ore has been converted to a mixture of crystalline hematite and magnetite near the contact with intrusive granite at many places both in the northern and southern portions of the ore body.

Exploration already carried out: It is stated on the auction platform by the DGM that the resource estimated by them encompasses in G2 category as per UNFC code. The resource, therefore, is a probable mineral. Thus, as per MEMC rules 2015, the deposit falls in category 122.

d) i) Name of prospecting /exploration agency: By Directorate of Geology and Mining, Govt. of Maharashtra, Regional Office, Chandrapur.

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.

Geological mapping: Before proceeding to core bore drilling, the iron ore hill near Lohara was geologically mapped on 1;1000 large scale topographical map. Further,

the entire area was again mapped in detail on 30.48m by 30.48m grid map showing therein the iron ore outcrops and the associated rocks.

Pitting:

To ascertain the thickness of Float ore and the iron ore boulders seen resting above the float ore, 12 trial pits were dug on the East, North east, Northwest and Western slope of the iron ore hill. From the data obtained in the trial pits and the old workings, the thickness of the boulder, float ore was taken 3m in Eastern part and 6m in the Western part of the hill. The average thickness and the percentage recovery of float ore as indicated in the trial pits sunk in the float ore area is 1.2m and 15% respectively as shown in table below:

Details of Trial Pits sunk

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Trial Pit No.	Total depth of Trial Pit, m	Thickness of Float ore observed, m	Recovery % of ore from the float bed.
1	3.048	0.9144	8%
2	3.6576	0.762	5%
3	3.2004	0.762	3%
4	3.3528	3.3528	25%
5	3.048	2.7432	10%
6	1.0668	0.3048	6%
7	0.9144	0.3048	2.6%
8	1.524	0.5334	12%
9	2.2098	0.7112	3.5%
10	2.5908	1.8288	20%
11	1.524	0.9144	16.6%
12	0.3048	0.3048	Nil
Quarry in the Southern portion of hill.	3.048	3.048	60%
Quarry in S-W portion of hill.	3.048	1.8288	40%
	Total Average	18.31 1.2	211.6 15.1%

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Exploration done through core bore holes

At the first instance, geological mapping of the iron ore hill and also of about 77 sq. km area surrounding Lohara village was completed in the month of January, 1963. Drilling commenced in the area on 9th Feb, 1963 with the first bore hole having been located on the top of the hill 56.69m N20^{0}W from the highest point 315m RL. The remaining bore hole's position was selected after the outcrop map on a 30 x 30m grid was prepared showing thereby the outcrops of iron ore and associated rocks.

In all 9 core bore holes were drilled by the end of August, 1963 totalling an aggregate metreage of 291.744m. Seven bore holes out of the nine bore holes drilled were angle bore holes and two were vertical bore holes. Angle bore holes were drilled in view of the steep dips and different direction of dips exhibited by the iron ore outcrops in the area.

Bore hole No. 1 and 2 were drilled to ascertain the depth continuation of iron ore in the south eastern portion of the ore body. Bore holes No. 3 and 5 were drilled to ascertain the depth of iron ore body in northern portion of the hill. Boreholes 4,6,7 and 9 were drilled to ascertain the depth of iron ore in the western and SW portions of the ore body.

Cross sections of the ore body in the hill passing through each of the bore holes were drawn in order to ascertain the average thickness of iron ore body in various portions of the hill.

Details of core bore holes drilled

Bore hole No. 1, (RL 298m): It was located 56.38m N20^{0}W from the highest point of the iron ore hill (315m). This bore hole passed through 8.83m of iron ore formation followed by highly quartzose granitic material up to 44.19m. This was a vertical bore hole.

Bore hole No. 2, (RL 306m): This bore hole was located 16.76m east from the highest point of the hill (315m) and drilled at an angle of 20^0 to vertical against the easterly dip of the iron ore in that spot. The bore hole passed through iron ore zone with intermittent patches of spoiled iron ore with plenty of free quartz up to 8.242m. From 8.24m to 26.21m, highly quartzose with clayey material from 15.2m to 20.3m was observed. After 26.2m, highly quartzose granitic material was met with up to 35.05m and this was followed by highly altered micaceous clayey material right up to 42.67m.

Bore hole No. 3, (RL 258m): This bore hole was located at the northern end of the hill right on the ore body about 233.47m N25^{0}E of B.H.No.1. This bore hole was again an angle borehole with an angle of 45^0 and was drilled across the strike of the ore body in the south east direction. The bore hole passed through massive crystalline iron ore up to 2.95m followed by siliceous iron ore up to 7.747m. From

7.747m to 30.58m highly Kaolinised altered granite with greenish epidotic material was encountered.

Bore hole No. 4, (RL 285m): Bore hole No. 4 located about 106.98m west of B.H. No. 1. It passed through 3m of massive crystalline iron ore and from 3m to 15.31m spoiled siliceous iron ore and again up to 22.94m massive crystalline iron ore was met with. From 22.94m to 39.40m the bore hole encountered highly altered clayey material.

Bore hole No. 5, (RL 271m): This bore hole was located 160m N37^{0}E of B.H.No. 1 on the eastern side of the body and was drilled across the strike at an angle of 45^0 in north-west direction. It passed through 0.91m of float ore in lateritic soil and was followed by highly altered and Kaolinised granitic material up to 38.10m.

Bore hole No. 6, (RL 289m): Bore hole No. 6 was located about 121.9m N30^{0}W of B.H.No. 1 and was drilled across the strike of the ore body at an angle of 45^0 in south east direction. This bore hole gave similar results as of B.H.No.4.It passed through first 22.5m of iron ore of varying nature and from 22.5m to 30.9m highly altered clayey material was met.

Bore hole No. 7, (RL 295m): This bore hole was located 147.5m S19^{0}W of B.H.No. 1 and was drilled at 45^0 angle in N70^{0}E direction. This bore hole encountered first 12.1m of quartzose intrusive material with grains of magnetite and hematite, embedded in it. From 12.1m to 22.32m spoiled iron ore was encountered intermittently. After 22.32m up to 30.26m it passed through unleached Banded Hematite Quartzite.

Bore hole No. 8, (RL 291m): This bore hole was located 65.8m N27^{0}E of B.H.No. 1 and was drilled at an angle of 45^0 in NW direction across the strike of the ore body. It passed through 0.91m of float ore in lateritic soil and later highly altered and Kaolinised granitic material was encountered up to the depth of 15.24m.

Bore hole No. 9, (RL 292m): This was a vertical borehole located in between B.H.No. 7 and B.H.No. 4 in the SW portion of the ore body. It encountered massive crystalline iron ore up to 14m and from 14m to 20.43m highly altered clayey granitic material was met with.

Log History sheets of all the boreholes are enclosed as Annexure 9.

Details of Drilled Boreholes falling in Iron ore block

Sr. No.	Drilled Bore holes	BH Collar mRL	Northing	Easting	Depth (m)	Type of Hole
1	BH -1	305	2255243.25	368109.75	44.19	Vertical

2	BH -2	308	2255208.87	368138.43	42.67	20^0 Inclined to vertical
3	BH -3	258	2255433.08	368203.46	30.58	45^0 Inclined to vertical
4	BH -4	289	2255242.53	368013.94	39.40	45^0 Inclined to vertical
5	BH -5	275	2255360.11	368195.22	38.10	45^0 Inclined to vertical
6	BH -6	294	2255313.25	368071.48	30.90	45^0 Inclined to vertical
7	BH -7	291	2255119.06	368063.19	30.26	45^0 Inclined to vertical
8	BH -8	294	2255296.65	368136.81	15.24	45^0 Inclined to vertical
9	BH -9	297	2255197.59	368035.88	20.43	Vertical

From the study of the borehole data and the chemical analysis, it is seen that the thickness of the iron ore body in different parts of the Lohara hill is roughly as given below:

1. Average thickness of iron ore in south east 8.2m
   portion of the ore body as seen from the
   data of the bore holes 1 and 2.

2. Average thickness of iron ore in south west..... 15.2m
   Portion of the ore body as seen from the
   data of bore holes 4,6, and 9.

3. Average thickness of iron ore in northern 9.1m
   portion of the ore body as seen from data
   of B.H.No.3.

From the exploration carried by DGM, Govt. of Maharashtra, the iron ore bodies of different grades known as blocks were demarcated on geological plan. The area of such blocks together with thickness of ore body is given below:

Block wise area and thickness of ore body

S.No.	Block No.	Type of Block	Area of Block, m^2	Recovery % of in-situ ore	Thickness of Block, m
1	I	Reef ore	12406.2	100	15.24
2	II	Reef ore	2455.431	100	8.2296
3	III	Reef ore	4716.981	100	9.144
4	IV	Boulder & Float ore	16929.48	20	3.048
5	V	Boulder & Float ore	2907.76	20	6.096
6	VI	Boulder & Float ore	268804.1	15	1.2192
7	VII	Spoiled ore	9886.291	25	15.24

Exploration already carried out:

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i) Explored & Mineralized area as per DGM: 13ha; category G2

ii) Non-mineralized area as per DGM: 22.73 ha

Though the area 22.73 ha has been declared non-mineralized by DGM and also the resource estimated is in G2 category, the preferred bidder intends to explore the entire area on 100m x 100m grid interval in ensuing plan period bringing the resource in G1 category. For the purpose, 32core bore holes have been proposed and details are given on page 19.

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.

Quality of Iron Ore: To ascertain it, systematic sampling and its analysis were carried out as detailed below:

Sampling: The core and sludge samples from the boreholes were carefully collected at intervals varying from 0.6m to 3.0m depending upon drilling conditions met within each bore hole. The full run of each sample was reduced in size by crushing, coning and quartering and was separately analysed. Analysis results are enclosed as Annexure 8. Besides, eight representative samples of the surface reef ore mined and

stacked at various places along the ore body by the previous lessee were collected and later reduced in size by crushing coning and quartering and its analysis results are enclosed as Annexure 8.

Two channels 15.2cm wide and10.16cm deep were cut in a east west direction in the southern portion of the ore body where the iron ore is spoiled by granitic intrusion. The samples were carefully collected at 6m intervals where possible. In all 13 samples were thus collected from the two channels and reduced in size by crushing, coning and quartering (Annexure 8). In addition to the above, five samples of float ore were collected from existing pits in the float ore on the slopes of the hill and reduced in size by crushing, coning and quartering (Annexure 8).

From the analysis results enclosed to this report (Annexure 8), the following important features as regards the quality of the iron ore available at Lohara are brought out:

i) **Float Ore**: The quality of Float ore in general is good, the iron content ranging from 51.37 to 68.68 and the average iron content being about 60%. The impurities are as under:

SiO_2 .....1.38 to 11.16%
Al_2O_3.....0.02 to 4.52%
TiO_2.....Traces
P.....0.010 to 0.29%

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ii) **Reef Ore:** The massive reef ore as seen on the surface outcrops (stack samples of worked ore) analysis as under:

Fe.....63.1 to 69.23%
SiO_2 .....0.14 to 3.24%
Al_2O_3.....0.08 to 1.83%
TiO_2.....Traces
P.....0.008 to 0.024%

The quality is obviously very good, the average Fe content being about 66.8%.

iii) **Core Samples:** The core samples of massive iron ore (reef) recovered from the bore holes drilled in the area show in general a high iron content, above 60% Fe and low silica, low alumina and low phosphorus.

iv) **Sludge samples:** The sludge samples of iron ore recovered from the bore holes drilled in the area in general show a poor iron content, high silica and high Alumina content. This is due to the fact that along the joint planes in the reef ore, spoiled siliceous ore with abundant free quartz and clay is encountered. This type of material being very friable is recovered in the form of sludge while drilling. This naturally has adversely affected the average grade of the ore as could be seen from the sludge samples given in Annexure 8.

v) **Channel samples:** The analyses of the channel samples from the spoiled ore in the southern portion of the ore body show that the iron content varies from 27.92% to 54.62%. The other impurities are as under:

SiO_2 .....10.7 to 58.9%
Al_2O_3.....0.4 to 1.4%
TiO_2.....Traces
P.....0.014 to 0.028%

The silica occurs in the form of free quartz as a physically separable impurity.

It will be seen that the quality of the iron ore in the area has deteriorated due to the effect of the granitic intrusion and that the ore is spoiled all along the joint planes in the ore body where the intrusion has taken place and the ore has been considerably ruined both in quality and quantity particularly in the southern portion of the ore body. The ore body appears as if it is just floating on the granitic intrusion along the entire length of the iron ore hill.

After computing the analysis results of core sludge samples from all the bore holes and giving proper weightage to the volumes of the core and sludge recovered, the average grade of iron ore in the various blocks marked for purposes of calculation of resource / reserves works out as under:

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Block wise Analysis of Iron ore

		Percentages				
		Fe	SiO_2	Al_2O_3	TiO_2	P
From analyses data of bore hole samples	Block I (B.H.Nos. 4,6,9	62.21	4.46	3.55	0.082	0.049
	Block II (B.H.Nos. 1,2	60.98	8.10	2.17	0.129	0.018
	Block III (B.H.No. 3	62.26	6.006	2.81	0.50	0.053
From analyses data of surface float ore samples	Block IV Block V Block VI	59.97	7.31	1.77	Traces	0.02

From analyses data of surface channel samples	Block VII	44.11	34.90	0.73	Traces	0.021

Bulk Density: For calculation of tonnages of resource / reserve, no bulk density has been considered by the DGM. Instead, conversion factor, i.e. 0.2123m^3 equal to one tonne for all types of ores except spoiled ore and for spoiled ore 0.4246m^3 equal to one tonne has been considered. The same conversion factor has been considered for this mining plan too.

iv) Expenditure incurred in various prospecting operations:

Information not available.

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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.

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.

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 DGM explored the deposit by drilling 9 core bore holes in entire Lohara iron ore block that is being allotted to preferred bidder M/s Sunflag Iron & Steel Company Limited and as per DGM, the resource fall in G2 category. This G2 category ore has to be brought in G1 category. For this purpose, during the ensuing plan period, it is proposed to drill core bore holes in whole lease area as detailed below:

Details of proposed bore holes

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Sr. no.	PBH No.	PBH Collar mRL	Latitude	Longitude	Easting	Northing
1	PBH-1	254.506	20°23'35.36"	79°44'0.87"	367849.617	2255498.666
2	PBH-2	256.352	20°23'35.39"	79°44'4.31"	367949.617	2255498.64
3	PBH-3	260.002	20°23'35.41"	79°44'7.76"	368049.617	2255498.614
4	PBH-4	255.852	20°23'35.44"	79°44'11.21"	368149.617	2255498.588
5	PBH-5	252.102	20°23'35.46"	79°44'14.66"	368249.617	2255498.561
6	PBH-6	255.952	20°23'32.24"	79°44'18.14"	368349.617	2255398.679
7	PBH-7	261.453	20°23'32.21"	79°44'14.69"	368249.617	2255398.679
8	PBH-8	270.561	20°23'32.19"	79°44'11.24"	368149.617	2255398.679
9	PBH-9	272.872	20°23'32.16"	79°44'7.79"	368049.617	2255398.679
10	PBH-10	263.568	20°23'32.14"	79°44'4.34"	367949.617	2255398.679
11	PBH-11	252.612	20°23'32.11"	79°44'0.89"	367849.617	2255398.679
12	PBH-12	253.366	20°23'28.86"	79°44'0.92"	367849.617	2255298.679
13	PBH-13	274.000	20°23'28.89"	79°44'4.37"	367949.797	2255298.81
14	PBH-14	288.002	20°23'28.91"	79°44'7.82"	368049.617	2255298.679
15	PBH-15	287.988	20°23'28.94"	79°44'11.27"	368149.617	2255298.679
16	PBH-16	276.963	20°23'28.96"	79°44'14.72"	368249.617	2255298.679
17	PBH-17	260.912	20°23'28.99"	79°44'18.17"	368349.617	2255298.679
18	PBH-18	260.213	20°23'25.73"	79°44'18.19"	368349.617	2255198.679
19	PBH-19	279.104	20°23'25.71"	79°44'14.74"	368249.617	2255198.679
20	PBH-20	307.631	20°23'25.68"	79°44'11.29"	368149.617	2255198.679

21	PBH-21	295.459	20°23'25.66"	79°44'7.84"	368049.617	2255198.679
22	PBH-22	274.531	20°23'25.63"	79°44'4.39"	367949.617	2255198.679
23	PBH-23	250.025	20°23'25.61"	79°44'0.95"	367849.773	2255198.858
24	PBH-24	250.080	20°23'22.36"	79°44'0.97"	367849.617	2255098.679
25	PBH-25	268.174	20°23'22.38"	79°44'4.42"	367949.617	2255098.679
26	PBH-26	286.012	20°23'22.41"	79°44'7.87"	368049.617	2255098.679
27	PBH-27	294.067	20°23'22.43"	79°44'11.32"	368149.617	2255098.679
28	PBH-28	267.603	20°23'22.46"	79°44'14.77"	368249.617	2255098.679
29	PBH-29	252.206	20°23'22.48"	79°44'18.22"	368349.617	2255098.679
30	PBH-30	254.009	20°23'19.20"	79°44'14.80"	368249.617	2254998.679
31	PBH-31	269.157	20°23'19.18"	79°44'11.35"	368149.617	2254998.679
32	PBH-32	272.004	20°23'19.15"	79°44'7.90"	368049.617	2254998.679

The above proposed core bore holes will be drilled during the five year period of ensuing plan period as per Rule 12(3) of MCDR 2017.

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Explored & unexplored area in Ha

Explored by DGM	Mineralised area as per DGM	Total lease area earmarked (ha)	Non Mineralized Area as per DGM, Maharashtra Notification, ha
Area under the influence of BH-1to 9 and Trial Pits.	As per DGM it is 13ha but not marked on plan.	35.73	22.73

Note: - In the Prospecting Report as obtained during the time of auction, clear demarcation of G-2 area has not been done by DGM; but DGM, Maharashtra has mentioned in auction document 22.73 ha area under non-mineralized zone. The DGM has estimated resource for area under influence of all nine bore holes and

twelve Trial pits. Thus, the area under influence of these bore holes and Trial pits has been considered for five years production proposals.

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 DGM is reproduced below:

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For calculating, the iron ore resource / reserve, Lohara iron ore block has been divided into seven different blocks. Blocks No I, II, III have been made for the main reef iron ore body; Block No. IV and V for the large float boulders seen resting above the float ore on the eastern and western portions of the iron ore body; and Blocks No. VI and VII for the float ore and the iron ore spoiled by granitic intrusive respectively.

For the iron ore in all the blocks except Block no VII, a tonnage factor of 0.2123 m^3 per tonne has been taken. For block no VII taking in to account the highly siliceous nature of the ore, the tonnage factor of 0.4246m^3 per tonne and recovery 25% has been assumed.

For Float ore as mentioned earlier an average thickness of 1.2192m and percentage recovery of about 15% has been taken in to account.

The calculation of resource / reserve, block wise for iron ore is furnished below in tabular form.

Table showing calculation of resource / reserve:

S. No.	Block No.	Location	Area of Block, m^2	Thickness of ore body, m	Volume of ore, m^3	Conversion factor, m^3/t	Resource / Reserve Tonnes
			1.Reef Ore				
1.	Block No I, B.H.No. 4,6,&9	SW Portion of ore body	12406.28	15.24	189071.70	0.2123	890587.37

2.	Block No II	SE Portion of ore body	2455.431	8.2296	20207.21	0.2123	95182.34
3.	Block No III	Northern Portion of ore body	4716.981	9.144	43132.07	0.2123	203165.66
						Sub Total, Reef ore	**1188935.37**

2. Boulder and Float Ore

S. No	Block No.	Location	Area of float, m^2	Thickness of bed	Volume of ore, m^3	Recovery %	Conversion factor, m^3/t	Resource / Reserve Tonnes
1.	Block No IV	Area to the east of ore body	16929.48	3.048	51601.05	20	0.2123	48611.45
2.	Block No V	Area to the west of ore body	2907.76	6.096	17725.70	20	0.2123	16698.73
3.	Block No VI	Whole area covering slopes of hill excluding blocks I to V & VII	268804.1	1.2192	327726.0	15	0.2123	231553.90
							Sub Total	**296864.08**
					Grand Total of Resource / Reserve			**1485799.45 or1485800.0**

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From the above calculation, the resource / reserve for all the six blocks excluding block VII i.e. spoiled ore, works out to 14,85,800 tonnes or say 1.48 million tonnes. Besides, in VII th block, there is a resource of 88711 tonnes. The above resource is inclusive of all the

ore that was already extracted from the area. It is mentioned in the prospecting report that the area under consideration was first leased out to M/s Tata Iron and Steel Co, Ltd who had prospected the area and had also laid a tramline connecting the Lohara deposit with the then main narrow gauge Railway line with an intention to use this low phosphorous content iron ore at their Jamshedpur plant as and when required. However, subsequently the area was leased out by Ex Madhya Pradesh Govt. to Shri P.B.Punjabi for a period of 20 years in 1952. Shri P.B.Punjabi and other contractors had excavated a quantity of about 50,000 tonnes of iron ore from this area.

The total resource / reserve of iron ore in the Lohara block are proved to be the order of 1.48 million tonnes. The quality of the ore and float ore is fairly good containing over 60% Fe except in the southern portion of the ore body where the ore is spoiled considerably as a result of the granitic intrusion. In nut shell, the resource / reserve and the average grade of the ore in the Lohara block are classified as below:

	Resource / reserve, tonnes	Avg. Iron content, in %
1. Reef ore	1188936.0	61.81
2. Float ore	296864.0	59.97
Total	1485800.0	As on 28.08.1963*

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- Date of completion of drilling operation.

Total Resource of Iron ore: 14,85,800.0 tonnes i.e. 1.48million tonnes, and the DGM in their 'Summary of Mineral Block' on auction platform has mentioned Total Geological Resources as 1.48 million tonnes with Average Fe content 60%.

Summary: Updated Resource as per DGM as on 28.08.1963 (Date of completion of drilling operation)

Resource	Total, tonnes	Grade	Category
Proved Category Iron ore as on 28.08.1963	14,85,800.0	60 % Fe content	G2
Total	14,85,800.0		

Blocked resource: None

Already Excavated iron ore: 50,000 tonnes

Balance Mineable Reserve: 14,85,800.0 – **50,000** =14,35,.800**tonnes Code: 122** as on 1.4. 2020. This mineable reserve has been considered for production planning.

Recovery of saleable Iron ore: The ROM which is passed through in-pit crusher is not saleable cent percent. It has to be sized as per customer's requirement. This will be done in pit itself. To arrive at recovery of saleable ore, it is gathered that the recovery will be about 95% of the volume of the ROM produced through in-pit crusher.

Chemical analysis of Iron ore by preferred bidder

One sample of iron ore was collected by the preferred bidder and got analysed through the chemical lab of DGM in Aug. 2019, the results of which are as below. Copy of analysis report is enclosed as Annexure10.

Constituent

Fe_2O_3 : 95.42 %

SiO_2 : 0.50%

Al_2O_3 : 0.95%

TiO_2 : 0.05%

P_2O_3 : 619 ppm

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Life of mine: There is a balance mineable reserve of 14,35,.800.0t. The preferred bidder intends to mine 5,36,717.0 tonnes during ensuing plan period leaving 8,99,083.0 tonnes for conceptual period. During the conceptual period of ten year the preferred bidder will mine the balance reserve. Thus, life of mine works out 5+10=15 years from the First year of operation.

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:

To assess the mineralization of Fe ore, the DGM drilled 9 core bore holes in proposed lease area. Medium to high grade Iron ore was discovered and established the Fe resource. The Iron ore bed has been fully delineated. Mapping of the Iron ore area in and around deposit was also done by the DGM. Iron ore mineralization has been proved to a maximum depth of 44.19m by core bore holes. The end use of iron ore has already market & iron ore is useable in their captive steel plant. Being a high grade it will fetch a high price. Thus, quantities of Iron ore resource of proved category qualifies for E-1 code.

(ii) Feasibility Axis F2:

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The deposit lies on a elevated hill and along the slopes of hill. It is proposed to mine iron ore by open cast method of mining, fully mechanized with in pit crushing as it is amenable for open cast operation. Mining plan is being prepared for lease grant. There is a balance mineable reserve to the tune of 14,35,.800tonnes with an average grade 60% Fe 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 hence, forest clearance will be sought. Forest will not be a hurdle in operating the mine. Thus, resource of proved category is eligible for F2 code.

(iii) Geological Axis G2:

The deposit has been explored by DGM by drilling 9 vertical as well inclined core bore holes to a depth ranging from 15.24 to 44.19m. The mineralization was intercepted in 7 core bore holes and not intercepted in two bore holes namely 5 & 8. These bore holes influence has been considered for resource estimation. Besides, DGM has also carried out geological mapping. Based on exploration data of core drilling, ore bodies have been delineated on geological plan. Resource has been estimated with average factor and area method. Mining plan is being prepared for grant of mining lease. There is a balance mineable reserve of 14,35,.800tonnes with saleable grade. The ore has been estimated with average factor and area 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 DGM is given on page 21 to 23.

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 Fe ore as on 28.08.1963	14,85,800.0	Fe : 60%
G3 - Prospecting	00	---
G4- Reconnaissance	00	---

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

	UNFC Code	Quantity in tonnes	Grade
A. Total Mineral Reserve as on 28.08.1963		14,85,800.0	
Mined out reserve	111	50,000.0	
Balance Probable mineral Reserve as on 1.4.2020.	122	14,35,800.0	Fe : 60%
B.Total Remaining Resources	---	0.0	

Feasibility mineral Resource	211	---	
Prefeasibility mineral resource	221 and 222	---	
Measured mineral resource, Blocked	331	---	
Indicated mineral resource	332	0.0	
Inferred mineral resource	333	---	
Reconnaissance mineral resource	334	---	
Total Reserves + Resources as on 1.4.2020		14,35,.800.0	

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.

2.0 MINING

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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: Lease is under grant hence it is not applicable

Proposed Method of Working:

The iron ore mineralization is a hilly terrain, amenable to opencast method of mining. The mining will be by A category mechanized operation commencing operation at crest of the hill RL 313m surface exposing the ore body and subsequently descending downward forming systematic benches of six meter high and width not less than the height i.e. six metre and slope of individual bench to 60^0 from horizontal as shown in Development and Production Plates 6.1 to 6.5 & cross sections plate 6A. The mineralized area consists of seven blocks of different grade. There are three reef ore blocks having 100% in-situ recovery of iron ore. Another three blocks are of boulder and float ore having in-situ recovery of 20 & 15%. The spoiled ore nomenclature as block VII is with in-situ recovery of 25%.

Whole lease is mineralized. There is no non-mineralized land within lease. Therefore, first float ore in block VI around the hill which has thickness 1.2192m with recovery 15% will be mined. This will make non mineralized land available for waste dumping and other ancillary activities. It is planned to mine float ore for first two years. From third year onward, mining of ore will commence from crest of the hill forming first bench at floor RL 307m. At every bench, full width of hill will be slashed. The next bench will be at floor RL 301m, the mining will proceed in descending order up to RL 283m and float ore from RL 250 to 271m RL in the ensuing plan period.

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The benches will be six metre high and its width at any stage will not be less than six metre. However, the width of the working bench shall not be less than three times the maximum width of dumper plying on haul road. There is no top soil that supports crop but it has lateritic soil mixed with iron ore pebbles. This laterite is a waste material and will be dumped along with other waste generated during mining operation. There is a side burden. It will be drilled and blasted along with the ore body as per need. During drilling and blasting operation, spacing and burden between two consecutive holes will be kept 3.0m and 2.5m respectively. Blast holes will be drilled by 100mm dia Wagon drill machine. 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 10% of hole depth i.e.0.60m to maintain bench floor level avoiding toe formation. Total depth of blast hole will be 6.60m. The blast holes in side burden and ore body 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 SB and ore will be 3.27m^3 per kg of explosive or about 6.54t. Besides, to dislodge hard ROM particularly in float ore, drilling will be done by Jack hammer and blasting by small dia cap sensitive explosive. Overall slope of hanging and foot wall will be maintained at 60°. At a time on an average 50 blast holes will be fired. Ore will be crushed by mobile crusher in pit itself.

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

Blasted SB and mineralized muck will be loaded by the loader in to dumpers of 16 tonnes capacity. SB will be dumped to its dump site and crushed iron ore to its stack yard.

The winning of iron ore will be carried out as shown in production and development plates 6.1 to 6.5 during the ensuing plan period. The preferred bidder will start mining after obtaining all permits.viz FC & EC.

A garland drain 1 m x 1 m will be provided at the ground level. 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 14

First Year: Mineralization in the form of reef is on crest of hill, whereas on its slopes, there is a float iron ore. During the year, it is planned to mine only float ore of block VI on surface area 88158.01m^2 in N, NE & SE side of the lease area as shown on Development & Production Plate 6.1. Depth of excavation will be 1.2192m as revealed from the exploration carried out by the DGM. The in-situ recovery of iron ore will be 15%, rest will be waste. It is planned to mine float ore from ground level 250m RL to 271m RL. Digging of ROM will be done by loader. Diggable soft ROM will be loaded in to dumpers, carried to the site of mobile screening and crushing. The hard/compact ROM will be drilled and blasted by using Jack hammer. The crushed, sized, saleable iron ore will be stacked in stack yard & waste to waste dump site in SW of lease area. The mining of float ore will commence from ground level, ascending towards crest following contour of the lease area. During the year it is proposed to produce 75,941 tonnes of iron ore. The haul roads following the contours with proper gradient will be provided. In nutshell, the information is provided in the following table:

Location of working	R.L.to be worked, m	Area under working, m^2	Ore Category & depth in m	ROM production, t	Waste, m^3
N, NE & SE N-2255420 to 2255540 E-368300 to 368450 plate 6.1	250 to 271m. Block VI	88158.01	Float ore with 15% recovery. Depth : 1.2192	75,941.0	91360.0 To waste dump site

Second Year: In this year, it is also planned to mine float iron ore on hill slope in block VI towards W, SW & NW of the lease area where the float iron ore exists as shown on Development & Production Plate 6.2. For the production purpose surface area to the tune of 104870.45m^2 has been earmarked. Depth of excavation will be 1.2192m as revealed from the exploration carried out by the DGM. The in-situ recovery of iron ore will be 15%, rest will be waste. It is planned to mine float ore from ground level 250m RL to 271m RL. Digging of ROM will be done by loader. Diggable soft ROM will be loaded in to dumpers, carried to the site of mobile screening and crusher. The hard/compact ROM will be drilled and blasted by using Jack hammer.The crushed, sized, fine saleable iron ore will be stacked to stack yard & waste to waste dump site in SW of lease

area. The mining of float ore will commence from ground level, ascending towards crest following contour of the lease area. During the year it is proposed to produce 90,338 tonnes of iron ore. The haul roads following the contours with proper gradient will be provided. In short, the information is provided in the following table:

Location of working	R.L.to be worked, m	Area under working, m^2	Ore Category & depth in m	ROM production, t	Waste, m^3
S, SW & NW N-2254075 to 2255540 E-368190 to 367800, plate 6.2	250 to 271m. Block VI	104870.45	Float ore with 15% recovery. Depth : 1.2192	90,338.0	108679.0 to waste dump site अनुमोदित APPROVED

Third Year: During the year it is planned to produce the ROM iron ore from hill crest 313m RL forming systematic benches of six metre high and width not less than the height of the bench, descending towards ground level as shown on Development & Production Plate 6.3 & cross sections in plate 6A. First bench at floor level 307m RL will be opened and entire hill above this level will be slashed. At this level, spoiled ore in block VII & block IV, boulder & float ore will be mined. Second bench at RL 301m will be opened that will also be in spoiled ore in block VII & block IV, boulder & float ore. Entire hill width from 301m to 295m RL will be slashed. Also, third bench at RL 295m will be mined for above stated blocks. Besides, block II i.e. reef ore will be mined at RL 295m. Thus, production from slashing the hill downward by forming three benches of six metre high each will be achieved. During the course of mining, it will encounter blocks viz. II,IV,VI &VII respectively known as reef ore, boulder & float ore, & spoiled ore. Bench wise calculation of ROM is furnished in Annexure 14. This will help to achieve the targeted production of 1,04,915.0 tonnes of ROM.

Drilling of blast holes will be done by Wagon drill 100mm dia with spacing between two holes 3.0m and burden 2.5m. Depth of blast hole will be 6.6m including sub grade drilling. The blast holes 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 SB and ore will be $3.27m^3$ per kg of explosive or about 6.54t. Blasted muck will be fed to in-pit mobile screening & crushing unit. The crushed saleable iron ore and waste generated will be

loaded in to 16 tonnes dumpers by loaders, transported to respective dump yard for stacking. In nutshell, the information is provided in the following table:

Location of working	R.L.to be worked, m	Area under working, m^2	Ore Category with block.	ROM production, t	Waste, m^3
Crest of hill N-2255095 to 2255180 E-368050 to 368190 Plate 6.3	313 to 295m.	16598.83	Block II: Reef ore, Block IV: Boulder & float ore, Block VI: Float ore. Block VII: Spoiled ore	1,04,917.0	1,35,940.0

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Fourth Year: During the year production will be achieved from third bench opened up in third year itself at RL 295m for a cross sectional area $2.95m^2$ for lateral distance 219.33m for block I. To achieve the desired production, fourth bench at RL 289m will be opened up for blocks I & II, i.e. reef iron ore where in-situ recovery is cent percent. In block I cross sectional area $109.80m^2$ for a lateral distance 219.33m and block II cross sectional area $22.48m^2$ for a lateral distance 83.02m will be mined as shown on Development & Production Plate 6.4 & cross sections in plate 6A. It will give production during the year 1,24,923.0 tonnes. In the process whole bench width will be slashed. Drilling, blasting, loading and hauling will be done as discussed in third year's operation stated above. In nutshell, the information is provided in the following table:

Location of working	R.L.to be worked, m	Area under working, m^2	Ore Category with block	ROM production, t	Waste, m^3
Slashing hill N-2255190 to 2255275 E-368010 to	295 to 289m.	7986.88	Block I: Reef ore, Block II: Reef ore.	1,24,923.0	0.00

368110. Plate 6.4					

Fifth Year: For the production during the year, fourth bench at floor RL 289m will be continued and production will be achieved from block II for cross sectional area 80.56m^2 for a lateral distance 83.02m & in block I

cross sectional area 73.71m^2 for a lateral distance 219.33m will be mined at RL 283m. There will be cent percent in-situ recovery of iron ore being a reef ore. Besides, production will be achieved from block VII spoiled ore and block IV boulder & float ore at RL 289m as shown on Development & Production Plate 6.5 & cross sections in plate 6A. One bench at RL 283m will be opened up and mined for block I. This will give production during the year 1,40,598.0 tonnes. Drilling, blasting, loading and hauling will be done as discussed in third year's operation. In nutshell, the information is provided in the following table:

Location of working	R.L.to be worked, m	Area under working, m^2	Ore Category	ROM production, tonnes	Waste, m^3
Slashing hill N-2255070 to 2255325 E-367075 to 368210. Plate 6.5	289 to 283m.	41805.46	Block II: Reef ore, Block IV: Boulder & float Block VII: Spoiled ore	1,40,598.0	139598.0

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During the plan period, the slashing of hill and total area that would be part of excavation is furnished below:

Area in m^2	Slashing of hill in m.
234833.93	30

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

I In-situ Tentative Excavation (Annexure 14)

Year	Total tentative Excavation (Cum)	Top Soil (Cu m)	Soil (Cu m)	OB/SB/IB (Cum)	ROM (Cu m)	ROM Tonnes	Mineral reject (Cum)	Mineral Reject (Tonne @2.65)	Ore/Waste Ratio t / m^3
1	3	4	5	6		8	9	10	10
I Year	108288.38	0.0	0.0	91360.0	16122.27	75941.0	806.11	3797.05	1:1.20
II Year	128816.69	0.0	0.0	108679.0	19178.75	90,338.0	958.94	4516.90	1:1.20
III Year	159327.57	0.0	0.0	135940.0	22273.88	104917.0	1113.69	5245.85	1:1.29
IV Year	27847.20	0.0	0.0	0.00	26521.15	124923.0	1326.05	6246.15	--
V Year	170939.40	0.0	0.0	139598.0	29848.95	140598.0	1492.45	7029.90	1:0.99
Total	**595219.24**	**0.0**	**0.0**	**4,75,577.0**	**113945.00**	**536717.0**	**5697.24**	**26835.85**	**1:0.88**

NOTE: For tonnage of the ore, conversion factor is 0.2123m^3/ tonne for reef ore, boulder & float ore and for spoiled ore 0.4246m^3 as per DGM's exploration report.

Summary of Year Wise SB/IB Removal and ROM iron ore Production

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Year	Iron ore Production, ROM tonnes	Top Soil m^3	Soil m^3	OB/SB/IB removal, m^3	Ore : OB ratio in t : m^3
I	75941.0	0.0	0.0	91360.0	1:1.20
II	90,338.0	0.0	0.0	108679.0	1:1.20
III	104917.0	0.0	0.0	135940.0	1:1.29
IV	124923.0	0.0	0.0	0.0	--
V	140598.0	0.0	0.0	139598.0	1:0.99
Total	**536717.0**	**0.0**	**0.0**	**4,75,577.0**	**1:0.88**

पत्र संख्या द्वारा
VIDE LETTER No. CND/FE/MPLN-1183/NGP-2020 Dt 20/11/2020

20/11/2020
क्षेत्रीय खान नियंत्रक (ना. क्षे.)
Regional Controller of Mines (N. R.)
भारतीय खान ब्यूरो नागपुर
Indian Bureau of Mines, Nagpur

Bench wise/ Level wise production of ore and waste removal

Bench / Level	Production Tonnes	Top Soil m^3	Soil m^3	Waste removal SB & IB, m^3
First Bench Floor RL 307m	3521.0	0.0	0.0	11540.0
Second Bench	26408.0	0.0	0.0	43795.0

Floor RL 301m				
Third Bench Floor RL 295m	77684.0	0.0	0.0	80605.0
Fourth Bench Floor RL289m	155171.0	0.0	0.0	97455.0
Fifth Bench Floor RL 283m	107654.0	0.0	0.0	42143.0
Float ore 271 to 250m RL	166279.0	0.0	0.0	200039.0
Total	**536717.0**	**0.0**	**0.0**	**475577.0**

Year wise and block wise production in tonnes.

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Block No	YEAR				
	I	II	III	IV	V
I	--	--	--	116132.0	76151.0
II	--	--	25586.0	8791.0	31503.0
III	--	--	--	--	--
IV	--	--	7278.0	--	11822.0
V	--	--	--	--	--
VI	75,941.0	90,338.0	11574.0	--	--
VII	--	--	60479.0	--	21122.0
Total	**75,941**	**90,338.0**	**104917.0**	**124923.0**	**140598.0**

II Dump re-handling (for the purpose of recovery of mineral):
Estimated available material (Cum): Nil

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 SB & ore will be carried out by Wagon drill 100mm dia with bench height 6m and width not less than the height of bench. The SB & ore benches will be blasted six meter high in one go. Drilling and blasting in float ore which is difficult to excavate by loader will be done by small dia Jack hammer drill. The blasted muck will be fed to in-pit mobile screening & crushing unit. Crushed ore and SB will be loaded by deploying loader into 16 tonnes dumpers. Both will be hauled to its respective stack 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 6 A. Further, it is described briefly as below:

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Layout of Mine workings: Iron ore mineralization is delineated on surface geological plan plate 3. Entire lease area bestows with mineralisation in the form of float, reef and boulder ore. In first two years of operation, the float ore from 250m RL to 271m RL will be mined. This will pave way for dumping waste, doing plantation, erecting structures. Entire depth of float i.e. 1.2192m will be mined. Mining will be from ground level in ascending mode. From third year onward, reef ore at hill crest forming six metre high bench at 307m RL slashing whole width of hill with longer axis of bench to be east – west direction will be formed. Second bench at RL 301m will be opened and will be worked as stated above and mining will continue up to RL 283m. Iron ore together with SB/IB 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 to in-pit crusher and screening unit.

The recovery of iron ore will be 95% by volume and reject will be 5% while crushing. This reject will be stacked to its designated place.

Pit road layout: Approach road will be formed as shown in Development & Production Plates 6.1 to 6.5. This road will be made up to 313m RL of hill's mineralised area. Ramps with gradient 1:16 as per requirement will be formed to reach the dumpers and excavator at pit bottom of bench floor.

Layout of Faces: In float ore along hill slope faces will be east-west direction for a width of one metre. At elevated hill, the faces of the benches will be along strike of the ore body i.e. E-W direction and height of bench to be along dip of ore body. Foot wall will follow the dip of the ore body or excavated entirely. The benches will be in descending order along dip of ore body.

Site for disposal of OB/waste: SB/IB generation will be in the form of quartzite, intrusive granite, laterite amounting to 4,75,577m^3 during five year period. For stacking, a separate dump will be created for which 47131.33m^2 of area has been earmarked. The waste will be dumped in a single layer of ten metre. This land consists of float ore as per the exploration done by DGM. However, this float ore will be mined in first two years of mining operation, considered as 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 iron ore which will be 5697.24m^3 during five year period. Iron ore in reef is hard, compact. Iron ore in boulder form is also hard, compact. The ROM obtained in same form will not be useable and needs crushing in in-pit crusher. This crushing process will generate fines of less than one mm size that containing Fe less than 45% and more silica. This will be stacked separately.

Details on Drilling and Blasting, Mining Machinery.

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(1) **Drilling**:- Drilling operations will be done by Wagon drills in over burden and by Jack hammer in float iron ore.

Parameters for drilling in side burden and ore body:

Drilling in Float ore		Drilling in side burden and ore body	
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 machines. It is presumed that 50% float iron will require drilling and blasting. In second year of operation there is maximum production of float ore i.e.90338.0 tonnes. Hence requirement of Jack hammers is calculated for the yearly production (90338/2)= 45169.0 tonnes

(i) Float iron ore blasted by each hole: 1.5m X 1.0m X 0.75m=1.125m^3
(ii) Maximum float ore production in a shift: 45169t x 0.2123 =9589.38m^3/300=31.96m^3

(iii) Average meterage drilled by 1 drill machine in a shift: 30m
(iv) No. of drill holes required for float iron ore production in a shift: 31.96/1.125=28.40
(v) Drill meterage required in a shift: 28.40 x1.5= 42.60m
(vi) One Jack hammer can drill 30m in a shift, hence Jack hammer required 42.60/30 = 1.42 or say 2 nos.

(B) Requirement of Wagon Drill machines. Maximum iron ore production and removal of side burden is in third year i.e. 158213.88m^3. Hence, calculation is based on this figure.

(i) Side burden and iron ore blasted by each hole: 6.6m X 2.5m X 3.0m=49.5 m^3
(ii)Maximum side burden and ore handling in a shift: 158213.88 m^3/300=527.37m^3
(iii)No. of drill holes required for side burden & ore removal in a shift: 527.37/49.5=10.65
(iv) Drill meterage required in a shift: 10.65x 6.6= 70.29m
(v) One drill machine can drill 50m in a shift, thus, no of drill machine required = 70.29/50 = 1.40 or say 2

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(C) Requirement of Dumpers. Maximum handling of side burden and iron ore is in third year of operation. i.e. 149664.7m^3. Hence, calculation is based on this figure.

(i) Maximum side burden & iron ore handling in a shift: 158213.88 m^3 /0.2123= 745237.30 t /300 =2484.12 t
(ii) No. of effective working hours in a shift: 7
(iii) No. of trips by 1 dumper in one hour: 3
(iv) No. of trips by 1 dumper in a shift: 7 X 3=21
(v) Total tonnage transported by one tipper in a shift: 21 X 16 t=336T
(vi)No. of tipper trucks required: 2484.12/336=7.39 say 8
(vii) No of spare tippers:1
(viii) Total no. of tippers required: 8+1= 9

D)Loading Equipment:

Calculations for Loading Equipment

i) Maximum handling of iron ore in a shift : 104917 t x 0.2123 = 22273.87m^3/300= 74.24m^3

ii) Maximum SB handling in a shift = 135940m^3/300= 453.13m^3

iii) Total handling of SB/IB & iron ore in a shift : 74.24m^3 +453.13m^3 = 527.37m^3

iv) Iron ore handling in a shift in terms of tonnage = 74.24/0.2123 =349.69 t

v) SB/IB handling in a shift = 453.13m^3/ 0.2123 = 2134.38 t
vi) Total Iron ore & SB/IB handling in a shift (349.69 t +2134.38 t) = 2484.07 t

vii) Average bucket capacity = 2.1m^3

viii) Fill factor =80%

ix) Broken ore density: 4.71t/m^3 (1/0.2123=4.71t)

x) Tonnage handled/Bucket (2.1x0.8x 4.71) = 7.91 t

xi) Average Cycle time/bucket = 45 seconds
xii) No of buckets /hour (60x 60/45) = 80
xiii) TPH of excavator (80 x 7.91) = 632.80 t

xi) Effective TPH to be considered (80%) = 632.80 x 0.80 = 506.24 t
(For shifting, waiting, face preparation etc.)

x) Total time required for loading materials in a shift (2484.07 t /506.24 t) =
4.90 hours

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

xii) Percentage Equipment utilization = 70%

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xiv) Percentage Equipment availability = 75%
xv) Hours available per excavator in a shift (7x0.75x 0.70) = 3.67

xvi) No of Excavators required (4.90/3.67) = 1.23 or say 2

(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 Iron ore:

(i) Maximum quantity of Iron ore to be blasted in a year: 45169t
(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 2.25/0.2123=10.60 t
(iv) Hence maximum requirement of explosive in a year=45169 /10.60=4261.23 kg or 4262 kg.

Large dia explosive for blasting side burden and iron ore:

i) Maximum quantity of side burden & ore to be blasted in a year: 158213.88 m^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 = 158213.88m^3/3.27 = 48383.44 or say 48384.0 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:

List of Machineries & Equipment

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

The lessee will deploy the above 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 is being granted through auction mode 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. As per lease period there shall be nine conceptual periods of five periods each.

There is a mineable reserves 14,35,.800.0 tonnes as per DGM's estimation. The preferred bidder now intends to mine 5,36,717.0 tonnes during the ensuing mining plan period, leaving balance 8,99,083.0 tonnes for conceptual period. Out of this balance mineable reserve, preferred bidder will mine 8,99,083 tonnes in conceptual period of ten year practically entire balance reserve. Calculation for production and waste removal in conceptual period of ten year is given in Annexure 14. However, the proposed exploration suggested in the ensuing plan period, if mineable iron ore encounters, the mining may continue for further more period even up to lease period.

There shall be conceptual period of ten year period, thus, there will be mining in conceptual period for ten year. Therefore, proposal described here are for ten year of conceptual periods.

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

Sr. No.	Land use Pattern	Total land use at the conceptual stage including ensuing plan period area, m^2
1	Area under pit	170899.83
2	Waste Dump	81007.61*
3	Mineral storage	1030.51*
4	Reject stack	1318.90*
5	Structures	599.88*
6	Plantation	60000.0*
	Total	314856.73

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* As per DGM's prospecting report, whole lease area is mineralized including float ore which constitutes major portion of the lease area. It is planned to mine float in first two years of operation of ensuing plan. Thus, float area from 250m RL to 271m RL will be non-mineralized from third year of operation and would be used for other activities such as waste dumping, mineral storage, structures, plantation etc. In the above table, area shown under waste dump, mineral storage, reject stack structures and plantation will be used after mining of float iron ore.

i) Excavation

During the ensuing mining plan period, float ore from 250m RL ground level to 271m RL in block VI will be mined. Besides, from the hill portion, spoiled ore from block VII, boulder and float from block IV & V and reef iron ore from blocks I & II will also be mined. Hill will be slashed from 313m to 283m RL, achieving production of 5, 36,711 tonnes out of 14,35, 800 tonnes of mineable reserve leaving balance reserve 8,99,083 tonnes for conceptual period or up to lease period. Based on reserve position, and the rate of yearly mining of iron ore, the life of deposit is for fifteen years only from the year of commencement of mining operations. However, the proposed exploration of ensuing period encounters mineable iron ore, it may enhance the production period beyond the fifteen years or even up to lease period. During the conceptual period production will be achieved from the in-situ ore from hill RL 283m and below forming systematic benches of six metre high. This ore will be mined by category A mode of operation. Float & boulder Iron ore will be won by drilling Jack hammer drill holes and blasting by small dia slurry explosive as practiced in ensuing plan period. The reef ore, spoiled ore together with side burden will be drilled by Wagon drill 100mm dia and blasted by slurry explosive.

The blasted muck will be loaded mechanically by loader in to 16 tonnes dumpers and fed to in-pit mobile screening and crushing unit. The screened & crushed material together with waste generated from mobile crusher will be brought to ground to respective stack yard by dumpers.

Area under pit: Due to mining operation in conceptual period, by slashing hill and mining iron ore float which constitutes the whole lease area, the area under pit will be 314856.73 m^2. There will be no formation of deep pit.

Water reservoir: There will be no deep pit formation, mining being on elevated ground. Hence, there will be no water reservoir for impounding rain water.

Life of mine: There is a mineable reserve of 14,35,.800.0t. The preferred bidder intends to mine 5,36,717.0 tonnes during ensuing plan period leaving 8,99,083 tonnes for conceptual period. During the conceptual period of ten year the preferred bidder will mine the balance reserve. Thus, life of mine works out 5+10=15 years from the First year of operation.

Ultimate Pit Bottom: The UPB for iron ore mineralization shall be 271m RL in conceptual period whereas in ensuing five year period while mining will be done up to 283m RL.

Ultimate Pit Limit: It is marked on geological plan plate 3 as per surface excavation.

ii) Recovery of ROM:

The recovery of ROM from in-situ will be 100% since mineral will not be blocked in 7.5m mining limit and ultimate pit slope while mining in ensuing period and in

conceptual period. Therefore, in conceptual period too, recovery of in-situ ROM would be 100%. The saleable iron ore when crushed and screened, it would be around 95%. The mineral reject generation therefore, would be around 5% containing less than 60% Fe.

iii) Disposal of waste:

While winning the iron ore during the conceptual period, there will be generation of IB and SB to the tune of 2,10,567m^3 in the form of side-burden & inter burden. It will be dumped within lease area in the form of waste dump, on non mineralised ground for which 33876.29m^2 area has been earmarked. To avoid erosion from the waste dump, it will be provided with retaining wall.

iv) Reclamation and rehabilitation:

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The major portion of the mineral block consists float ore to a depth of 1.2m. The inter burden generated will be dumped in external dump within lease area in NW corner as shown in Development & Production Plates 6.1 to 6.5. This inter burden will not be used for reclamation of worked area. Besides, the excavation is in the form of slashing of hill. There will be no creation of pit either deep or shallow. It will be as far as plain ground. After exhausting the mineral from mineral block, the mined out area will be planted with local varieties. It will be discussed in detail in FMCP.

v) Plantation:

In conceptual period it is proposed to do plantation work on 4.0 ha or 40,000m^2 of area. The area of plantation is shown on conceptual plan plate 7. For plantation purpose, the conditions incorporated by the Forest department and MoEF while granting Forest clearance & EC will be adhered to.

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 area appears to be quite good as seen in the nearby existing wells. The water table in dug wells varies from 5 to 10 meters from winter to summer season.

b) Indicate maximum and minimum depth of workings.

The mining is on elevated hill at RL 313m and it will be slashed up to RL 283m. The RL ground level is 250m. The excavation planned does not intercept the water table. There will be no de-watering. Thus, there is no adverse impact on sub surface water.

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 not intercept the water table because excavation will be above the ground water table. There will be no excavation below ground but it is on elevated ground. There will be no pumping of ground water, however, a pump of 10HP capacity will be kept standby for use in rainy season. Rain water will be allowed to join natural drainage system after passing through settling tank.

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 south-west, south & south east direction and finally merge with Alewahi reservoir. The 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.

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4. Stacking of Mineral Reject/ Sub-grade Material and Disposal of Waste

Existing Waste Dumps: None

Re-handling of dump: None

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 mineral block which supports crops. Therefore, there will not be generation of top soil in ensuing plan period. However, there would be generation of inter burden waste and side burden amounting to 475577m^3 will be dumped separately for which an area of 47131.33m^2 has been earmarked. The waste will be dumped in a single layer within mineral block as shown in plates 6.1 to 6.5 i.e. Development & Production Plan. The waste dumping will be in a retreating manner and to minimize the siltation from waste dump, it will be provided retaining wall around it.

Waste: The waste in context of this deposit is that which has no economic value or which cannot be upgraded to a useable grade economically. Under this context, any

size material is a waste which may be excavated either from surface or inters burden or side burden. From the bore hole data of DGM, it is gathered that waste will have Fe content less than 45% and high in silica.

Reject: Reject will be considered which contains less than 45% Fe i.e. below threshold value limit and size less than one mm.

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

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Year	Soil (cum)			Mineral Rejects (cum)			
	Reuse/sp reading	Storage	Waste generation, m^3	Backfilling	Storage	Blending	Beneficiation
I	0.00	0.0	91360.0	0.00	806.11	0.00	0.00
II	0.00	0.0	108679.0	0.00	958.94	0.00	0.00
III	0.00	0.0	135940.0	0.00	1113.69	0.00	0.00
IV	0.00	0.0	0.0	0.00	1326.05	0.00	0.00
V	0.00	0.0	139598.0	0.00	1492.45	0.00	0.00
Total	0.00	0.0	**4,75,577.0**	0.00	**5697.24**	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 mineral block and non mineralized as per the documents provided by the state DGM on auction platform. It is also outside the present known UPL. No simultaneous back filling is possible as it does not form the deep pit. The float ore mined from block VI, consequently, the inter burden/waste generated will not be simultaneously back filled in mined out area, but will be dumped externally in waste dumps located at NW corner of the lease area. The year wise dumping area is shown in plates 6.1 to 6.5 i.e. Development and Production plates. The IB/SB generated from hill area too will be dumped externally in same dump from third year onward. To avoid siltation from dump, a retaining wall at toe of dump will be provided. It will be one metre high above surface and half a metre beneath the surface as foundation. Its width will be kept one metre at top and on ground level it will be 1.5m wide. In addition to that plantation will be done on 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. In this process, it will get time for stabilization and will have minimum erosion.

d) Protective measures to be taken in plan period.

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

i) Retaining wall: To prevent any wash-off and degradation of land in the adjoining areas, retaining wall will be constructed along the toe of proposed waste dump and reject stacks during the plan period. It will be one metre high above surface and half a metre beneath the surface as foundation. Its width will be kept one metre at top and on ground level it will be 1.5m wide

ii) Garland drain: It will be 1.0m wide and 1.0m deep to arrest the siltation and is proposed to construct along the retaining wall to waste dump and to working pit.

iii) Settling Tank: One settling tank of 30m x 15m x 5m(D) with check dam is proposed in the downstream direction of natural drainage, in south-east direction of the proposed working area to arrest siltation, if any, due to rain 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.

Iron ore is mined almost entirely for production of metallic iron, very minor amounts say about 0.1% of total consumption, being used in manufacture of paints, polishing compounds, cements and in foundry, coal washeries, under water cable sheathings, powder metallurgy etc

The primary use of iron ore is in the production of iron. Most of the iron produced is then is used to make steel. Steel is used to make automobiles, locomotives, ships, beams used for buildings, furniture, paper clips, tools reinforcing rods for concrete, cycle and thousands of other items.

While making concentrates, iron ore tailings are generated. These tailings can be used for road- building materials like pavement and filler and building materials such as cement, low grade glass and wall materials.

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The iron ore may be enriched through zigging, a gravity process if required. Besides, the preferred bidder has planned to convert the magnetic ore to hematite at mine site before it is dispatched to integrated steel plant for captive use and/or for commercial use. For the purpose, ROM mined will be finely ground, passed through magnetic separator enriching to hematite.

The consuming industry in general demands the chemical composition of more than 60% Fe, with low silica, low alumina and low phosphorus. As per the DGM's chemical analysis, the iron ore has above 60% Fe, low silica, low alumina and low phosphorus therefore, the ore mined will be in demand fetching good price when it is sold in open market. Now the preferred bidder has planned to sell it in open market and also to use it in their own integrated steel plant which manufactures high grade alloy steel in Bhandara district as value addition.

The iron ore fines will be transported to Bhandara Steel plant by rail and road. It will also be sold to buyers ex-mine subject to profit.

Cut-off grade: The iron ore containing + 60% Fe of any size will be directly useable ore.

Mineral reject: The iron ore that contains Fe below 45% i.e below threshold value limit and size below one mm will form as mineral reject and it will be stacked separately.

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 export but it will be for captive consumption and for sell in open market.

d) Indicate precise physical and chemical specification stipulated by buyers

The buyers always purchase iron ore which has more than 60% Fe, low silica, low alumina and low phosphorus.

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

During the course of mining, efforts will be put to mine grade wise in-situ iron ore based on chemical composition done by DGM and preferred bidder at the time of mining. Such high & low grade will be differentiated and stacked separately. The low grade i.e. below 60% to 55% will be blended with high grade the later has since no demand in industry. This will help to consume low grade iron ore.

6.0 Processing of ROM and Mineral Reject

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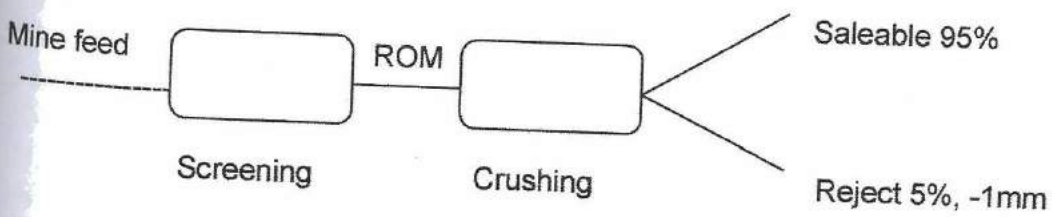
a) If processing / beneficiation of the ROM or Mineral Reject is planned to be conducted, briefly describe nature of processing / beneficiation. This may indicate size and grade of feed material and concentrate (finished marketable product), recovery etc.

Material balance chart is furnished as below:



The iron ore may be enriched through zigging, a gravity process if needed. The ore is slightly magnetic and calls for elimination of magnetic constituent from ore i.e. making it a hematite ore before its use at captive plant and/or for commercial use. This action will be carried out within the lease area. For this purpose, the ROM ore will be finely ground and passed through the magnetic separator, producing the hematite ore as per the flow sheet designed by the consultant being engaged for the purpose.

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.

Information will be furnished to IBM after a flow sheet is designed.

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

Details will be submitted after a flow sheet is designed.

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.

Details will be submitted after a flow sheet is designed.

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

Details will be submitted after a flow sheet is designed.

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

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Details will be submitted after a flow sheet is designed.

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.

Details will be submitted after a flow sheet is designed. However, for mining activities water requirement will be as below:

i) Drinking purpose: 200 L/day
ii) Watering plantation: 3000L/day
iii) Dust suppression: 2000L/day
iv) Wet drilling : 2000L/day
v) Total requirement of water per day: 7200L or 7.20m^3/ day

No sub surface water will be dewatered due to mining of iron ore. There will be no change in water balance of sub surface water due to meager consumption of water for mining purpose.

The above water requirement will be met by tube well to be dug in the lease area or purchased from dug well located in village Loharadongri as per the approved EMP.

(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. Besides, it will be monitored at nearest village Loharadongri.

2. Water: Mining will not intercept the ground water table. Hence, ground water samples will not be available. Therefore, water sample in monsoon season when there is a flow of water due to rain will be collected and analysed for parameters as per IS:2490 (Part-1) 1981 for one sample in a year.

3. Noise: It will be monitored in dry season i.e. summer at near quarry edge and at nearest village Loharadongri. 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:

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Describe briefly the following:

a) Site services:

The following site services will be provided at mine site.

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:

As per production planning, the maximum SB & IB removal and ore production will be in third year. Calculation is, thus, furnished below:

Calculation for manpower

Sr. no	Details of activity	Quantity with unit
1	Total SB & IB removal in a year	135940.0m^3
2	Total iron ore production in a year	22274.0m^3
3	Total Handling of material in a year	158214.0m^3
4	No. of working days in a year	300
5	Per day material handling 158214/300	527.38m^3
6	OMS due to deployment of machinery	20m^3
7	Daily manpower required 498.88/20.	26.36 or 27

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No statutory mining personnel are employed at mineral block as it is in the process of grant. The required statutory personnel would be deployed when mining operations commences after obtaining all permits. For winning of Iron ore and removal of overburden contract labour would be engaged.

The company will appoint the following statutory, technical/non-technical personnel to carry out the activities smoothly.

The mining operations will be supervised by highly qualified personnel with long experience in Iron ore mining.

Mines Manager with Ist class Certificate & graduate Mining Engineer	1
Geologist	1
Mine Foreman (R)	1
Mine Mates	1
Blaster	1
Supervisors/ Office Staff	1
Mechanical Supervisor	1
	7

Highly Skilled	5
Skilled workers	5
Un-Skilled workers	15
Total	32

In addition to above, unskilled work force of about 10 will be required for miscellaneous jobs such as re-handling ore, making roads, etc at mine site. Thus, total labour requirement will be 42.

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 iron ore has not yet commenced. The existing land use pattern is as under.

No.	Head	Present Land use pattern m^2
1	Area under channels	67.66
	Total	67.66

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Water regime: The area is a slight undulating ground sloping towards east direction. The rain water is mostly drained through adjoining drains that meet to Pench river flowing within 500m distance from block. In the northern side of the block, there is a water tank that irrigates the agricultural land, the beetle nuts garden benefits from it.

The water table in dug wells is found at 5 to 10m deep from surface during dry months. The winning of Iron ore will be on elevated hill, slashing it downward for 30m high from crest. It is not intercepting water table, thus, there will be no lowering of water table due to mining activities. The daily consumption of water will be about $7.2m^3$

iv) Flora & Fauna: Core zone being a dense reserve forest, there is a thick vegetation of tendu, teak. neem, mango, jamun etc. In buffer zone too, there is thick vegetation.

It is reported that being thick forest, there is a fauna in the core zone. The fauna such as fox, wild animals are seen in the core zone. Rabbits are commonly seen. Common birds like doves, koel, seven sisters, wood pecker, maina are seen.

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 35.5° 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 12.7° to 20.5° C but as low as 10° C is also recorded as cold winter nights in December-January. In the last few years Brahmapuri town has been listed among the top five hottest cities in India.

Rainfall: The monsoon season starts off in the month of June and stays till September with maximum rainfall 1388mm in a year; the highest amount of rainfall is recorded in the month of July.

Human Settlement: There is no human settlement in the iron ore block. The nearest human settlement is in the village Lohara which is about 1.5 km due north 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.	Lohara	1.5	N
2.	Kharkhara	5.0	W

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

Quality of Air : Around the Fe ore block in the vicinity of 5km radius, no industrial activity which produces SPM exists. Deposit is surrounded by forest land which is 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:

There is a Tadoba sanctuary whose buffer zone is 45 km away from the block under grant.

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 plan period, and at conceptual plan period is given below in tabular form.

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Sr. No.	Land use Pattern	Present Land use m^2	Land use in ensuing Plan period m^2	Land use in conceptual plan period, m^2	Total land use at conceptual stage m^2
1	Area under Pit	67.66	234766.27	17,08,99.83	17,08,99.83
2	Waste Dump	0.00	47131.32	33876.29	81007.61*
3	Mineral storage	0.00	1030.51	1030.51	1030.51*
4	Reject stack	0.00	1318.90	1318.90	1318.90*
5	Structures	0.00	599.88	599.88	599.88*
6	Plantation	0.00	20000.0	40000.00	60000.0*
	Total	66.67	304846.88	314856.73	314856.73

* The clarification is furnished on page 40 of the text matter

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 mining machinery, drilling and blasting. EIA is being prepared by the EC consultant. Those data will be submitted to 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 medium 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 iron 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. The mining excavation will not intercept the water table requiring its pumping as it on elevated hill. No ground water level will be lowered; however, permission for water abstraction will be taken from the CGWB.

vii) Socio-economics: Carrying out mining activities in the area by the preferred bidder 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 negative as iron ore 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:

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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.

Plantation: To mitigate the adverse impact of mining on surrounding environment, it is proposed to do plantation work year wise as stated below:

I Year: During the year plantation will be done between boundary point BP-1 & BP2 as shown in Development and Production Plates. Plantation shall be from lease boundary line covering 7.5m mining limit for an area of 4000m^2 with 450 samplings. Local variety of plants such as tendu. neem, mango, jamun will be preferred.

II Year: During the year plantation will be done between boundary point BP-1 & BP2 as shown in Development and Production Plates contiguous to first year plantation. Plantation shall be from lease boundary line covering 7.5m mining limit for an area of 4000m^2 with 450 samplings. Local variety of plants such as tendu. neem, mango, jamun will be preferred.

III Year: During the year plantation will be done between boundary point BP-3 & BP4 as shown in Development and Production Plates. Plantation shall be from lease boundary line covering 7.5m mining limit for an area of 4000m^2 with 450 samplings. Local variety of plants such as tendu. neem, mango, jamun will be preferred.

IV Year: During the year plantation will be done between boundary point BP-3 & BP4 as shown in Development and Production Plates contiguous to third year plantation. Plantation shall be from lease boundary line covering 7.5m mining limit for an area of 4000m^2 with 450 samplings. Local variety of plants such as tendu. neem, mango, jamun will be preferred.

V Year: During the year plantation will be done between boundary point BP-3 & BP4 as shown in Development and Production Plates contiguous to fourth year plantation. Plantation shall be from lease boundary line covering 7.5m mining limit for an area of 4000m^2 with 450 samplings. Local variety of plants such as tendu. neem, mango, jamun will be preferred.

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".

The State DGM has explored probable mineralized area by drilling nine core drill holes. Besides, twelve trial pits were also dug. The iron ore block is explored by close spaced bore holes enumerating mineralization on hill crest and along its slope. During the ensuing plan period, part of hill height will be slashed. Excavation will not create a deep pit that calls for backfilling or converting to water reservoir. Hence, mined out area will not be reclaimed but will be kept as it is as the ore body extends in deeper horizon. In the ensuing plan period, 32 core bore holes have been proposed to convert G2 category ore in to G1 and also to establish any iron ore lode that exists within the lease area. Because of proposed exploration, reclamation by backfilling is not being proposed. The proposals on reclamation and rehabilitation therefore, will be discussed in detail in subsequent Review of Mining Plan to be submitted to IBM for approval.

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

The iron ore block does not contain soil or top soil, hence, it will not be generated during the ensuing plan period.

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 iron ore will be carried out and also there is no proposal to erect a beneficiation plant within or outside a block. Hence, tailings dam will not come up thus, question of its management does not arise.

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 Year wise 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	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	212	212	212	212	212
	Cost including watch and care during the year, in lac for retaining wall	4.0	4.0	4.0	4.0	4.0
	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	460	460	460	460	460
	Cost including watch and care during the year, in lac for garland drain.	1.00	1.00	1.00	1.00	1.00
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	0
	Any other means (specify)	0	0	0	0	0
rehabilitation of waste land within lease	Area available (ha)	0	0	0	0	0
	Area rehabilitated	0	0	0	0	0
	Method of rehabilitation	0	0	0	0	0
Settling tank	Construction, nos	1	0	0	0	0
Check dam	Construction, nos	0	0	0	0	0

Afforestation	Plantation proposed	450	450	450	450	450
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.

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:

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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 deposit as it will be a mine on elevated hill. 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 with grown up trees 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 will be 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.

4.0 Inundation: It is an opencast operation and has water tank at south west side of the mineral block at five km distance. Beyond five km distance there are also small water tanks for irrigating paddy fields. These water tanks are located at downstream. The mining will be on elevated ground, hence, there will be no flooding of opencast workings

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5.0 Subsidence: It will 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 preferred bidder 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 enters 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 for fifteen years. Deposit is fully explored by the DGM by core drilling and trial pitting. No additional resource is expected to encounter in iron ore block. 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 27(1) of Mineral Conservation and Development Rules, 2017 for five year period expiring at the end of validity of the document.

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

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	0.0068	23.4766	23.4834	0.00	23.4834
2.	Storage for soil	0.00	0.00	0.00	0.00	0.00
3.	Storage for Top soil	0.00	0.00	0.00	0.00	0.00
4.	Waste dump site	0.00	4.7131	4.7131	0.00	4.7131
5	Mineral Storage	0.00	0.1031	0.1031	0.00	0.1031
6	Infrastructure Office etc.(blaster shade	0.00	0.0600	0.0600	0.00	0.0600
7	Railways	0.00	0.00	0.00	0.00	0.00
8	Tailings	0.00	0.00	0.00	0.00	0.00

	Dam/pond					
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	2.0000 0.1319	2.0000 0.1319	0.00 0.00	2.0000 0.1319
	Grand Total	0.0068	30.4847	30.4915	0.00	30.4915

The lease is being granted through auction. As per rule 27(1) of MCDR 2017, Financial Assurance is not applicable to this deposit. Hence, FA has not been calculated. However, MDPA will be signed with the State Govt at the time of execution of lease deed. The performance security required under the rule amounting to Rs 2,14,57,553/- will be submitted to the State Govt. at the time of lease execution.

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Abhay 20/11/2020
क्षेत्रीय खान नियंत्रक (ना. क्षे.)
Regional Controller of Mines (N. R.)
भारतीय खान ब्यूरो नागपुर
Indian Bureau of Mines, Nagpur

पत्र संख्या द्वारा
VIDE LETTER No. CNA/FE/MPLN-1183/NGP-2020
दि 20/11/2020

9.0 PREFEASIBILITY REPORT: LOHARADONGRI IRON ORE BLOCK

0.0 General:

For a mining venture, to arrive its economic viability, feasibility/prefeasibility 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, prefeasibility report of Loharadongri iron ore block 35.73ha; taluka: Brahmpuri, Dist: Chandrapur, preferred bidder M/s Sunflag Iron & Steel Company Limited (SISCO) 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 Sunflag Iron & Steel Company Limited (SISCO) is a limited company, having its registered office at 33, Mount Road, Sadar Nagpur, is a renowned Sunflag Group. It has put up Indian's most modern steel plant, at Warthi, Bhandara, the first integrated steel plant of its kind in the country with a capacity of 0.5 million tonnes of high grade alloy steel per annum, comparable to the best in the world. It has a sound financial background and industrial experience in the field of mining for coal, iron ore and limestone.

The Warthi steel plant near Bhandara, has a manufacturing route of Sponge Iron Plant, Mini Blast furnace, Power plant, Electric Arc Furnace, Vacuum Degassing, Continuous Casting Machine, Rolling Mills, Garret Coiler and Wire Rod Mill, Annealing and Bright Bar facilities.

To have the assured supply of raw material i.e. iron ore to their steel plant and also considering commercial aspects, the preferred bidder, entered in to auction process and became the preferred bidder for Loharadongri iron ore block in taluka: Brahmpuri district: Chandrapur, Maharashtra State for an area 35.73ha.

M/s Sunflag Iron & Steel Company Limited, Nagpur has been allocated a mining lease through auction for over an area 35.73 ha, for iron ore in taluka Brahmpuri, Dist Chandrapur M.S. in village Loharadongri by the State Govt. The LOI has been received and it is annexed to this mining plan report. It is a limited firm, has its office at 33, Mount Road, Sadar Nagpur. The lease has not been executed yet but it will be executed after obtaining all approval/ permits.

1.0) Mineral Resource estimate for conversion to Mineral Reserves:

Resource estimation: Resource estimated by the DGM is reproduced below:

For calculating the iron ore resource / reserve, Lohara iron ore block has been divided into seven different blocks. Blocks No I, II, III have been made for the main reef iron ore body; Block No. IV and V for the large float boulders seen resting above the float ore on the eastern and western portions of the iron ore body; and Blocks No. VI and VII for the float ore and the iron ore spoiled by granitic intrusive respectively.

For the iron ore in all the blocks except Block no VII, a tonnage factor of 0.2123 m^3 per tonne has been taken. For block no VII taking in to account the highly siliceous nature of the ore, the tonnage factor of 0.4246m^3 per tonne and recovery 25% has been assumed.

For Float ore as mentioned earlier an average thickness of 1.2192m and percentage recovery of about 15% has been taken in to account.

The calculation of resource / reserve, block wise for iron ore is furnished below in tabular form.

Table showing calculation of resource / reserve:

S. No.	Block No.	Location	Area of Block, m^2	Thickness of ore body, m	Volume of ore, m^3	Conversion factor, m^3/t	Resource / Reserve Tonnes
1.Reef Ore							
1.	Block No I, B.H.No. 4,6,&9	SW Portion of ore body	12406.28	15.24	189071.70	0.2123	890587.37
2.	Block No II	SE Portion of ore body	2455.431	8.2296	20207.21	0.2123	95182.34
3.	Block No III	Northern Portion of ore body	4716.981	9.144	43132.07	0.2123	203165.66
						Sub Total, Reef ore	**1188935.37**
2. Boulder and Float Ore							
S. No	Block No.	Location	Area of float,	Thickness of	Volume of ore, m^3	Recovery	Conversion / Reserve

			m^2	bed		%	factor, m^3/t	Tonnes
1.	Block No IV	Area to the east of ore body	16929.48	3.048	51601.05	20	0.2123	48611.45
2.	Block No V	Area to the west of ore body	2907.76	6.096	17725.70	20	0.2123	16698.73
3.	Block No VI	Whole area covering slopes of hill excluding blocks I to V & VII	268804.1	1.2192	327726.0	15	0.2123	231553.90
							Sub Total	**296864.08**
3.								
					Grand Total of Resource / Reserve			**1485799.45 or1485800.0**

From the above calculation, the resource / reserve for all the six blocks excluding block VII i.e. spoiled ore, works out to 14,85,800 tonnes or say 1.48 million tonnes. Besides, in VII th block, there is a resource of 88711 tonnes. The above resource is inclusive of all the ore that was already extracted from the area. It is mentioned in the prospecting report that the area under consideration was first leased out to M/s Tata Iron and Steel Co, Ltd who had prospected the area and had also laid a tramline connecting the Lohara deposit with the main narrow gauge Railway line with an intention to use this low phosphorous content iron ore at their Jamshedpur plant as and when required. However, subsequently the area was leased out by Ex Madhya Pradesh Govt. to Shri P.B.Punjabi for a period of 20 years in 1952. Shri P.B.Punjabi and other contractors had excavated a quantity of about 50,000 tonnes of iron ore from this area.

The total resource / reserve of iron ore in the Lohara block are proved to be the order of 1.48 million tonnes. The quality of the ore and float ore is fairly good containing over 60% Fe except in the southern portion of the ore body where the ore is spoiled considerably as a result of the granitic intrusion. In nut shell, the resource / reserve and the average grade of the ore in the Lohara block are classified as below:

	Resource / reserve, tonnes	Avg. Iron content, in %
Reef ore	1188936.0	61.81
Float ore	296864.0	59.97
Total	1485800.0	As on 28.08.1963*

- Date of completion of drilling operation.

Total Resource of Iron ore: 14,85,800.0 tonnes i.e. 1.48million tonnes, however, the DGM in their 'Summary of Mineral Block' on auction platform has mentioned Total Geological Resources as 1.48 million tonnes with Average Fe content 60%.

Summary: Updated Resource as per DGM as on 28.08.1963 (Date of completion of drilling operation)

Resource	Total, tonnes	Grade	Category
Proved Category Iron ore as on 28.8.1963	14,85,800.0	60 % Fe content	G2
Total	14,85,800.0		

Blocked resource: None

Already Excavated iron ore: 50,000 tonnes

Balance Mineable Reserve: 14,85,800.0 – 50,000 = 14,35,800 tonnes Code: 122 as on 1.4.2020. This mineable reserve has been considered for production planning.

Sampling:

After computing the analysis results of core sludge samples from all the bore holes and giving proper weightage to the volumes of the core and sludge recovered, the

average grade of iron ore in the various blocks marked for purposes of calculation of resource / reserves works out as under:

Block wise Analysis of Iron ore

		Percentages				
		Fe	SiO_2	Al_2O_3	TiO_2	P
From analyses data of bore hole samples	Block I (B.H.Nos. 4,6,9	62.21	4.46	3.55	0.082	0.049
	Block II (B.H.Nos. 1,2	60.98	8.10	2.17	0.129	0.018
	Block III (B.H.No. 3	62.26	6.006	2.81	0.50	0.053
From analyses data of surface float ore samples	Block IV Block V Block VI	59.97	7.31	1.77	Traces	0.02
From analyses data of surface channel samples	Block VII	44.11	34.90	0.73	Traces	0.021

Chemical analysis of Iron ore by preferred bidder

One sample of iron ore was collected by the preferred bidder and got analysed through the chemical lab of DGM in Aug. 2019, the results of which are as below. Copy of analysis report is enclosed as Annexure 10

Constituent

Fe_2O_3 : 95.42 %

SiO_2 : 0.50%

Al_2O_3 : 0.95%

TiO_2 : 0.05%

P_2O_3 : 619 ppm

The analytical results are given in Annexure 8.

Bulk Density: For calculation of tonnages of resource / reserve, no bulk density has been considered by the DGM. Instead, conversion factor, i.e. 0.2123m^3 equal to one tonne for all types of ores except spoiled ore and for spoiled ore 0.4246m^3 equal to one tonne has been considered. The same conversion factor has been considered for this mining plan too.

2) Cut off Parameters:

The average Fe content in ore is 60% i.e. above the threshold value limit of 45% Fe content. Other contents of deleterious elements in iron ore are within acceptable level. As on date iron ore containing Fe above 60% is saleable/ useable. The ore containing Fe between 60 to 45% will be blended with high grade ore and used in their captive plant or sold in open market..The ore containing below 45% Fe will form part of reject and will be stacked separately. The sorting of ore will be done as per grade, thus, cut off parameters considered here is threshold value limit i.e. 45% .

3) Mining Factors or assumptions:

The shape, size & content of Fe in ore body and float ore is amenable to opencast mode of operation where in-situ recovery of ore is 100% and less gestation period. Ore to SB/IB 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 iron ore saleable or for captive use. Hence, no metallurgical test work was undertaken or metallurgical recovery factors applied. No bulk sample or pilot scale test was done.

While excavating iron ore from elevated hill, the whole ROM will be excavated and loaded into tipper brought to in-pit crusher & screening site and sized. Useable iron ore together with waste will be brought to surface at respective stack yards.

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

4.0 Cost and Revenue Factors:

The preferred bidder, considering the high cost of production due to 90.2% premium, it is not economical to sell the iron ore produced in open market but has to be utilized it for value added product i.e. steel making, in their captive plant as it will be little cheaper than purchasing from open market. The prefeasibility, therefore, is prepared considering that entire iron ore produced will be for a captive use and thus cost and revenue factors are calculated below:

S. No.	Details of activity	Cost in Rs Lac
	Project Cost	
	A. Fixed Cost	
1	Mines workshop	5.0
2	Mine office, furniture	2.0
3	Mines Rest Room	4.0
4	Mine's other structures Like first Aid room & amenities as per Mines Rule	4.0
	Sub Total	**15.0**
	B. Mining Machineries	**Rs/ tonne**
5	Mining Machineries (Production on the basis of tonnage to be out sourced)	0.00
6	In pit screening cum crusher (on contract)	0.00
7	**C. Pre production expenditure:** Upfront payment, Performance security payment, bidding expenditure, expenditure on obtaining various permits such as EC, Mining Plan etc. in Rs lac	950.0
8	**D. Total Project Cost in Rs lac**	965.0
9	**E. Means of Finance**	
10	Promoters Contribution in Rs lac	965.0
11	Term loan from Banks in Rs lac	0.00

	Total in Rs lac	**965.0**

	F .Production Cost in Rs/ tonne	**Rs/ tonne**
1	Exploration (32BHs x 40m each D x Rs 3000/-m)/ 14,85,800 tonne, reserve = Rs 2.58 / tonne	2.58
2	Mining on contract basis	550.0
3	Crushing & screening	20.0
4	Over head cost	10.0
5	Interest	0.00
6	Royalty 15% of sale price (ASP Rs 3087/- per tonne in Jun 2020 for 62 to 65% Fe)	463.05
7	Payment to DMF 10% of royalty	46.30
8	Payment to NMET 2% of royalty	9.26
9	Payment to Govt. premium 90.2% of Rs 3087/-	2784.47
10	Taxes i.e. GST 5%	154.35
11	Dead Rent	0.0
12	Others (specify), EC monitoring, Statutory Clearances, donation to Gram Panchayat, CSR etc approximate	10.0
13	Ore transportation cost from Loharadongri to Bhandara plant site	600.0
	Sub Total	**4650.01**
	G. Reserves	
1	Mineable reserves, Iron ore, tonnes	14,85,800.0
2	Life of deposit, Years	15
3	ROM production in plan period, tonnes	5,36,717.0
4	Avg. Production of ROM per year in plan period, tonnes	1,07,343.40
5	Iron ore available per year for value addition in plan period, tonnes 95% of ROM	1,01,976.23

6	Value addition, conversion to crude steel, Sale price of crude steel Rs per tones as per preferred bidder.	20,200.0
7	Quantity of Value added production i.e. crude steel, tentative recovery 73% by BF route of 101976.23 in tonnes. (1370 kg iron ore for one tonne production of crude steel).	74442.65
	H. Calculation of Profitability	
1	Avg. Annual ROM production, tonnes	1,07,343.40
2	Production cost of iron ore per tonne in Rs	4650.01
3	Production cost of crude steel including other inputs per tonne in Rs	10349.99
4	Total production cost of crude steel including cost of iron ore per tonne in Rs	15,000.0
5	Life time of mineral deposit, years	15
6	Investment in Rs Lac	965.0
7	Minimum rate of return per year in decimal	0.1
8	Average annual operating cost of crude steel in Rs Lac (Rs15000 x 74442.65 t)	11166.39
9	Annual saleable crude steel in tonnes	74442.65
10	Average sale price per tonne in Rs	20200.0
11	Average annual sales of steel in Rs lac	15037.41
12	Profit before tax: 15037.41 – 11166.39 in Rs lac	3871.02
13	Income tax at 25%, 3871.02 x 0.25: Rs lac	967.75
14	Profit after tax: 3871.02 – 967.75 in Rs lac	2903.27
15	Interest rate on borrowed capital in%	0
16	Borrowed capital in Rs Lac	0
17	Capital recovery factor Wn at 10% 15n = $R^n(R-1)/R^n-1$	0.1315
18	Provision for recovery of tied up capital per year = 965 x 0.1315 in Rs Lac	126.89
19	Yearly Profit after provision for capital recovery in Rs Lac (2903.27 – 126.89)	2776.38
20	Linear depreciation on fixed capital : 15/15 in Rs Lac	1.00

21	Profit after depreciation: 2776.38 – 1.0 in Rs Lac	2775.38
22	Imputed interest on tied up capital Rs 965.0 lac at 10% interest, in Rs Lac	96.50
23	Yearly Average net profit in Rs Lac 2775.38 – 96.50	2678.88

I) Internal Rate of Return (IRR);

$$IRR = \frac{\text{Net Profit}}{\text{Investment}} = \frac{2678.88 \text{ lac}}{965.00 \text{ lac}} X100 = 277.60\%$$

J) Cash Flows: Net Profit+ depreciation= Rs 2678.88 + 1.0.lac yearly from First to fourteenth year = **Rs 2679.88 lac**.

Cash Flows in fifteenth year: Rs 2679.88 lac + 2.0 lac Rs salvage value= **Rs 2681.88 lac**

K) Calculation of Net Present Value:

Year	Cash flows in Lac Rs	Discount factor at 15%	Discounted value in Lac Rs
1	2679.88	0.870	2331.49
2	2679.88	0.756	2025.99
3	2679.88	0.658	1763.36
4	2679.88	0.572	1532.89
5	2679.88	0.497	1331.90
6	2679.88	0.432	1157.71
7	2679.88	0.376	1007.63
8	2679.88	0.327	876.32
9	2679.88	0.284	761.08
10	2679.88	0.247	661.93
11	2679.88	0.215	576.17

12	2679.88	0.187	501.14
13	2679.88	0.163	436.82
14	2679.88	0.141	377.86
15	2681.88	0.123	329.87
		Total	**15672.16**

The **Net Present Value of Iron ore deposit** works out to **Rs 15672.16 lac**

In calculation, price escalation, general inflammation and technical changes affecting the profitability have not been taken in to account.

Sensitivity Analysis: As per the DGM's report, it is basically a high grade deposit. The DGM in their report stated average Fe content of 60%. There are also analysis results that show above 60% Fe content. This finding is based on the data generated by the core bore hole drilling. In such event, the proponent is optimistic to get iron ore about 64% during the course of mining. This grade of ore may not be hundred percent but at least seventy percent is likely to get. Because of higher premium to Govt, the production cost is higher than sell price & not profitable to sell it in open market but only to use as captive source for value addition.

6) Market Assessment:

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

There are few small iron ore mine owners and a many large scale producers in the country. These large scale producers are the competitors but demand pattern does not affect the selling of ore. However, this iron ore has to be used as captive source for value addition due to high premium to be paid to Govt. Selling in open market is uneconomical.

7) Other Modifying Factors:

Iron ore will be mined by the opencast mode of operation by slashing elevated hill for a 30metre height. There will be no formation of pit below ground level. Natural risk in mining is reduced compared to underground mining. The site is well connected to state roadways and railhead is just at a distance 4km. 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 iron ore, consuming toxic chemicals is required within the iron ore block under grant of lease. Legal hurdles may not come in way as mining activities will start after obtaining all legal permits. No social problems are likely to face as the core zone is a Govt forest land. No hurdles either from public or Govt. are likely to put in operating the mine as preferred bidder will not violate the rule as the lease will be executed after completing all formalities. There is a high production cost due to premium to be paid to Govt and uneconomical to sell in open market. It has to be used as captive source.

The DGM has proved the deposit by core bore holes with a high confidence level on occurrence of iron ore. Analysis of core established the high quality of iron ore. Resources are estimated with standard method. The procedure used for estimation of reserves may not jeopardise the availability of mineable reserve affecting the viability of mining.

8 Classifications:

Mineral reserves are estimated with the maximum depth of 44.19m 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 iron ore is acceptable to consuming industry. Besides, preferred bidder is going for value added product. 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. The UNFC code for the deposit is 122.

Place: Nagpur

Date: 29.08.2020

(M.S. Waghmare)
Qualified Person

xxxxx