Lessee Copy

GUALI IRON ORE BLOCK

Over an area of 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR)
in Village Guali, Panduliposi etc under Barbil Tahasil of Keonjhar district of Odisha

MINING PLAN

(For the period from 2020-21 to 2024-25)
Under Rule 16 (1) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rule, 2016

PROGRESSIVE MINE CLOSURE PLAN

Under Rule 23 of Mineral Conservation and Development Rules, 2017

Lessee Details	Odisha Mining Corporation Limited OMC House, Bhubaneswar - 751001, District: Khurda, State: Odisha E-mail: info@orissamining.com Tel: 0674-2377400 & 2377401, Fax No: (0674) 2530145/020
ML Area	Lease Area: 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR) Govt Land: 88.434 Ha Forest Land: 229.524 Ha Pvt. Land: 40.3 Ha
Category of Mine: Fully Mechanised (FM)	Date of Execution of the ML: 12.01.2021 Date of Expiry of the ML: 11.01.2031 Lease Period: 10 Years

Registration no under Rule 45 of MCDR 2017: IBM/4269/2011
Mine Code No: 30ORI08126

TEXT

Prepared by Qualified Persons

Sri Pradip Kumar Sahoo, B. Tech in Mining Engineering
Sri Subrat Kumar Behera, M. Sc & M. Phil in Geology

OMC   ODISHA NEW OPPORTUNITIES

Odisha Mining Corporation Limited
OMC House, Bhubaneswar - 751001,
District: Khurda, State: Odisha

भारत सरकार GOVERNMENT OF INDIA
खान मंत्रालय MINISTRY OF MINES
भारतीय खान ब्यूरो INDIAN BUREAU OF MINES
क्षेत्रीय खान नियंत्रक के कार्यालय
OFFICE OF THE REGIONAL CONTROLLER OF MINES

BY REGD PARCEL
Phone 0674-2552453
Tele Fax 0674-2552490
Email-ro.bhubaneswar@ibm.gov.in
Plot No.149, Pokhariput
BHUBANESWAR-751020

No. MP/A/38-ORI/BHU/2020-21/2916 Date: 19.03.2021

सेवामे

The Managing Director & Nominated Owner,
M/s Odisha Mining Corporation Ltd,
OMC House, Bhubaneswar -751001

विषय: Approval of Mining Plan of Guali Iron Ore Mine along with Progressive Mine Closure Plan (PMCP), over an area of 358.258 ha (As per DGPS)/ 365.026 ha (As per RoR) in Keonjhar district of Odisha State, submitted by M/s Odisha Mining Corporation Ltd under Rule 16 of Mineral Concession Rules, 2016.

संदर्भ:- i) Your letter No. 3121/OMC/PMC/2021 dated 25.02.2021.
ii) This office letter of even no. dated 26.02.2021.
iii) This office letter of even no. dated 26.02.2021 addressed to the Director of Mines, Govt. of Odisha, copy endorsed to you.
iv) This office letter of even no. dated 04.03.2021.
v) Your letter No. 3705/OMC/PMC/2021 dated 10.03.2021.

महोदय,

In exercise of the power delegated to me vide Gazette Notification No. S.O. 1857(E) dated 18.05.2016, I hereby **Approve** the Mining Plan including Progressive Mine Closure Plan of Guali Iron Ore Mine over an area of 358.258 ha (As per DGPS)/ 365.026 ha (As per RoR) of M/s Odisha Mining Corporation Ltd in Keonjhar district of Odisha State submitted under Rule 16 of Mineral Concession Rules, 2016. This approval is subject to the following conditions:

I. The Mining Plan is approved without prejudice to any other law applicable to the mine area from time to time whether made by the Central Government, State Government or any other authority and without prejudice to any order or direction from any court of competent jurisdiction.
II. The proposals shown on the plates and/or given in the document is based on the lease map /sketch submitted by the applicant/ lessee and is applicable from the date of approval.
III. It is clarified that the approval of aforesaid Mining Plan does not in any way imply the approval of the Government in terms of any other provision of Mines & Minerals (Development & Regulation) Act, 1957, or the Mineral Concession Rules, 2016 and any other laws including Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 or the rules made there under, Mines Act, 1952 and Rule & Regulations made there under.
IV. Indian Bureau of Mines has not undertaken verification of the mining lease boundary on the ground and does not undertake any responsibility regarding

correctness of the boundaries of the leasehold shown on the ground with reference to lease map & other plans furnished by the applicant / lessee.

V. At any stage, if it is observed that the information furnished, data incorporated in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.

VI. If this approval conflicts with any other law or court order/ Direction under any statute, it shall be revoked immediately.

VII. The Mining Plan has been processed based on Geological Report without field verification. Deficiencies/ discrepancies observed if any during the inspection will be communicated which should be incorporated in the Mining Plan by way of modification.

भवदीय / yours faithfully,

Encl: - One copy of
of Mining Plan

(HARKESH MEENA)
क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

Copy for kind information to:-

1. The Director of Mines, Directorate of Mines, Government of Odisha, Heads of the Department Building, Bhubaneswar– 751001, Odisha along with one copy of Mining Plan by **REGISTERED PARCEL**.
2. Shri Pradip Kumar Sahoo, M/s Odisha Mining Corporation Ltd, OMC House, Bhubaneswar -751001.

(HARKESH MEENA)
क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

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3	Lease Plan	Plate no - 2A	1 : 3960
4	Surface Plan	Plate No - 3	1 : 2000
5	Geological Plan	Plate No - 4	1 : 2000
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LIST OF ANNEXURES

OMC | ODISHA NEW OPPORTUNITIES

CONSENT LETTER / UNDERTAKING / CERTIFICATE FROM THE LESSEE

1. The Mining Plan in respect of **Guali Iron Ore Block** of Odisha Mining Corporation Limited over an area of 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR) in Village Guali, Panduliposi etc under Barbil Tahasil of Keonjhar district of Odisha state submitted under Rule 16(1) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rule, 2016 has been prepared by following Qualified Persons namely **Sri Pradip Kumar Sahoo, Manager (Mining) & Sri Subrat Kumar Behera, Manager (Geology) of OMC Ltd** Jointly.

   This is to request the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar, to make any further correspondence regarding any correction of the Mining Plan with the said qualified person at their addresses below.

Sri Pradip Kumar Sahoo Manager (Mining), OMC House, Post Box No 34, Bhubaneswar, Odisha - 751001 Phone: (0674), 2399950 Fax: (0674) 2391629, 2396889, Email: pksahoo2@odishamining.in	Sri Subrat Kumar Behera Manager (Geology), OMC House, Post Box No 34, Bhubaneswar, Odisha - 751001 Phone: (0674), 2399950 Fax: (0674) 2391629, 2396889, Email: skbehera@odishamining.in

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

2. It is certified that the **CCOM's Circular no. 2/2010** will be implemented and complied with when an authorized agency is approved by the State Government.

3. It is certified that the Progressive Mine Closure Plan prepared under Rule 23 of MCDR, 2017 of Guali Iron Ore Block of Odisha Mining Corporation Ltd over an area of 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR) complies with all statutory rules, regulations, orders made by the Central or State Government, statutory organization, court etc. which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.
   The information furnished in the **Progressive Mine Closure Plan** is true and correct to the best of our knowledge and records.

4. The provisions of **Mines Act, Rules and Regulations** made there under have been observed in the Mining Plan of Guali Iron Ore Block over an area of 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR) in Village Guali, Panduliposi etc under Barbil Tahasil of Keonjhar district of Odisha state belonging to Odisha Mining Corporation Limited and where specific permissions are required, the applicant will approach the **DGMS**. Further, standards prescribed by **DGMS** in respect of miner's **health** will be strictly implemented.

Place: Bhubaneswar
Date: 05.03.2022

Managing Director & Nominated Owner
Odisha Mining Corporation Limited
OMC House, Bhubaneswar

CERTIFICATE FROM THE QUALIFIED PERSONS

The provisions of the Mineral Conservation and Development Rules, 2017 have been observed in the preparation of the Mining Plan for Guali Iron Ore Block over an area of 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR) of Odisha Mining Corporation Limited in village Guali, Panduliposi etc under Barbil Tahasil of Keonjhar district of Odisha state and whenever specific permissions are required, the applicant will approach the concerned authorities of Indian Bureau of Mines.

The information furnished in the Mining Plan is true and correct to the best of our knowledge.

Pradip Kumar Sahoo
Qualified Person

Subrat Kumar Behera
Qualified Person

Place: Bhubaneswar
Date: 09.03.2021

INTRODUCTORY NOTE

Odisha Mining Corporation is a Gold category state PSU, Govt of Odisha and one of the fastest growing mining companies in India. The major minerals mined by OMC are chrome, manganese & bauxite ore which cater to the requirement of mineral based industries such as steel, sponge iron, pig iron, ferro-manganese, ferro-chrome, aluminum etc. both in India as well as overseas. To a large extend, OMC provides the ore and fulfills the commitment of the State Government.

Pursuance to the order No. F.No. 4/1/2020-M.VI dated 05.01.2021 issued by the Central Government, the Guali Iron Ore Block in Keonjhar district of Odisha state has been reserved in favour of Odisha Mining Corporation Limited for a period of 10 years vide notification No. 283/SM dated 11.01.2021. Refer Annexure 6 & 7.

Letter of Intent vide letter No. 312/SM dated 11.01.2021 for grant of mining lease for a period of 10 years has been issued to Odisha Mining Corporation Limited by Government of Odisha. Refer Annexure 8.

अनुमोदित
APPROVED

Vide order No. 324/SM dated 11.01.2021 all the valid rights, approvals, clearances, licensees and the likes vested with the previous lessee has been transferred in favour of Odisha Mining Corporation Limited for a period of 2 years by Government of Odisha. Refer Annexure 9.

Vide order No 358/SM dated 12.01.2021, Government of Odisha granted the mining lease for iron ore in favour of Odisha Mining Corporation in respect of Guali Iron Ore Block over an area of 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR) in village Guali, Kolabada, Pandulipasi, Topodihi, Rugidihi Villages and Siddhamath Reserve Forest etc under Barbil Tahasil of Keonjhar district for a period of 10 (ten) years. Refer Annexure 10.

क्षेत्रीय खान नियंत्रक
Regional Controller of Mines
भारतीय खान ब्यूरो
पूर्वांचल/Bhubaneswar

Accordingly, the Mining Lease Deed has been executed on 12.01.2021. Refer Annexure 11.

As the block has been reserved by Central Government in exercise of power under section 17A(2) of the MMDR Act read with section 20A, there is no provision of Mine Development and Production Agreement (MDPA) made.

Pradip Ku Sahoo

Subrat Ku Behera

Guali Iron Ore Block is located in village Guali, Panduliposi, Rugudihi, Laidapada and Topadihi in Barbil Taluka of Keonjhar district of Odisha state between Latitude & Longitude 21°59'21.98" to 22°00'01.10"N; 85°17'04.19" to 85°18'57.35"E and is covered by Survey of India topo sheet No. 73 G/5 & 73F/8. Refer Key Plan at Plate No: 01.

STATUS OF CLEARANCES:

As per Section 8B of the Amended MMDR Act, 2015 and vide order No. 324/SM dated 11.01.2021 of Government of Odisha, all the valid rights, approvals, clearances, licensees and the likes vested with the previous lessee has been transferred in favour of Odisha Mining Corporation Limited for a period of 2 years from the date of execution of ML deed, i.e. 12.01.2021.

The details of existing statutory clearances are given below.

Environmental Clearance:

Environmental Clearance for the mining lease over an area of 365.026 Ha for a production capacity of 5.7 MTPA of Iron Ore has been obtained by the previous lessee vide Ministry of Environment & Forest letter J-11015/1155/2007-IA-II (M) dated 22 June 2009. Refer Annexure 13.

The lease has been executed on 12.01.2021, which forms the first year of the plan period i.e. 2020-21 during which a production of 0.479 Million Tonnes has been considered. For the second year of the plan period i.e. 2021-22 an existing EC capacity of 5.7 MTPA has been proposed. From third year onwards a production capacity of 30 MTPA has been proposed for the balance three years of the plan period i.e. 2022-23, 2023-24 and 2024-25. Hence revised Environmental clearance for the expanded quantity will be applied. Similarly lessee shall obtain requisite statutory clearances from different statutory authorities and also shall execute an amendment to the lease deed as per provision in para 2.4 of executed lease deed.

Forest Clearance:

The entire ML area over 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR) comprises of 229.524 Ha of forest land, 88.434 Ha of Govt. land and 40.3 ha of Pvt. Land. Refer Land Schedule in Annexure 14.

Ministry of Forests & Environment, Govt. of India, New Delhi vide their letter No F.No-8-96/96-FC dated 14th January 2005 have accorded approval for diversion of 42.417 Ha of forest land. Refer Annexure 15.

Pradip Ku Sahoo

Subrat Ku Behera

MoEF, New Delhi vide letter No F.No-8-96/96-FC (Pt) dated 6th September 2011 have accorded approval for diversion of 95.00 Ha of forest land in addition to the earlier approved diversion of 42.417 Ha of forest land. Refer Annexure 15.

Thus the total diverted forest area at present is 137.417 Ha.

Consents from SPCB:

Consent for discharge of sewage and trade effluent under section 25/26 of the water (PCP) Act 1974 and for operation of the existing plant under Section 21 of Air (PCP) Act 1981 have been received from State Pollution Control Board, Odisha vide consent order No. 1806 dt. 06.03.2018. Refer Annexure 16.

Sl No	Details	Description
	Product	
1	Production of Iron Ore	5.7 MTPA
	Details of Mineral Handling Plants/Units	
1	Operation of stationary crusher plant of capacity	1 x 175 TPH
2	Operation of stationary crusher plant of capacity	1 x 200 TPH
3	Operation of stationary crusher plant of capacity	2 x 400 TPH
4	Operation of mobile crusher plant of capacity	1 x 150 TPH
5	Operation of mobile screen plant of capacity	1 x 150 TPH
6	Operation of mobile screen plant of capacity	5 x 250 TPH
7	Operation of stationary screen plant of capacity	1 x 1500 TPH

Surface Right:

Surface over an area of 286.089 Ha area has been obtained from the district authorities in two phases for carrying out various mining activities. Refer Annexure 17.

Concerned Authority issuing Surface Right	Letter No & Date	Area over which SR is Granted
Dy. Director of Mines, Joda	18518/ Mines dated 04.03.2008	260.715 Ha
Collector, Keonjhar	7369/Mines dated 26.06.2008	25.374 Ha
	Total	286.089 Ha

Pradip Ku Sahoo

Subrat Ku Behera

Mining Plan along with Progressive Mine Closure Plan

The Mining Plan along with Progressive Mine Closure Plan being submitted is a fresh Mining Plan proposal after reservation, allocation and execution of the mining lease deed in favour of Odisha Mining Corporation Ltd. Hence the details of earlier approved Mining plan and review of Mining plan is not applicable in this case.

As part of the statutory clearance, this Mining Plan and Progressive Mine Closure Plan is being submitted under Rule 16(1) of MCR, 2016 and Rule 23 of MCDR, 2017 respectively for a period from 2020-21 to 2024-25. This mining plan is prepared based on the Geological report provided by the State Government.

Justification for proposed enhanced production of 30 MTPA

Consequent to sub-section (6) of Section 8A of the Mines & Mineral (Development and Regulation) Act, 1957 as amended in 2015, the lease period of many operating non-captive iron ore mines in the state of Odisha expired on 31st March, 2020. Non-operationalisation of these mines resulted in decline of production and dispatch of iron ore. This leads to spike in iron ore price in the market. To meet the exigencies of the situation, stabilize the production levels and to ensure supply of iron ore, Central and State Government companies were roped in to facilitate production from such auctioned mines which are not in operation. Hence, to ensure the availability of iron ore in the state, production rate of 30MTPA has been proposed from Guali Iron Ore block.

Pradip Ku Sahoo

Subrat Ku Behera

1.0 GENERAL

a. Name of applicant/ lessee/ Rule 45 registration No.	Shri Balwant Singh, IAS, Managing Director & Nominated Owner Odisha Mining Corporation Limited, Bhubaneswar, Odisha A list of Board of Directors is enclosed as Annexure 1. A copy of the relevant extract from the minutes of the 439th meeting approved by Board regarding appointment of Nominated Owner of the mine is enclosed as Annexure 2. A copy of photo id & address proof of the nominated owner of the mine is enclosed as Annexure 3.
Registration No. of OMC Ltd. under Rule 45	IBM/4269/2011
Address	OMC House, Post Box No. 34 Bhubaneswar - 751001
District	Khurda
State	Odisha
Pin Code	751001
Phone	0674-2393431, 2395689, 2393389
Fax	0674-2391629, 2396889, 2394772
Gram	-
Telex	-
e-mail	info@orissamining.com; planningcellomc@gmail.com
b) Status of the applicant	
Private individual	No
Cooperative Association	No
Private Company	No
Public Company	No
Public Sector Undertaking	Yes
Joint Sector Undertaking	No
Other (pl. specify)	Not Applicable
Certificate of incorporation is enclosed as Annexure 4.	
c) Mineral(s) which is / are include in	Not applicable

Pradip Ku Sahoo

Subrat Ku Behera

the prospecting license (For fresh grant)		
d) Mineral(s) which is / are include in the lease deed	Iron ore	
e) Mineral(s) which the applicant /lessee intends to mine	Iron ore	
f) Name of Qualified Person under rule 15(1) of MCR, 2016 preparing Mining Plan:		
Name of the Qualified Person preparing the Mining Plan	Pradip Ku. Sahoo, Manager (Mining)	Subrat Ku. Behera Manager (Geology)
	Copy of the proof of qualification & experience of qualified persons satisfying the requirements under rule 15(1) of MCR 2016 who have prepared this document are enclosed as Annexure 5.	
Address	Pradip Ku. Sahoo, Manager (Mining) OMC House, P. B. No. 34, Bhubaneswar, Odisha – 751001	Subrat Ku. Behera, Manager (Geology) OMC House, P. B. No. 34, Bhubaneswar, Odisha – 751001
Phone	0674- 2399937, 2399936	
Fax	0674-2391629, 2396889, 2394772	
e-mail	info@orissamining.com; planningcellomc@gmail.com	
Telex	-	
Registration No.	NA	
Date of grant / renewal	NA	
Valid up to	NA	

Pradip Ku Sahoo

Subrat Ku Behera

2.0 LOCATION AND ACCESSIBILITY

a) Lease Details (Existing Mine).

Name of Mine: Guali Iron Ore Block (358.258 Ha as per DGPS)/ 365.026 Ha as per RoR)

Guali Iron Ore Block of Odisha Mining Corporation Limited (OMC Ltd.) is locat between Latitude & Longitude 21°59'21.98" to 22°00'01.10"N; 85°17'04.19" 85°18'57.35"E and is covered by survey of India new topo-sheet no. F45H8 (73F and F45N5 (73G5).

Co-ordinates of ML boundary pillars (DGPS readings) are given below.

Lat/long of any boundary point.

DGPS SURVEYED ML PILLAR CO-ORDINATES

Sl. No	Pillar Id	Latitude	Longitude	Easting	Northing
1	LP1	21°59'21.99060"	85°17'04.22179"	322892.9880	2432651.2940
2	LP2	21°59'22.16804"	85°17'14.57122"	323189.9110	2432653.4250
3	LP3	21°59'22.17927"	85°17'22.29641"	323411.5030	2432651.2910
4	LP4	21°59'22.19323"	85°17'26.64877"	323536.3500	2432650.3250
5	LP5	21°59'22.33830"	85°17'30.25241"	323639.7660	2432653.6320
6	LP6	21°59'22.23378"	85°17'34.25693"	323754.5950	2432649.1350
7	LP7	21°59'22.50160"	85°17'43.91174"	324031.6230	2432654.2840
8	LP8	21°59'22.54043"	85°17'49.92594"	324204.1460	2432653.5570
9	LP9	21°59'22.52341"	85°17'52.03584"	324264.6600	2432652.3600
10	LP10	21°59'22.59005"	85°17'55.65783"	324368.5750	2432653.2540
11	LP11	21°59'22.58084"	85°18'02.37831"	324561.3400	2432650.8280
12	LP12	21°59'23.02402"	85°18'10.00752"	324780.3250	2432662.0290
13	LP13	21°59'23.40309"	85°18'21.66267"	325114.7660	2432669.9820
14	LP14	21°59'23.48655"	85°18'29.83050"	325349.0770	2432669.9560
15	LP15	21°59'23.70566"	85°18'32.58638"	325428.2000	2432675.8210
16	LP16	21°59'23.85836"	85°18'36.76816"	325548.2000	2432679.1920
17	LP17	21°59'23.92954"	85°18'42.98574"	325726.5660	2432679.4120
18	LP18	21°59'24.29008"	85°18'51.87569"	325981.6830	2432687.6890
19	LP19	21°59'34.97425"	85°18'58.12472"	326164.5440	2433014.3140
20	LP20	21°59'39.01743"	85°18'59.14042"	326195.0460	2433138.3440
21	LP21	21°59'46.76827"	85°18'57.54019"	326151.7720	2433377.2320

Pradip Ku Sahoo

Subrat Kr Behera

22	LP22	21°59'52.80178"	85°18'57.27019"	326146.1020	2433565.6590
23	LP23	21°59'57.19220"	85°18'56.87957"	326136.3550	2433698.0000
24	LP24	22°00'00.98397"	85°18'57.49257"	326155.7210	2433814.4610
25	LP25	22°00'00.77417"	85°18'51.88419"	325994.2940	2433809.7810
26	LP26	22°00'00.30711"	85°18'44.60218"	325785.2770	2433797.7200
27	LP27	21°59'59.94508"	85°18'37.41147"	325578.9140	2433788.8630
28	LP28	21°59'59.71044"	85°18'30.29256"	325374.6530	2433783.9040
29	LP29	21°59'59.57737"	85°18'21.03198"	325109.0000	2433782.7520
30	LP30	21°59'59.19329"	85°18'12.15925"	324854.3850	2433773.7610
31	LP31	21°59'59.15776"	85°18'09.54936"	324779.5170	2433773.4990
32	LP32	21°59'59.01169"	85°18'05.03950"	324650.1170	2433770.4430
33	LP33	21°59'58.89122"	85°18'00.59279"	324522.5370	2433768.1550
34	LP34	21°59'58.78787"	85°17'56.62184"	324408.6080	2433766.2430
35	LP35	21°59'58.69747"	85°17'51.86674"	324257.8520	2433765.1400
36	LP36	21°59'58.68767"	85°17'45.45037"	324088.1570	2433766.7290
37	LP37	21°59'58.73776"	85°17'40.65103"	323950.5210	2433769.8040
38	LP38	21°59'58.82366"	85°17'35.22390"	323794.8910	2433774.1830
39	LP39	21°59'58.89133"	85°17'31.33132"	323683.2680	2433777.5110
40	LP40	21°59'58.99961"	85°17'26.88555"	323555.7930	2433782.2660
41	LP41	21°59'59.14680"	85°17'21.86851"	323411.9460	2433788.4050
42	LP42	21°59'59.26848"	85°17'18.80382"	323324.0870	2433793.1280
43	LP43	21°59'59.43751"	85°17'11.37222"	323110.9940	2433800.7140
44	LP44	21°59'57.19400"	85°17'10.61447"	323088.4870	2433731.9560
45	LP45	21°59'51.42433"	85°17'08.54168"	323027.0460	2433555.1700
46	LP46	21°59'41.54871"	85°17'05.03679"	322923.1110	2433252.5620
47	LP47	21°59'34.18478"	85°17'02.37474"	322844.2150	2433026.9330
48	LP48	21°59'27.21098"	85°17'02.50016"	322845.4060	2432812.4060
49	LP49	21°59'23.34811"	85°17'03.74172"	322879.6860	2432693.2000

Pradip Ku Sahoo
Qualified Person

Subrat Ku Behera
Qualified Person

Date of grant of lease	12.01.2021
Period/Expiry Date	11.01.2031
Name of lease holder	Odisha Mining Corporation Limited
Postal Address	OMC House, Post Box No. 34 Bhubaneswar – 751001, Odisha
Tel.	0674-2393431, 2395689, 2393389
Fax	0674-2391629, 2396889, 2394772
e-mail	info@orissamining.com; planningcellomc@gmail.com

b) Details of applied / lease area with location map (fresh area/mine)

Government Land	88.434 Ha
Forest Land	229.524 ha
Private Land	40.3 ha
Total	358.258 Ha

Total lease area / applied area	358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR)
District & State	District: Keonjhar, State: Odisha
Taluka	Barbil
Post	Joda
Village	Guali, Loldapada, Pandulliposi, Topodihi, Rugidihi Villages and Siddhamath Reserve Forest
Whether the area falls under Coastal Regulation Zone (CRZ)? If yes, details thereof	No

Authenticated DGPS Lease Plan of Guali Iron Ore Block is shown in Plate No 2.

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

The approaches to the mine are as follows.

Rail	:	The nearest railway station is Barbil (both Passenger and goods train).
Road	:	Guali Iron Ore Block is located in Guali, Loldapada, Pandulipposi, Topodihi, Rugidihi Villages and Siddhamath Reserve Forest in Keonjhar district of Odisha state. The mining lease area is approachable from Barbil town covering a distance of 20 km by Barbil Rourkela NH - 215. Also the area can be approachable from Koira which is on NH - 215 at a distance of 13 km. Also the lease is connected by road from Panikoili-Barbil-Koira-Rajamunda NH-215. District Head Quarters is at Keonjhar and is approx. 80 km from lease area.
Air strips	:	Bhubaneswar (Odisha) at a distance of 280 km.

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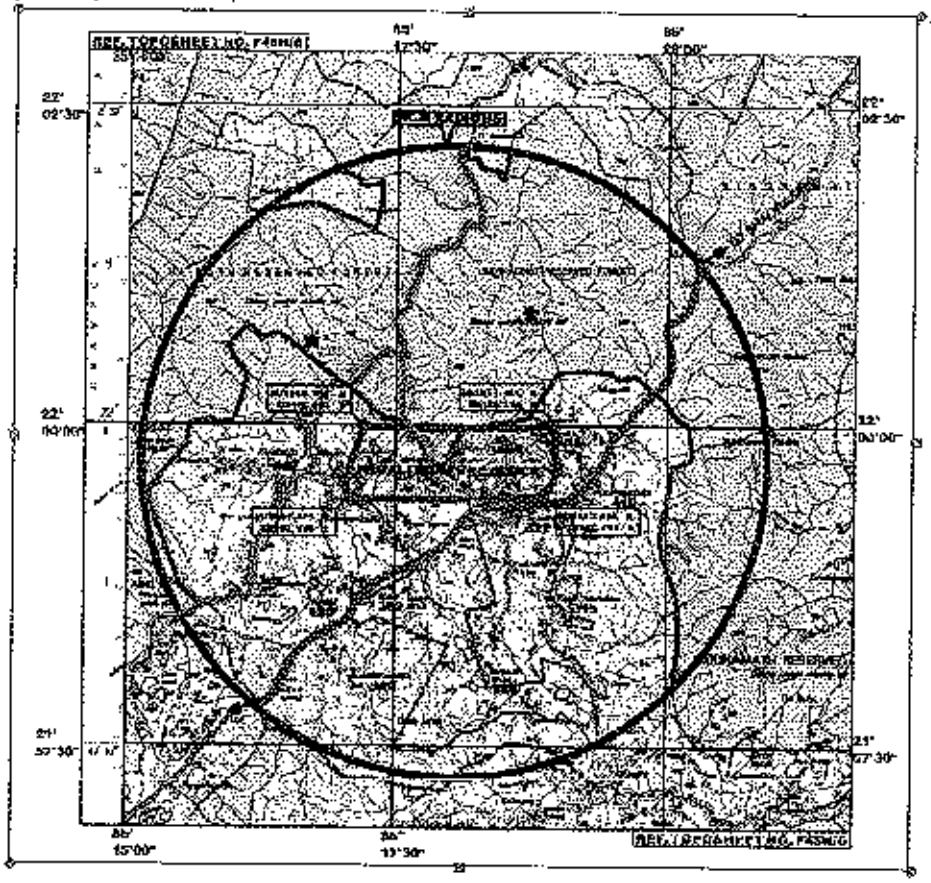
Topo-sheet No. with latitude & longitude of all corner boundary point/ pillar:
Guali Iron ore Block of Odisha Mining Corporation Limited is located between Latitude & Longitude $21^{0}59'21.98"$ to $22^{0}00'01.10"N$; $85^{0}17'04.19"$ to $85^{0}18'57.5$ [illegible] is covered by survey of India new topo-sheet no: F45H8 (73F8) and F45N5 (73G5).

Details of the DGPS reading of boundary pillar co-ordinates has been given at para 2.0 (a) above.

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:**

General location map of lease area showing access routes is given below. The same has been shown in the Key Plan (Plate No: 1).



General location map

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Qualified Person

Subrat Ku Behera
Qualified Person

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

3.1 Date and reference of earlier approved MP/ SOM:

The Mining Plan being submitted is a fresh Mining Plan. Hence the details of earlier approved Mining Plan and review of Mining Plan is not applicable in this case.

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. As part of the statutory clearance, this Mining Plan and Progressive Mine Closure Plan is being submitted under Rule 16(1) of MCR, 2016 and Rule 23 of MCDR, 2017 respectively for a period from 2020-21 to 2024-25.

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

As part of the statutory clearance, this Mining Plan and Progressive Mine Closure Plan is being submitted under Rule 16(1) of MCR, 2016 and Rule 23 of MCDR, 2017 respectively for a period from 2020-21 to 2024-25. Hence, review in respect of exploration, excavation, reclamation etc. is not applicable.

3.4 Give status of compliance of violations pointed out by IBM

Not applicable.

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/RMP is submitted under rule 17(3) of the MCR' 2016 for approval of modification, specify reason and justification for modification under these rules:

Not applicable.

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PART – A

1.0 GEOLOGY AND EXPLORATION

a) Briefly describe the topography, drainage pattern, vegetation, climate, and rainfall data of the area applied/mining lease area.

i. Topography & Drainage:

The lease area is having four moderately sloping hillocks. Middle portion is almost flat. Highest elevation is at 620 mRL whereas the lowest elevation shows 500 mRL. Wide range of rock types discerns the iron ore.

One seasonal nala namely Topadih nala fall within the lease area and controls the drainage system of the area. Karo river and Suna Nadi flow at a distance of 1.1 and 5.5 Kms from the lease area.

ii. Vegetation

The prevailing vegetative cover over the area is mainly of tropical dry deciduous forest. The tree types in core zone is dominated by Shorea robusta, Terminlia belerica, Terminalia tomentosa, Adina cordifolia, Anogeissus latifolia, Madhuca latifolia, Lagerstroernia flosreginae and Holarrhena antidysenterica. It has been observed that the relative frequency of Shorea robusta is maximum at 15% while that of Bambusa a rundinacea is minimum at 1%.

iii. Climate & Rainfall of the Lease Area

Climate and meteorology of a place play an important role in the implementation of any developmental project. Meteorology (weather climate) is also the key to understanding local air quality as there is essential relationship between meteorology and atmospheric dispersion involving the wind in the broadest sense of them.

The meteorological data has been obtained from the EIA/EMP report prepared for the project based on which the Environment Clearance has been granted for project by MoEF, Govt of India.

a. Temperature:

The climate of the study area is characterized by an oppressively hot summer with high humidity. Summer generally commences in the month of March. Temperature begins to rise rapidly attaining the maximum in the month of May. During the summer maximum temperature can go up to 47.4^{0}C. The weather becomes pleasant with onset of monsoon in June and remains as such up to the end of October. The temperature in the month of December is lowest i.e. 7^{0}C.

b. Relative Humidity

The air is dry except during the South – West monsoon season. The maximum humidity ranges from 55% to 76% with annual average of 64.83% while the minimum humidity ranges from 26% to 43% with an annual average of 34%.

c. Rainfall Data

From the table it is seen that maximum rainfall occurs during the month of June, July, August and September. Maximum monthly rainfall of 677.5 mm was observed during September 2011. Annual rainfall data is given below.

Annual Rainfall Data (Keonjhar District)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2006	0	0	19	50.1	179.9	199.3	287.1	568.2	247	67.4	56	0	1648
2007	2	94.1	20.6	32.8	110.4	242.9	404.6	355.9	316.5	28.5	77.3	0	1685.6
2008	62.5	21.9	12.7	35.2	98.2	605.1	175.6	193.8	429.1	4.6	15	0	1643.7
2009	0	0	2.8	0.5	133.1	103.5	386	333.4	195.2	123.2	26.8	0	1304.5
2010	1.3	1 3	71	0.4	122.1	114.4	289.2	233.1	238.3	125.2	28.6	19.5	1254.1
2011	0	32.8	31.3	121.2	117.6	359.9	157.5	318.7	677.5	55.1	0	0	1871.6
2012	54.7	7.8	0	46.9	9.5	269.7	225	283.6	212.7	66.3	0	0	1135.6
2013	7.5	49.5	88	87	130	9.5	230.5	385.03	309.5	76	8.5	0	1381.03
2014	4.5	97	24.5	8.5	26	86.5	308	318	191.5	137.5	0	0	1202
2015	8.5	29	4	26	48.5	157.5	436.1	200.5	136	64.5	0	0	1105.6
2016	1.5	92	38.5	2	70	116	608.1	357	269.9	76	8.5	1	1596.1
2017	0.5	23.5	42	16.5	13	362	590.5	364	309.5	123	14	0	1838.5
2018	0	0	6.5	38.5	37	129	133.5	85	287	76	3.5	3	797
Average	14.07	33.68	26.22	35.76	80.40	203.86	325.5	307.40	293.77	78.7	16.78	2.42	1418.7

Average month-wise Predominant wind directions are as below.

Sl No	Month	Direction	Prominent wind Direction
1	January	North-East > South -West	Predominant Wind Direction is South South-West to North North-East
2	February	South South-West > North North-East	
3	March	South South-West > North-East	
4	April	South > North	
5	May	South South-West > North North-East	
6	June	South South-West > North North-East	
7	July	South-West South > North-East North	
8	August	South-West South > East North	
9	September	South-West South > North East	
10	October	North North-East > South	
11	November	North North-East > North North-West	
12	December	North North-East > North North-West	

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

Regional Geology

The iron ore deposit of the lease area forms the closure part of the famous Precambrian 'Horse Shoe' shaped iron ore belt of Singbhum – Keonjhor – Bonai formation which extends for 80 Kms as a narrow NNE – SSW trending folded synclinorium Pre-Cambrian schistose rocks, in which different types of iron & manganese ore deposits occur. The rock types are schist, tuffs, phyllites, basic rocks and banded iron ore formations. The manganese ore bodies mostly associated with the shale and form prominent geomorphic features due to their resistance to weathering. This has been represented by the hill ranges representing the iron ore 'horse shoe' of Singbhum - Keonjhor – Bonai synclinorium.

Regional Stratigraphy

The inter relationship between the different formations has been updated by several workers since it was first interpreted by Jones and Dunn.

The Stratigraphy as per Murthy and Acharya (1975) is as below Table :

Kolhan Group	Sandstone, Conglomerate – Breccia
----------Unconformity----------	
	Basic Lava, tuffs and tuffits of Volcanic facies
Mixed Facies Formation	Iron, Manganese, lenses of iron formation, chert, and small dolomite patches of chemical facies. Minor lenses of sandy and silty shale of clastic facies
Banded Shale Formation	Banded shale member Black shale member Black shale-chert member
Koira Group	
Banded Iron Formation	Finely banded Jaspilite member Coarsely banded Jaspilite member
	Tuffaceous shale Basic lava
Volcanic Formation	
	Basal sandstone, Gritty sandstone, Quartzite Conglomeratic at places with inter-bedded lava at top
----------Unconformity----------	
Singhbhum Granite with enclaves of older meta-basic and meta-sedimentary rocks.	

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Regional Structure

The horse-shoe shaped iron ore deposits form a northerly plunging synclinorium. The hill [illegible] broadly delineate the folded limbs of the synclinorium. Superimpositions of several [illegible] deformation in the area has resulted a complex fold system.

c) Detailed description of geology of the lease area such as shape and size of the mineral/ Ore deposit, disposition various litho-units indicating structural features if any etc.

Local Geology:

The Guali iron Ore Block discerns a fairly wide range of rock types of the iron ore group. The iron ore found is mainly hematite in nature .The different lithological units present can be broadly categorized into three major groups, namely

a) Laterite/Lateritic iron ore.
b) Iron Ore formation (BIF), Stratiform deposit such as BHJ/BHQ.
c) Argillaceous formations such as shale.

The lease area has been geologically mapped in 1: 2000 scale. The lithological succession established as observed within the leasehold area are compatible with other locations on the western limb of the synclinorium. The general lithological succession is as follows:

↑
Soil & alluvium
Laterite
Lateritic Iron Ore
Banded Iron formation
BHJ/BHQ
Lower Shale

The lease area is having four moderately sloping hillocks. Middle portion is almost flat. Highest elevation is at 620 mRL whereas the lowest elevation shows 500 mRL. Wide range of rock types discerns the iron ore. The rock encountered in the area generally strikes NNE / SSW.

The important ore types are hematite with minor portion of Goethite and Limonite. The iron ore is occurring in the form of lumpy, laminated, friable and powdery ore.

Control of Mineralization: The possible parameters of control of mineralization may be attributed to a) Regional and local tectonics b) Leaching and metasomatic replacement of BHJ and thereby

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leading to iron ore formations as evidenced by the presence of un-leached portion of the ore and BHJ in the ore body.

Effects of weathering: The weathering has led to the formation of laterite which is highly erratic in nature and hence irregular/discontinuous pockets of laterite is a common feature in the iron ore deposit

Disposition of various litho-units indicating the structural features

The different litho units of Guali Iron Ore Block are given below:

(i) Soil & alluvium

Part of the area inside the lease is covered with lateritic soil & alluvium. The soil is mostly unfertile with brown to red color on the upper most 0.0 to 0.5 m.

(ii) Laterite:

The Laterite is reddish, brown, porous, concretionary material. As per the bore hole data, laterite occurs below the soil cover within the lease area. The thickness of laterite varies from 0m to 5m approximately.

(iii) Lateritic Iron Ore

Lateritic iron ore occurs at various places below the laterite horizon.

(iv) Iron Ore (Hard Laminated Ore, Soft Laminated Ore, Blue dust etc.)

As per the geology, the area contains iron ore of all grades. The iron ore is mainly friable laminated comprising of hard laminated ore with bulk density of 3.48, soft laminated ore with bulk density of 3.39 and powdery ore with bulk density of 3.28. Based on the results obtained from Geological Report, the average bulk density of saleable ore (+) 55% Fe is considered as 3.40, while that for mineral reject ore (45-55% Fe) is considered as 2.5 and that of intercalated waste/ rejects (-45% Fe) have been taken as 2.0.

(v) Banded Hematite Jasper (BHJ)/ Banded Hematite Quartzite (BHQ)

As per the exploration data, BHJ found to be occurring below the iron ore zone. Further, BHJ has also exposed as pockets at some places in Topadih and Baliasahi Block.

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(vi) Shale

Ferruginous shale is occurring at some places within the exposed benches. The attitude of shale is same as that of the banded iron formation.

Strike and Dip:

SLO exposed in the lease area and other places exhibit east-west strike with moderate dip of 45^0 to 50^0 towards north. Considering the Regional structural features, the Regional Strike has been considered east-west with dip of 45^0 to 50^0 towards north.

Geological Report of Guali Iron Ore Block is given at Annexure-24.

d) Name of prospecting /exploration agency:

(i) Name	(ii) Address	(iii) Email id	(iv) Contact No	Name of the Director
M/s Gemco Kati Exploration	34,Bapat Nagar,Nagpur Road,Chandrapur -442401	jijo@gemcokati.com	9370220075	Jijo George
Tulip Mines	Avani Signature, 2nd floor, 91A/1, Park street, Kolkata-700016West Bengal	kolkata@tpsigroup.in	033-32476301	S.K.Naredi

e) Details of prospecting/exploration already carried out:

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

Based on the Geological Report of Guali Iron Ore Block received from State Government, there are no pitting and trenching available within the lease area. There are two blocks namely as Topadihi (Block-A) & Baliasahi (Block-B).

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

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Based on the Geological Report of Guali Iron Ore Block received from State Government a total of 167 bore holes have been drilled within the lease area for a metrage of 10005.45m as on 31.07.2019, in different types i.e. 20 nos are RC type, 1 no DTH and remaining 146 bore holes are Core type drilling. Out of the total bore holes, 99 bore holes are drilled at a grid interval of 100m X 100m in G1 level and remaining 68 bore holes have been drilled at a grid interval of 200m X 200m in G2 level.

a) Summary of the exploration carried out in the lease hold area indicating mapping, pitting, drilling (No./ spacing), sample drawn/ analyzed etc, existing pit data, grade variation, thickness is given in the table below: -

Summary of all drill holes

Sl. No	Year	BH NO	Type of BH (Core/ RC/ DTH)	Inclination	Collar RL (m)	Location (Co-ordinate)	Depth of BH (m)	Ore Zone (m)			Samples Analysed
								From	To	Length	
1	2004-05	BSI/B-2	Core	Vertical	567.00	N50/E410	69.35	GL	60.00	60.00	35
2	2005-06	BSI/5	Core	Vertical	540.00	N720/W570	40.20	No ore			0
3	2005-06	BSI/6	Core	Vertical	525.00	S109/W950	13.20	1.30	7.50	6.20	13
4	2005-06	BSI/7	Core	Vertical	550.00	S395/W1490	55.35	GL	55.35	54.60	35
5	2005-06	BSI/10	Core	Vertical	576.00	S190/W250	64.10	GL	62.10	62.10	49
6	2005-06	BSI/11	Core	Vertical	574.00	S400/E230	40.50	3.30	25.55	22.25	19
7	2005-06	BSI/12	Core	Vertical	601.00	S200/E450	66.45	GL	64.60	64.60	54
8	2005-06	BSI/14	Core	Vertical	568.60	S444/E463	57.50	3.50	53.30	57.50	27
9	2005-06	BSI/16	Core	Vertical	540.00	S230/W85	30.20	No ore			8
10	2005-06	BSI/17	Core	Vertical	545.00	S80/W65	30.50	No ore			5
11	2006-07	BSI/13	Core	Vertical	542.00	N90/E770	53.00	0.00	51.90	51.90	27
12	2006-07	BSI/15	Core	Vertical	574.00	S80/E200	60.10	1.50	57.80	57.80	43
13	2006-07	BSI/18	Core	Vertical	586.00	N133/E255	54.50	0.00	52.10	52.10	33
14	2006-07	BSI/19	Core	Vertical	545.00	N450/W600	37.00	No ore			8
15	2006-07	BSI/20	Core	Vertical	552.00	N425/W380	34.50	No ore			10
16	2006-07	BSI/21	Core	Vertical	553.00	S100/W1800	40.30	No ore			5
17	2006-07	BSI/22	Core	Vertical	550.00	N10/W1740	43.30	1.20	36.50	36.30	39
18	2006-07	BSI/23	Core	Vertical	550.00	N300/W1900	62.00	No ore			0
19	2006-07	BSI/24	Core	Vertical	542.00	N80/W200	50.20	No ore			0
20	2006-07	BSI/25	Core	Vertical	540.00	S100/W200	39.60	No ore			0
21	2008-09	RC/2	RC	Vertical	553.00	N300/W700	51.00	No ore			51
22	2008-09	RC/75	RC	Vertical	522.00	S700/W1400	35.00	GL	35.00	35.00	35
23	2008-09	RC/90	RC	Vertical	555.00	S400/W1000	51.00	GL	51.00	51.00	51
24	2008-09	RC/87	RC	Vertical	547.00	S500/W1100	71.00	GL	73.00	71.00	71
25	2008-09	RC/93	RC	Vertical	540.00	S500/W800	40.00	GL	17.00	17.00	40
26	2008-09	RC/12	RC	Vertical	542.979	N200/E700	40.00	3.00	40.00	37.00	19
27	2008-09	RC/72	RC	Vertical	500.00	S200/W1500	51.00	GL	40.00	40.00	40
28	2008-09	RC/53	RC	Vertical	560.00	S300/E400	40.00	GL	40.00	40.00	40
29	2008-09	RC/37	RC	Vertical	570.00	S20/E200	55.00	GL	55.00	55.00	55
30	2008-09	RC/38	RC	Vertical	568.60	S200/E200	51.00	GL	51.00	51.00	51
31	2008-09	RC/42	RC	Vertical	565.364	S300/E300	40.00	GL	40.00	40.00	40
32	2008-09	RC/52	RC	Vertical	599.00	S200/E400	51.00	GL	51.00	51.00	51

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Sl. No	Year	BH NO	Type of BH (Core/ RC/ DTH)	Inclination	Collar RL (m)	Location (Co-ordinate)	Depth of BH (m)	Ore Zone (m)			
								From	To	Length	
33	2008-09	RC/34	RC	Vertical	565.00	N200/E200	40.00	0.00	40.00	40.00	40
34	2008-09	RC/57	RC	Vertical	577.00	S200/E500	35.00	GL	29.00	29.00	29
35	2008-09	RC/58	RC	Vertical	579.00	S100/E500	50.00	GL	48.00	48.00	50
36	2008-09	RC/63	RC	Vertical	567.70	N300/E500	41.00	GL	41.00	41.00	41
37	2008-09	RC/16	RC	Vertical	565.00	N000/E200	55.00	GL	55.00	55.00	55
38	2008-09	RC/44	RC	Vertical	565.457	S100/E300	60.00	GL	60.00	60.00	60
39	2008-09	BH/54	Core	Vertical	537.00	S400/E400	27.00	GL	17.30	17.30	16
40	2008-09	BH/01	Core	Vertical	542.00	S500/E200	68.50	GL	62.80	62.80	44
41	2008-09	BH/36	Core	Vertical	550.00	N000/E250	55.20	GL	40.60	40.60	39
42	2008-09	BH/37	Core	Vertical	550.00	S100/E250	105.00	0.80	97.10	96.30	94
43	2008-09	BH/2	Core	Vertical	546.00	N200/E650	132.20	29.10	132.20	103.20	73
44	2009-10	30/09	Core	Vertical	526.00	S486/W584	40.00	No ore			0
45	2009-10	24/09	Core	Vertical	540.00	S431/W903	61.50	GL	54.80	54.80	36
46	2009-10	28/09	Core	Vertical	525.00	S300/W700	45.00	No ore			0
47	2009-10	29/09	Core	Vertical	537.00	N100/W700	85.00	No ore			0
48	2009-10	26/09	Core	Vertical	525..00	S200/W900	20.00	No ore			0
49	2009-10	74/09	Core	Vertical	521.00	S183/W1413	90.00	GL	54.15	54.15	33
50	2009-10	81/09	Core	Vertical	520.00	S340/W1245	63.00	GL	62.85	61.85	36
51	2009-10	01/10	DTH	Vertical	538.00	N000/W900	36.00	No ore			0
52	2009-10	02/10	DTH	Vertical	530.00	S100/W800	44.00	No ore			0
53	2009-10	03/10	DTH	Vertical	540.00	S300/E500	35.00	No ore			0
54	2009-10	04/10	DTH	Vertical	530.00	S300/W300	30.00	No ore			0
55	2011-12	BH-18/11	Core	Vertical	549.272	S300/000	104.60	11.00	97.00	86.00	105
56	2011-12	BH-22/11	Core	Vertical	549.755	S100/W100	77.10	GL	10.00	10.00	16
57	2011-12	BH-32/11	Core	Vertical	570.00	S300/E300	65.50	GL	35.00	35.00	43
58	2011-12	BH-9/11	Core	Vertical	566.788	N300/E300	190.10	14.00	188.00	174.00	191
59	2011-12	BH 26/11	Core	Vertical	562.445	N200/E000	71.70	GL	71.70	71.70	72
60	2011-12	BH-36/11	Core	Vertical	541.430	S200/W300	71.30	60.00	68.00	8.00	27
61	2011-12	BH-28/11	Core	Vertical	543.000	S400/E300	65.10	GL	38.00	38.00	38
62	2011-12	BH-7/11	Core	Vertical	555.803	N300/E600	137.30	GL	133.00	133.00	133
63	2011-12	BH-31/11	Core	Vertical	542.160	N100/E200	60.10	GL	34.00	34.00	60
64	2011-12	BH 10/11	Core	Vertical	550.123	N100/000	130.40	GL	130.40	130.40	130
65	2011-12	BH-15/11	Core	Vertical	548.000	000/W300	52.10	GL	8.00	8.00	6
66	2011-12	BH-8/11	Core	Vertical	569.503	N300/E400	152.40	GL	152.40	152.40	153
67	2011-12	GBH-24/11	Core	Vertical	550.000	S200/E500	34.10	No ore			7
68	2011-12	GBH-21/11	Core	Vertical	548.405	S300/E700	42.00	1.00	33.00	32.00	42
69	2011-12	GBH-11/11	Core	Vertical	541.197	000/E800	87.10	GL	87.10	87.10	87
70	2011-12	GBH-25/11	Core	Vertical	538.000	S400/E600	20.00	No ore			20
71	2012-13	BH-1/13	Core	Vertical	559.000	124N/565W	70.00	GL	13.00	13.00	9
72	2013-14	BH-2/13	Core	Vertical	550.000	194N/807W	40.50	1.00	40.30	40.30	14
73	2013-14	BH-70/13	Core	Vertical	526.000	478S/1027W	91.50	GL	54.50	54.50	46
74	2018-19	BH-22/18	Core	Vertical	574.000	N2433450/ E325895	125.00	GL	117.00	117.00	125
75	2018-19	BH-28/18	Core	Vertical	544.000	N2433350/ E323945	60.00	GL	57.50	57.50	70
76	2018-19	BH-31/18	Core	Vertical	547.000	N2433350/ E324545	34.00	GL	18.30	18.30	37
77	2018-19	BH-33/18	Core	Vertical	553.000	N2433350/ E325695	40.00	GL	29.00	29.00	41
78	2018-19	BH-34/18	Core	Vertical	586.000	N2433350/ E325895	82.00	GL	73.40	73.40	84
79	2018-19	BH-37/18	Core	Vertical	571.000	N2433350/ E325745	39.00	GL	17.00	17.00	40
80	2018-19	BH-43/18	Core	Vertical	520.000	N2433116/ E324131	80.00	GL	65.00	65.00	81
81	2018-19	BH-45/18	Core	Vertical	597.000	N2433150/ E325695	75.00	GL	62.00	62.00	76

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Sl. No	Year	BH NO	Type of BH (Core/ RC/ DTH)	Inclination	Collar RL (m)	Location (Co-ordinate)	Depth of BH (m)	Ore Zone (m)			
								From	To	Ore Intersected	Sample Analysed
87	2018-19	BH-46/18	Core	Vertical	594.000	N2433150/ E325445	90.00	GL	82.00	82.00	92
88	2018-19	BH 49/18	Core	Vertical	553.000	N2433050/ E325895	37.00	GL	18.00	18.00	38
89	2018-19	BH-50/18	Core	Vertical	596.000	N2433050/ E325695	113.00	GL	105.00	105.00	104
85	2018-19	BH-57/18	Core	Vertical	543.000	N2432950/ E323745	59.50	2.00	56.00	56.00	70
86	2018-19	BH-65/18	Core	Vertical	591.000	N2432950/ E325945	46.00	GL	18.00	18.00	47
87	2018-19	BH-69/18	Core	Vertical	534.000	N2432850/ E324045	54.00	GL	48.00	48.00	54
88	2018-19	BH-77/18	Core	Vertical	586.000	N2432750/ E324145	100.00	GL	92.00	92.00	101
89	2018-19	BH-78/18	Core	Vertical	577.000	N2432750/ E324395	59.50	GL	57.50	57.50	77
90	2018-19	BH-21/18	Core	Vertical	542.000	N2433450/ E326095	96.00	GL	92.00	92.00	97
91	2018-19	BH-23/18	Core	Vertical	555.000	N2433450/ E325695	112.00	GL	104.00	104.00	113
92	2018-19	BH26/18	Core	Vertical	557.000	N2433350/ E326545	38.50	GL	17.00	17.00	45
93	2018-19	BH32-18	Core	Vertical	558.000	N2433350/ E325445	107.00	GL	101.00	101.00	108
94	2018-19	BH-42/18	Core	Vertical	535.000	N2433147/ E323913	46.00	GL	13.50	13.50	56
95	2018-19	BH 48/18	Core	Vertical	550.000	N2433050/ E326095	98.00	GL	94.00	94.00	99
96	2018-19	BH-52/18	Core	Vertical	532.000	N2433050/ E324145	66.00	GL	62.00	62.00	67
97	2018-19	BH-64/18	Core	Vertical	562.000	N2432950/ E325695	119.00	GL	115.00	115.00	120
98	2018-19	BH-68/18	Core	Vertical	524.000	N2432850/ E324245	47.50	GL	42.50	42.50	53
99	2018-19	BH-75/18	Core	Vertical	540.000	N2432750/ E323745	69.00	21.00	64.00	43.00	60
100	2018-19	BH-76/18	Core	Vertical	548.000	N2432755/ E323994	104.00	GL	101.50	101.50	118
101	2018-19	DTH-1	DTH	Vertical	565.000	N2433050/ E325745	30.00	GL	30.00	30.00	--
102	2018-19	BH-38/18	Core	Vertical	567.000	N2433550/ E325650	136.00	GL	136.00	136.00	137
103	2018-19	BH 19/18	Core	Vertical	566.000	N2433550/ E325895	81.00	GL	81.00	81.00	82
104	2018-19	BH20/18	Core	Vertical	542.000	N2433550/ E326095	102.00	GL	93.00	93.00	104
105	2018-19	BH-27/18	Core	Vertical	556.000	N2433350/ E323745	21.00	GL	21.00	21.00	27
106	2018-19	BH-41/18	Core	Vertical	546.000	N2433150/ E323745	59.50	23.5	53.00	29.50	64
107	2018-19	BH-44/18	Core	Vertical	568.000	N2433150/ E325445	92.00	8.00	89.00	81.00	93
108	2018-19	BH-51/18	Core	Vertical	575.000	N2433050/ E325445	104.00	15.00	100	85.00	108
109	2018-19	BH-59/18	Core	Vertical	524.000	N2432033/ E324234	50.50	GL	44.50	44.50	65
110	2018-19	BH-61/18	Core	Vertical	552.000	N2432950/ E324845	25.00	NO ORE			26
111	2018-19	BH-66/18	Core	Vertical	530.000	N2432850/ E325770	36.00	GL	21.00	21.00	37
112	2018-19	BH-70/18	Core	Vertical	540.000	N2432850/ E323745	75.00	6.00	72.00	66.00	80
113	2018-19	BH-79/18	Core	Vertical	533.000	N2432750/ E324945	37.00	No ore			37
114	2018-19	BH-82/18	Core	Vertical	533.000	N2432750/ E325645	37.00	No ore			37
115	2018-19	BH-88/18	Core	Vertical	544.000	N2432750/ E325945	30.00	GL	16.00	16.00	137
116	2018-19	BH-03/18	Core	Vertical	544.000	E326056-N2433687	52.00	18	32	14	53
117	2018-19	BH-07/18	Core	Vertical	553.000	N2433750/ E325845	97.00	GL	93	93	99
118	2018-19	BH-03/18	Core	Vertical	567.000	N2433750/ E325645	87.00	25	82	57	88
119	2018-19	BH-04/18	Core	Vertical	557.000	N2433750/ E325445	90.00	10	29	19	100
								41	96	55	
120	2018-19	BH 93/18	Core	Vertical	556.000	N2433337/ E323709	80.50	34	78.5	44.50	93
121	2018-19	BH-35/18	Core	Vertical	542.000	N2433350/ E326095	79.00	GL	75	75	80
122	2018-19	BH-36/18	Core	Vertical	580.000	N2433250/ E325945	103.00	GL	98	98	104
123	2018-19	BH 47/18	Core	Vertical	555.000	N2433150/ E326095	96.00	GL	91	91	97
124	2018-19	BH-58/18	Core	Vertical	522.000	N2432950/ E323945	83.50	GL	76.5	76.50	107
125	2018-19	BH-60/18	Core	Vertical	530.000	N2432998/ E324447	34.00	GL	32.5	32.5	46
126	2018-19	BH-63/18	Core	Vertical	536.000	N2432950/ E325545	93.00	GL	89	89	94
127	2018-19	BH 67/18	Core	Vertical	547.000	N2432850/ E325495	91.00	GL	88	88	92
128	2018-19	BH-83/18	Core	Vertical	549.000	N2432750/ E325345	52.00	GL	48	48	53
129	2018-19	BH-90/18	Core	Vertical	558.000	N2433500/ E325273	50.00	GL	38	38	51
130	2018-19	BH-91/18	Core	Vertical	549.000	N2433622/ E325508	111.00	8	105	97	112
131	2018-19	BH-92/18	Core	Vertical	576.000	N2432850/ E325495	68.00	2	64	62	69
132	2018-19	BH-94/18	Core	Vertical	555.000	N2433450/ E324745	40.50	GL	5	5	29
133	2019-20	BH-73/18	Core	Vertical	528.000	N2432750/E322945	35.00	NO Ore			36

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Sl. No	Year	BH NO	Type of BH (Core/ RC/ DTH)	Inclination	Collar RL (m)	Location (Co-ordinate)	Depth of BH (m)	Ore Zone (m)			Samples Analysed
								From	To	Length	
134	2019-20	BH-05/18	Core	Vertical	517.000	N2433750/ E323945	57.00	26.00	52.00	26.00	58
135	2019-20	BH-06/18	Core	Vertical	524.000	N2433750/E323745	35.00	NO Ore			36
136	2019-20	BH-07/18	Core	Vertical	527.000	N2433750/ E323545	30.00	NO Ore			31
137	2019-20	BH-08/18	Core	Vertical	528.000	N2433750/ E323345	40.00	NO Ore			41
138	2019-20	BH-09/18	Core	Vertical	540.000	N2433750/E323145	40.00	NO Ore			41
139	2019-20	BH-10/18	Core	Vertical	537.000	N2433550/E323145	40.00	NO Ore			28
140	2019-20	BH-11/18	Core	Vertical	557.000	N2433550/E323345	52.00	No ore			53
141	2019-20	BH-12/18	RC	Vertical	571.000	N2433550/E323545	30.00	NO Ore			21
142	2019-20	BH-13/18	RC	Vertical	567.000	N2433550/E323745	30.00	NO Ore			31
143	2019-20	BH-14/18	Core	Vertical	527.000	N2433550/E323945	60.00	24.00	53.00	29.00	61
144	2019-20	BH-15/18	Core	Vertical	522.000	N2433550/E324145	48.00	28.00	36.00	8.00	49
145	2019-20	BH-16/18	Core	Vertical	549.000	N2433550/E324345	57.00	13.00	47.00	34.00	53
146	2019-20	BH-17/18	Core	Vertical	549.000	N2433550/E324545	40.50	NO Ore			24
147	2019-20	BH-24/18	Core	Vertical	533.000	N2433350/E323145	35.50	NO Ore			29
148	2019-20	BH-25/18	Core	Vertical	542.000	N2433350/E323345	42.00	NO Ore			43
149	2019-20	BH-29/18	Core	Vertical	520.000	N2433350/E324145	33.00	5.00	10.00	5.00	34
150	2019-20	BH-30/18	Core	Vertical	538.000	N2433350/E324345	38.00	10.00	27.00	17.00	39
151	2019-20	BH-38/18	Core	Vertical	527.000	N2433150/E322945	30.50	NO Ore			31
152	2019-20	BH-39/18	Core	Vertical	536.000	N2433150/E323145	35.50	NO Ore			22
153	2019-20	BH-40/18	Core	Vertical	548.000	N2433150/E323345	40.00	NO Ore			41
154	2019-20	BH-53/18	Core	Vertical	528.000	N2432950/E322945	36.00	NO Ore			26
155	2019-20	BH-54/18	Core	Vertical	553.000	N2432950/E323145	54.00	22.00	43.00	21.00	55
156	2019-20	BH-55/18	Core	Vertical	568.000	N2432950/E323345	64.00	NO Ore			65
157	2019-20	BH-56/18	Core	Vertical	538.000	N2432950/E323545	44.00	NO Ore			45
158	2019-20	BH-62/18	Core	Vertical	542.000	N2432950/E325245	35.00	NO Ore			36
159	2019-20	BH-72/18	Core	Vertical	540.000	N2432750/E3231445	49.00	NO Ore			50
160	2019-20	BH-73/18	Core	Vertical	550.000	N2432750/E323345	38.00	NO Ore			39
161	2019-20	BH-74/18	Core	Vertical	536.000	N2432750/E323545	46.00	NO Ore			47
162	2019-20	BH-80/18	Core	Vertical	542.000	N2432850/E325145	30.00	NO Ore			31
163	2019-20	BH 84/18	Core	Vertical	530.000	N2433750/E324145	53.00	28.00	47.00	19.00	54
164	2019-20	BH-85/18	Core	Vertical	550.000	N2433750/E324345	49.00	15.00	27.00	12.00	48
165	2019-20	BH-86/18	Core	Vertical	555.000	N2433750/E324545	53.00	NO Ore			54
166	2019-20	BH-87/18	Core	Vertical	555.000	N2433750/E324745	40.50	NO Ore			30
167	2019-20	BH-89/18	Core	Vertical	529.000	N2433350/E322995	32.50	NO Ore			25
Total length drilled (m) and Samples analysed (Nos)							10005.45				8644

The details of boreholes e.g. diameter, spacing, inclination, collar level, depths etc. with standard borehole logs marked on geological plan/sections are furnished in Form J & K (Ref Geological Report attached as Annexure-24).

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b) Based on the Geological Report of Guali Iron Ore Block received from State Government, Mineral Reject zone (45-55% Fe) and Safable Ore zone (+ 55%Fe) has been marked in the geological section for the purpose of resource estimation. Accordingly, resource has been estimated for two types of grade i.e. 45-55%Fe (Mineral Reject) and +55%Fe (Saleable Ore). Therefore, total resource has been estimated by considering the recovery factor of 100% as per the Geological report received from State Govt of Odisha.

The details of summarized statement regarding parameters considered are tabulated below:

Explored Strike length-	2.2km (approx.)
Width/thickness of the ore body	Width : 1.0km (approx) Thickness: 70m (approx)
Explored Depth/mRL	190.10m / 376.688 mRL.
Cut-off grade	+55 % Fe
Estimated Bulk density in T/cum (Not specific gravity)	3.4 T/cum for saleable ore (+55% Fe) 2.5 T/cum for mineral reject (+45-55% Fe) 2.0 T/cum for Top Soil/Waste
Threshold Value	45 % Fe
Maximum depth of the Mineralization established	190.10 mtr
Minimum depth of exploration	13.20 mtr
Recovery Factor considered (As per the geological report received from State Govt)	100%

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The data spacing of bore holes and distribution is sufficient to establish the level of exploration which, are furnished below:

Year of Exploration	No of Bore holes	Type of BH	Meterage	Spacing/Grid Interval	Area Covered (Ha)	Level of Exploration
2004-05	1	Core type	69.35	Not in grid	1	G3 converted to G1
2005-06	9	Core type	398.00	200m x 200m	21	G2/G3 converted to G1
2006-07	10	Core type	474.50	100m x 200m	22	G1
2008-09	23	18 nos RC and 5 core type	1244.90	100 m x 200m	27.2	17 nos-G1 06 nos-G2
2009-10	11	7 core and 4DTH type	549.50	100m x 200m	15.41	2 nos-G1 9 nos -G2
2011-12	16	Core type	1360.90	100 m x 200m	22.77	G1
2012-13	1	Core type	70.00	In filling hole	1.18	G2
2013-14	2	Core type	132.00	In filling hole	2.56	G2
2018-19	59	58 Core and 01 DTH	4238.50	200m x 200m	125.21	43 nos -G1 16 nos -G2
2019-20	35	33 Core type and 2 nos RC type	1467.80	200m x 200m	126.696	34nos-G2 1 no- G1
Total	167		10005.45		365.026	

Total lease area : 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR)

Item of Information	Lease area explored as per UNFC norms (in Ha) 12.01.2021 Total Lease area = A+B+C+E					Remarks / Comments including reasons for not carrying out the exploration as per UNFC norms.
	G1 Level	G2 Level	G3 Level	Explored and found non mineralized with level of exploration (Remarks)	Unexplored lease area	
	A	B	C	D	E	
Area as per level of exploration	113.72	224.656	0.0	214.715 (Explored in G1 & G2 level)	26.65	The unexplored lease area comprises of an existing infrastructure is mostly non mineralized (as per surface exposure). Bore holes have been proposed to prove the lateral extension of ore zone as well as non-mineralized area in G1 level.
No. of BH drilled	167			49	-	
No. of BH considered for Resource Estimation	99	68	0.0	49	-	
Meterage Drilled	10005.45			1927.6	-	
Grid Interval	100 m X 100m	200m X 200m			-	
Scale of Mapping	1:2000					
Reserve estimated based on Survey (12.01.2021)					160.136 million tonnes	
Remaining Resources estimated based on Survey (12.01.2021)					36.59 million tonnes	
Total Reserve/Resources estimated based on Survey (12.01.2021)					196.726 million tonnes	

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Justification of area considered for G1/G2/G3 & G4

G1 area:

- Borehole spacing has been considered within 100mtrs on a grid pattern.
- Geological mapping has been done in 1:2000 scale.
- Detailed three-dimensional delineation of an ore body has been achieved though sampling, pit mapping etc. and relevant characteristics of the deposit are established with high degree of accuracy using software.

G2 area:

- Borehole spacing has been considered within 200mtrs on a grid pattern.
- Geological mapping has been done in 1:2000 scale.
- Detailed three-dimensional delineation of an ore body has been achieved though sampling, Pit/Surface mapping etc. and relevant characteristics of the deposit are established with high degree of accuracy using software.

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 Laboratory or Government laboratory or equivalent. Entire mineralized area may be analyzed meter wise with 10% of check samples. (At least for 10% of total samples may be analyzed in accordance to BIS and reports from NABL accredited/other Government laboratory).**

Based on Geological Report received from State Government, total of 8644 nos of samples have been collected analyzed to know the percentage of Fe. Samples of the core of drilled bore hole have been analyzed from NABL accredited lab. The analysis result has been attached in Annexure-X of Geological Report.

Type of Sample (Grab Sample, Bulk Sample, Core Drill Sample, DTH Sample etc.	Total Samples Collected	Total Samples Analysed	Samples analysed at NABL Accredited lab
Core drill sample	8644	8644	1140

Out of the above samples 8644 Nos of primary samples and 195 nos check samples have been analyzed.

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iv) Expenditure incurred in various prospecting operations.

No expenditure made by OMC Ltd in Guali Iron ore Block as this ML has been granted to OMC afresh.

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 28(1)(a) of MCDR 1988.

Based on the topographical survey of the area, surface plan of the lease area has been prepared on 1:2000 scales with contour interval of 5 m and grid lines at 100 m interval. All surface features as indicated under rule 32(a) of MCDR, 2017 have been marked in the Surface Plan (Plate No 3).

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 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 28 (1)(b) of MCDR 1988.

Geological plan (Plate No 04) of the lease area has been prepared on 1:2000 scale based on surface plan as the base plan (Plate No 03) and geological mapping. Previous exploration data mentioned in geological report are also supporting for existence of mineral, locations of proposed exploration, various litho-units along with structural features, mineralized/ore zone with grade variation if any earmarked on the geological plan along with other features indicated under Rule32(b) of MCDR2017

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

Eleven numbers of cross sections 2433750 (AA') to 2432750 (KK') at 100 m interval from boundary to boundary in east-west direction have been prepared in 1 : 2000 scale and shown in Plate No 05 A & B.

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

Based on the Geological Report received from State Govt., the entire Mining Block has been converted in to G1 & G2 category covering 167 nos. of boreholes. Mineralized and Non-

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Mineralized areas are marked on the Geological plan. The proposed boreholes (215 nos have been planned during the Plan period to convert the G3 category of the entire Guali Iron Ore Block which are shown on Geological Plan (Plate No 04).

The proposed depth of the holes has been determined in a strategic manner considering the ore intercepted in the adjacent bore holes and sections. The drilling of the bore holes shall be extended maximum up to 100 meters or up to the bottom of ore body, whichever is later. Priority of drilling is given in the area proposed for depth proving of the mineralize area and for waste dumping & mineral reject stacking to prove for non-mineralization.

Summary of proposed exploration in the lease area is as below.

Year of drilling	Section No	Proposed BH No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest/Non Forest-diverted/ Non Diverted	Surface Right/Non surface right area
2021-22	A A' (2433750 N)	PBH-01	2433750	325346	550	Core	100	Vertical	Diverted Forest	Non-surface Right area
		PBH-02	2433750	325545	565	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-03	2433750	325745	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-04	2433750	325946	560	Core	100	Vertical	Non-Diverted Forest	Non surface Right area
		PBH-05	2433750	326046	540	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	B B' (2433650 N)	PBH-06	2433650	325246	545	Core	100	Vertical	Diverted Forest	Non surface Right area
		PBH-07	2433650	325146	550	Core	100	Vertical	Diverted Forest	Non-surface Right area
		PBH-08	2433650	325446	555	Core	100	Vertical	Diverted Forest	Non-surface Right area
		PBH-09	2433650	325546	570	Core	100	Vertical	Diverted Forest	Non-surface Right area
		PBH-10	2433650	325646	563	Core	100	Vertical	Diverted Forest	Non-surface Right area
		PBH-11	2433650	325846	560	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-12	2433650	325945	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-13	2433650	326046	540	Core	100	Vertical	Diverted Forest	Surface Right area
	C C' (2433550 N)	PBH-14	2433550	325846	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-15	2433550	325445	555	Core	140	Vertical	Diverted Forest	Surface Right area
		PBH-16	2433550	325600	563	Core	200	Vertical	Diverted Forest	Surface Right area
		PBH-17	2433550	325800	560	Core	200	Vertical	Diverted Forest	Surface Right area
		PBH-18	2433550	326046	540	Core	110	Vertical	Diverted Forest	Surface Right area
	D D' (2433450 N)	PBH-19	2433450	325546	570	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-20	2433450	325646	565	Core	100	Vertical	Diverted	Surface Right

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Year of drilling	Section No	Proposed BH No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest Diverted / Non Diverted	Surface Right Diverted / Non Diverted
		PDH-21	2433450	323746	570	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-22	2433450	323846	560	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-23	2433450	323946	545	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-24	2433450	325946	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-25	2433450	325647	555	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-26	2433450	325795	560	Core	120	Vertical	Diverted Forest	Surface Right area
		PBH-27	2433350	323644	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-28	2433350	323845	560	Core	100	Vertical	Diverted Forest	Surface Right area
	E E' (2433350N)	PBH-29	2433350	325645	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-30	2433350	325794	560	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-31	2433350	325995	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PDH-32	2433250	323646	545	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-33	2433250	323744	545	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-34	2433250	323846	560	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-35	2433250	323945	550	Core	100	Vertical	Diverted Forest	Surface Right area
	F F' (2433250N)	PBH 36	2433250	325446	560	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-37	2433250	325646	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-38	2433250	325846	580	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-39	2433250	326046	555	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-40	2433150	323845	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-41	2433150	324045	545	Core	100	Vertical	Diverted Forest	Surface Right area
	G G' (2433150 N)	PBH-42	2433150	325346	565	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-43	2433150	325745	555	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH 44	2433150	325995	565	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-45	2433050	323745	540	Core	100	Vertical	Diverted Forest	Surface Right area
	H H' (2433050 N)	PBH-46	2433050	324046	520	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH 47	2433050	325346	575	Core	100	Vertical	Diverted Forest	Surface Right area

Pradip Ku Sahoo

Subrat Ku Behera

Year of drilling	Section No	Proposed BH No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest diverted/ Non-Diverted	Surface Right
		PBH-48	2433050	325495	545	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-49	2433050	325645	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-50	2433050	325946	570	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-51	2433050	326046	550	Core	100	Vertical	Diverted Forest	Surface Right area
	JJ' (2432950N)	PBH-52	2432950	323646	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-53	2432950	323844	520	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-54	2432950	324046	520	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-55	2432950	324146	520	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-56	2432950	325445	560	Core	130	Vertical	Diverted Forest	Surface Right area
		PBH-57	2432950	325600	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-58	2432950	325800	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-59	2432950	326000	555	Core	100	Vertical	Diverted Forest	Surface Right area
	JJ' (2432850 N)	PBH-60	2432850	323646	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-61	2432850	323945	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-62	2432850	324146	520	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-63	2432850	324446	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-64	2432850	324546	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-65	2432850	325246	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-66	2432850	325246	545	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-67	2432850	325345	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-68	2432850	325446	555	Core	130	Vertical	Diverted Forest	Surface Right area
		PBH-69	2432850	325545	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-70	2432850	325695	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-71	2432850	325845	565	Core	100	Vertical	Diverted Forest	Surface Right area
	KK' (2432750 N)	PBH-72	2432750	323646	540	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-73	2432750	323845	545	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-74	2432750	323946	550	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-75	2432750	324046	550	Core	100	Vertical	Diverted	Surface Right

Prafulla Ku Sahoo

Subrat Ku Behera

Year of drilling	Section No	Proposed BH No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest/Non Forest-diverted/ Non Diverted Forest	Surface Right
		PBH-76	2432750	324346	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-77	2432750	324446	545	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-78	2432750	324646	535	Core	100	Vertical	Diverted Forest	Surface Right area
	XX' (2432750 N)	PBH-79	2432750	325445	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-80	2432750	325746	560	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-81	2432750	325846	550	Core	100	Vertical	Non-Diverted Forest	Surface Right area
2022-23	AA' (2433750 N)	PBH-82	2433750	323246	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-83	2433750	323446	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-84	2433750	323640	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	AA' (2433750 N)	PBH-85	2433750	324846	555	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-86	2433750	324946	550	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-87	2433750	325046	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-88	2433750	325146	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-89	2433750	325246	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	BB' (2433650 N)	PBH-90	2433650	323146	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-91	2433650	323246	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-92	2433650	323346	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-93	2433650	323444	550	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH 94	2433650	323546	550	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-95	2433650	323646	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-96	2433650	323746	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH 97	2433650	323846	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	BB' (2433650 N)	PBH-98	2433650	324646	555	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-99	2433650	324746	560	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-100	2433650	324846	575	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-101	2433650	325000	555	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-102	2433650	325146	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area

Prafulla Ku Sahoo

Subhash Ch Behera

Year of drilling	Section No	Proposed BH No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest land Forest diverted/ Non Diverted	Surface Right/ Non surface Right/ Govt area
	C C' (2433550 N)	PBH-103	2433550	323240	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-104	2433550	323445	565	Core	100	Vertical	Non Diverted Forest	Surface Right area
		PBH-105	2433550	324646	565	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-106	2433550	324858	570	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-107	2433550	325000	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-108	2433550	325146	545	Core	100	Vertical	Non Diverted Forest	Non-surface Right area
		PBH-109	2433550	325346	550	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	D D' (2433450 N)	PBH-110	2433450	323046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-111	2433450	323146	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-112	2433450	323246	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-113	2433450	323346	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-114	2433450	323446	560	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-115	2433450	324646	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-116	2433450	324846	555	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	D D' (2433450 N)	PBH-117	2433450	325000	540	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-118	2433450	325146	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-119	2433450	325246	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-120	2433450	325346	550	Core	100	Vertical	Non Diverted Forest	Surface Right area
	E E' (2433350N)	PBH-121	2433350	323074	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-122	2433350	323146	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-123	2433350	324446	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-124	2433350	324746	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-125	2433350	324846	540	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-126	2433350	325000	540	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-127	2433350	325146	540	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-128	2433350	325246	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	F F' (2433250N)	PBH-129	2433250	324546	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-130	2433250	324646	540	Core	100	Vertical	Non Diverted	Surface Right

Pradip Ku Sahoo

Subrat Kr Behera

Year of drilling	Section No	Proposed DH No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest/Non Forest diverted/ Non Diverted Forest	Surface Right/Non surface right
		PBH-131	2433250	324746	540	Core	100	Vertical	Non-Diverted Forest	Surface right area
		PBH-132	2433250	324900	540	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-133	2433250	325046	540	Core	100	Vertical	Non-Diverted Forest	Non surface Right area
		PBH-134	2433250	325346	570	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	G G' (2433150 N)	PBH-135	2433150	324146	520	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-136	2433150	324280	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-137	2433150	324400	535	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-138	2433150	324500	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-139	2433150	324646	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-140	2433150	324800	535	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-141	2433150	324946	540	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-142	2433150	325046	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	H H' (2433050 N)	PBH-143	2433050	324246	520	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-144	2433050	324346	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-145	2433050	324546	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-146	2433050	324646	535	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-147	2433050	324800	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-148	2433050	324946	535	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-149	2433050	325046	535	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-150	2433050	325146	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	II' (2432950N)	PBH-151	2432950	324346	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-152	2432950	324490	530	Core	100	Vertical	Diverted Forest	Surface Right area
		PBH-153	2432950	324746	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-154	2432950	324946	530	Core	100	Vertical	Non Diverted Forest	Surface Right area
		PBH-155	2432950	325146	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	JJ' (2432850 N)	PBH-156	2432850	324646	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-157	2432850	324746	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area

Pradip Ku Sahoo

Subrat Ku Behera

Year of drilling	Section No	Proposed BH No	Northing	Easting	Collar Rl.	Core/RC /DTH	Proposed Depth	Inclination	Forest/ Non Forest/ Diverted / Non Diverted	Surface Right/ Non Surface Right area
		PBH-158	2432850	324846	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-159	2432850	324946	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-160	2432850	325046	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	K K' (2432750 N)	PBH-161	2432750	324846	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-162	2432750	325046	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-163	2432750	325246	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	A A' (2433750 N)	PBH-164	2433750	323846	510	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-165	2433750	324046	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-166	2433750	324246	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-167	2433750	324446	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-168	2433750	324646	555	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	B B' (2433650 N)	PBH-169	2433650	324000	510	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-170	2433650	324146	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-171	2433650	324346	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-172	2433650	324446	545	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
		PBH-173	2433650	324546	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	C C' (2433550 N)	PBH-174	2433550	324045	515	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-175	2433550	324246	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-176	2433550	324445	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	D D' (2433450 N)	PBH-177	2433450	324046	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-178	2433450	324146	520	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-179	2433450	324346	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-180	2433450	324446	550	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	E E' (2433350N)	PBH-181	2433350	324046	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-182	2433350	324246	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	F F' (2433250N)	PBH-183	2433250	323046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-184	2433250	323146	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area
2023-24		PBH-185	2433250	323246	535	Core	100	Vertical	Non-Diverted	Surface Right

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Year of drilling	Section No	Proposed B/H No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest/Non Forest- diverted/ Non Diverted Forest	Surface Right/Non Surface right area
		PBH-186	2433250	323346	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-187	2433250	323446	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH 188	2433250	323546	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	F F' (2433250N)	PBH-189	2433250	324046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-190	2433250	324146	520	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-191	2433250	324246	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-192	2433250	324346	530	Core	100	Vertical	Non-Diverted Forest	Non-surface Right area
	G G' (2433150 N)	PBH 193	2433150	323046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-194	2433150	323246	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-195	2433150	323446	555	Core	100	Vertical	Non Diverted Forest	Surface Right area
		PBH-196	2433150	323646	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	H H' (2433050 N)	PBH-197	2433050	322946	525	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-198	2433050	323046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-199	2433050	323208	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-200	2433050	323346	555	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH 201	2433050	323446	560	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-202	2433050	323546	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-203	2433050	323646	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	I I' (2432950N)	PBH-204	2432950	323046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-205	2432950	323246	565	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-206	2432950	323446	550	Core	100	Vertical	Non-Diverted Forest	Surface Right area
	J J' (2432850 N)	PBH-207	2432850	322946	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-208	2432850	323046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-209	2432850	323200	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-210	2432850	323346	560	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-211	2432850	323446	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-212	2432850	323546	535	Core	100	Vertical	Non-Diverted Forest	Surface Right area

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Year of drilling	Section No	Proposed BH No	Northing	Easting	Collar RL	Core/RC /DTH	Proposed Depth	Inclination	Forest/Non Forest-diverted/ Non Diverted	Surface Right/Non surface right
	K K' (2432750 N)	PBH-213	2432750	323046	530	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-214	2432750	323246	545	Core	100	Vertical	Non-Diverted Forest	Surface Right area
		PBH-215	2432750	323446	540	Core	100	Vertical	Non-Diverted Forest	Surface Right area

Year	No of Boreholes (Core/RC/DTH)	Grid Interval (In Mtr)	Total Metrage	No of pits, dimensions and volume	No of Trenches, dimensions and volume
2020-21	Nil	Nil	Nil	---	---
2021-22	81	100 X 100	Each borehole @ 100 mtrs or till the end of mineralisation / discontinuation of ore body, whichever is earlier.	---	---
2022-23	82	100 X 100		---	---
2023-24	52	100 X 100		---	---
2024-25	Nil	Nil	Nil	---	---

Note: The proposed exploration shall be carried out after getting the necessary statutory Clearances.

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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.

Based on Geological Report of Guali Iron Ore Block received from State Government, the Resources estimated as on 31.07.2019 are furnished below;

Summarized Geological Resources as on 31.07.2019 (In Million Tonnes)

Category	Resource +45-55% Fe (Avg grade:53.41)	Resource+55%Fe (Avg grade:62.12)	Resource of ROM (+45%Fe) Avg grade:61.21
Measured (G1)	13.02	143.26	156.29
Indicated Resource (G2)	11.89	30.56	42.45
Total	24.91	173.82	198.74

Ratio of different litho type of Iron Ore:

Considering the Bore holes data and previous mining practices the percentage of different types of ore are furnished below:

Litho Types	Percentage	Total Resource in Million Tonnes.
Lateritic Iron ore (Lumpy)	20	39.75
HLO (Hard Laminated ore-Lumpy)	15	29.81
SLO(Fines)	25	49.69
Blue Dust(Fines)	40	79.49
Total	100.00	198.74

Depletion of Reserve:

The depletion of reserves on account of production of ROM for the period from 01.08.2019 to 31.03.2020 by previous lessee is as follows;

Period	Production in Million Tonnes
01.08.2019 to 31.03.2020	2.033

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Re-assessment of the balance Reserve / Resource based on Survey on dtd 12.01.2021

Minerals (Evidence of Mineral Contents) Rule 2015 came into effect on 17th April 2015. As per Minerals (Evidence of Mineral Contents) Rule 2015, lateral extension of the mineral continuity shall be limited to a distance of 50% of the borehole spacing & depth continuity of G1 & detailed G2 category mineral resource shall be limited up to the depth of evidence of established mineral evidence. Accordingly, geological cross-sections have been prepared & assessment of the geological & mineable reserve has been carried out considering above factors. Reserve/Resource estimation has been done based on the cross sectional method. Further for quality purposes ore body modeling has been made on the basis of all the boreholes drilled using software i.e. 'SURPAC' at 45% Fe threshold value and the resources/ reserves figures have been established as per the guidelines of UNFC.

Parameters considered for estimation of Mineral Resources

(a) The threshold value has been considered as per the IBM guidelines is 45% Fe.

(b) The Cutoff grade considered for estimation of resource/reserve is 55 % Fe.

(c) Updated pit position as on 12.01.2021.

(d) Borehole collar, survey, assay & litho data from Geological Report.

(e) Pit exposures data & Ultimate Pit.

(f) The influence of the ore body has been taken @ 50 m on either side of the grid along the strike of the bore hole drilled. No extrapolation of the ore section has been done beyond 50m.

(g) The depth continuity of mineralization has been considered limited to the depth up to which direct evidence of mineralization is established.

(h) The lateral extension has been considered for resource assessment depending on geological continuity by mapping and has not been more than 50 m of the probe point.

(i) Bulk density of individual ore types has been used as a tonnage conversion factor (TCF) in this document. The bulk density considered as per Geological Report.

(k) The Recovery Factor of 100% for Saleable Ore (+55 % Fe) & Mineral Rejects (+45 % Fe to -55 % Fe) for assessment of Ore resource/reserve has been taken in to consideration as per Geological report.

(l) In total, 11nos. of cross sections from 2433750(AA') to 2432750(KK') at 100 m interval have been prepared for estimations of resource.

(m) Reserve estimation has been carried out by Cross Sectional method.

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Preparation of Database

Four basic files namely collar, survey, assay and litho files are prepared as per the information/data of Geological report received from State Govt. of Odisha in Comma Separated Value (CSV) format for further processing by SURPAC Software. Ore type-wise litho codes used for database preparation.

Delineation of Ore Geometry and Construction of Ore Body

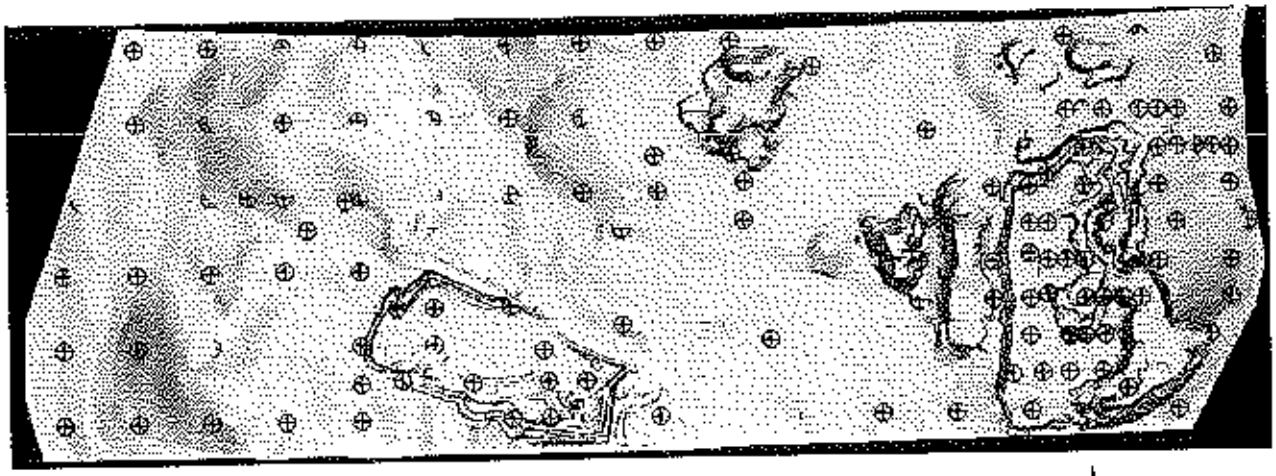
Preparation of Transverse Sections

Boreholes were displayed in SURPAC graphics window along with litho, Fe%, SiO2% & Al2O3%. 11 nos. of transverse sections at 100m interval were extracted from the strike direction. The envelopes of ore (Fe% >= 55%), Mineral Rejects (45%<=Fe%<55%) & Waste (Fe%<45%) were delineated at each section considering the continuity of mineralization, lithology and other geological features. Lateral extent of mineralization has been limited up to 50% of borehole spacing & vertical extent of mineralization has been limited up to the depth of evidence of established mineral evidence in the boreholes.

Preparation of Digital Terrain Model (DTM) of Surface Topography

The digitized contour of updated surface plan with Z values have been transformed into digital terrain model (DTM) utilizing the principle of triangulation and wire framing of points with X, Y and Z co-ordinates. Digital terrain model is the most effective way of representing a surface in three-dimensional computerized form. It is an important tool to calculate volume between two or more surfaces. The digital terrain model of surface topography with drill holes of Guali Iron Ore Block is shown in the figure below: -

Digital Terrain Model (DTM) of Surface Topography with drill holes



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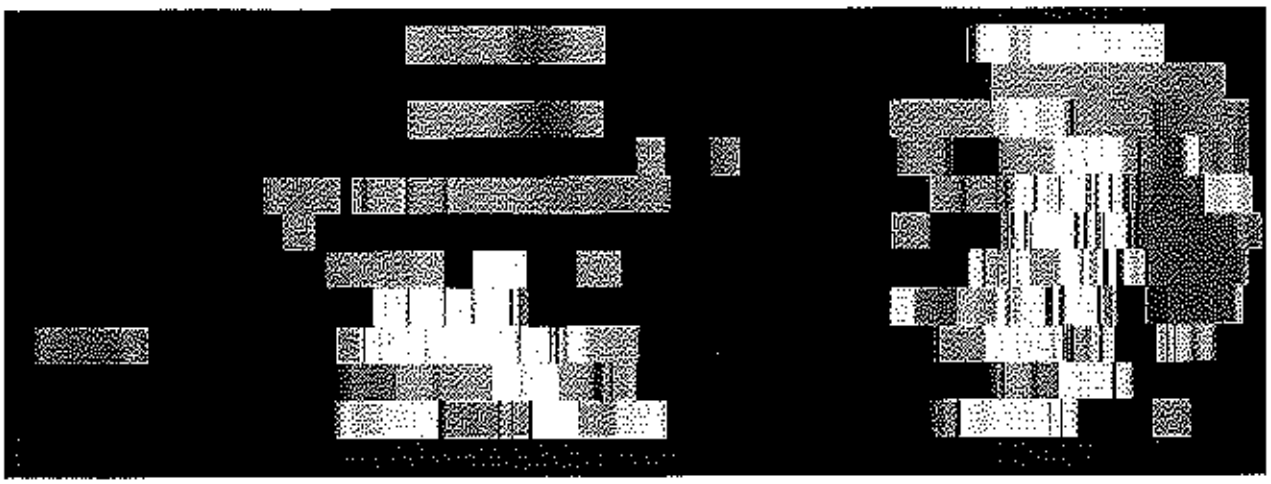
3-D Solid Modeling of Ore Body

The respective envelopes of ore lithology, Mineral Rejects & waste of the respective transverse cross sections have been connected/ joined to form respective solid ore body models. 3-D solid model of Guali Iron Ore Block deposit is presented in the figure below:



Block Modeling

The entire deposit is divided into no. of judiciously chosen sub-blocks for proper estimation of grade and quantity, keeping in view of the structural discontinuity of the deposit, extent etc. The estimated blocks in the block model has been used for optimum pit generation, mine planning and production scheduling.

Selection of Block Size

Considering the accuracy desired, borehole spacing and mining constraints, a unit block of 10 m x 10 m x 2.5 m has been selected for block wise grade estimation.

Development of Block Model

In order to cover the entire extent of Guali Iron Ore Block in three dimensions, a dummy block model with unit block sizes as indicated above have been generated.

Addition of Attributes

Attributes are the properties of individual block such as Fe, SiO2, Al2O3, specific gravity, litho code etc. These attributes were added in the dummy block model using suitable technique.

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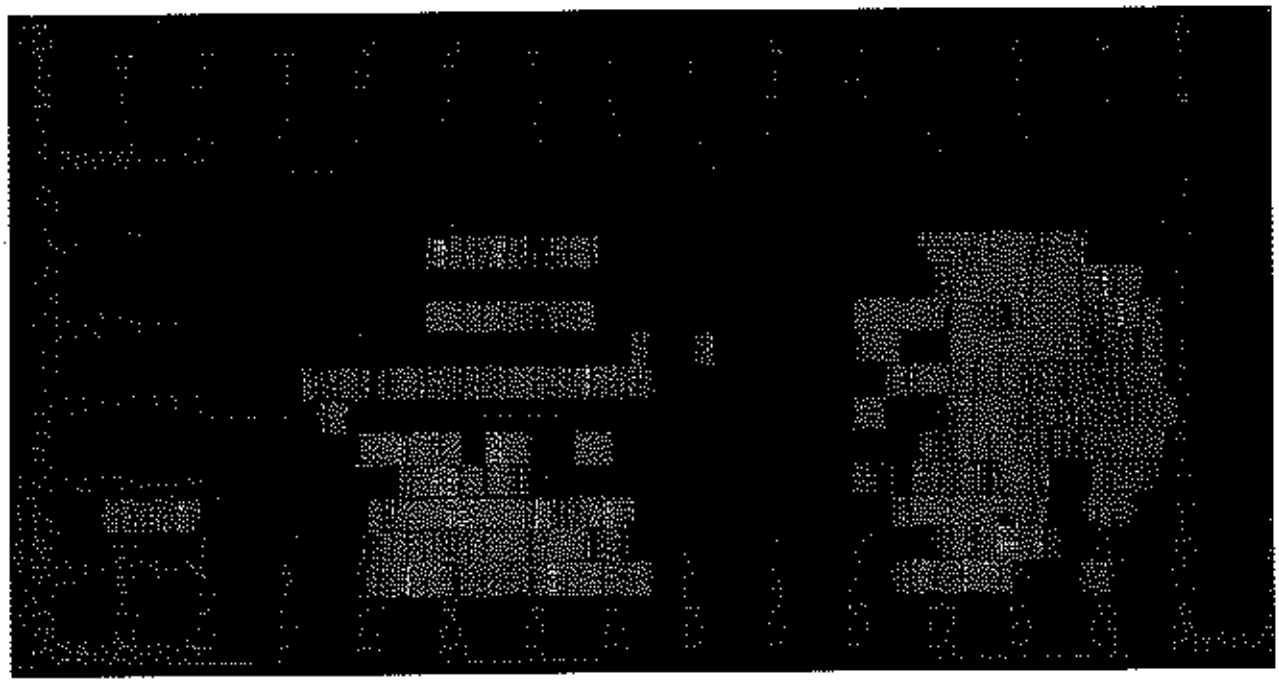
Application of Constraints

Constraints are the logical combination of spatial operators and objects such as DTM of surface contour, solid model of ore zone, block etc. with which the block model can be enveloped/ intersected with respect to inside/ outside and above/ below their spatial position. The block model developed for Guali Iron Ore Block has been constrained with the surface DTM with updated pit positions, mining lease boundary, statutory safety barriers, individual quarry boundaries as well as ore type-wise 3-D solid models as developed and discussed in the preceding paragraphs. In this way, the blocks have been enveloped within ore zone boundary and surface topography for the purpose of grade interpolation and reserves estimation. Constrained block model is given below.



Block model estimation

The globally accepted technique of Inverse Square Distance (ISD) method has been used for ore reserve estimation for different ore types. A search ellipsoid as indicated below has been used to select samples for assigning grade to the blocks. The axial parameters and its search orientation were derived from the results of geo-statistical analysis.

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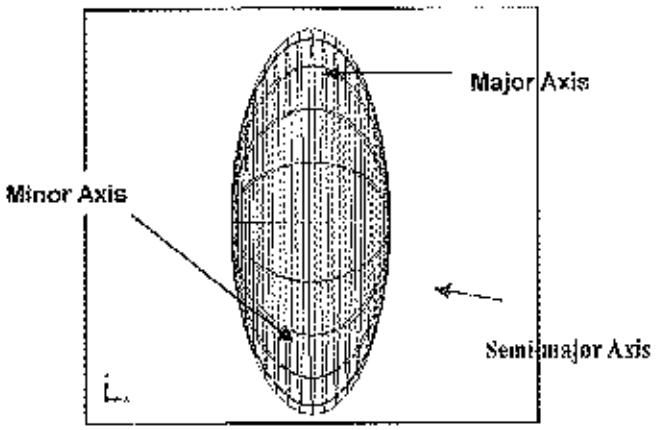

The bulk density of the individual ore types as given below were taken as the in-situ densities of the respective ore type. Same has been derived from the Geological report of Guali Iron Ore Block..

Sl. No.	Ore Type	Bulk Density, t/cu.m
1	Saleable ore (+ 55% Fe)	3.4 t/ cum
2	Mineral rejects (45 to below 55% Fe)	2.5 t/ cum
3	Waste (below 45% Fe)	2.0 t/cum

Copy of report of bulk density test report by a NABL accredited lab is enclosed as Annexure-XI of the Geological Report.

For estimation resources the following parameters have been considered: -

Measured resources: -

A-'Measured Mineral Resource" is that part a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content has been estimated with a high level of confidence is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and/or grade continuity.

The lessee has also undertaken 167 Core/DTH/ RC type holes within the lease area. The geological map has been prepared on a scale of 1:2000. Based on the borehole data, existing quarries and surface geology, measured resource has been estimated. The depth of the bore hole where the mineralization ends has been considered as the depth of measured ore zone (331). However, the thickness of the ore body is variable from section to section. Lateral influence of 50% of grid has been considered as indicated resource.

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The entire exploratory drill holes with grid spacing of 100m X 100m has been considered as G1 category and has been categorized under 331 as per UNFC code.

Indicated resources: -

An 'indicated Mineral Resource' is that part a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content has been estimated with a lower level of confidence is based on general exploration.

The entire exploratory drill hole with grid spacing at more than 100m X 100m and less than 200m x 200m grid interval and also where the borehole density is quite low has been considered as G2 category and has been categorized under 332 as per UNFC code. The indicated resource has been taken another 50m from the proved limit considering the lateral extension of ore body at depth matching with the measured limit.

k) **Furnish detailed calculation of reserves/resources section wise (When the mine is 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.**

Detail calculation of reserves/resources section wise.

Method of Reserve Estimation

Resource/Reserve assessment has been made by cross sectional area method. Cross sectional area measured in sections are multiplied with the respective length of influence of each section giving the volume. As the volume so calculated is combination of saleable ore, sub-grade ore and intercalated waste, a recovery factor has been applied to get the volume of each saleable ore, sub-grade ore and waste. The volume (cum) so calculated for saleable ore and sub-grade ore is then converted into tonnage under different category. The cross sectional area method is defined as follows:

G = C * LI * TCF

Where, G = Geological reserve in metric tones

C = Cross sectional area in Square meters

LI = Length of Influence in meters

TCF = Tonnage conversion factor

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Section-wise Reserve/Resource

The Measured Mineral Resource (331) and Indicated Mineral Resource (332) under different sections are tabulated below.

The Measured Mineral resource (331) under different sections on saleable grade @>55% Fe are given below: -

TOPADIH

Sl. No.	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Ore/ saleable Ore (>55% Fe)		
					Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	100	0	3.4	0.00	0
2	B B'	0	100	0	3.4	0.00	0
3	C C'	34198.5	100	3419850	3.4	11.64	61.75
4	D D'	41162.88	100	4116288	3.4	14.00	62.75
5	E E'	46842.1	100	4684210	3.4	15.91	62.8
6	F F'	25954.32	100	2595432	3.4	8.83	60.67
7	G G'	43488.61	100	4348861	3.4	14.79	62.95
8	H H'	33327.92	100	3332792	3.4	11.32	62.61
9	I I'	39425	100	3942500	3.4	13.41	62.25
10	J J'	12272.01	100	1227201	3.4	4.16	63.16
11	K K'	17714.69	100	1771469	3.4	6.02	61.85
Total						100.08	62.39

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Sl. No.	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Ore/ saleable Ore (>55% Fe)		
					Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	100	0	3.4	0	0
2	B B'	0	100	0	3.4	0	0
3	C C'	0	100	0	3.4	0	0
4	D D'	0	100	0	3.4	0	0
5	E E'	0	100	0	3.4	0	0
6	F F'	0	100	0	3.4	0	0
7	G G'	10128.5	100	1012850	3.4	3.45	60.59
8	H H'	19893	100	1989300	3.4	6.77	62.85
9	I I'	22022	100	2202200	3.4	7.48	61.48
10	J J'	32237.63	100	3223763	3.4	10.96	62.16
11	K K'	39670	100	3967000	3.4	13.49	61.25
Total						42.15	61.72

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The Measured Mineral resource (331) under different sections on saleable grade @>45% Fe to <55% Fe are given below:-

TOPADIHI

Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Mineral Reject (>45% to <55% Fe)		
					Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	100	0	2.5	0.00	0
2	B B'	0	100	0	2.5	0.00	0
3	C C'	3650	100	365000	2.5	0.92	52.01
4	D D'	3269	100	326888	2.5	0.82	53.61
5	E E'	3555	100	355500	2.5	0.88	52.82
6	F F'	6153	100	615300	2.5	1.53	54.88
7	G G'	6227	100	622720	2.5	1.55	53.24
8	H H'	7917	100	791701	2.5	1.98	53.62
9	I I'	2407	100	240734	2.5	0.60	50.27
10	J J'	2382	100	238230	2.5	0.59	52.57
11	K K'	1179	100	117900	2.5	0.29	51.75
Total						9.18	53.27

BALIASAHI

Sl. No.	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Mineral Reject (>45% to <55% Fe)		
					Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe%)
1	A A'	0	100	0	2.5	0	0
2	B B'	0	100	0	2.5	0	0
3	C C'	0	100	0	2.5	0	0
4	D D'	0	100	0	2.5	0	0
5	E E'	0	100	0	2.5	0	0
6	F F'	0	100	0	2.5	0	0
7	G G'	706	100	70600	2.5	0.18	52.84
8	H H'	326	100	32600	2.5	0.09	51.31
9	I I'	1159	100	115900	2.5	0.28	50.54
10	J J'	1690	100	169000	2.5	0.42	52.57
11	K K'	7485	100	748500	2.5	1.87	52.75
Total						2.84	52.00

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The Indicated Mineral Resources (332) under different sections on saleable grade @ >55% Fe are given below:-

TOPADIHI							
Sl. No.	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Ore/ saleable Ore (>55% Fe)		
					Bulk Density	Resource(in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	25415	150	3812250	3.4	12.99	62.22
2	B B'	0	200	0	3.4	0	0
3	C C'	14384	200	2876800	3.4	9.79	61.98
4	D D'	0	200	0	3.4	0	0
5	E E'	0	200	0	3.4	0	0
6	F F'	0	200	0	3.4	0	0
7	G G'	0	200	0	3.4	0	0
8	H H'	656	200	131200	3.4	0.44	62.79
9	I I'	0	200	0	3.4	0	0
10	J J'	0	200	0	3.4	0	0
11	K K'	0	200	0	3.4	0	0
Total						23.22	62.13

BALIASAHI							
Sl. No.	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Ore/ saleable Ore (>55% Fe)		
					Bulk Density	Resource(in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	200	0	3.4	0	0
2	B B'	0	200	0	3.4	0	0
3	C C'	0	200	0	3.4	0	0
4	D D'	0	200	0	3.4	0	0
5	E E'	6590	200	1318000	3.4	4.48	59.23
6	F F'	1872	200	374400	3.4	1.28	63.72
7	G G'	2377	200	475400	3.4	1.61	62.89
8	H H'	0	200	0	3.4	0	0
9	I I'	0	200	0	3.4	0	0
10	J J'	0	200	0	3.4	0	0
11	K K'	0	200	0	3.4	0	0
Total						7.37	60.81

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The Indicated Resources (332) under different sections on Mineral Rejects @ >45 % Fe<55 % Fe are given below;

TOPADIHI

Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Mineral Reject (>45% to <55% Fe)		
					Bulk Density	Resource(in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	11871	150	1780650	2.5	4.45	52.85
2	B B'	0	200	0	2.5	0	0
3	C C'	8063	200	1612600	2.5	4.03	52.82
4	D D'	908	200	181600	2.5	0.45	53.24
5	E E'	0	200	0	2.5	0	0
6	F F'	0	200	0	2.5	0	0
7	G G'	0	200	0	2.5	0	0
8	H H'	0	200	0	2.5	0	0
9	I I'	0	200	0	2.5	0	0
10	J J'	0	200	0	2.5	0	0
11	K K'	0	200	0	2.5	0	0
Total						8.93	52.86

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Sl. No.	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Mineral Reject (>45% to <55% Fe)		
					Bulk Density	Resource(in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	200	0	2.5	0	0
2	B B'	0	200	0	2.5	0	0
3	C C'	0	200	0	2.5	0	0
4	D D'	190	200	38000	2.5	0.09	51.36
5	E E'	3107	200	621400	2.5	1.56	51.71
6	F F'	0	200	0	2.5	0	51
7	G G'	747	200	149400	2.5	0.38	50.86
8	H H'	0	200	0	2.5	0	0

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9	II'	1867	200	373400	2.5	0.911	50.88
10	JJ'	0	200	0	2.5	0	
11	KK'	0	200	0	2.5	0	0
Total						2.941	51.33

From the above table, the summarized Measured and Indicated Resources assessed under are given below.

In Million Tonnes

Resource Type	Total Tonnage @ +45% Fe (Threshold value)	Saleable Grade @ +55% Fe.	Mineral Rejects @ +45 % Fe to < 55 % Fe.
331	154.25 (Av Grade: 61.47 %)	142.23 (Av Grade: 62.19 %)	12.02 (Av Grade: 52.97 %)
332	42.451 (Av Grade: 59.2 %)	30.59 (Av Grade: 61.81%)	11.871 (Av Grade: 51.48%)
Total	196.707 (Av Grade: 60.98%)	172.82 (Av Grade: 62.13%)	23.891 (Av Grade: 52.73%)

* Recovery Factor of 100 % for Saleable Ore (+55 % Fe) & Mineral Rejects (+45 % Fe to -55 % Fe) have been considered for estimation of Reserve & Resource.

(i) Mineral reserves/Resources:

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

The details of the resources established based on level of exploration as on 12.01.2021 is given in the table below at a cut off of 45% Fe.

Section-Wise Resource of Guali Iron Ore Block (As on 12.01.2021)

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Sl. No	Section No.	X-Sectional area		Length of Influence (mtr)	Volume (CuM)		Bulk Density		Total Resource (in Million Tonnes)	Grade Derived From SURPAC Model(Fe %)
		ORE (>55 %Fe)	MIN.REJ (>45 to < 55 %Fe)		ORE (>55 %Fe)	MIN.REJ (>45 to < 55 %Fe)	ORE (>55 %Fe)	MIN.REJ (>45 to < 55 %Fe)		
1	AA'	7541.5	1187.1	100, 150	3812250	1780650	3.4	2.5	17.41	62.01
2	BB'	0	0	100	0	0	3.4	2.5	0.00	0.00
3	CC'	48582.5	11713	100, 200	6296650	197/600	3.4	2.5	26.35	59.04
4	DD'	41162.88	4176.884	100, 200	4116288	508488.4	3.4	2.5	15.27	60.67
5	EE'	46842.1	3555	100, 200	4684210	355500	3.4	2.5	16.82	62.75
6	FF'	25954.32	6153	100, 700	2595432	615300	3.4	2.5	10.36	59.04
7	GG'	43488.61	6227.202	100, 200	4348861	622720.2	3.4	2.5	16.34	61.16
8	HH'	33983.92	7917.013	100, 200	3463902	791701.3	3.4	2.5	13.76	58.93

9		3942S	2407.34	100, 200	3942500	240734	3.4	2.5	14.01	60.25
10		12272.01	2382.3	100, 200	1227201	238230	3.4	2.5	4.77	61.15
11		17714.69	1179	100, 200	1771469	117900	3.4	2.5	6.32	60.45
Sub-Total									143.40	61.15

Section-Wise Resource of Guali Iron Ore Block (As on 12.01.2021)

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Sl. No	Section No.	X-Sectional area,		Length of influence (mtr)	Volume (CuM)		Bulk Density		Total Resource (in Million Tonnes)	Grade Derived From SURPAC Model. (Fe %)
		ORE (>55 %Fe)	MIN.REJ (>45 to < 55 %Fe)		ORE (>55 %Fe)	MIN.REJ (>45 to < 55 %Fe)	ORE (>55 %Fe)	MIN.REJ (>45 to < 55 %Fe)		
1	AA'	0	0	100, 200	0	0	3.4	2.5	0.00	0.00
2	BB'	0	0	100, 200	0	0	3.4	2.5	0.00	0.00
3	CC'	0	0	100, 200	0	0	3.4	2.5	0.00	0.00
4	DD'	0	190	100, 200	0	38000	3.4	2.5	0.10	61.23
5	EE'	6590	3107	100, 200	1318000	621400	3.4	2.5	6.03	59.46
6	FF'	1872	0	100, 200	374400	0	3.4	2.5	1.27	60.59
7	GG'	12505.5	1453	100, 200	1488250	220000	3.4	2.5	5.61	60.45
8	HH'	19893	326	100, 200	1989300	32600	3.4	2.5	6.85	59.04
9	II'	22022	3026	100, 200	2202200	489300	3.4	2.5	8.71	60.23
10	JJ'	32237.63	1690	100, 200	3223763	169000	3.4	2.5	11.38	58.23
11	KK'	39670	7485	100, 200	3967000	748500	3.4	2.5	15.36	61.67
Sub-Total									55.307	60.54

Summary of Geological Reserve as per the standard norms of UNFC is given below

In Million Tonnes

Resource Type	Total Tonnage @ +45% Fe (Threshold value)	Saleable Grade @ +55% Fe.	Mineral Rejects @ +45 % Fe to < 55 % Fe.
G1 (Detailed Exploration)	154.25 (Av Grade: 61.47 %)	142.23 (Av Grade: 62.19 %)	12.02 (Av Grade: 52.97 %)
G2 (General Exploration)	42.451 (Av Grade: 59.2 %)	30.59 (Av Grade: 61.81%)	11.871 (Av Grade: 51.48%)
G3 (Prospecting)	---	---	---
G4 (Reconnaissance)	---	---	---
Total	196.707 (Av Grade: 60.98%)	172.82 (Av Grade: 62.13%)	23.891 (Av Grade: 52.73%)

(ii) Mineable Reserve: Mineable Reserve has been calculated deducting the reserve that would be blocked under the pit slope, statutory barrier. The details section wise Mineable Reserve and Non-Mineable Remaining Resource are given below.

(i) Probable Mineral Reserve (121), above UPL @ (>55% Fe)

TOPADIHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	100	0	3.4	0.00	0.00
2	B B'	0	100	0	3.4	0.00	0.00
3	C C'	29535	100	2953500	3.4	10.05	62.8
4	D D'	35559	100	3555900	3.4	12.10	60.67
5	E E'	35024	100	3502400	3.4	11.90	61.49
6	F F'	19735	100	1973492	3.4	6.71	62.61
7	G G'	34047	100	3404700	3.4	11.58	62.25
8	H H'	29116	100	2911600	3.4	9.89	63.16
9	I I'	39425	100	3942500	3.4	13.41	61.85
10	J J'	11208	100	1120800	3.4	3.80	62.39
11	K K'	14594	100	1459400	3.4	4.96	61.75
Total						84.40	62.57

ii. Probable Mineral Reserve (122), above UPL (> 55 % Fe)

TOPADIHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	18337	150	2750550	3.4	9.37	62.25
2	B B'	0	200	0	3.4	0	0
3	C C'	7134	200	1426800	3.4	4.85	62.56
4	D D'	0	200	0	3.4	0	0
5	E E'	0	200	0	3.4	0	0
6	F F'	0	200	0	3.4	0	0
7	G G'	0	200	0	3.4	0	0
8	H H'	615	200	123000	3.4	0.41	62.39
9	I I'	0	200	0	3.4	0	0
10	J J'	0	200	0	3.4	0	0

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11	K K'	0	200	0	3.4	0	
	Total					14.61	62.44

(iii) Probable Mineral Reserve (121), above UPL (> 45 %to < 55 % Fe)

TOPADIHI

Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	100	0	2.5	0	0
2	B B'	0	100	0	2.5	0	0
3	C C'	3650	100	365000	2.5	0.92	51.95
4	D D'	2920	100	292000	2.5	0.73	53.7
5	E E'	3555	100	355500	2.5	0.88	52.85
6	F F'	6153	100	615300	2.5	1.53	53.9
7	G G'	5877	100	587700	2.5	1.46	52.57
8	H H'	7583	100	758300	2.5	1.90	53.24
9	I I'	2309	100	230900	2.5	0.58	50.65
10	J J'	2382	100	238230	2.5	0.59	52.47
11	K K'	1179	100	117900	2.5	0.29	51.78
	Total					8.90	52.67

(iv) Probable Mineral Reserve (122), above UPL (> 45 % to < 55 % Fe)

TOPADIHI

Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	11871	150	1780650	2.5	4.45	52.85
2	B B'	0	200	0	2.5	0	0
3	C C'	8063	200	1612600	2.5	4.03	52.82
4	D D'	0	200	0	2.5	0	0
5	E E'	0	200	0	2.5	0	0
6	F F'	0	200	0	2.5	0	0
7	G G'	0	200	0	2.5	0	0
8	H H'	0	200	0	2.5	0	0

Pradip Ku Sahoo

Subrat Ku Behera

9	I I'	0	200	0	2.5	0	
10	J J'	0	200	0	2.5	0	
11	K K'	0	200	0	2.5	0	0
Total						8.48	52.83

(v) Probable Mineral Reserve (121), above UPL (> 55 % Fe)

BALIASAHI

Sl. No	Section No.	X Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe%)
1	A A'	0	100	0	3.4	0.00	0.00
2	B B'	0	100	0	3.4	0.00	0.00
3	C C'	0	100	0	3.4	0.00	0.00
4	D D'	0	100	0	3.4	0.00	0.00
5	E E'	0	100	0	3.4	0.00	0.00
6	F F'	0	100	0	3.4	0.00	0.00
7	G G'	7126	100	712600	3.4	2.43	60.17
8	H H'	14265	100	1426500	3.4	4.85	62.17
9	I I'	22022	100	2202200	3.4	7.48	61.48
10	J J'	23721	100	2372100	3.4	8.07	62.34
11	K K'	31035	100	3103500	3.4	10.55	61.3
Total						33.38	61.65

(vi) Probable Mineral Reserve (122), above UPL (> 55 % Fe)

BALIASAHI

Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe%)
1	A A'	0	200	0	3.4	0	0
2	B B'	0	200	0	3.4	0	0
3	C C'	0	200	0	3.4	0	0
4	D D'	0	200	0	3.4	0	0
5	E E'	6478	200	1295600	3.4	4.4	59.3
6	F F'	1872	200	374400	3.4	1.28	63.72

Pradip Ku Sahoo

Subrat Ku Behera

7	G G'	0	200	0	3.4	0	0
8	H H'	0	200	0	3.4	0	
9	I I'	0	200	0	3.4	0	
10	J J'	0	200	0	3.4	0	
11	K K'	0	200	0	3.4	0	0
Total						5.68	62.18

(vii) Probable Mineral Reserve (121), above UPL (> 45 % to < 55 % Fe)

BALIASAHI

Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	100	0	2.5	0	0
2	B B'	0	100	0	2.5	0	0
3	C C'	0	100	0	2.5	0	0
4	D D'	0	100	0	2.5	0	0
5	E E'	0	100	0	2.5	0	0
6	F F'	0	100	0	2.5	0	0
7	G G'	706	100	70600	2.5	0.18	52.84
8	H H'	326	100	32600	2.5	0.09	51.31
9	I I'	871	100	87100	2.5	0.21	50.27
10	J J'	1690	100	169000	2.5	0.42	52.57
11	K K'	7137	100	713700	2.5	1.78	51.75
Total						2.68	53.27

(viii) Probable Mineral Reserve (122), above UPL (> 45 % to < 55 % Fe)

BALIASAHI

Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Reserve (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
1	A A'	0	150	0	2.5	0	0
2	B B'	0	200	0	2.5	0	0
3	C C'	0	200	0	2.5	0	0
4	D D'	0	200	0	2.5	0	0
5	E F'	2134	200	426800	2.5	1.07	51.85
6	F F'	0	200	0	2.5	0	0

Pradip Ku Sahoo

Subrat Ku Behera

7	G G'	0	200	0	2.5	0	
8	H H'	0	200	0	2.5	0	
9	I I'	1867	200	373400	2.5	0.93	0
10	J J'	0	200	0	2.5	0	0
11	K K'	0	200	0	2.5	0	0
Total						2.00	51.85

(ix) Pre-Feasibility Mineral Resource (221), below UPL (>55% Fe)

TOPADIHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe%)
		Blocked under UPL					
1	A A'	0	100	0	3.4	0.00	0.00
2	B B'	0	100	0	3.4	0.00	0.00
3	C C'	4664	100	466350	3.4	1.59	60.59
4	D D'	5604	100	560388	3.4	1.90	62.10
5	E E'	11818	100	1181810	3.4	4.01	59.04
6	F F'	6219	100	621939.5	3.4	2.12	62.16
7	G G'	9442	100	944161.2	3.4	3.21	60.67
8	H H'	4232	100	421192	3.4	1.43	60.59
9	I I'		100	0	3.4	0.00	60.45
10	J J'	1064	100	106401	3.4	0.36	59.04
11	K K'	3121	100	312069	3.4	1.06	62.16
Total						15.68	61.68

(x) Pre-Feasibility Mineral Resource (222), below UPL (>55% Fe)

TOPADIHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe%)
		Blocked under UPL					
1	A A'	7078	150	1061700	3.4	3.62	60.67
2	B B'	0	200	0	3.4		
3	C C'	7250	200	1450000	3.4	4.94	60.95
4	D D'	0	200	0	3.4	0	0
5	E E'	0	200	0	3.4	0	0
6	F F'	0	200	0	3.4	0	0

Pradip Kr Sahoo

Subrat Ku Behera

7	G G'	0	200	0	3.4	0	0
8	H H'	41	200	8200	3.4	0.03	
9	I I'	0	200	0	3.4	0	
10	J J'	0	200	0	3.4	0	
11	K K'	0	200	0	3.4	0	0
Total						8.60	60.85

(xi) Pre-Feasibility Mineral Resource (221), below UPL (>45% Fe to <55% Fe)

TOPADIHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe%)
		Blocked under UPL					
1	A A'	0	100	0	2.5	0	0
2	B B'	0	100	0	2.5	0	0
3	C C'	0	100	0	2.5	0	0
4	D D'	349	100	34888	2.5	0.09	52.37
5	E E'	0	100	0	2.5	0	0
6	F F'	0	100	0	2.5	0	0
7	G G'	350	100	35020	2.5	0.09	50.35
8	H H'	334	100	33401	2.5	0.08	51.8
9	I I'	98	100	9834	2.5	0.02	52.01
10	J J'	0	300	0	2.5	0	0
11	K K'	0	100	0	2.5	0	0
Total						0.28	53.79

(xii) Pre-Feasibility Mineral Resource (222), below UPL (>45% Fe to <55% Fe)

TOPADIHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (in Million Tonnes)	Grade (Fe%)
		Blocked under UPL					
1	A A'	0	150	0	2.5	0	0
2	B B'	0	200	0	2.5	0	0
3	C C'	0	200	0	2.5	0	0
4	D D'	908	200	181600	2.5	0.45	53.24

Prarlin Ku Sahoo

Subrat Kr Behera

5	E E'	0	200	0	2.5	0	
6	F F'	0	200	0	2.5	0	
7	G G'	0	200	0	2.5	0	
8	H H'	0	200	0	2.5	0	0
9	I I'	0	200	0	2.5	0	0
10	J J'	0	200	0	2.5	0	0
11	K K'	0	200	0	2.5	0	0
Total						0.45	51.51

(xiii) Pre-Feasibility Mineral Resource (221), below UPL (>55% Fe)

BALIASAHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe%)
		Blocked under UPL					
1	A A'	0	100	0	3.4	0.00	0.00
2	B B'	0	100	0	3.4	0.00	0.00
3	C C'	0	100	0	3.4	0.00	0.00
4	D D'	0	100	0	3.4	0.00	0.00
5	E E'	0	100	0	3.4	0.00	0.00
6	F F'	0	100	0	3.4	0.00	0.00
7	G G'	3003	100	300250	3.4	1.02	60.87
8	H H'	5628	100	562800	3.4	1.92	63.19
9	I I'		100	0	3.4	0.00	0.00
10	J J'	8517	100	851663	3.4	2.89	60.80
11	K K'	8635	100	863500	3.4	2.94	61.15
Total						8.77	61.59

(xiv) Pre-Feasibility Mineral Resource (222), below UPL (>55% Fe)

BALIASAHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
		Blocked under UPL					
1	A A'	0	200	0	3.4	0	0
2	B B'	0	200	0	3.4	0	0
3	C C'	0	200	0	3.4	0	0

Prafulla Ku Sahoo

Subrat Ku Behera

4	D D'	0	200	0	3.4	0	
5	E E'	112	200	22400	3.4	0.08	
6	F F'	0	200	0	3.4	0	
7	G G'	2377	200	475400	3.4	1.61	62.89
8	H H'	0	200	0	3.4	0	0
9	I I'	0	200	0	3.4	0	0
10	J J'	0	200	0	3.4	0	0
11	K K'	0	200	0	3.4	0	0
Total						1.69	60.32

(xv) Pre-Feasibility Mineral Resource (221), below UPL (>45% Fe to <55% Fe)

BALIASAHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (In Million Tonnes)	Grade derived from SURPAC software. (Fe %)
		Blocked under UPL					
1	A A'	0	100	0	2.5	0.00	0
2	B B'	0	100	0	2.5	0.00	0
3	C C'	0	100	0	2.5	0.00	0
4	D D'	0	100	0	2.5	0.00	0
5	E E'	0	100	0	2.5	0.00	0
6	F F'	0	100	0	2.5	0.00	0
7	G G'	0	100	0	2.5	0.00	0
8	H H'	0	100	0	2.5	0.00	0
9	I I'	288	100	28800	2.5	0.07	50.91
10	J J'	0	100	0	2.5	0.00	0.00
11	K K'	348	100	34800	2.5	0.09	52.87
Total						0.16	53.45

(xvi) Pre-Feasibility Mineral Resource (222), below UPL (>45% Fe to <55% Fe)

BALIASAHI							
Sl. No	Section No.	X-Sectional Area (In M2)	Length of Influence (In Mtr)	Volume (CuM)	Bulk Density	Resource (in Million Tonnes)	Grade derived from SURPAC software. (Fe %)
		Blocked under UPL					
1	A A'	0	150	0	2.5	0	0
2	B B'	0	200	0	2.5	0	0
3	C C'	0	200	0	2.5	0	0

Pradip Ku Sahoo

Subrat Ku Behera

4	D D'	190	200	38000	2.5	0.0	
5	E E'	973	200	194600	2.5	0.471	
6	F F'	0	200	0	2.5	0	0
7	G G'	747	200	149400	2.5	0.38	50.80
8	H H'	0	200	0	2.5	0	0
9	I I'	0	200	0	2.5	0	50.88
10	J J'	0	200	0	2.5	0	0
11	K K'	0	200	0	2.5	0	0
Total						0.941	51.19

Reserves/Resources as on 12.01.2021 for the Guali Iron Ore Block as per UNFC are given below.

Summary updated Reserve & Resource as on 12.01.2021 are given below.

In Million Tonnes

Sl. No	Reserve Category (UNFC Classification)	Fe > 45 %		Fe > 45 % & < 55%		Fe > 55 %	
		Qty. in million Tonnes	Grade (Fe %)	Qty. in million Tonnes	Grade (Fe %)	Qty. in million Tonnes	Grade (Fe %)
1	Proved Mineral Reserves (111)	0	0	0	0	0	0
2	Probable Mineral Reserves (121)	129.36	61.59	11.58	52.94	117.78	62.30
3	Probable Mineral Reserves (122)	30.776	61.34	10.48	52.64	20.296	62.35
A	Total Reserve	160.136	61.54	22.06	52.80	138.076	62.31
B	Feasibility Mineral Resource (211)	0	0	0	0	0	0
	Pre-Feasibility Mineral Resource (221)	24.89	60.85	0.44	53.67	24.45	61.65
	Pre-Feasibility Mineral Resource (222)	11.681	53.58	1.387	51.29	10.294	60.76
4	Remaining measured resource (331)	NIL	NIL	NIL	NIL	NIL	NIL
5	Indicated Resource (332)	NIL	NIL	NIL	NIL	NIL	NIL
6	Inferred Resource (333)	NIL	NIL	NIL	NIL	NIL	NIL
7	Reconnaissance Resource (334)	NIL	NIL	NIL	NIL	NIL	NIL
B	Total Resource	36.571	58.53	1.831	51.85	34.744	61.39
	Total Reserve & Resource (A+B)	196.707	60.98	23.887	52.73	172.82	62.13

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 in variable recovery factor and bulk density. Thus, tonnage arrived are tentative.

Reserve & Grade as per United Nations Framework Classification: (As on 12.01.2021)

	Category	Code	Quantity (Million Tons)	Grade %
A- Mineral Reserve	Proved	(111)	-	-
	Probable	(121)	117.78	+55% Fe
			11.58	+45% to -55% Fe
		(122)	20.296	+55% Fe
			10.48	+45% to -55% Fe
	Sub Total (A)		138.076	+55% Fe
			22.06	+45% to -55% Fe
B- Remaining Resources	Feasibility Mineral Resources	(211)		
	Pre-feasibility Mineral Resources	(221)	24.45	+55% Fe
			0.44	+45% to -55% Fe
		(222)	10.294	+55% Fe
			1.387	+45% to -55% Fe
	Measured Mineral Resources	(331)		
	Indicated Mineral Resources	(332)	--	
	Inferred Mineral Resources	(333)	--	
	Reconnaissance Mineral Resources	(334)	--	
	Sub Total (B)		34.744	+55% Fe
			1.827	+45% to -55% Fe
Total Reserve + Resource (A+B)			172.82	+55% Fe
			23.887	+45% to -55% Fe
Grand total			196.707	+45% Fe

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.

Justification in respect of UNFC Codification

Under UNFC, the reserves have been categorized by attributing 3-digit codes of Economic axis (E) Feasibility axis) (F) and Geological axis (G). Though there is no one to one comparison between the conventional/ Indian National Classification System (INCS) with UNFC, an attempt has been made to co relate the two systems in the instant study area of Guali mining lease based on the details available for the lease area.

(a) Probable Reserves of Ore and Mineral Reject (121)

Economic Axis	Feasibility Axis	Geological Axis	Code
Exploration 1. Geological Report of Guali Iron Ore Block indicates different grades of iron ore. 2. Probable mineral reserve (>55% Fe & 45-55% Fe) under UNFC code 121 comes to 129.36 million tonnes. Under 122 category, the ore and mineral rejects quantities are 30.77 million tonnes . The ore and mineral rejects under these categories are economically extractable. Status of Forests 3. Knowledge of forest & non forest & other land use data are available. 4. Forest clearance obtained over an area of 137.417 Ha Status of Environment 6. Environmental Clearance obtained for 5.7 million tonnes. Further for the expanded quantity the lessee will go for environmental clearance	The mineable reserve from the measured resource has been kept under F2 Axis because of the following reason: Geology 1. Geological mapping and study of opened up quarries within the lease area along with core drilling. Feasibility of MR is dependent on market condition, blending with higher grade ore. Part of the area is explored under G1 category by drilling 99 bore holes and part of the area is explored under G2 category. Hence the entire area is not explored under G1 category Mining 2. Open cast mechanized method of mining with forming of 15m height and 30 width benches will be followed both in Topadih (Block – A) and Baliasahi (Block – B). Environmental issue 3. Base line data on environment has been collected. Further after the mining commencement the periodical monitoring will be carried out Processing 4. Processing is required and proposed for sizing and screening of R.O.M. ore.	Geological Survey 1. Mapping has been done on 1:2000 Scale 2. Opened up quarries have been mapped in detail and the exposures studied. Drilling 1. Based on Geological Report, 167 numbers of holes have been drilled at 100 m x 100 m spacing to calculate G1 and 200 m x 200 m to calculate G2 resources. Sampling 1. Based on Geological Report Sampling has been done all over the excavated quarry as well as drill hole core samples and analyzed. Totally 8644 core samples were analysed out of which 1140 samples are analysed in NABL accredited lab Petrography 3. Study of petrography and mineralogy of the ores shall be at the time of beneficiation studies	121

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Economic Axis	Feasibility Axis	Geological Axis
	Infrastructure and Services and construction activities 5. Infrastructural facilities for mining operation already exist since the same was created by the earlier lessee and further the area is surrounded by a number of working mines. Costing 6. The cost of mining will be economical as evidenced in the nearby mines and past records of this mine. Economic viability 7. The mining project is economically viable since the ore will be supplied to different steel plant and sponge iron plants to a large extend. OMC provides the ore and fulfills the commitment of the State Government. 8. Mining is being and will be carried out under Mines Act - 1952, MCDR-2017.	

Pradip Ku Sahoo

Sukrat Ku Behera

b) Probable Reserves of Ore and Mineral Reject (122)

Economic Axis	Feasibility Axis	Geological Axis	Code
Exploration 1. Geological Report of Guali Iron Ore Block indicates different grades of iron ore. 2. Probable mineral reserve (>55% Fe & 45-55% Fe) under UNFC code 121 comes to 329.36 milllion tonnes. Under 122 category, the ore and mineral rejects quantities are 30.77 million tonnes . The ore and mineral rejects under these categories are economically extractable. Status of Forests 3. Knowledge of forest & non forest & other land use data are available. 4. Forest clearance obtained over an area of 137.417 Ha Status of Environment 6. Environmental Clearance obtained for 5.7 million tonnes. Further for the expanded quantity the lessee will go for environmental clearance	The mineable reserve from the measured resource has been kept under F2 Axis because of the following reason: Geology 1.Geological mapping and study of opened up quarries within the lease area along with core drilling. Feasibility of MR is dependent on market condition, blending with higher grade ore. Part of the area is explored under G2 category by drilling 68 bore holes. Hence the entire area is not explored under G1 category Mining 2. Open cast mechanized method of mining with forming of 15m height and 30 width benches will be followed both in Topadih (Block – A) and Bailasahi (Block – B). Environmental issue 3. Base line data on environment has been collected. Further after the mining commencement the periodical monitoring will be carried out Processing 4. Processing is required and proposed for sizing and screening of R.O.M. ore. Infrastructure and Services and construction activities 5. Infrastructural facilities for mining operation already exist since the same was created by the earlier lessee and further the area is surrounded by a number of working mines. Costing 6. The cost of mining will be economical as evidenced in the nearby mines and	Geological Survey 1. Mapping has been done on 1:2000 Scale 2. Opened up quarries have been mapped in detail and the exposures studied. Drilling 1. Based on Geological Report, 167 numbers of holes have been drilled at 100 m x 100 m spacing to calculate G1 and 200 m x 200 m to calculate G2 resources. Sampling 1. Based on Geological Report Sampling has been done all over the excavated quarry as well as drill hole core samples and analyzed. Totally 8644 core samples were analysed out of which 1140 samples are analysed in NABL accredited lab Petrography 1. Study of petrography and mineralogy of the ores shall be at the time of beneficiation studies	122

Pradip Ku Sahoo

Subrat Ku Behera

Economic Axis	Feasibility Axis	Geological Axis	Co
	past records of this mine. Economic viability 7. The mining project is economically viable since the ore will be supplied to different steel plant and sponge iron plants to a large extend. OMC provides the ore and fulfills the commitment of the State Government. 8. Mining is being and will be carried out under Mines Act - 1952, MCDR-2017.		

Pradip Ku Sahoo

Subrat Ku Behera

(c) Pre- Feasibility Mineral Resource of iron ore including Mineral Rejects (221)

Economic Axis	Feasibility Axis	Geological Axis	Code
1. Geological Report of Guali Iron Ore Block indicates different grades of iron ore. 2. Blocked resources due to safety zone and non-mineable resources is of 24.45 million tonnes (>55% Fe) & 0.44 million tonnes (45% Fe to <55% Fe) under UNFC code 221. These ores are possibly economically viable subject to changes in technological, economic, environmental and/or other relevant conditions. 3. Knowledge of forest & non forest & other land use data are available. 4. Forest clearance obtained over an area of 137.417 Ha Status of Environment 5. Environmental Clearance obtained for 5.7 million tonnes. Further for the expanded quantity the lessee will go for environmental clearance.	Geology : 1. Geology: Geological mapping and study of opened up quarries within the lease area along with core drilling. Feasibility of MR is dependent on market condition, blending with higher grade ore. Part of the area is explored under G1 category by drilling 99 bore holes and part of the area is explored under G2 category. Hence the entire area is not explored under G1 category Mining 2. Open cast mechanized method of mining with forming of 15m height and 30 width benches will be followed both in Topadih (Block – A) and Bailasahi (Block – B). Environmental issue 3. Base line data on environment has been collected. Further after the mining commencement the periodical monitoring will be carried out Processing 4. Processing is required and proposed for sizing and screening of R.O.M. ore. Infrastructure and Services and construction activities 5. Infrastructural facilities for mining operation already exist since the same was created by the earlier lessee and further the area is surrounded by a number of working mines. Costing 6. The cost of mining will be economical as evidenced in the nearby mines and past records of this mine.. Economic viability 7. The mining project will be economically viable since the ore will be supplied to different steel	1. 1 Mapping has been done on 1:2000 Scale 2. Opened up quarries have been mapped in detail and the exposures studied. Drilling 1. Based on Geological Report, 167 numbers of holes have been drilled at 100 m x 100 m spacing to calculate G1 and 200 m x 200 m to calculate G2 resources. Sampling 1. Based on Geological Report Sampling has been done all over the excavated quarry as well as drill hole core samples and analyzed. Totally 8644 core samples were analysed out of which 1140 samples are analysed in NABL accredited lab Petrography 1. Study of petrography and mineralogy of the ores shall be at the time of beneficiation studies	221

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Economic Axis	Feasibility Axis	Geological Axis	Code
	plant and sponge iron plants to a large extend. OMC provides the ore and fulfills the commitment of the State Government. 8. Mining is being and will be carried out under Mines Act - 1952, MCDR-2017.		

(d) Pre- Feasibility Mineral Resource of Iron ore Including Mineral Rejects (222)

Economic Axis	Feasibility Axis	Geological Axis	Code
1. Geological Report of Guali Iron Ore Block indicates different grades of iron ore. 2. Blocked resources due to safety zone and non-mineable resources is 10.294 million tonnes (>55% Fe) & 1.41 million tonnes (45% Fe to <55% Fe) under UNFC code 222. These ores are possibly economically viable subject to changes in technological, economic, environmental and/or other relevant conditions. 3. Knowledge of forest & non forest & other land use data are available. 4. Forest clearance obtained over an area of 137.417 Ha Status of Environment 5. Environmental Clearance obtained for 5.7 million tonnes. Further for the expanded quantity the lessee will go for environmental clearance.	Geology : 1. Geology: Geological mapping and study of opened up quarries within the lease area along with core drilling. Feasibility of MR is dependent on market condition, blending with higher grade ore. Part of the area is explored under G2 category by drilling 68 bore holes and part of the area is explored under G2 category. Hence the entire area is not explored under G1 category Mining 2. Open cast mechanized method of mining with forming of 15m height and 30 width benches will be followed both in Topadih (Block – A) and Baliasahi (Block – B). Environmental issue 3. Base line data on environment has been collected. Further after the mining commencement the periodical monitoring will be carried out Processing 4. Processing is required and proposed for sizing and screening of R.O.M. ore. Infrastructure and Services and construction activities 5. Infrastructural facilities for mining operation already exist since the same was created by the earlier lessee and further the area is surrounded by a number of working mines.	1. 1 Mapping has been done on 1:2000 Scale 2. Opened up quarries have been mapped in detail and the exposures studied. Drilling 1. Based on Geological Report, 167 numbers of holes have been drilled at 100 m x 100 m spacing to calculate G1 and 200 m x 200 m to calculate G2 resources. Sampling 1. Based on Geological Report Sampling has been done all over the excavated quarry as well as drill hole core samples and analyzed. Totally 8644 core samples were analysed out of which 1140 samples are analysed in NABL accredited lab Petrography 1. Study of petrography and mineralogy of the ores shall be at the time of beneficiation studies	222

Pradip Ku Sahoo

Subrat Ku Behera

Economic Axis	Feasibility Axis	Geological Axis	Code
	Costing 6. The cost of mining will be economical as evidenced in the nearby mines and past records of this mine.. Economic viability 7. The mining project will be economically viable since the ore will be supplied to different steel plant and sponge iron plants to a large extend. OMC provides the ore and fulfills the commitment of the State Government. 8. Mining is being and will be carried out under Mines Act - 1952, MCDR-2017.		

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Subrat Kr Behera

2.0 MINING

A. OPEN CAST MINING:

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

The present proposal is a fresh Mining Plan submitted after reservation, allocation and execution of the mining lease deed in favour of Odisha Mining Corporation Ltd. The existing quarries, waste dump, stock yards, infrastructures etc are detailed below.

Details of existing Quarry Position:

As per fresh survey conducted in the Guali Iron Ore Block, following quarry locations have been identified.

Sl. No	Name of the Pit/ Block	Location (Grid)	Size of Pit (in m)		Surface Area Covered (in Ha.)	Top Bench RL, mRL	Bottom Bench RL, mRL	Over all pit slope	Total no. of Benches		Area Back filled	Area Reclaimed & Rehabilitated
			Length	Breadth					Ore	OB		
01	Tapadihi Block A	2432685N to 2433505N 325455E to 325960E	840	348	29.26	590	525	45°	07	0	NIL	NIL
02	Baliasahi Block B	2432670N to 2433130N 323755E to 324485E	685	309	21.19	569	520	45°	05	0	NIL	NIL

Details of existing Stock Position

As per fresh survey conducted in the ML area following stocks locations have been identified in Guali Iron Ore Block. As per field survey done, following ROM stacks were found within ML area. However, detail analysis will be done for each stack once the mining operation resumes in the mine.

Sl.No	Location	Stock Type	Co-ordinate
01	Tapadihi Block-A	Stock -1	2432867N to 2433400 N; 325280E to 326025E
		Stock 2	2432694N to 2433013 N; 325619E to 326025E
		Stock-3	2433060N to 2433320N; 325095E to3252628
		Stock-4	2433480N to 2433748N; 325335E to 325540E
		Stock-5	2433568N to 2433745N; 325470N to 325690E
02	Baliasahi Block-B	Stock-6	2433435N to 2433605N; 324625E to 374840E
		Stock-7	2433183N to 2433357N; 323893E to 323976E

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Details of the existing Waste Dumps

As per fresh survey conducted in the ML area following waste dump location have been identified in Guali Iron Ore Block.

Name of Dump	Block	Location	Length (max) in mtr	Breadth (max) in mtr	Area occupied		Grade
					(m^2)	(Ha)	
Waste Dump-1	Baliasahi Block-B	2433490N to 2433715N 324650E to 324970E	225	170	38370	3.8	<45%Fe
Temporary Waste Dump-2	Topadihi Block-A	2433595N to 2433740N 325640E to 325850E	190	105	20000	2	<45%Fe

Details of the existing major infrastructure

Within the ML area, infrastructure such as site office, Weigh Bridge, rest shed, First-aid Centre, blasting shed security house, magazine, guard house etc are already there. There is Steel and power plant inside the ML area which doesn't belong to the lessee.

Justification for proposed area of mining

Both the blocks where mining is proposed is covered under G1 /G2 category of exploration. Hence the above two blocks are considered for mining. Till date two quarries namely Topodihi and Balaisahi was worked by the earlier lessee. The mine is proposed to be continued to be worked in those two blocks namely Topodihi (Block –A) and Balaisahi (Block – B)

Proposed Mining Method:

- The Guali Iron Ore Block is to be considered under Category-A (Fully Mechanized Opencast category) as per the IBM guidelines.
- The mine is proposed to be worked by mechanised opencast mining method by engaging HEMMs with deep hole drilling and blasting.
- The lease has been executed on 12.01.2021, which forms the first year of the plan period i.e. 2020-21 during which a production of 0.479 Million Tonnes has been considered. For the second year of the plan period i.e. 2021-22 an existing EC capacity of 5.7 MTPA has been proposed. From third year onwards a production capacity of 30 MTPA has been proposed for the balance three years of the plan period i.e. 2022-23, 2023-24 and 2024-25. Hence revised Environmental clearance for the expanded quantity will be applied. Similarly lessee shall obtain requisite statutory clearances from different statutory authorities.

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- Two quarries namely Topadih (Block A) and Baliasahi (Block B) within the ML area are proposed to be worked.
- The maximum bench height & width in Topadih (Block A) and are proposed to be 15 m & 30 m respectively.
- Average bench slope is proposed to be 80^0- 85^0.
- Drill hole diameter is proposed to be 150 to 160mm.
- During the first year of the plan period i.e. 2020-21 during which a production of 0.479 Million Tonnes has been considered. For the second year of the plan period i.e. 2021-22 an existing EC capacity of 5.7 MTPA has been proposed, after which for the balance 3 years of the plan period the proposed production will be 30 MTPA. Hence in the initial two years excavators of 6.0 m3 capacity and 60m3 dumpers will be used. From third year onwards i.e. 2022-23 to 2024-25 excavator of 36 m3 capacity and 120m3 capacity dumpers will be primarily used. Alternatively an excavator of 15 m3 capacity is kept optionally instead of 36m3 excavator. Besides wheel loaders of 5 m3 is proposed for product loading at the screen/crusher.
- Blasting is proposed to be carried out with emulsion/slurry explosive. NONEL is proposed to be used to control ground vibration & better optimization in blasting.
- The blasted ROM is proposed to be fed to crusher & screening plants for further sizing and screening to CLO (10-40/ 5-18 mm) and fines (-10 mm). The output is to be sent to designated stack yards for selling to different buyers.

Proposed Mine Design Parameter:

	Topadih (Block A)	Baliasahi (Block B)
Maximum Bench Height, mtr	15	15
Minimum Bench Width, mtr	30	30
Bench Slope Angle	80	80
Overall Pit Slope Angle	45	45
Depth of working during plan period	75 meter	45 meter
Maximum Gradient of Haul Road	Max 1 in 16	Max 1 in 16

Proposed Drilling & Blasting: Blast holes drilling are proposed by DTH drill of 150-160 mm dia. Single or multi row drilling with hole to hole delay are proposed. Proper charging, stemming and control blasting by using NONEL of different delay interval are proposed to reduce ground vibration.

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Proposed Loading & Transportation: During the first year of the plan period i.e. 2020-21 production of 0.479 Million Tonnes has been considered. For the second year of the plan period i.e. 2021-22 the existing EC capacity of 5.7 MTPA has been proposed, after which for the balance 3 years of the plan period the proposed production will be scaled to 30 MTPA. Hence in the initial two years excavators of 6.0 m^3 capacity and 60m^3 dumpers will be used. From third year onwards i.e. 2022-23 to 2024-25 excavator of 36 m^3 capacity and 120m^3 capacity dumpers will be primarily used. Alternatively an excavator of 15 m3 capacity is kept optionally instead of 36m3 excavator. Besides at the crushing and screening plant wheel loader of 5m3 capacity will be used.

During the plan period: Waste/ ROM material is proposed to be loaded in the initial two years by utilizing excavators of 6.0 m^3 capacity and 60m^3 dumpers. From third year onwards i.e. 2022-23 to 2024-25 excavator of 36 m^3 capacity and 120m^3 capacity dumpers will be primarily used for transporting the ROM to the crushing and screening plan and waste to the waste dump yards. Alternatively an excavator of 15 m3 capacity is kept optionally instead of 36m^3 excavator.

ROM after processing in crushing and screening plants is to be stacked in the designated stockyards within the lease hold area for selling to buyers. During the plan period the entire ore is proposed to be transported by road. For 30 MTPA, it is proposed to transport approx 9 MTPA through road and 21 MTPA through pipeline in the form of slurry out of the ML area.

Method and Manner of disposal of waste:

During the first years of the plan period i.e. 2020-21 no waste is likely to generate as the mining will be carried out in already developed area. The waste generated during the 2nd year i.e. 2021-22 will be utilized for road formation/maintenance. From the 3rd year onwards the 70 % of the waste generated will be dumped in Waste dump-A along co-ordinates N-2433403 to N-2433713 & E-323200 to E-323795 and the rest 30% will be utilized for road formation/maintenance.

Capacity of the Mine

The lease has been executed on 12.01.2021, which forms the first year of the plan period i.e. 2020-21 during which a production of 0.479 Million Tonnes has been considered. For the second year of the plan period i.e. 2021-22 an existing EC capacity of 5.7 MTPA has been proposed. From third year onwards a production capacity of 30 MTPA has been proposed for the balance three years of the plan period i.e. 2022-23, 2023-24 and 2024-25. Hence Environmental clearance for the enhanced

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quantity will be applied. The ROM constitutes saleable ore and Mineral Rejects. However, the required grade of ore will be met by blending the mineral reject with high grade ore.

No of pits to be developed

Till date two quarries namely Topodihi and Balaisahi was worked by the earlier lessee. The mine is proposed to be continued to be worked in those two blocks namely Topodihi (Block –A) and Balaisahi (Block – B)

Based on the exploration result, the ore body has been earmarked in the geological plan. Considering the ore body configuration it has been planned to extend the existing benches laterally as well as depth ward.

Proposed Dumping:

It has been planned to dump waste in Waste dump-A along coordinates N-2433403 to N-2433713 & E-323200 to E-323795 over an area of 20.18 Ha in the northern-west part of the lease area.

Other designing parameter

- **Bench Parameters**

The benches shall be developed in a systematic manner with 15m height and 30m width. Thus both the quarry will have a final pit slope of 45^0 and individual bench slope will be maintained at 80^0-85^0.

- **Haul Road design:**

The layout of roads for haulage of ore/ waste and access to different installation in the mine will be developed complying with the statutory regulations stipulated in the Metalliferous Mines Regulations, 1961. Overburden and mineral reject will be dispatched to the dumping and mineral reject stacking sites located in the lease area. It is proposed to maintain 30m wide haul road in the lease area as per need at a gradient up to 1in16. Regular maintenance of haul road will be done throughout the mine life to protect the road from damage and vehicles from wear & tear.

Site Services:

As far as day to day mine operation is concerned, the infrastructure such as site office, weigh bridge, rest shed, First-aid Centre, blasting shed security house, magazine, guard house etc are already made available in the lease area.

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Machineries to be deployed:

The mine will be operated in a three shift basis as per the existing practice. Process of excavation and loading of overburden/waste will be done by deploying hydraulic excavators and dumpers in the initial two years excavators of 6.0 m^3 capacity and 60m^3 dumpers will be used. From third year onwards i.e. 2022-23 to 2024-25 excavator of 36 m^3 capacity and 120m3 capacity dumpers will be primarily used. Alternatively an excavator of 15 m3 capacity is kept optionally instead of 36m3 excavator. Besides wheel loaders of 5 m3 is proposed for product loading at the screen/crusher. Hard iron ore will be loosened through drilling & blasting. For the purpose, 160mm dia. drill machine etc. will be used during ensuing plan period to achieve the targeted production. For maintenance of OB backfill-cum-dump dozers will be deployed. Loading & un-loading of sorted & sized ore is loaded by mechanized method.

Transportation:

Ore will be transported from quarry site to screen and crushing site for processing by use of 60m^3/120m^3 dumpers whereas waste materials will be dispatched from quarry to dumping site by using same capacity dumpers.

Crushing and screening

ROM will be fed to crushing and screening plant for segregating the CLO (+10-40/5-18 mm) & fines (-10mm). If required the ROM may be fed directly to screen plant for segregation of the CLO (+10-40/5-18 mm), fines (-10mm) and oversize (+40 mm). The oversize is to be fed to crusher directly for further size reduction to CLO and fines. The CLO & fines generated after screening and crushing will be transported to the designated stack yard for sale. Out of 30 MTPA, it is proposed to transport approx 9 MTPA through road and 21 MTPA through pipeline in the form of slurry out of the ML area.

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

The mine was a operating opencast mine of previous lessee. There are two quarries well developed within the mining lease. During the proposed plan period, opencast mining over the existing opencast quarries and other mineralised area have been proposed.

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I. **In-situ Tentative Excavation**

The year-wise in-situ tentative excavation for the first five years is given below.

Year	Quarry	Total Tentative Excavation	Top Soil	OB/SB/IB	ROM (M Cu. m) Ore	Mineral Rejects	Total ROM (Cum)	ROM: Waste Ratio
		M cu. m	M cu. m	M cu. m	M cu. m	M cu. m	M cu. m	cu. m: cu. m
1st Year (12.03.2021 to 31.03.2021)	Topadih (Block-A)	0.1424	0.00	0.00	0.14	0.0024	0.1424	NA
	Ballasahi (Block-B)	Nil	Nil	Nil	Nil	Nil	Nil	NA
Sub Total		**0.1424**	**0.00**	**0.00**	**0.14**	**0.0024**	**0.1424**	NA
2nd Year 2021-22	Topadih (Block-A)	1.83	0.00	0.04	1.38	0.41	1.79	1:0.02
	Ballasahi (Block-B)	Nil	Nil	Nil	Nil	Nil	Nil	NA
Sub Total		**1.83**	**0.00**	**0.04**	**1.38**	**0.41**	**1.79**	**1:0.02**
3rd Year 2022-23	Topadih (Block-A)	7.11	0.00	0.91	4.99	1.20	6.19	1:0.14
	Ballasahi (Block-B)	3.13	0.00	0.05	2.59	0.49	3.08	1:0.01
Sub Total		**10.23**	**0.00**	**0.96**	**7.58**	**1.69**	**9.27**	**1:0.10**
4th Year 2023-24	Topadih (Block-A)	7.59	0.16	1.17	4.91	1.35	6.26	1:0.21
	Ballasahi (Block-B)	3.32	0.00	0.37	2.84	0.11	2.95	1:0.12
Sub Total		**10.91**	**0.16**	**1.54**	**7.75**	**1.46**	**9.21**	**1:0.18**
5th Year 2024-25	Topadih (Block-A)	7.80	0.04	1.85	5.07	0.83	5.91	1:0.31
	Ballasahi (Block-B)	5.13	0.06	1.89	3.00	0.19	3.19	1:0.61
Sub Total		**12.93**	**0.10**	**3.74**	**8.07**	**1.02**	**9.10**	**1:0.42**
Grand Total		**36.05**	**0.26**	**6.28**	**24.92**	**4.58**	**29.51**	**1:0.22**

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APPROVED

Note: Tentative tonnage of the ore may be arrived by computing approximate bulk density and recovery factor as these data are variable and may be established on time series.

At present in this document, the tonnage factor and recovery factor has been considered as per exploration input from the drilled bore-hole data and time series.

19/3/21

क्षेत्रीय खान नियंत्रक
Regional Controller of Mines
भारतीय खान ब्यूरो
Indian Bureau of Mines

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Tonnage Factor/ Av Bulk Density:

Sl. No.	Ore Type	Bulk Density, t/cu.m
1	Saleable ore (+ 55% Fe)	3.4 t/ cum
2	Mineral rejects (45 to below 55% Fe)	2.5 t/ cum
3	Waste (below 45% Fe)	2.0 t/cum

Recovery Factor:

Recovery Factor of 100 % for Saleable Ore (+55 % Fe) & Mineral Rejects (+45 % Fe to -55 % Fe) have been considered for calculation of year wise production as per the Geological Report received from State Government of Odisha.

Year wise ROM Production Details

Year	ROM Production Quantity in Million Tonnes	Waste (OB/IB/Top Soil) Development Quantity in Million Cum.	Stripping Ratio (Tons/Cum.)
1st Year (12.01.2021 to 31.03.2021)	0.48	0.00	Nil
2nd Year (2021-22)	5.7	0.042	1 : 0.007
3rd Year (2022-23)	30	0.96	1 : 0.032
4th Year (2023-24)	30	1.71	1 : 0.057
5th Year (2024-25)	30	3.84	1 : 0.128
Total	96.18	6.54	1 : 0.068

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The year wise development & production quantity in million tonnes for the period from 2020-21 to 2024-25 is given below.

Year	Quarry	ROM Production Quantity in million Tonnes	Saleable Ore Production Quantity in million Tonnes	Mineral Reject Production Quantity in million Tonnes	Waste (OB/IB/Top Soil) Development Quantity in Million Cum.	Stripping Ratio (Tons/Cum.)
1st Year (12.01.2021 to 31.03.2021)	Topadih (Block-A)	0.48	0.474	0.006	0.00	NA
	Baliasahi (Block-B)	0.00	0.00	0.00	0.00	NA
Sub Total		**0.48**	**0.474**	**0.006**	**0.00**	**NA**
2nd Year 2021-22	Topadih (Block-A)	5.7	4.69	1.01	0.04	NA
	Baliasahi (Block-B)	0.00	0.00	0.00	0.00	NA
Sub Total		**5.7**	**4.69**	**1.01**	**0.04**	**1:0.007**
3rd Year 2022-23	Topadih (Block-A)	19.97	16.96	3.01	0.91	1 : 0.046
	Baliasahi (Block-B)	10.03	8.80	1.23	0.05	1 : 0.005
Sub Total		**30.00**	**25.76**	**4.24**	**0.96**	**1 : 0.032**
4th Year 2023-24	Topadih (Block-A)	20.07	16.70	3.37	1.33	1 : 0.07
	Baliasahi (Block-B)	9.93	9.65	0.28	0.38	1 : 0.04
Sub Total		**30.00**	**26.35**	**3.65**	**1.71**	**1 : 0.057**
5th Year 2024-25	Topadih (Block-A)	19.33	17.25	2.08	1.89	1 : 0.098
	Baliasahi (Block-B)	10.67	10.19	0.48	1.95	1 : 0.18
Sub Total		**30.00**	**27.44**	**2.56**	**3.84**	**1 : 0.128**
Grand Total		**96.18**	**84.72**	**11.46**	**6.55**	**1 : 0.068**

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

There is no proposal for waste dump re-handling (for the purpose of recovery of mineral) during the proposed Mining Plan period.

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

On account of exposures of iron ore and its depth of occurrence, opencast method of mining will be continued on three shift basis with the deployment of drills, associated compressors, dumpers, excavators and other auxiliary equipment for development, production, processing, protection of environment and safety. Separate year wise development plan along showing pit layouts, dumps, stacks of mineral rejects along with sections are attached.

Development during 2020- 21

Topodihi Quarry:

During the first year (2020-21) of the plan period mine working will be carried out in topodihi block to achieve the required grade of production of 0.479 Million Tonnes of ROM along N- 2432990 to N-2433100, E- 325596 - E-325707. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16. The Year-wise details layout of the proposed quarry & sections are indicated in development plan & sections development plans are shown in Plate No 06 A to F. The year-wise pit development sections are shown in Plate No 07 A to F.

For the achievement of the required production, it has been planned to develop the quarries as following:

Quarry Layouts		Topadihi Quarry Block-A
Bench Geometry	Height	15m
	Width	30 m or more than the height.
	Individual bench slope angle	80^0
Road design	Average width of the haul road	30m
	Gradient of Haul road	1 in 16
	Ramp Gradient	1 in 10
	Berm height	1.0 m
Quarry development	Location of development	N- 2432963 to N- 2433230, E- 325595 - E-325887
	Sections considered for development	GG' (2433150 N) & H H' (2433050 N)
	Benches considered for development with RL	545m RL to 590 m RL

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	Top bench RL	575m RL
	Bottom Bench RL	545m RL
	Number of Benches proposed for working	3
	Length of proposed benches	805m
	Direction of advancement	Vertical extension in the bottom of existing working
	Dimension of Quarry at the end of the year including existing benches	677 m x 404 m x28 m
	Overall quarry slope angle	26°
	Production of saleable ore(Million Tonnes)	0.473
	Generation of Mineral rejects ore from quarry (Million Tonnes)	0.006
	Production of ROM (Ore+ mineral rejects) Million Tonnes	0.479
	Top Soil (Cum.)	0
	Generation of Waste (Million Cum.)	0

Development during 2021- 22

Topodihi Quarry:

During the Second year of the plan period mine i.e. 2021-22 working will be carried out in topodihi block to achieve the required grade of production of 5.7 Million Tonnes of ROM along N-2433055 to N- 2433547, E- 325634 - E-325959. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16. The Year-wise details layout of the proposed quarry & sections are indicated In development plan & sections development plans are shown in Plate No 06 A to F.

The year-wise pit development sections are shown in Plate No 07 A to F. For the achievement of the required production, it has been planned to develop the quarries as following:

	Quarry Layouts	Topadihi Quarry Block-A
Bench Geometry	Height	15m
	Width	30 m or more than the height.
	Individual bench slope angle	80°
Road design	Average width of the haul road	30m
	Gradient of Haul road	1 in 16
	Ramp Gradient	1 in 10
	Berm height	1.0 m
Quarry	Location of development	N-2433055 to N- 2433547, E- 325634 - E-325959
	Sections considered for development	D D' (2433450 N), E E' (2433350N),

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development		F F' (2433250N) & G G' (2433150 N)
	Benches considered for development with RL	530m RL to 575 m RL
	Top bench RL	575m RL
	Bottom Bench RL	530m RL
	Number of Benches proposed for working	4
	Length of proposed benches	806 m
	Direction of advancement	Lateral and depth extension in casting & northing Direction
	Dimension of Quarry at the end of the year including existing benches	745 m x 426 m x33 m
	Overall quarry slope angle	32°
	Production of saleable ore(Million tonnes)	4.69
	Generation of Mineral rejects ore from quarry (Million Tonnes)	1.01
	Production of ROM (Ore+ mineral rejects) Million Tonnes	5.7
	Top Soil (Cum.)	0
	Generation of Waste (Million Cum.)	0.04

Development during 2022- 23

Topodihi Quarry (Block – A):

During the third year of the plan period i.e. 2022-23 mine working will be carried out in topodihi block to achieve the required grade of production of 19.97 Million Tonnes of ROM along N-2432699 to N- 2433646, E- 325374 - E-326010. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16. The Year-wise details layout of the proposed quarry & sections are indicated in development plan & sections development plans are shown in Plate No 06 A to F. The year-wise pit development sections are shown in Plate No 07 A to F.

Baliasahi Quarry (Block – B):

During the third year of the plan period i.e. 2022-23 mine working will be carried out in Baliasahi block to achieve the required grade of production of 10.03 Million Tonnes of ROM along N-2432661 to N- 2433145, E- 323779 - E-324485. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16. The Year-wise details layout of the proposed quarry & sections are indicated in development plan & sections development plans are shown in Plate No 06 A to F.

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The year-wise pit development sections are shown in Plate No 07 A to F. For the achievement of the required production, it has been planned to develop the quarries as following:

Quarry Layouts		Topadihi Quarry Block-A	Baliasahi Quarry Block-B
Bench Geometry	Height	15m	15m
	Width	30 m or more than the height.	30 m or more than the height.
	Individual bench slope angle	80°	80°
Road design	Average width of the haul road	30m.	30m
	Gradient of Haul road	1 in 16	1 in 16
	Ramp Gradient	1 in 10	1 in 10
	Berm height	1.0 m	1.0 m
Quarry development	Location of development	N-2432699 to N- 2433646, E- 325374 - E-326010	N-2432661 to N- 2433145, E- 323779 - E-324485
	Sections considered for development	C C' (2433550 N) D D' (2433450 N) E E' (2433350N) F F' (2433250N) G G' (2433150 N) H H' (2433050 N) I I' (2432950N) J J' (2432850 N) & K K' (2432750 N)	H H' (2433050 N) I I' (2432950N) J J' (2432850 N) & K K' (2432750 N)
	Benches considered for development with RL	515m RL to 560 m RL	530m RL to 500m RL
	Top bench RL	560m RL	530m RL
	Bottom Bench RL	515m RL	500m RL
	Number of Benches proposed for working	4	3
	Length of proposed benches	1975 m	1539 m
	Direction of advancement	Lateral and depth extension in all direction	Lateral and depth extension in all direction
	Dimension of Quarry at the end of the year including existing benches	819 m x 533 m x45 m	449 m x 615 m x 30 m
	Overall quarry slope angle	25°	24°
	Production of saleable	16.96	8.80

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	ore(Million Tonnes)		
	Generation of Mineral rejects ore from quarry (Million Tonnes)	3.01	1.23
	Production of ROM (Ore+ mineral rejects) Million Tonnes	19.97	10.03
	Top Soil (Cum.)	0	0
	Generation of Waste (Million Cum.)	0.91	0.053

Development during 2023-24

Topodihi Quarry (Block – A):

During the fourth year of the plan period i.e. 2023-24 mine working will be carried out in topodihi block to achieve the required grade of production of 20.07 Million Tonnes of ROM along N- 2432699 to N- 2433662, E- 325274 - E-326052. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16. The Year-wise details layout of the proposed quarry & sections are indicated in development plan & sections development plans are shown in Plate No 06 A to F. The year-wise pit development sections are shown in Plate No 07 A to F.

Baliasahi Quarry (Block – B):

During the fourth year of the plan period i.e. 2023-24 mine working will be carried out in Baliasahi block to achieve the required grade of production of 9.93 Million Tonnes of ROM along N- 2432659 to N- 2433179,E- 323689 - E-324427. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16.

The Year-wise details layout of the proposed quarry & sections are indicated in development plan & sections development plans are shown in Plate No 06 A to F. The year-wise pit development sections are shown in Plate No 07 A to F.

Quarry Layouts		Topadihi Quarry Block-A	Baliasahi Quarry Block-B
Bench Geometry	Height	15m	15m
	Width	30 m or more than the height.	30 m or more than the height.
	Individual bench slope	80^0	80^0

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	angle		
Road design	Average width of the haul road	30m	30m
	Gradient of Haul road	1 in 16	1 in 16
	Ramp Gradient	1 in 10	1 in 10
	Berm height	1.0 m	1.0 m
Quarry development	Location of development	N- 2432699 to N- 2433662, E- 325274 - E-326052	N- 2432659 to N- 2433179, E- 323689 - E-324427
	Sections considered for development	B B' (2433650 N) C C' (2433550 N) D D' (2433450 N) E E' (2433350N) F F' (2433250N) G G' (2433150 N) H H' (2433050 N) I I' (2432950N) J J' (2432850 N) K K' (2432750 N)	G G' (2433150 N) H H' (2433050 N) I I' (2432950N) J J' (2432850 N) K K' (2432750 N)
	Benches considered for development with RL	545m RL to 515 m RL	530m RL to 500m RL
	Top bench RL	545 m RL	530m RL
	Bottom Bench RL	515m RL	500m RL
	Number of Benches proposed for working	3	3
	Length of proposed benches	2604 m	1007 m
	Direction of advancement	Lateral and depth extension in all direction	Lateral extension in the west and north and depth extension
	Dimension of Quarry at the end of the year including existing benches	962 m x 631 m x30 m	485 m x 590 m x 30 m
	Overall quarry slope angle	30°	29°
	Production of saleable ore(Million Tonnes)	16.70	9.65
	Generation of Mineral rejects ore from quarry (Million Tonnes)	3.37	0.28
	Production of ROM (Ore+ mineral rejects) Million Tonnes	20.07	9.93

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	Top Soil (Cum.)	155280	0
	Generation of Waste (Million Cum.)	1.17	0.37

Development during 2024-25

Topodihi Quarry (Block – A):

During the fifth year of the plan period i.e. 2024-25 mine working will be carried out in topodihi block to achieve the required grade of production of 19.33 Million Tonnes of ROM along N-2432800 to N- 2433662, E-325293 to E- 326160. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16. The Year-wise details layout of the proposed quarry & sections are indicated in development plan & sections development plans are shown in Plate No 06 A to F. The year-wise pit development sections are shown in Plate No 07 A to F.

Baliasahi Quarry (Block – B):

During the fifth year of the plan period i.e. 2024-25 mine working will be carried out in Baliasahi block to achieve the required grade of production of 10.67 Million Tonnes of ROM along N-2432659 to N- 2433243, E-323643 to E- 324393. The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1 in 16.

The Year-wise details layout of the proposed quarry & sections are indicated in development plan & sections development plans are shown in Plate No 06 A to F. The year-wise pit development sections are shown in Plate No 07 A to F.

Quarry Layouts		Topadihi Quarry Block-A	Baliasahi Quarry Block-B
Bench Geometry	Height	15m	15m
	Width	30 m or more than the height.	30 m or more than the height.
	Individual bench slope angle	80°	80°
	Average width of the haul road	30m	30m
Road design	Gradient of Haul road	1 in 16	1 in 16
	Ramp Gradient	1 in 10	1 in 10
	Berm height	1.0 m	1.0 m
	Location of	N-2432800 to N- 2433662,	N-2432659 to N- 2433243,

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Quarry development	development	E-325293 to E- 326160	E-323643 to E- 323893
	Sections considered for development	N-2432800 to N- 2433662, E-325293 to E- 326160	G G' (2433150 N) H H' (2433050 N) I I' (2432950N) J J' (2432850 N) K K' (2432750 N)
	Benches considered for development with RL	500m RL to 545 m RL	530m RL to 485m RL
	Top bench RL	545m RL	530m RL
	Bottom Bench RL	500m RL	485m RL
	Number of Benches proposed for working	4	4
	Length of proposed benches	1687 m	1756 m
	Direction of advancement	Lateral extension in west and east direction and depth extension of the quarry	Lateral extension in the west and north and depth extension
	Dimension of Quarry at the end of the year including existing benches	962 m x 736 m x45 m	584 m x 676 m x 30 m
	Overall quarry slope angle	31°	27°
	Production of saleable ore(Million Tonnes)	17.25	10.19
	Generation of Mineral rejects ore from quarry (Million Tonnes)	2.08	0.48
	Production of ROM (Ore+ mineral rejects) Million Tonnes	19.33	10.67
	Top Soil (Cum.)	42000	55000
	Generation of Waste (Million Cum.)	1.85	1.88

Details of calculations of ROM, Saleable Ore, Mineral Reject and Waste for the period from 2020-21 to 2024-25 of the Mining Plan period is enclosed at Annexure 19.

Year-wise pit development plans are shown in Plate No 06 A to F. The year-wise pit development sections are shown in Plate No 07 A to F.

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

Mining Method: The Guali Iron Ore Block is to be considered under Category-A (Fully Mechanized Opencast category) as per the IBM guidelines. The mine is proposed to be worked by mechanised opencast mining method by engaging HEMMs with deep hole drilling and blasting.

Working Regime: Mine has been proposed to be operated in three shifts. Each shift will be of 8 hours duration. Number of working days per year will be 300 days.

Designing parameter

- **Bench Parameters**

The benches shall be developed in a systematic manner with 15m height and 30m width. Thus both the quarry will have a final pit slope of 45^0 and individual bench slope will be maintained at 80^0-85^0

- **Haul Road design:**

The layout of roads for haulage of ore/ waste and access to different installation in the mine will be developed complying with the statutory regulations stipulated in the Metalliferous Mines Regulations, 1961. Overburden and mineral reject will be dispatched to the dumping and mineral reject stacking sites located in the lease area. It is proposed to maintain 30m wide haul road in the lease area as per need at a gradient up to 1 in 16. Regular maintenance of haul road will be done throughout the mine life to protect the road from damage and vehicles from wear & tear.

Proposed Mine Design Parameter:

	Topadih (Block A)	Baliasahi (Block B)
Maximum Bench Height, mtr	15	15
Minimum Bench Width, mtr	30	30
Bench Slope Angle	80	80
Overall Pit Slope Angle	45	45
Depth of working during plan period	75 meter	45 meter
Maximum Gradient of Haul Road	Max 1 in 16	Max 1 in 16

Proposed Drilling & Blasting: Blast holes drilling are proposed by DTH drill of 160 mm dia. Single or multi row drilling with hole to hole delay are proposed. Proper charging, stemming and control blasting by using NONEL of different delay interval are proposed to reduce ground vibration. Basically the blasting design would be with a spacing of 6.0 m and Burden of 5.0 and with a sub

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grade drilling of 1.5 m depth (10% of total bench height). The holes are prime charged with boosters and column charged with SME. The stemming height would be around 30% of depth of the hole. Non electrical delay detonators (NONEL Tubes) are used for initiation .The connection Patten shall be of either single row or multiple rows depending on availability of working face.

Proposed Loading & Transportation: During the first year of the plan period i.e. 2020-21 during which a production of 0.479 Million Tonnes ores has been considered. For the second year of the plan period i.e. 2021-22 an existing EC capacity of 5.7 MTPA has been considered, after which for the balance 3 years of the plan period the proposed production will be scaled to 30 MTPA. Hence in the initial two years excavators of 6.0 m^3 capacity and 60m^3 dumpers will be used. From third year onwards i.e. 2022-23 to 2024-25 excavator of 36 m^3 capacity and 120m^3 capacity dumpers will be primarily used. Alternatively an excavator of 15 m3 capacity is kept optionally instead of 36m^3 excavator. Besides at the crushing and screening plant wheel loader of 5m3 capacity will be used.

Crushing and screening

ROM will be fed to crushing and screening plant for segregating the CLO (+10-40/5-18mm) & fines (-10mm). If required the ROM may be fed directly to screen plant for segregation the CLO (+10-40/5-18mm), fines (-10mm) and oversize (+40 mm). The oversize is to be fed to crusher directly for further size reduction to CLO and fines. The CLO & fines generated after screening and crushing will be transported to the designated stack yard for sale. Out of 30 MTPA, it is proposed to transport approx 9 MTPA through road and 21 MTPA through pipeline in the form of slurry out of the ML area.

Site Services:

As far as day to day mine operation is concerned, the infrastructure such as site office, weigh bridge, rest shed, First-aid Centre, blasting shed security house, magazine, guard house etc are already made available in the lease area.

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.

The year wise pit development plans & sections for the first 5 years of the plan period are shown

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in Plate No 06 A to F & Plate No 07 A to F.

The Surface Plan of the mine is shown as Plate No 03. During the first 2 years of the Mine Plan period from 2020-21 to 2021-22 mining is proposed only in Topodihi block and further from third year onwards i.e. 2022-23 to 2024-25, mining operation have been proposed in Topadihi (Block-A) & Baliasahi (Block-B). The mine has been proposed to be worked in open pit method with a maximum bench height of 15 m & width of 30 m.

Approach road with avg. width of 30 m at a gradient of 1 in 16 exists up to the proposed waste dump & mineral reject sites. These approach roads along with main access road will be regularly graded & compacted using motor graders to avoid formation of pot holes. Cross sloping of roads will be maintained at approximately 4% to facilitate easy drainage. The entire waste dumping site is selected beyond UPL.

The layout of faces to be developed is mentioned in detail as follows:

Name of Pit	Description	1st year (2020-21)	2nd year (2021-22)	3rd year (2020-23)	4th year (2023-24)	5th year (2024-25)
Topodih (Block - A)	Face RL (Top & Bottom)	545 mRL & 575 mRL	575 mRL & 530 mRL	560 mRL & 515 mRL	545 mRL & 515 mRL	545mRL & 500 mRL
	Length of Face (Mtr avg.)	865	806	1975	2604	1687
	Direction of advancement	Vertical extension in the bottom of existing working	Lateral and depth extension in easting & northing Direction	Lateral and depth extension in all direction	Lateral and depth extension in all direction	Lateral extension in west and east direction and depth extension of the quarry
Baliasahi (Block - B)	Face RL (Top & Bottom)	--	--	530 mRL & 500 mRL	530 mRL & 500 mRL	530 mRL & 485 mRL
	Length of Face (Mtr avg.)	--	--	1539	1007	1756
	Direction of advancement	--	--	Lateral and depth extension in all direction	Lateral extension in the west and north and depth extension	Lateral extension in the west and north and depth extension

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Site for disposal of waste along with ground preparation

It has been planned to dispose of the waste in Waste dump-A in the north western part of the lease area along Coordinates N-2433403 to N-2433713E-323200 to E-323795 over an area of 20.18 Ha. Retaining wall & garland drains along with settling pits will be constructed to protect the surrounding environment from wash-offs etc. and after that the waste materials shall be disposed of in a re-treating fashion.

Site for disposal of mineral rejects along with ground preparation

It has been proposed to temporarily store mineral rejects in 2 locations in the Northern and northern western portion of the lease area. An area of 8.46 ha has been earmarked for the purpose of stacking of mineral rejects. The mineral rejects generated will be stored in the above mentioned two locations namely Mineral reject dump 1 situated along N-2433282 to N-2433515E-324482 to E-324800 (Northern), and Mineral reject dump 2 situated along N-2433263 to N-2433362E-323553 to E-324005 (North western side). The mineral reject generated will be blended with Ore in proportionately to get desired salable grade. Mineral Rejects/Sub grade ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage.

The mineral reject will be stocked temporarily for a short period and blended with high grade ore to make it consumable. No ground preparation is necessary for the purpose.

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.

Guali Iron Ore Block comes under Category – A (fully mechanized category) as per the IBM guidelines. Although the exploration has proved existence of the mineral up to 376 mRL for Topadihi Block A and up to 430mRL for Baliasahi Block B the Conceptual mining plan has been prepared following the guidelines of IBM, ultimate depth upto which the mine can be worked keeping in view the present knowledge of the deposit, topography of the area, surface drainage pattern, mineable reserves available, mining technology and selection of the sites for waste disposal etc.

The area contains iron ore of all grades. The iron ore is mainly friable laminated comprising of hard laminated ore, soft laminated ore and powdery ore. Occasionally, hard massive ore of cherry red color is also found to occur. Grade of the iron ore is (+) 55% Fe. The various structural imprints observed and recorded are in the BHJ and laminated ore.

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As per the Geological Report received from State Govt. and assessment done, the mine is having a reserve of 160.136 Million Tonnes of proved category (UNFC Code 121 & 122). During the Plan Period, further exploration will be proposed, which will augment the reserve potential of Guali Iron ore Mine. During the initial 5 years of the plan period (2020-21 to 2024-25), systematic & scientific development the mine has been proposed to achieve the optimum production.
Considering the present level of exploration, the ultimate pit bottom will be at 446 mRL for Topadhi Block (A) & 446 mRL for Baliasahi Block (B), which will change depending upon the existence of ore in the unexplored part of the lease where exploration has been proposed.

A safety barrier of 7.5 m width all along inside the lease area has been kept as per the provisions of the statutes. The ROM ore produced will be screened & sized to produce the lumps & fines fractions within the lease. The lease has been executed on 12.01.2021, which forms the first year of the plan period i.e. 2020-21 during which a production of 0.479 Million Tonnes has been proposed. For the second year of the plan period i.e. 2021-22 an existing EC capacity of 5.7 MTPA has been proposed. From third year onwards a production capacity of 30 MTPA has been proposed for the balance three years of the plan period i.e. 2022-23, 2023-24 and 2024-25. The entire waste generated during the second year i.e. 2021-22 i.e. 41800 m3 will be utilized for road maintenance. Further out of the waste generated from the Guali Iron ore Block from third year onwards, 70% i.e. 4.396 Million Cum. will be dumped in temporary waste dump proposed waste dump & remaining 30% i.e. 1.884 Million Cum. will be utilized for development and maintenance of haul road. Besides temporary Waste dump 2 will be removed from third year onwards.

Life of Mine

Total mineable reserve of iron ore within the lease area after depletion of production from the earlier resources under proved category 160.136 Million Tonnes up to of +45 % Fe grade available as on date as per present exploration data. The total production (+55% Fe & +45 to -55%) from mines during the ensuing plan period will be 96.19 Million Tonnes. Hence reserve available in the conceptual period will be 63.946 million tons. Thus, the life of mine would be 8 years including current plan period. However, further exploration has been proposed during the plan period, which will augment the resource thus exceeding the life of mine beyond lease period.

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Exploration:

During the first five years of the plan period from 2020-21 to 2024-25, 215 nos. of boreholes have been proposed to convert the entire lease area into G1 Category. Beyond current plan period, further exploration shall be proposed to augment resource.

Ultimate Extent & Size of the Pit

Guali Iron ore block exposes iron. ore, BHJ, Shale etc. Keeping in view the ore occurrences, safety zone, ultimate pit limit has been delineated. There will be two quarries at the end of the life of the mine. As per the exploration data, an area 155.17 Ha will be utilized for mining of iron ore. Besides 57.10 Ha is proposed for exploration which will converted into mining and allied activities in future. Thus the total mining area will become 212.27 Ha. The details of benches are with their R.L, extent and area to be covered are given below:

Name of the quarry	Location	Extent of the quarry				
		Length (m)	Width (m)	Area (m2)	Top RL	Bottom RL
Topodihi quarry	N-2432695 to N-2433807 E-325176 to E-326182	1023	981	1003563	554	446
Baliasahi quarry	N-2432656 to N-2433390 E-323219 to E-324808	700	783	548136	554	446

Further, the Topodihi nalla passing within the ML area is proposed for diversion during the conceptual period for merging of both the pits i.e. Topodihi pit and Baliasahi pit. This will enhance the mineable reserve and the life of mine.

Note: Besides 57.10 Ha is proposed for exploration which will converted into mining and allied activities in future. Thus the total mining area during conceptual will become 212.27 Ha.

Final slope angle at the close of mine:

The individual bench slope would be kept nearly vertical, height and width of the benches would be kept at 12m each. The final slope angle of the pit will be 45^0 at the end of the life of the mine.

Ultimate Pit Limit Boundaries

The ultimate pit limit boundaries have been earmarked in the conceptual plan and conceptual sections. (Plate No-8 and 9)

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Disposal of Mineral Rejects:

Material containing 45-55% Fe has been considered as mineral rejects. A total of 22.06 Million Tonnes of mineral reject will be generated up to conceptual stage. Year-wise generation of sub grade is given below.

In Million Tonnes

Year	Topadih (Block - A)	Baliasahi (Block-B)	Total
First 5 Years of the Plan Period (2020-21 to 2024-25)	9.478	1.995	11.473
Beyond Plan period till Conceptual	10.587		10.587
Total up to Conceptual	22.06		

The mineral reject generated will be blended with Ore in proportionately to get desired salable grade. Mineral Rejects/Sub grade ore can be sold directly, as per market requirement in future. However, an area of 8.46 Ha in two locations has been designated for mineral reject within the lease hold area for temporary storage. Further the mineral reject generated during the conceptual period will be temporarily stacked and then blended and sold.

Waste Disposal:

The waste generated during mining operation comprises of laterite, shale and overburden (OB) occurring at the top profile of ore zone. These waste materials are dumped at the earmarked non-mineralized areas in a retreating manner by forming number of terraces and compacting it by use of dozer. Precautionary measures like retaining walls, garland drains, settling ponds, plantation on matured slopes of waste dumps, mineral stacks etc have been proposed. Presently, there are two waste dumps present in the lease area out of which temporary waste dump – 2 will be removed from third year onwards for advancement of mining during the plan period.

Further one more waste dump (Waste Dump-A) will be created along the co-ordinates N-2433403 to N-2433713E-323200 to E-323795 during the plan period over an area of 20.18 Ha. The same dump will be extended and utilized to accommodate the waste generated during the conceptual period also over an area of 28.97 Ha along N-2433340 to N-2433767 and E-323168 to E-324050. Further one more dump (Waste Dump-B) will be created along N-2432659 to N-2433313 and E-323098 to E- 323642 over an area of 27.93 ha during conceptual period. Thus at the end of conceptual period the dump area will be 56.90 Ha.

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Dump-sites selected for disposal of the waste have been considered after considering the following criteria.

1. All dump sites have been located outside the mineralized zone beyond ultimate pit limit based on the present exploration data.
2. Topography features have been taken into account, particularly in the context of water drainage and availability of relatively flat ground.
3. Initially the natural depression has been planned to be leveled upto adjoining ground level & then terracing will be carried out.

A total of 9.5 Million CuM of wastes will be generated from entire Guali Iron ore Block up to conceptual stage out of which 6.29 Million Cum will be generated during the plan period and the rest 3.21 Million CuM during conceptual period.

The height & width of individual terrace has been considered as 15 m & 15 m respectively with a bench slope angle of 37^0. Year-wise waste generation up to end of mine life is given below.

In Million CuM

Year	Topadih (Block - A)	Baliasahi (Block-B)	Total
First 5 Years of the Plan Period (2020-21 to 2024-25)	3.976	2.316	6.29
Beyond Plan period till Conceptual	3.21		3.21
Total up to Conceptual	9.5		

The management of overburden dumping during conceptual period has been furnished below:

Tentative Year of dumping	Quantity of waste for dumping @ 70%, (Million CuM)	Road maintenance @ 30%, (Million CuM)	Total (Million CuM)	Top RL (m)	Bottom RL (m)	Grid Location
First 5 Years of the Plan Period (2020-21 to 2024-25)	4.4	1.89	6.29	590	535	Proposed waste dump – A N-2433403 to N-2433713 E-323200 to E-323795
Beyond Plan period till Conceptual period	2.24	0.97	3.21	620	535	Proposed waste dump – A N-2433340 to N-2433750 E-323168 to E-324050 & Proposed waste dump – B N-2432672 to N-2433313 E-323098 to E-323642
				640	535	
Total	6.64	2.86	9.5			

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Out of the total 9.5 Million CuM of waste generated up to conceptual, approximately 30% i.e. 2.85 Million CuM will be utilized for road formation, maintenance and bund formation and the remaining 6.65 Million CuM shall be utilized for development and remaining waste will be dumped at proposed dump location during the conceptual period.

The garland drains will be dug around 1 m beneath the adjoining contour level at the lower peripheral areas of the dump. The width of the drains shall be around 1.5 m. A series of settling pits will be provided to arrest the wash-off solid particles.

The retaining walls will be of 1.5m height and 1.2 m width at the top and around 1.5m at the base. Besides, it is also proposed to stabilize the existing dead waste dump with bio-degradable coir geo textile made of coconut fibre or husk. It facilitates new vegetation by absorbing water and preventing topsoil from drying out. Seeding or plantation is done after blanketing the coir matting on the dump slope. They provide dump soil good support allowing natural vegetation to become established.

The OB dumps areas will be compacted and afforestation will be carried out on the terraces as well as along the slopes after spreading a layer of top soil over it before rehabilitation. The location of the external dump is marked on Conceptual Plan, Refer Plate No 08. Top soil being generated during mining shall be used for rehabilitation & also for avenue plantation.

Waste dumps will be afforested/ re-grassed to check wash off. Waste dumps will be guarded with retaining walls at their toes along the lower contours. Following the retaining wall a garland drain will be developed for carrying water to the natural drainage system. Settling pits have also been proposed in the drains to arrest solid particles.

Environmental Monitoring:

Noise, air, water and other environmental parameters will be monitored periodically to have a close check on the environmental parameters. Spraying of water on haul roads, use of wet drilling techniques & prevention of vibration by utilization of minimum quantity of explosive per delay will be carried out.

Land Use Planning:

The land use pattern at the start of the Plan period, at the end of first five years and at the end of conceptual period is given in the below table.

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Sl No	Description	Area put to use at the start of plan period, Ha	Total area at the end of Plan Period, Ha	Land use by End of Conceptual Period, Ha
1	Area under Mining **	50.461	115.961	155.170
2	Storage of topsoil	0.093	0.00	0
3	Waste Dump Site	6.959	21.532	56.000
4	Mineral storage	42.243	66.388	19.190
5	Infrastructure, Workshop, admin Building etc)	4.650	5.166	4.650
6	Roads	32.445	14.995	10.850
7	Railways	0	0	0
8	Safety Zone/Green belt *	14.563	14.342	6.469
9	Tailing pond	0	0	0
10	Effluent Treatment Plant	0	0	0
11	Mineral Separation Plant (Crushing, Screening Unit & Slurry Pipeline)	2.706	24.000	29.380
12	Township area	0	0	0
13	Forest Area (Diverted) not used by earlier lessee	40.572	0	0
14	Area retained for Plantation	0	0	0.763
Total area of utilization		194.692	262.384	340.472
13	Other Unutilized Area	163.566	95.874	17.786
Grand Total		358.258	358.258	358.258

* An area 0.221Ha safety zone is converted to road for proposed/existing entry point of Mining Lease. Thus the safety zone becomes 14.342Ha (14.563 - 0.221). During conceptual period 0.047 Ha will be converted to road and 7.826 Ha to Mineral separation plant & ore stack yard. Thus the safety zone will be 6.469 Ha.

** Out of the 212.27 Ha, mining will be 155.17 Ha and the remaining 57.10 Ha will be area under future exploration which subsequently will be converted to mining and allied activities.

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Post Mining Land-Use

Sl No	Land Use	Land use by end of Conceptual Period, In Ha	Post Mining Land Use
1	Area under Mining	212.270	The minedout quarry shall be developed into a water reservoir.
2	Waste Dump site	56.300	Plantation shall be developed over the waste dump in a phased manner.
3	Mineral storage	19.190	Regrassing shall be developed over the area after cessation of mining activities.
4	Infrastructure	4.650	This area shall be left as it is for future utilisation by concerned authorities or will be dismantled.
5	Roads	10.850	The area shall be left as it is for future utillsation by concerned authorities & Public.
6	Safety Zone and Green Belt	6.469	Status shall be maintained.
7	Mineral Separation Plant (Crushing, Screening Unit & Slurry Pipeline)	29.380	This area shall be left as it is for future utillsation by concerned authorities or will be dismantled.

B. UNDERGROUND MINING

Not applicable

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Extent of Mechanization

The rated production from Guali Iron Ore Block for the first year of the plan period i.e. 2020-21 during which a production of 0.479 Million Tonnes has been considered. For the second year of the plan period i.e. 2021-22 an existing EC capacity of 5.7 MTPA has been proposed. From third year onwards a production capacity of 30 MTPA has been proposed for the balance three years of the plan period i.e. 2022-23, 2023-24 and 2024-25, the details of HEMM, Plant and machinery have been calculated. Higher capacities of machines are proposed both for loading and hauling to reduce the numbers of loading and hauling equipments plying inside the mines. Hence the height and width of benches are maintained as 15m and 30 m respectively for safe movement of mining machineries, protection of environment, systematic and scientific development of the proposed quarries.

a. **Drilling Machine**

Specification of Drilling Machine		For 5.7 MTPA	For 30 MTPA
Diameter of blast hole drill	:	150-160 mm	150-160 mm
Air consumption	:	12.5 CuM/min	12.5 CuM/min
Pressure supplied up to	:	14.5 kg f/sq.cm.	14.5 kg f/sq.cm.
Drilling parameters			
Dia. of blast hole (D)	:	150-160 mm	150-160 mm
Height of the bench	:	15 m	15 m
Additional drilling required (Subgrade Drilling) (A)	:	1.5 m	1.5 m
Length of the hole (H + A)	:	16.5 m	16.5 m
Burden (B)	:	4 m	4 m
Spacing (S) (SPACING= 1.5 x Burden)	:	5 m	5 m
Volume of earth to be broken/loosen per hole	:	B x S x H = 4 x 5 x 16.5= 330 Cu M	B x S x H = 4 x 5 x 16.5= 330 Cu M
Meterage of drilling per drill for primary blasting in ore zone			
Total volume of material (Max in any year)	:	1830000 CuM	12930000 CuM
Drilling & Blasting required (30% of total volume)	:	549000 CuM	3879000 CuM
Number of holes to be drilled	:	549000 ÷ 330 = 1664 holes	3879000 ÷ 330 = 11755 holes
Number of holes to be drilled per day of 300 working days in a year	:	1664 ÷300 = 5.54 or say 6 Holes	11755 ÷300 = 39.18 or say 40 Holes
Total meter of drilling per day (length of blast hole = 16.5 m)	:	6 x 16.5 =99 m	40 x 16.5 =660 m
Requirement of drills			
Drilling penetration rate of the wagon drill on average	:	15 m / hr	15 m / hr
Effective drilling hr / shifts (6 hrs / shift) X 2 shift	:	12 hrs	12 hrs
Meterage of drilling to be effected / day	:	15 x 12 = 180 m	15 x 12 = 180 m
Number of drills required	:	99 ÷ 180= 0.55 or say 1 number	660 ÷ 180= 3.6 or say 4 numbers

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b. Excavators

Specification of Excavator		For 5.7 MTPA	For 30 MTPA
Bucket capacity (C1)	:	6 CuM	36 CuM
Bucket fill factor (F)	:	0.8	0.8
Time cycle pass at 90° swing (T1 and T2)	:	50 sec	50 sec
Swell factor (S)	:	0.8	0.8
Production efficiency factor (e)	:	0.8	0.8
Job management factor (f)	:	0.8	0.8
Time scheduling			
Working days per year	:	300 days	300 days
Number of working shifts per day	:	3 shifts	3 shifts
Working hours per shift	:	8 hrs	8 hrs
Effective working hours per shift	:	6 hrs	6 hrs
Effective working hours per three shift	:	18 hrs	18 hrs
Seconds in hour	:	3600 sec	3600 sec
Output CuM shovel/annum	:	[C1 x F x S x e x f x 3600 x 18 x 300] ÷ T1 = [6 x 0.8 x 0.8 x 0.8 x 0.8 x 3600 x 18 x 300] ÷ 50 = 955515 CuM per year in 3 shifts.	[C1 x F x S x e x f x 3600 x 18 x 300] ÷ T1 = [36 x 0.8 x 0.8 x 0.8 x 0.8 x 3600 x 18 x 300] ÷ 50 = 5733089 CuM per year in 3 shifts.
Number of excavators required			
Maximum excavation in any year		1830000 CuM	12930000 CuM
Total excavation by one shovel per annum	:	955515 CuM	5733089 CuM
Requirement of excavators	:	1830000 / 955515 CuM = 2 numbers	12930000 / 5733089 CuM =2.25 say 2 numbers
To excavate the maximum in any of the years, the requirement of excavator including stand by (30%) will be	:	2+1=3 numbers of 6 CuM capacity	2+1=3 numbers of 36 CuM capacity

c. Dumpers

i. Dumpers Required For 5.7 MTPA

Sl. No.	Parameters	ROM Handling	OB Handling	Product Handling, CLO/Fines	Unit of Measurement
1	Total Handling Requirement	57,00,000	80,000	57,00,000	tonnes
2	Dumper Capacity	120	120	120	tonnes
3	Pay load	115	100	115	tonnes
4	Speed of dumper Uphaul	18	18	18	km/h
5	Speed of dumper downhaul	20	20	20	km/h
6	Lead (Uphaul)	2.0	2.0	2.0	Km
7	Lead (downhaul)	2.0	2.0	2.0	Km

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Sl. No.	Parameters	ROM Handling	OB Handling	Product Handling/ CLO/Fines	Unit of Measurement
8	Swings required to load a dumper	10	11	10	Nos.
9	Loading time	450	540	450	secs
10	Hauling time (loaded)	600	600	600	secs
11	Unloading time	60	60	60	
12	Hauling time Empty)	450	450	450	secs
13	Positioning time etc	60	60	60	secs
14	Total cycle time (9+10+11+12)	1620	1710	1620	secs
15	Theoretical Handling/ hr./ dumper	255	210	255	tonnes/hour/ dumper
16	Actual handling/dumper/hour, (80% of Theoretical handling)	204	168	204	tonnes/hour/
17					dumper
18	Availability	80	80	80	%
19	Utilization	80	80	80	%
20	Net Utilization	64	64	64	%
21	Effective run. Hrs/ dumper/ annum	3456	3456	3456	hours
22	Handling/ annum/ dumper	7,05,024	5,80,608	7,05,024	Tonne /dumper
23	Dumper Required for Operation	8	-	8	Nos.
24	Actual Dumper Fleet Required (Considering 20% Stand By)	2	-	2	Nos.
25	Actual Dumper Fleet Required (Rounded)	20			Nos

ii. Dumpers Required For 30 MTPA

Sl. No.	Parameters	ROM Handling	OB Handling	Unit of Measurement
1	Total Handling Requirement	300,00,000	76,80,000	tonnes
2	Dumper Capacity	240	240	tonnes
3	Pay load	230	200	tonnes
4	Speed of dumper Uphaul	18	18	km/h
5	Speed of dumper downhaul	20	20	km/h
6	Lead (Uphaul)	2.0	2.0	Km
7	Load (downhaul)	2.0	2.0	Km
8	Swings required to load a dumper	4	4	Nos.

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Sl. No.	Parameters	ROM Handling	OB Handling	Unit of Measurement
9	Loading time	140	150	secs
10	Hauling time (loaded)	600	600	secs
11	Unloading time	60	60	
11	Hauling time Empty)	450	450	secs
12	Positioning time etc	60	60	secs
13	Total cycle time (9+10+11+12)	1310	1310	secs
14	Theoretical Handling/ hr./ dumper	632	550	tonnes/hour/ dumper
15				
16	Actual handling/dumper/hour, (80% of Theoretical handling)	506	440	tonnes/hour/
17				dumper
18	Availability	80	80	%
19	Utilization	80	80	%
20	Net Utilization	64	64	%
21	Effective run. Hrs/ dumpet/ annum	3456	3456	hours
22	Handling/ annum/ dumper	21,84,192	15,20,640	Tonne /dumper
23	Dumper Required for Operation	14	5	Nos.
24	Actual Dumper Fleet Required (Considering 20% Stand By)	3	1	Nos.
26	Actual Dumper Fleet Required (Rounded)	23 Nos.		

d. **Loaders**

Sl. No.	Purpose	For 5.7 MTPA	For 30 MTPA
1	Capacity, cu.m	5	5
2	Annual running hours	3456	3456
3	Productivity, tph	420	420
4	Production per m/c per year, Tonne (2*3)	14,51,520	14,51,520
5	Max. handling, Mt	57,00,000	300,00,000
6	Loaders required to operate, Nos.	4	20
8	Loaders required, Nos.	4+1 =5	**20+2 = 22**

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Proposed Fleet of Major HEMM & Auxiliary Mining Equipment

Sl. No.	HEMM TYPE	CAPACITY	Nos (units)	
			For 5.7 MTPA	For 30 MTPA
1	Drill Machine combined with compressor	150-160 mm	1	4
2	Excavator	4.3 / 6.0 CuM	4 / 3	-
3	Excavator	15 / 36 CuM	-	5 / 3
4	Dumper	80/120 tonner	25 / 20	-
5	Dumper	120/240 tonner	-	46 / 23
6	Loader	5 CuM	5	22
7	Diesel Tanker	12 KL	1	2
8	Water Sprinkler	12 KL	3	3
9	Dozer	20 CuM	2	4
10	Motor Grader	Variable Capacity	2	2
11	Diesel Generator	Variable Capacity	7	10
12	Dewatering Pumps	Variable Capacity	4	6
13	Rock Breaker	Variable Capacity	2	4
14	Tower lights	Variable Capacity	12	15
15	Fixed Water Sprinkler	1 km	-	-
16	Mobile Service Van	Variable Capacity	2	2
17	Crane	50 ton	1	1

The proposed equipment shall be sufficient for smooth operation of the Mine for the proposed capacity of 5.7 MTPA of ROM ore during second year of the mining plan period and 30 MTPA thereafter. However, exact specification, capacity & numbers of HEMMs proposed may vary as per exact requirement.

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Proposed Crushing & Screening Plants:

In order to segregate the ROM to different size specification, following crushing and screening plants within ML area have been proposed.

Sl. No.	PLANT TYPE	CAPACITY	No (units)	
			For 5.7 MTPA	Additional Plant for 30 MTPA
1	Stationary Crusher Plant	175 TPH	1	1 no of 5000 TPH stationary multi stage crushing & screening plant & 1 no of 2500 TPH stationary multi stage crushing & screening plant
2	Stationary Crusher Plant	200 TPH	1	
3	Stationary Crusher Plant	400 TPH	2	
4	Mobile Crusher Plant	150 TPH	1	
5	Mobile Screening Plant	150 TPH	1	
6	Mobile Screening Plant	250 TPH	5	
7	Stationary Screening Plant	1500 TPH	1	

As ROM production of 30MTPA is proposed from 3rd year, i.e. 2022-23 onwards, thus the construction for 5000 TPH and 2500 TPH multi stage crushing & screening plant shall start from 2nd year (i.e. 2021-22) after getting all statutory clearances. In case of delay in commissioning of the proposed additional 5000TPH & 2500 TPH stationary multi stage crushing & screening plants then the existing mobile screens/crusher and stationery crusher and screens will be continued to be used.

The proposed location of the crushing & screening plants have been shown in Conceptual Plan. Refer Plate No 8. Before establishment of above stationary plants, the proposed area shall be explored through drilling.

Proposed Slurry Transportation of Iron Ore through Pipeline:

It is proposed to transport the iron ore through pipeline in the form of slurry. Out of 30 MTPA, it is proposed to transport approx 9 MTPA through road and 21 MTPA through pipeline in the form of slurry out of the ML area. As ROM production of 30MTPA is proposed from 3rd year, i.e. 2022-23 onwards, thus the construction for Plant for Slurry Transportation of Iron Ore shall start from 2nd year (i.e. 2021-22) after getting all statutory clearances.

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Requirement of Explosive and Magazine

The most common types of explosives available readily such as Power gel 1, powergel 2, Superdyne for Column charge and for booster charge Power gel C, Cast booster, Aquadyne shall be used in the mines.

Sl. No.	Parameters	Unit	For 5.7 MTPA	For 30 MTPA
1	Total Excavation,	Cum.	18,25,400	12,831,000
2	% of Rock Requiring Blasting	%	30	30
3	Total Excavation requiring blasting	cum	547620	38,49,300
4	Hole Dia	mm	150-160	150-160
5	Drill Deployment % for Drilling	%	100	100
6	Burden	m	5	5
7	Spacing	m	6	6
8	Bench Height	m	15	15
9	Subgrade	m	1.5	1.5
10	Hole Depth	m	16.5	16.5
11	Stemming	m	6.5	6.5
12	Charge Length	m	10	10
13	Explosive Density	g/cc	1.1	1.1
14	Loading Density, kg/m	kg/m	11.23	11.23
15	Total Explosive Charge/hole (12*14)	kg	112.3	112.3
16	Total no. of holes to be blasted/year	Nos.	1107	7776
17	Blasting frequency/week	Nos.	3	4
18	No. of operating faces/round	Nos.	2	3
19	Drilling Pattern		Staggered	Staggered
20	Initiation System		NONEL/Detonating Fuse	NONEL/Detonating Fuse
21	Firing Pattern		Wide V -Cut	Wide V -Cut
22	Explosive consumption/year (12*14*16)	kg	1,24,316	8,73,245
23	Explosive consumption per month (25/no of months)	kg	10,360	72,770
24	Charge Factor	Kg/ CuM	0.23	0.23
25	Powder Factor (based on blasting experience in other mines)	Ton/kg	13	13

Rock breaker will be used for breaking big boulders therefore no secondary blasting is required. The lessee may go for storage of explosive in the existing Magazine or may conduct the blasting through third party agency.

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Blasting Procedure

In Topadih (Block - A) and Baliasahi (Block - B) 16.5 m deep bore holes will be drilled for 15m of bench height. Diameter of the hole will be 150-160 mm. High explosives cartridges of base charge and booster cartridge tied with Cordex or Excel will be loaded to blast holes. Deck charging will be done at places where Hard and soft zones are encountered. The stemming length is proposed to be one third of the hole depth. The explosive column will be initiated by detonator & safety fuse. Single row blasting with hole to hole delay interval and/or double row blasting with row to row delay interval as well as hole to hole delay interval will be followed for controlling blast noise, vibration and fly rock as well as to get better fragmentation and better yield of ore.

Precautionary measures during blasting

The major hazards associated with blasting are as follows:

i) Ground vibration and resulting damage to structure and surrounding rock strata.
ii) Fly rock
iii) Noise and air overpressure and
iv) Dust and fumes

Some of measures proposed to be adapted to restrict these hazards with acceptable limit are:

i) Adopting the safe charge per day to restrict the peak particle velocity (ppv) of ground vibration as per blasting test results.
ii) Avoiding holes of uneven depth of blocked holes from tie-up sequence.
Iii) Avoiding water accumulation in the holes, and if there is any water accumulation in the hole, the same has to be dewatered wherever practicable.
iv) Muffing the blasting, as far as practicable, particularly where safe zone is not possible to be adhered to and Covering the detonating cords by soil layers.

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3.0 MINE DRAINAGE

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

The topography of the area is undulating. Elevation ranges from 515 m AMSL to 840 m AMSL. The ground water table in the mining lease area is 446 m AMSL in pre-monsoon and m AMSL 450 in monsoon period. However the general water table in the area is at 490 m AMSL as per the latest observation in the surrounding buffer zone bore wells. Hence water table will is likely to be intersected during the 5th year i.e. 2024-25 of the plan period since the working will go up to 485 m AMSL (Will be touched in the fifth year i.e. 2024-25) during the plan period. Hydrological study will be conducted and necessary NOC will be obtained for working beyond the water table.

(a) Existing water bodies / source of water

Topadih (Block – A) nalla flows from South East to North West within the lease. The Baliasahi (Block – B) quarry which is situated towards South West of the Topadih nalla, has been provided with bunds all along the top bench. Besides, 1 m high and 1 m wide retaining wall has been provided on both sides of the nalla as a measure of protection up to the end of working zone. The nalla is seasonal and gets activated only during peak rainy seasons; otherwise remain dry for the rest of the non monsoon period. As the mine working is confined too much higher levels, the flow of Topadih (Block - A) nalla will not interfere the working. Further there is proposal to divert the topodihi nalla during the conceptual period after which both the pits i.e. Topodihi pit and Balaisahi pit will be merged based on the outcome of proposed exploration

(b) The surface water from dump yard, mine working area will flows in to a garland drain dug all around the periphery of the mine which is connected to a settling tank.

(c) Ground water in the area occurs in unconfined condition in weathered mantle. The ground surface is undulating. A large portion of rainwater falling on the ground finds its way through openings in the underlying rocks. The aquifers are composed mainly of peridotitic rock. Both laterite and peridotite are porous in nature and helps absorption of most of the rainwater in the ground to recharge the water table under the surface.

(d) The buffer zone of mining lease area falls within Karo River. Karo in the west of the ML area is perennial and form the drainage system of the area. Apart from this river there are other streams to serve the irrigation needs of the study area. There are several streams and canals crisscrossing the buffer zone. The upper aquifer has been formed consisting of laterite forming top mantle,

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which has high porosity and good permeability. The ore body in the core area does not indicate any ground water seepage.

b) **Indicate maximum and minimum depth of Workings.** The existing depth of the Quarries with their RLs and depth of the quarries at the end of plan/ conceptual period can be summarized below:

Name of the Quarry	Existing depth (mRL)		End of first 5 years of the Plan Period (mRL)		End of Conceptual Period (mRL)	
	Top	Bottom	Top	Bottom	Top	Bottom
Topadihi Quarry (Block-A)	590	525	575	500	500	446
Baliasahi Quarry (Block-B)	569	520	530	485	485	446

However the general water table in the area is at 490m AMSL as per the latest observation in the surrounding buffer zone bore wells. Hence water table will is likely to be intersected during the 5th year i.e. 2024-25 of the plan period since the working will go upto 485 m AMSL (Will be touched in the fifth year i.e. 2024-25) during the plan period.

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

Catchment area and likely quantity of Rainwater to flow through the lease area:

The total area is 358.258 Ha out of which the opened up pit is around 115.961 Ha which is considered as catchment area. An average rainfall of 1418mm has been taken into consideration for the calculation of run-off. The details of runoff per annum and the quantity of Rainwater to flow through the lease area are as follows:

- Run off co-efficient = 0.15
- Average annual rainfall = 1.41 m/yr
- Runoff = catchment area × Runoff coefficient × Annual rainfall
  = 1159610 Sq. m × 0.15 × 1.41m/ year = 245258 cu.m/yr

Considering evaporation @ 40% = 245258 x 0.40 = 98103 cum

The annual run off = 245258 – 98103 = 147155 cum/yr.

Thus the per day water for pumping is 147155/365 = 403 cum/day

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The area experiences high rainfall, the site will generate above volume of run offs during south rainy periods. The surface run off from the uncovered site would contain high concentration of suspended matter and eroded matter.

This may result potential impact to surface water body. Outside water will not be allowed to enter the quarries as there will be garland drain in the periphery of quarry top. Water shall be pumped out to keep the floor of the quarry dry.

Three number of 52 HP capacity shall be sufficient to pump out this water in case rain water accumulates in the pit. The pumped out water shall be discharged to outside the quarry and channeled through garland drains to check dams and settling ponds and shall be used for water sprinkling and gardening purpose.

Both surface and ground water quality monitoring shall be monitored periodically in core and buffer zones.

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.

The area has a dendritic drainage pattern, following the general topography of the area. Further, there are few first order and second order streams in the area covering the total watershed around the study area. The third and fourth order drainage channels are surface fissures and furrows for seasonal flow of runoff water in the area.

(i) Drainage Pattern of the area

There is no perennial water course inside the lease. One seasonal nala namely Topadih nala passes through the lease in North West- south east direction. Karo River is at a distance of 1.1 km towards North West of lease area flows from south to north. The bank level is at 510 AMSL. Since mine working is far away from the River/nala and deepest level to be mined in the lease is above the level of perennial water source expectation of flooding of the mine at any time will not be there. The general water table in the area is at 500 m AMSL. Hence the water table will is likely to be intersected during the 3rd year i.e. 2022-23 of the plan period since the working will go upto 500 m AMSL (Will be touched in the third year i.e. 2022-23) during the plan period.

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Minimum seasonal fluctuation in the ground water level in general varies from 2 to 4m. The makeup water during average rainy season with maximum rainfall occurring in any day has been calculated below based on mine area under excavation (there is no backfilling).

(ii) As discussed, considering the maximum rain fall in a day, it has been calculated that around 403 CuM water will be on the floor of the quarry on any of the rainy day. Outside water will not be allowed to enter the quarries as there will be garland drain in the periphery of quarry top. Water shall be pumped out to keep the floor of the quarry dry. Regular sampling of surface and ground water shall be conducted for assessing the water quality in the lease area. Sufficient pumping arrangement shall be done to channelize the surface water through garland drains with check dams and settling tanks and shall be used for water sprinkling and gardening purpose.

(iii) Water requirement and its utilization

The existing water requirement for 5.7 MTPA is 320 m3/day for which NOC from CGWA is available.

For the additional 30 MTPA the total water requirement for the said production is 2,500 KLD. The water requirement will be fulfilled from ground water source for which NOC would be obtained from CGWB. Further the water will be intersected during 5th year which will be utilized for mining, green belt and dust suppression purposes. Any excess water will be utilized for surrounding industrial facilities and for public use.

Water Balance of Guali Iron Ore Block

Particulars	Quantity in KLD	Remarks
Haul road Dust Suppression 3.50 Kms 15.0 Kms	 216 KLD 1750 KLD*	*it may verify based on lead and location of water sources
Dry Fog System 5000 TPH & 2500 TPH Other Mobile plants	 378 KLD 38 KLD	
Plantation	50 KLD	It has to be decided based on area and number of plants to be planted.
STP - For 400 Manpower	48 KLD	
ETP - For Workshop	20 KLD	
TOTAL	2,500 KLD	

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4.0 STACKING OF MINERAL REJECT AND DISPOSAL OF WASTE

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

The nature of over burden are top soil, laterite, shale and overburden (OB) occurring at the top profile of ore zone followed by ROM (>45% Fe). While mining ROM intercalated (<45% Fe) occurs which is delineated as separate patches and will be removed. In an fully mechanized mines IB can be segregated if the thickness is more than 1 m. Other-wise it is blended with ROM. Substantial quantity of side burdens (SB) analyzing <45% Fe are also excavated while forming benches to excavate the ore zone.

Details of the existing Waste Dumps

As per fresh survey conducted in the ML areas following waste dump location have been identified in Guali Iron Ore Block.

Name of Dump	Block	Location	Length(max) in mtr	Breadth (max) in mtr	Area occupied		Grade
					(m^2)	(Ha)	
Waste Dump-1	Baliasahi Block-B	2433490N to 2433715N 324650E to 324970E	225	170	38370	3.8	<45%Fe
Temporary Waste Dump-2	Topadihi Block-A	2433595N to 2433740N 325640E to 325850E	190	105	20000	2	<45%Fe

The details of existing mineral reject dumps are mentioned as follows:

Sl.No	Location	Stock Type	Co-ordinate
01	Topadihi Block-A	Stock -1	2432867N to 2433400 N 325280E to 326025E
		Stock-2	2432604N to 2433013 N 325619E to 326025E
		Stock-3	2433060N to 2433320N 325095E to325262E
		Stock-4	2433480N to 2433748N 325335E to 325540E
		Stock-5	2433558N to 2433745N 325470N to 325650E
02	Baliasahi Block-B	Stock-6	2433435N to 2433605N 324625E to 324840E
		Stock 7	2433183N to 2433357N 323893E to 323976E

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It is proposed to re-handle the existing mineral stacks within the first two years to facilitate advancement of mining, subject to requisite permission from authorities. This mineral stack handling is in addition to the ROM handling quantity proposed in each of the years of the plan period.

Year-wise Mineral reject/Sub grade generation for first 5 years of the Plan period:

In Million Tonnes

Year	Mineral reject Dump ID	Location	Topadhi (Block-A)			Baliasahi (Block-B)		
			Quantity	Top RL (m)	Bottom RL (m	Quantity	Top RL (m)	Bottom RL (m
1st Year (12.01.2021 to 31.03.2021)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2nd year (2021-22)	Minera reject Dump –1 (topodihi)	N-2433282 to 2433444 E-324482 to E-324713	1.01	565	550	0.00	Nil	Nil
3rd year (2022-23)	Minera reject Dump –1 (topodihi)	N-2433300 to 2433515 E-324541 to E-324800	3.007	565	550	1.232	560	545
	Minera reject Dump - 2 (Baliasahi)	N-2433263 to 2433362 E-323553 to E-323800						
4th year (2023-24)	Minera reject Dump -1 (topodihi)	N-2433303 to 2433489 E-324504 to E-324777	3.266	580	565	0.280	560	545
	Minera reject Dump – 2 (Baliasahi)	N-2433263 to 2433362 E-323782 to E-324005						
5th year (2024-25)	Minera reject Dump –1 (topodihi)	N-2433312 to 2433443 E-324537 to E-324723	2.082	595	580	0.482	575	560
	Minera reject Dump – 2 (Baliasahi)	N-2433283 to 2433342 E-323580 to E-323985						
Total			9.472			1.995		
Grand Total			11.467					

Note: During the year 2020-21 about 6000 Tonnes of mineral reject will be generated which will be blended and used.

Two mineral stacks are proposed during the plan period, both of which are temporary in nature. Mineral reject dump - 1 (temporary stack) falls outside the UPL, whereas Mineral reject dump – 2 (temporary stack) falls within the UPL

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No proposal is given for stacking of mineral rejects over existing minerals rejects stacks/mineral reject dumps of previous lessee within the stipulated time frame as allowed by State Govt. to remove it in favor of earlier lessee as per rule. The generated mineral reject is proposed to be stacked in 2 proposed mineral reject stacks namely Mineral reject dump 1 along N-2433282 to N-2433515E-324482 to E-324800 (Northern), and Mineral reject dump 2 situated along N-2433263 to N-2433362E-323553 to E-324005 (North western side)

Total mineral reject generated during the plan period is 11.467 Million Tonnes out of which 6000 t generated during 1st Year will be blended and sold. Further 11.461 Million Tonnes of mineral reject generated from 2nd (2021-22) to 5th year (2024-25) which will be blended with high grade ore in proportionately to get desired salable grade and the Mineral reject will be stored temporarily in two locations in the north and north western part of the lease area. The In future this will also be sold based on the market demand. It is also proposed to sell the mineral reject directly in the market if there is a demand. After exhaustion of proposed generated stock, the area shall be utilized for storing of freshly generated mineral reject.

The details of the quantity of top soil, over burden and mineral rejects generated & its disposal during the proposed plan period is given below: -

Year	Top Soil CuM		Overburden CuM			Mineral Rejects Cum		
	Reuse/ spreading from the stored qty.	Storage	Road maintenance	Storage	Back-filling	Blending	storage	Beneficiation
1st Year (12.01.2021 to 31.03.2021)	NIL	NIL	NIL	NIL	NIL	2400	NIl	NIL
2nd year (2021-22)	NIL	NIL	41800	NIl	NIL	162600	243900	NIL
3rd year (2022-23)	NIL	NIL	290040	676760	NIL	678400	1017600	NIL
4th year (2023 24)	155280	NIL	464610	1084090	NIL	583440	875160	NIL
5th year (2024-25)	97000	NIL	1120680	2614920	NIL	410320	615480	NIL
Total	2,52,280	NIL	1917130	4375770	NIL	1837160	2752140	NIL

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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.

Waste generated from the mine during the initial 5 years of the mining plan period has been proposed to be dumped in proposed waste dump-A in the North western part of the lease area along coordinates N-2433403 to N-2433713E-323200 to E-323795. The proposed dump is situated outside the ultimate pit limit and the proved as non mineralized based on bore holes BH-06/18, BH-07/18, BH-08/18, BH-09/18, BH-10/18, BH-11/18, BH-12/18 and BH-13/18. However further exploration is also proposed in the area.

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

Details of the existing Waste Dumps

Sl. No.	Dump Number	Location (Grid)	Designated Capacity	Present Quantity	Remaining quantity	Top RL, mRL	Bottom RL, mRL
01	Waste Dump WD-1	N-2433482 to N-2433738 E-324653 to E-324922	---	11,51,100 CuM.	- -	580	550
02	Temporary Waste Dump WD-2	N-2433600 to N-2433735 E-325645 to E-325843	10,00,000 Cum.	2,15,000 Cum.	7,85,000 Cum.	580	560

The over burden quantity of waste dump WD-1 will be utilized for cutting and filling for ground leveling, foundation earth filling during construction, ramp for hopper etc during the construction of mineral separation plant. This dump will be utilized from 3rd year onwards.

The area of the temporary OB dump WD-2 is coming within the UPL which will be re-handled before commencement of the mining operation in the above area. The dump will be handled 3rd year onwards i.e. 2022-23 to facilitate mining in the area.

All the dumps will be formed be retreating method of dumping, so as to facilitate early reclamation. The height of the individual terrace will be 15 m. The height of the dump will further exceed beyond 55 m during the plan period after carrying out required scientific study. The bank slope angle considered for designing the dump is 36^0 with overall slope angle of 28^0.

Year-wise generation, disposal, configuration and built up for the proposed 5 years of the Mining Plan period is given below.

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Year	Waste Generation (in m3)		Waste Re handled from Temp.WD -2 (in m3)	Road maintenance (in m3)	Waste Dumped (in m3)	Dump name	Location of Dump (co-ordinates)	Existing or New dump	Dump Dimension			
	Topodhi Block-A	Ballasahi Block-B										
1st Year (12.01.2021 to 31.03.2021)	Nil	Nil	Nil	Nil	Nil	Proposed Waste Dump	Nil	New proposed dump on the north western side of the lease area	Nil	Nil	Nil	36°
2nd Year (2021-22)	41800	Nil	Nil	41800	Nil		Nil		Nil	Nil	Nil	36°
3rd Year (2022-23)	913200	53600	55984	290040	732144		N-2433420 to N-2433728 E-323200 to E-323060		550	01	15	36°
4th Year (2023-24)	1173900	374800	32250	464610	1136340		N-2433400 to N-2433713 E-323233 to E-323795		565	01	15	36°
5th Year (2024-25)	1847300	1888100	Nil	1120580	2614920		N-2433403 to N-2433659 E-323276 to E-323795		590	02	15 & 10	36°
Grand Total	3976400	2316500	87634	1917130	4463404							36°

Note: About 41800 m3 of waste is generated during the 2nd year i.e. 2021-22 of the plan period which will entirely utilized for road maintenance

Proposed Environmental Protection Measures

Following environmental protection measures have been proposed for dump stabilization during the first 5 years of the plan period.

Year	Location	Garland drain	Retaining wall	Settling tank
		L x W x H, m	L x W x H, m	
1st Year(12.01.2021 to 31.03.2021)	Nil	Nil	Nil	Nil
2nd Year (2021-22)	Nil	Nil	Nil	Nil
3rd Year (2022-23)	N-2433400 to N-2433738 E-323188 to E-323800	1345X1X1	1345X1.5X1.5	6 nos (at the bottom of dump)
4th Year (2023-24)	Maintenance			
5th Year (2024-25)	N-2433393 to N-2433559 E-323556 to E-323809	410X1X1	410X1.5X1.5	2 nos (at the bottom of dump)

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The year-wise wastes dumping plans & sections have been shown in Plate No: 06 C to F and Plate No: 07 C to F.

Retaining Walls

The retaining walls will be of 1.5m height and 1.2 m width at the top and around 1.5m at the base. Retaining boulder wall of substantial strength shall be constructed all around the bottom periphery of waste dumps with locally available boulders mixed with sand and cement, to arrest any rolling down of the dump materials. Perforation shall be left at around 10 m intervals to allow for passage of water.

Garland drains

Garland drains of 1.5 m deep and 1.0 m wide shall be constructed all along the bottom periphery of waste dumps followed by the retaining wall to prevent any wash off or leaching of dump materials during heavy rains. Side walls and the base shall be pitched with locally available boulders. Joints shall be filled up with cement and sand mixture so that water cannot percolate.

Settling Tank

A series of 8 settling pits along bottom of the dump of 10m length, 10m width and 3 depth will be provided to arrest the wash-off solid particles. The settling tank will be provided with two compartments each of around 5m width to arrest the suspended solids. The suspended particles will be allowed to settle down in one chamber and clear water will be left out in other chamber before discharge for various uses. Side walls and base shall be packed with locally available boulders mixed with cement and sand.

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5.0 USE OF MINERAL AND MINERAL REJECT

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

The entire ore of +55% Fe production including lumps and fines produced from Guali Block will be consumed in neighboring steel plants/sponge iron plants of Odisha and nearby states. The total mineral reject generated during the plan period will be blended with ore in proportionately to get desired salable grade. Mineral Rejects/Sub grade ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage. However, any existing mineral stack if found to be saleable, will be considered for direct selling to buyers. It is proposed to re-handle the existing mineral stacks within the first two years to facilitate advancement of mining, subject to requisite permission from authorities.

Quality parameters of lumps and fines as specified by the steel plants are as follows.

S No	Parameters	Lump Ore	Fines Ore
i	Fe	62.0 % (min)	60.0 % (min)
ii	SiO_2	2.0 % (max)	2.0 % (max)
iii	Al_2O_3	2.0 % (max)	2.0 % (max)
iv	Total Gangue ($Al_2O_3 + SiO_2$)	4.0 % (max)	4.0 % (max)
v	Size	+10 - 40 mm (Over & under size: Max. 10% Each)	Size: - 10mm (with oversize 10% maximum)

Quality parameters of lumps and fines as specified by the sponge iron plants are as follows.

Fe	Al_2O_3	SiO_2	P	Moisture	LOI	Size
64% to 65%	2.52%	1.48	0.046%	2.9% Maximum	3% maximum	+5 to -18 mm as well as -10 to -40 mm

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

- The ROM will be subjected to screening, crushing, sizing, blending etc before finished product is ready for dispatch, etc.
- ROM iron ore will be crushed and screened in the M.L area to cater the need of the neighboring steel plants/sponge iron plants in respect of size and grade.
- The total mineral reject generated during the plan period will be blended with ore in proportionately to get desired salable grade. If required Mineral Rejects/Sub grade ore can be sold directly, as per market requirement in future. However, a space has been

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designated for mineral reject within the lease hold area for temporary storage.

Year	Mineral Rejects in CuM.		
	Blending	storage	Beneficiation
1st Year (12.01.2021 to 31.03.2021)	2400	Nil	Nil
2nd year (2021-22)	162600	243900	Nil
3rd year (2022-23)	678400	1017600	Nil
4th year (2023-24)	583440	875160	Nil
5th year (2024-25)	410320	615480	Nil
Total	1837160	2752140	Nil

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

The entire ore of +55% Fe production including lumps and fines produced from Guali Block will be consumed in neighboring steel plants/sponge iron plants of Odisha and nearby states. The total mineral reject generated during the plan period will be blended with ore in proportionately to get desired salable grade. Mineral Rejects/Sub grade ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage.

d) Indicate precise physical and chemical specification stipulated by buyers

The entire ore production including lumps and fines produced from Guali Block will be consumed in sponge & steel plants of Odisha & nearby states. Quality parameters of lumps and fines as specified by the long-term buyers are as follows.

SN	Parameters	Lump Ore	Fines Ore
i	Fe	62.0 % (min)	60 % (min)
ii	SiO_2	2.0 % (max)	2.0 % (max)
iii	Al_2O_3	2.0 % (max)	2.0 % (max)
iv	Total Gangue (Al_2O_3 + SiO_2)	4.0 % (max)	4.0 % (max)
v	Size	+10 - 40 mm	Size: - 10mm.
vi	Tolerance	+/- 10%	+/- 10%

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c) **Give details of processes adopted to upgrade the ROM to suit the user requirements**

- The ROM will be subjected to screening, crushing, sizing, blending etc. before finished product is ready for dispatch, etc.
- ROM iron ore will be crushed and screened in the M.L area to cater the need of the neighboring steel plants/sponge iron plants in respect of size and grade.
- Part of mineral reject will be blended with ROM and sold.
- The mineral reject generated during the plan period will be blended with ore in proportionately to get desired salable grade. If required Mineral Rejects/Sub grade ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage.

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6.0 PROCESSING OF ROM AND MINERAL REJECT

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

Iron ore in the lease area mainly comprises hard and soft lumps, lateritic Ore, blue dust etc with major part of the ROM is fines of variable grades.

Mineral processing practices is mainly by crushing and screening which will generate Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm for industrial applications. The capacity and specifications of the screening and crushing plants proposed are as below.

Details of Proposed Screening and Crusher Plant (both Stationery and Mobile)

For 5.70 MTPA

Plant	Capacity	No. of Units	Feed Grade/size	Product size fractions	Remarks
Mobile Screening Plant	150 TPH	One umber	ROM ore/(- 250 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	The above crushing and screening plant arrangement is for catering 5.70 MTPA
Mobile Screening Plant	250 TPH	5 numbers	ROM ore/ (- 250 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	
Stationary Screening Plant	1500 TPH	One number	ROM ore/ (- 500 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	
Stationery Crushing Plant (Stationary)	175/ 200/ TPH	2 numbers One each	ROM ore & crushing of lumps (- 40 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	
Stationery Crushing Plant (Stationary)	400 TPH	2 numbers	ROM ore & crushing of lumps (- 40 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	
Mobile Crushing Plant	150 TPH	1 number	Screened lumps (+ 80 mm) and (+ 40 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	

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For 30.00 MTPA

Plant	Capacity	No. of Units	Feed Grade/size	Product size fraction	Remarks
Stationary integrated multi stage crushing & screening plant	5000 TPH	One number	ROM ore/(- 500 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	Stationary crushing and screening plant arrangement is for catering 30 MTPA
Stationary integrated multi stage crushing & screening plant	2500 TPH	One number	ROM ore/ (- 500 mm)	Lumps 10 - 40 mm & 0-10 mm, optional + 5- 18mm and 0 – 5mm	

As ROM production of 30MTPA is proposed from 3rd year, i.e. 2022-23 onwards, thus the construction for 5000 TPH and 2500 TPH multi stage crushing & screening plant shall start from 2nd year (i.e. 2021-22) after getting all statutory clearances. In case of delay in commissioning of the proposed additional 5000TPH & 2500 TPH stationary multi stage crushing & screening plants then the existing mobile screens/crusher and stationery crusher and screens will be continued to be used.

The proposed location of the crushing & screening plants have been shown in Conceptual Plan. Refer Plate No 8. Before establishment of above stationary plants, the proposed area shall be explored through drilling.

Proposed Slurry Transportation of Iron Ore through Pipeline:

It is proposed to transport the iron ore through pipeline in the form of slurry. Out of 30 MTPA, it is proposed to transport approx 9 MTPA through road and 21 MTPA through pipeline in the form of slurry out of the ML area. As ROM production of 30MTPA is proposed from 3rd year, i.e. 2022-23 onwards, thus the construction for Plant for Slurry Transportation of Iron Ore shall start from 2nd year (i.e. 2021-22) after getting all statutory clearances.

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.

The area proposed for establishment of stationary crushing and screening plant, conveyors etc are already proved as non mineralized by the bore holes already drilled i.e. BH 79/18, BH 80/18, BH28/09, BH61/18, BH 4/10, BH 60/18, BH 26/09, BSI 6, BH 02/10, BH 1/10, BSI-5, BH 31/18, BH 29/09, BH 1/13, BH 2/13, BH 94/18, RC -2, BSI-19 and BSI 20. Further bore holes are proposed during the 3rd year of the plan period in the stationary screening plant and crushing plant area to confirm with non mineralization in the entire area. Hence the site selected will not restrict the

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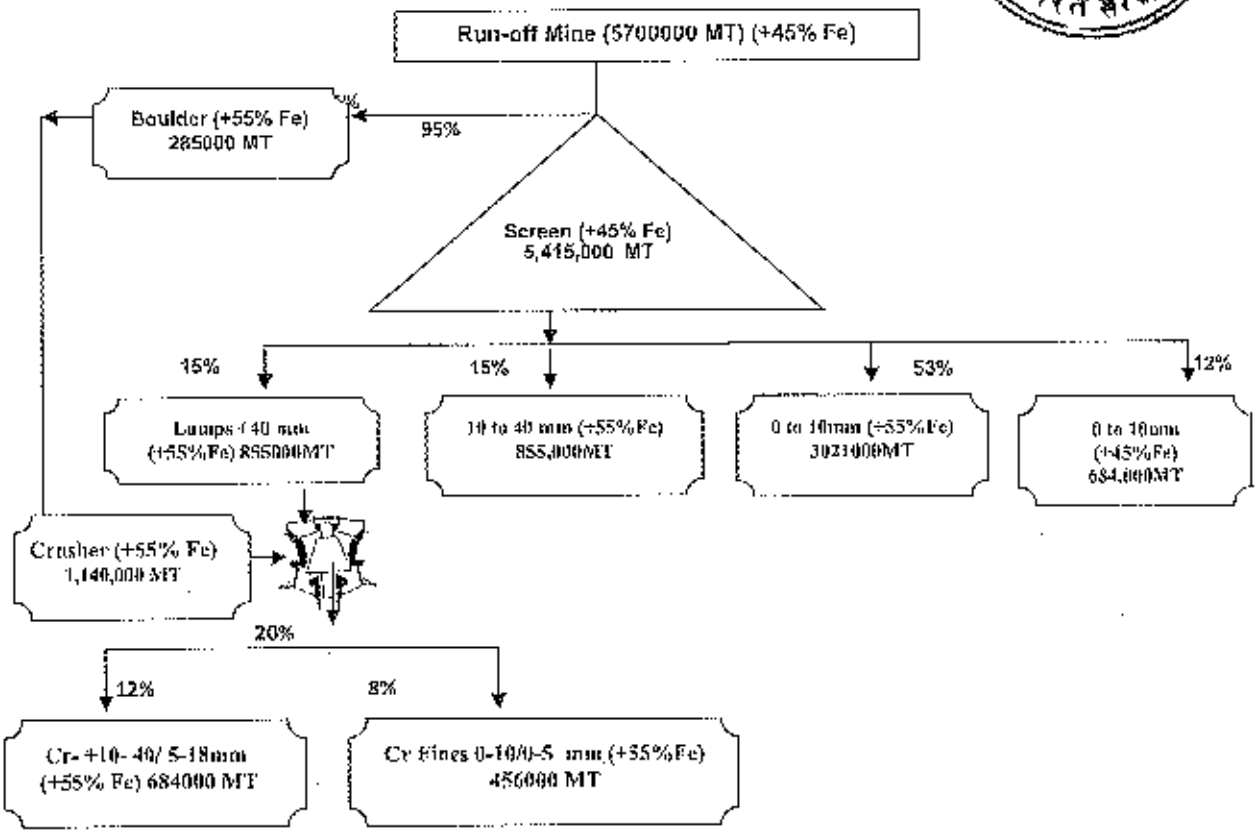
mine development

Block Diagram with Material Balance For 5.70 MTPA



The ROM mined is screened wherein 5% of oversize lumps of +55% grade are segregated and the remaining 95% passes though the screen generating +40 mm size fraction of 10%, +10-40 mm of 20%, and the rest 65% of 0-10 mm fraction.

5 % of boulders generated from ROM and 15 % of +40mm size generated from screening are sent to crushers for further size reduction to+10-40 / 5-18 mm and 0 -10 /5-10 mm which will be 12% and 8% respectively.

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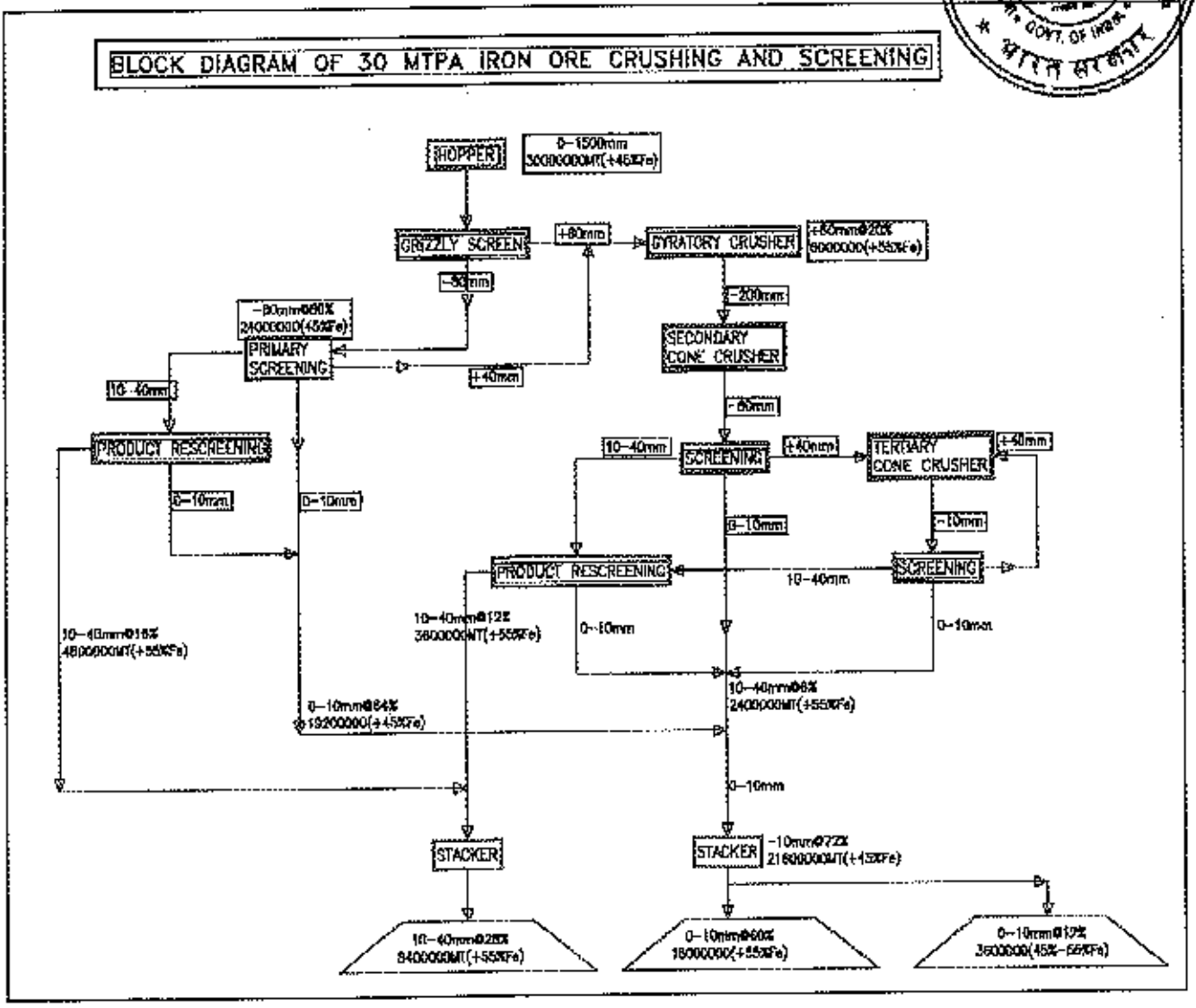
Block Diagram with Material Balance for 30 MTPA



The flow sheet is given in annexure 20.

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

Not applicable.

Qualified Person

Qualified Person

d. **Quantity and quality of tailings /reject proposed to be disposed, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailings dam.**
Not applicable.

e) **Specify quantity and type of chemicals if any to be used in the processing plant.**
Not applicable.

f) **Specify quantity and type of chemicals to be stored on site / plant.**
Not applicable.

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

The water requirement of the mine shall be met from bore wells. Pumps with power supply have been provided. From this place water supply to different points will be done through water tanker and pipe line. Effective storm water collection network is designed to collect the rain water from the mining and screening plant areas. The collected rainwater will be diverted to the rainwater harvesting pits for recharging the ground water. Water harvesting structures can be developed for storage of rain water for use. Similarly, rain water collected in opened up pits can be pumped for settling and used afterwards.

The existing water requirement for 5.7 MTPA is 320 m3/day for which NOC from CGWA is available.

For the additional 30 MTPA the total water requirement for the said production is 2,500 KLD. The water requirement will be fulfilled from ground water source for which NOC would be obtained from CGWB. Further the water will be intersected during 5th year which will be utilized for mining, green belt and dust suppression purposes. Any excess water will be utilized for surrounding industrial facilities and for public use.

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Qualified Person

Water Balance of Guali Iron Ore Block

Particulars	Quantity in KLD	Remarks
Haul road Dust Suppression 3.50 Kms 15.0 Kms	 216 KLD 1750 KLD*	*it may verify based on lead and location of water sources
Dry Fog System 5000 TPH & 2500 TPH Other Mobile plants	 378 KLD 38 KLD	
Plantation	50 KLD	It has to be decided based on area and number of plants to be planted.
STP - For 400 Manpower	48 KLD	
ETP - For Workshop	20 KLD	
TOTAL	2,500 KLD	

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7.0 OTHER

Site Services

Site services such as office, explosive magazine, first aid centre, store room, rest sheds, blasting sheds, and canteen for staff and executives will be set up as per the statute. Staff bus and ambulance etc. will be provided. These services will be enhanced/modified and continued during the future mining operations as per necessity. Few site services envisaged above are available in the Guali Iron Ore Block. Further additional requirements if any, shall be developed.

Other Support Facilities:

All the statutory facilities such as crèche, canteen, first-aid center, vocational training center etc. will be set up as per statute. To take care of the drinking water needs at different working areas, water tankers have been envisaged for the mine. The rest shed-cum-lunch rooms will be set up near quarry site. First aid facilities and toilet will be attached to the rest shed. Portable blasting sheds of one end open type will be provided at the mine site for giving protection to the blasters during blasting. These blasting sheds are made up of steel and are shifted in accordance with the shifting of blast hole locations. Few support facilities envisaged above are available in the Guali Iron Ore Block. Further additional requirements if any, shall be provided.

b) Employment Potential:

The details of the employment and manpower requirement in the mine are mentioned below.

Category of staff/ Workers		No. of Person employed		
		Direct OMC Departmental	Contractor	Total
Admn. & Technical	Mines Manager	1	-	1
	1st Class Mines Manager	2	1	3
	2nd Class Mines Manager	5	4	9
	Mechanical Engineer	2	3	5
	Electrical Engineer	2	2	4
	Civil Engineer	1	1	2
	Manager (Quality Control)	1	-	1
	Geologist	3	-	3
	Surveyor	2	-	2
	Medical Officer	1	-	1
	Other	14	-	14
Open cast	Foreman & Mate	15	15	30
	Electrical Supervisor, Electrician, Mechanic, Foreman, Mechanics, Welder, Tyre Fitter, Tyre Helper JE Electrical, JE Civil & Shotfirer	12	38	50
	Face Workers & Loader (Deployed	-	183	183

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Category of staff/ Workers			No. of Person employed		
			Direct OMC Departmental	Contractor	Total
Above Ground	HEMM operator/ Helper				
	Other face workers (Supervisors)		-	5	
	Others	In pit Beneficiation	-	18	18
		Other Worker	-	3	3
	Clerical & Supervisory staff	Time office/ Store/ VT/ WB/ QC/Medical/Security/HSD	35	81	116
	Workers in attached work shop/ mineral dressing plant		17	-	17
	Others	QC Staff	3	-	3
		Security Guards	10	30	40
		Canteen	5	-	5
		Other worker	8	-	8
Grand Total			139	384	523

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

8.1 Environment Base line information:

The leasehold area is located in the villages of Guali, Pandulposi, Rugudihi, Loldapada, Topadih and Siddhamath Reserved forest. The lease area is 358.258 Ha (as per DGPS)/ 365.026 Ha (as per RoR). The lease area is having four moderately sloping hillocks. Middle portion is almost flat. Highest elevation is at 598 mRL whereas the lowest elevation shows 500 mRL.

As present proposal is for "Mining Plan", so a fresh study for base line data will be undertaken by M/s OMC Ltd in due course of time to ascertain the Environmental base line information in the core zone, 500mtr from the lease boundary and buffer zone of the mining lease area on water regime, quality of air, ambient noise level, flora, climatic conditions and Surface water regime etc.

Existing land use pattern indicating the area already degraded due to mining, roads, processing plant, workshop, township etc.

The existing land use pattern at start of Mine Plan period is shown in the table below:

Sl No	Description	Area put to use at the start of plan period, Ha
1	Area under Mining	50.461
2	Storage of topsoil	0.093
3	Waste Dump Site	6.959
4	Mineral storage	42.243
5	Infrastructure, Workshop, admin Building etc)	4.650
6	Roads	32.445
7	Railways	0
8	Safety Zone/Green belt	14.563
9	Tailing pond	0
10	Effluent Treatment Plant	0
11	Mineral Separation Plant (Crushing, Screening Unit & Slurry Pipeline)	2.706
12	Township area	0
13	Forest Area (Diverted) not used by earlier lessee	40.572
14	Area retained for Plantation	0
Total area of utilization		194.692
13	Other Unutilized Area	163.566
Grand Total		358.258

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Base line information to be furnished for surrounding 500 meter form lease boundary

- Sidhamath reserve forest falls in the north side of the lease area.
- Lairhapada village in the SE direction, Rugurdihi village in the East, Rududihi village in the East, Baliasahi village in the west side, Tamaklasahi vaillge in the Southern side and Topodihi village in the southern side area the villages falling in the 500m buffer zone.
- NH -215/520 falls in the Southern side of the lease area.
- Nuagaon mines falls in the southern side of the lease area.
- Further some agricultural land is falling in the Western , South Western side North Eastern and South Eastern side of the lease area adjacent to the villages .

Water regime

Karo nala, a perennial source, exists beyond the Guali mining Block area (flowing at a distance of 5.5 Kms from western boundary), which discharges water into Baitarani River, a tributary to Bay of Bengal. Topadih seasonal nala flows from South East to North West within the lease. The Baliasahi (Block – B) quarry is situated towards South West of the Topadih nalla. The nala is seasonal and gets activated only during peak rainy seasons; otherwise remain dry for the rest of the non monsoon period. As the mine working is confined too much higher levels, the flow of Topadih nala will not interfere the working.

Ground water regime

Ground water in the area occurs in unconfined condition in weathered mantle. The ground surface is undulating. A large portion of rainwater falling on the ground finds its way through openings in the underlying rocks. The aquifers are composed mainly of peridotitic rock. Both laterite and peridotite are porous in nature and helps absorption of most of the rainwater in the ground to recharge the water table under the surface.

Quality of air

Air quality of the mine will be established after a fresh study for base line data is undertaken by M/s OMC Ltd in due course of time to ascertain the Environmental base line information in the core and buffer zone of the mining lease area.

Ambient noise level

Ambient noise level of the mine will be established after a fresh study for base line data is undertaken by M/s OMC Ltd in due course of time to ascertain the Environmental base line information in the core and buffer zone of the mining lease area.

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Fugitive dust

Fugitive dust in the mine will be established after a fresh study for base line data is undertaken by M/s OMC Ltd in due course of time to ascertain the Environmental base line information in the core and buffer zone of the mining lease area.

Flora and Fauna

The Floral assemblage within the core and buffer zones are more or less same, but due to broken areas within core zone, the density and distribution varies from the buffer zone. There is no elephant or tiger migratory corridor within the core and buffer zone of the project site. Impact of the proposed mining will be minimal in nature. The major flora observed in study area are Karam, Semul, Kumbhi, Sunari, Kendu, Sidha, Mohula, Barakoli, Sal, Asan, Bahada, Jamun etc. Endangered and Endemic species were not found in the study area. The area is not having any wildlife animals with in core & buffer zone which are likely to be disturbed.

Climatic conditions

Climate and meteorology of a place play an important role in the implementation of any developmental project. Meteorology (weather climate) is also the key to understanding local air quality as there is essential relationship between meteorology and atmospheric dispersion involving the wind in the broadest sense of them.

The meteorological data has been obtained from the EIA/EMP report prepared for the project based on which the Environment Clearance has been granted for project by MoEF, Govt of India.

a. Temperature

The climate of the study area is characterized by an oppressively hot summer with high humidity. Summer generally commences in the month of March. Temperature begins to rise rapidly attaining the maximum in the month of May. During the summer maximum temperature can go up to 47.4^{0}C. The weather becomes pleasant with onset of monsoon in June and remains as such up to the end of October. The temperature in the month of December is lowest i.e. 7^{0}C.

b. Relative Humidity

The air is dry except during the South – West monsoon season. The maximum humidity ranges from 55% to 76% with annual average of 64.83% while the minimum humidity ranges from 26% to 43% with an annual average of 34%.

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c. **Rainfall Data**

From the table it is seen that maximum rainfall occurs during the month of June, July, August and September. Maximum monthly rainfall of 677.5 mm was observed during September 2008. Annual rainfall data is given below

ANNUAL RAINFALL DATA (KEONJHAR DISTRICT)

EAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2006	0	0	19	50.1	179.9	199.3	287.1	568.2	247	67.4	36	0	1648
2007	2	94.1	20.6	32.8	110.4	242.9	404.6	355.9	316.5	28.5	77.3	0	1685.6
2008	62.5	11.9	12.7	35.2	98.2	605.1	175.6	193.8	429.1	4.6	15	0	1643.7
2009	0	0	2.8	0.5	133.1	303.5	386	333.4	195.2	128.2	26.8	0	1304.5
2010	1.3	1.3	71	0.4	122.1	114.4	289.2	233.1	238.1	125.2	28.6	29.5	1254.2
2011	0	32.9	31.3	171.2	117.6	359.9	157.5	318.7	677.5	95.3	0	0	1871.6
2012	94.7	7.8	0	46.3	9.5	169.7	225	283.6	213.7	66.3	0	0	1115.6
2013	7.5	49.5	88	87	130	9.5	230.5	385.03	309.5	76	8.5	0	1381.03
2014	4.5	97	24.5	8.5	76	86.5	308	318	191.5	137.5	0	0	1202
2015	8.5	29	4	26	48.5	152.5	436.1	200.5	136	64.5	0	0	1105.6
2016	1.5	91	38.5	2	26	110	609.1	357	269.5	76	8.5	1	1596.1
2017	0.5	23.5	22	18.5	13	262	500.5	364	309.5	123	14	0	1838.5
2018	0	0	6.5	38.5	37	129	133.5	85	287	76	3.5	1	797
Average	14.07	33.68	26.22	35.76	80.40	203.86	325.5	307.40	293.77	78.7	16.78	2.42	1418.7

Average month-wise Predominant wind directions are as below

Sl No	Month	Direction	Prominent wind Direction
1	January	North-East > South -West	Predominant Wind Direction is South South-West to North North-East
2	February	South South-West > North North-East	
3	March	South South-West > North-East	
4	April	South > North	
5	May	South South-West > North North-East	
6	June	South South-West > North North-East	
7	July	South-West South > North-East North	
8	August.	South-West South > East North	
9	September	South-West South > North East	
10	October	North North-East > South	
11	November	North North-East > North North-West	
12	December	North North-East > North North-West	

Human settlements

Observations have been made with in a region of 5 Kms around the lease area under reference and the census data of 2011 indicates the followings.

- ✓ Few hutments belonging to 2 villages Guali and Pandaluposhi exist within the lease in addition to lessee's own colony.
- ✓ There are about 14 villages within the surrounding 5 Km buffer zone of the ML area.

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- ✓ Topadih is the nearest village lying in the south eastern side of the ML area. Ruhadi village is the biggest village situated at a distance of around 250 m North eastern side of the ML area.
- ✓ The total population is about 27504 people within the surrounding 5 Kms area out of which the population in nearby Topadihi village is 1042.
- ✓ Majority of the population of these villages are observed to be workers engaged in mining and other activities with very few persons engaged in periodic cultivation and agricultural workers.
- ✓ The villagers are mostly scheduled tribes (67.27%) and the literacy is low at 49.81%.

Public buildings, places of worship and monuments

The lease area (Core Zone) and the area within 5km radius of the M.L area (Buffer Zone) do not have the places of archeological, historical, cultural, monumental and aesthetic and important residential as well as official buildings.

Indicate any sanctuary is located in the vicinity of leasehold

There is no national park/wild life sanctuary/biosphere reserve/ tiger reserve/ elephant reserve in the core (M.L area) and buffer zone (5 km radius of the M.L area).

Proposed Environmental Monitoring Parameters and Stations

The monitoring of various environment parameters as per relevant statute shall be conducted. The details of proposed monitoring stations are shown in Environment Plan (Plate No-11).

	Within Core one	Within Buffer Zone	Remark
Ambient Air Quality	8 nos	2 nos	Refer Environment Plan (Plate No-11)
Fugitive Air Quality	6 nos	Nil	
Noise Quality	6 nos	1 nos	
Soil Quality	7 nos	4 nos	
Surface Water Quality	2 nos	Nil	
Ground Water Quality	4 nos	4 nos	

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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, dumping, road, workshop, processing plant, tailing pond/dam, township etc.

The land use pattern at the start of the Plan period, at the end of first five years and at the end of conceptual period is given in the below table.

The land use in stages is given below: -

Sl No	Description	Area put to use at the start of plan period, Ha	Total area at the end of Plan Period, Ha	Land use by End of Conceptual Period, Ha
1	Area under Mining **	50.461	115.961	212.270
2	Storage of topsoil	0.093	0	0
3	Waste Dump Site	6.959	21.532	56.900
4	Mineral storage	42.249	66.388	19.190
5	Infrastructure, Workshop, admin Building etc)	4.650	5.166	4.650
6	Roads	32.445	14.995	10.850
7	Railways	0	0	0
8	Safety Zone/Green belt *	14.563	14.342	6.469
9	Tailing pond	0	0	0
10	Effluent Treatment Plant	0	0	0
11	Mineral Separation Plant (Crushing, Screening Unit & Slurry Pipeline)	2.706	24.000	20.380
12	Township area	0	0	0
13	Forest Area (Diverted) not used by earlier lessee	40.572	0	0
14	Area retained for Plantation	0	0	0.763
Total area of utilization		194.692	262.384	340.472
13	Other Unutilized Area	163.566	95.874	17.786
Grand Total		358.258	358.258	358.258

* An area 0.221Ha safety zone is converted to road for proposed/existing entry point of Mining Lease. Thus the safety zone becomes 14.342Ha (14.563 - 0.221). During conceptual period 0.047 Ha will be converted to road and 7.826 Ha to Mineral separation plant & ore stack yard. Thus the safety zone will be 6.469 Ha.

** Out of the 212.27 Ha, mining will be 155.17 Ha and the remaining 57.10 Ha will be area under future exploration which subsequently will be converted to mining and allied activities.

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i) Air quality

Method of mining will be mechanized with the deployment of DTH drills, Excavators, Dumper etc. Therefore, there will be emission of noxious gases like NOX, SOx, CO etc. due to mining operation. As such, there will also be generation of dust during movement of loaded or empty trucks, excavation and dumping affecting the condition of ambient air quality (AAQ). Periodic monitoring will be conducted to check the status of air quality.

Following measures are proposed for management of air quality: -

- Water sprinkling on haul roads at regular intervals.
- Installing of permanent water sprinklers at strategic places.
- Dense plantation along the safety zone/avenue plantation.
- No overloading of tippers/ Dumpers.
- Ore shall be covered with tarpaulin during transportation from stackyard to outwards.
- Provision of dust extractors with the drill machines/ wet drilling practices.
- Water spraying in the dump hopper of crusher.
- Provisions of dust masks to the persons exposed to dust.

ii) Water quality

Baliasahi (Block – B) quarry is situated towards South West of the Topadih nalla, which is seasonal and gets activated only during peak rainy seasons. Mine working is confined too much higher levels, the Flow of Topadih nala is not interfering / will not interfere mine working since the nala is at much lower level then mine working. Retaining wall has been constructed along the nala course to arrest the wash-offs and to release clean water outside. Hence, there is no chance of flowing sediments. Periodic monitoring will be conducted to check the status of both surface and ground water quality.

Impact on Ground Water Quality

The downward movement of the polluting substances from the stacks, dump and exposed quarry faces during seepage and percolation of ground water normally affects the ground water quality adversely in mining area. The ground water table will touched during the 3rd year of the plan period. Hydrological study will be conducted and necessary NOC will be obtained for working beyond the water table.

The garland drains around quarry and dumps shall be constructed. In 8 numbers of two stage settling ponds and afforestation on existing dumps and on vacant land has been proposed. These

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measures shall be taken to ensure that the surface water quality in the project area is within permissible limit in respect of all the parameters for all four seasons. However, it is anticipated that there may be slight increase in water pollution load due to enhancement of production. The measures being proposed for water treatment and conservation water are as follows: -

a. Extension of garland drain around quarry, waste dump yard etc.
b. Construction of more check dams around the dump site to arrest flow of loose sediments before discharge into the drainage system of the region through settling tanks.
c. Drains to be cleaned up periodically.
d. Strengthen of small stone/ rock barriers across the drains at intervals to check the water current and to arrest the solid particles.
e. Effluent water from the quarry to be pumped regularly and discharged to the adjacent garland drains.
f. All the water of mines has to pass into the settling tanks and after settling, the water shall be used for plantation & dust suppression.
g. Water shall be treated before use for drinking purpose. Before water is supplied for consumption particularly for drinking purpose it has to be ensured that the water is free from any pathogens.
h. The domestic sewage from the canteen and toilets will be routed to septic tanks followed by soak pits. The workshop effluent will be routed through oil and grease trap and treated to the discharge standards and reused in the workshop.
i. Regular monitoring of water is being conducted quarterly to know the quality of water.

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Proposed Environmental Protection Measures

Following environmental protection measures have been proposed for dump stabilization

Year	Location	Garland drain	Retaining wall	Settling tank
		L x W x H, m	L x W x H, m	
1st Year (17.03.2021 to 31.03.2021)	Nil	Nil	Nil	Nil
2nd Year (2021-22)	Nil	Nil	Nil	Nil
3rd Year (2022-23)	N-2433400 to N-2433738 E-323188 to E-323800	1345X1X1	1345X1.5X1.5	6 nos (at the bottom of dump)
4th Year (2023-24)	Maintenance			
5th Year (2024-25)	N-2433393 to N-2433559 E-323556 to E-323803	410X1X1	410X1.5X1.5	2 nos (at the bottom of dump)

iii) Noise levels

As general precaution, to reduce the effect of high noise level, the following ameliorating measures have been proposed:

- Provision of protective devices like acoustic wool, earplugs, ear muffs to workers exposed to noise of more than 80 dB (A) provided.
- Provision of sound proof cabins for the workers deployed on machines producing higher level of sound like Dozers, dumpers, shovels etc.
- Proper maintenance of noise generating machinery including transporting vehicles would be ensured.
- A thick green belt shall be provided around the periphery of mine to screen the noise.
- Reducing the exposure time of workers wherever required.

Regular monitoring of noise is being conducted quarterly to know the quality of noise in core as well as buffer zone.

iv) Vibration levels (due to blasting)

The blast induced ground vibrations will be controlled through limiting the charge per delay and use of in-hole delay by NONEL means of initiation. The blasting frequency will be limited to 3-4 times per week.

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v) **Acid mine drainage**

Not applicable.

vi) **Surface subsidence**

Not applicable.

vii) Socio-economics

The mining employment will greatly increased the income levels of the local population and indirectly will generate employment in tertiary services like transport and repair shops. The impact of mining operations in the area on socio-economic will be a positive one. The infrastructure of the area roads, public transport and electricity supply will also improve after continuation of the mining operation in the area.

viii) Historical monuments etc.

There are no historical monuments or places of archeological interest within 5 km radius of the lease.

ix) Plantation Proposal:

Gap planation will be carried out all along the safety zone of the lease area the details of which are given below

YEAR	Location	AREA OF PLANTATION (Ha)	NO OF SAPLINGS	LOCATION	NAME OF THE SPECIES
2020 -21	-	-	-	-	
2021-22	N-2432687 to N-2433565 E-325981 to E-326195	0.70	1750	Boundary Safety zone area	Neem, Mango, Chakunda, Sissam , Krishnachuda, Radhachuda, Shrubs
2022-23	N-2433565 to N-2433814 E-325109 to E-326155	0.97	2425		
2023-24	N-2433758 to N-2433782 E-323794 to E-325109	0.98	2450		
2024-25	N-2432649 to N-2432661 E-323190 to E-324368	0.85	2125		
TOTAL		3.5	8750	--	

The Over Burden Quantity of waste dump WD-1 will be utilized for cutting and filling for ground leveling, foundation earth filling during construction, ramp for hopper etc during the construction of mineral separation plant. This dump will be utilized from 3rd year onwards. The area of the temporary OB dump WD-2 is coming within the UPL which will be partly re-handled before the mining operation during the year 2022-23 to facilitate mining in the area. The remaining temporary OB dump WD-2 will be handled during conceptual period to facilitate mining.

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Hence no plantation proposal is given on the old dumps. As far as proposed waste dump in the northern corner proposed during the plan period, since the dump is going to be active no proposal is given for plantation.

8.3 Progressive Reclamation Plan:

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

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

No quarry within the lease hold area is matured for reclamation/ back filling during the 5 years of the plan period. Hence there is no proposal for reclamation through back filling.

8.3.2 Topsoil Management:

The top soil generated will be utilized for afforestation. The top soil generated will be utilized for afforestation during the year itself. Hence there will be no top soil stack. The detail of the same is given below.

Year	Top Soil CuM	
	Reuse/ spreading from the stored qty.	Storage
1st Year (12.01.2021 to 31.03.2021)	NIL	Nil
2nd year (2021-22)	NIL	Nil
3rd year (2022-23)	NIL	Nil
4th year (2023-24)	155280	Nil
5th year (2024-25)	97000	Nil
Total	252280	Nil

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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.

Not applicable.

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

Not applicable

8.3.5 Surface subsidence mitigation measures through backfilling of mine voids or by any other means and its monitoring mechanism.

Not applicable

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Summary of year-wise proposal for item no. 8.3 for first 5 years of the Plan Period from 2020-21 to 2024-25

Items	Details	Proposal				
		1st Year (2020-21)	2nd Year (2021-22)	3rd Year (2022-23)	4th Year (2023-24)	(2024-25)
Dump Management	Area afforested (Ha)	Nil	Nil	Nil	Nil	Nil
	No of saplings planted	Nil	Nil	Nil	Nil	Nil
	Cumulative no of plants	Nil	Nil	Nil	Nil	Nil
	Cost including watch and care during the year.	Nil	Nil	Nil	Nil	Nil
Management of worked out benches	Area available for rehabilitation (Ha)	Nil	Nil	Nil	Nil	Nil
	Afforestation done (Ha)	Nil	Nil	Nil	Nil	Nil
	No of saplings planted in the year	Nil	Nil	Nil	Nil	Nil
	Cumulative no of plants	Nil	Nil	Nil	Nil	Nil
	Any other method of rehabilitation (specify)	Nil	Nil	Nil	Nil	Nil
	Cost including watch and care during the year	Nil	Nil	Nil	Nil	Nil
Reclamation and Rehabilitation by backfilling	Void available for backfilling (L x B x D) pit wise/ stop wise	Nil	Nil	Nil	Nil	Nil
	Void filled by waste /tailings	Nil	Nil	Nil	Nil	Nil
	Afforestation on the backfilled area	Nil	Nil	Nil	Nil	Nil
	Rehabilitation by making water reservoir	Nil	Nil	Nil	Nil	Nil
	Any other means (Specify)	Nil	Nil	Nil	Nil	Nil
Rehabilitation of waste land within lease	Area available (Ha)	Nil	Nil	Nil	Nil	Nil
	Area rehabilitated (Ha)	Nil	Nil	Nil	Nil	Nil
	Method of rehabilitation	Nil	Nil	Nil	Nil	Nil
Others (specify)	Gap Plantation in Boundary Safety Zone	Nil	1750 nos	2425 nos	2450 nos	2125nos
	Garland drain (meter)	Nil	Nil	1345 x1.0 x1.0	Maintenance	410 x1.0 x1.0
	Retaining wall (L x W x H, m)	Nil	Nil	1345 x 1.5 x 1.5	Maintenance	410 x 1.5 x 1.5
	Settling Tank	Nil	Nil	6nos of 10x 10 x3m	Maintenance	2nos of 10x 10 x3m

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8.4 **Disaster Management and Risk Assessment:**

As far as the nature of deposit & method of mining is concerned, there is no possibility of landslides, subsidence, flood, fire and tailing dam failure. Map of seismic zone in India indicates that Odisha falls under seismic zone-I, II & III. In Odisha, minor earth quakes have been felt many often but none is severe. Lessee will need the help of nearest state fire department located at Koira for rescue, if any high risk accident occurs in the area.

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. Lease area is planned to operate for Iron ore continuously over a period of next 10 years.

However, there may be temporary discontinuance during the course of mining due to unforeseen causes such as -Court order; Statutory Requirements; Accidents in the Mine, Natural Calamities; Local issues and any other unforeseen circumstances. Therefore, an emergence plan is necessary to re-open the mine which will include:

1. Intimation to local mine and legal administrative authorities concerned (IBM, DGMS, Directorate of Mines, Circle Mining Office etc.) regarding temporary discontinuance.
2. Explanation to the local community regarding the cause of temporary discontinuance and possibility of reopening of mine in future.
3. Listing and proper storing of the Machines, Materials, Assets and Documents.
4. Care and maintenance of machinery as per the machine operating manuals.
5. Employment and tightening of the security for proper watch and ward to keep the machine and materials in safe and secure.
6. Repair and maintenance of haul road.
7. Regular monitoring of Air, Water, Noise etc. in the permitted area.
8. Monitoring of status of mining operation in respect of bench height, width, individual bench slope angle, overhang, undercut, or any other parameters whose levels either in form of higher side or lower side is dangerous for further mine working.
9. Preparation of plan and sections of discontinued mining operation.
10. Projection of benches in plan and sections which is safe for further working.
11. Formation of safe benches as per plan and sections.
12. Intimation to the concerned authorities for reopening once the mine is risk free.

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8.6 FINANCIAL ASSURANCE:

Financial assurance calculation as per Rule 27(1) of MCDR 2017 is given in the table below:-

Sl. No	Head	Area of Land Use (In Ha)		Total Area (Ha)	Area considered as fully reclaimed & rehabilitated (Ha)	Net area considered for calculation (Ha)
		Area put on use at the start of Plan Period (Ha)	Additional requirement during Plan Period (Ha)			
(a)	(b)	(c)	(d)	(e) = (c)+(d)	(f)	(g) = (e)-(f)
1	Area under mining	50.461	65.500	115.961	0.000	115.961
2	Storage for Topsoil	0.093	(-) 0.093	0	0.000	0
3	Waste Dump Site	6.959	14.573	21.532	0.000	21.532
4	Mineral Storage	42.243	24.145	66.388	0.000	66.388
5	Infrastructure (workshop, administrative building etc)	4.650	0.516	5.166	0.000	5.166
6	Road	32.445	(-) 17.450	14.995	0.000	14.995
7	Railways	0.000	0.000	0.000	0.000	0.000
8	Tailing Pond	0.000	0.000	0.000	0.000	0.000
9	Effluent Treatment Plant	0.000	0.000	0.000	0.000	0.000
10	Mineral Separation Plant (Crushing, Screening & Slurry Pipeline Unit)	2.706	21.294	24.000	0.000	24.000
11	Township area	0.000	0.000	0.000	0.000	0.000
12	Others (Safety Zone/ Green belt)	14.563	(-) 0.221	14.342	0.000	14.342
Grand Total		154.120	108.264	262.384	0.000	262.384

APPROVED

Total Financial Assurance payable till the end of plan period, i.e. up to 31.03.2025 is calculated to be Rs. 7,87,15,200/- (Rupees Seven Crores Eighty Seven Lakhs Fifteen Thousand and Two Hundred Only) for Category-A fully mechanized mines calculated at Rs. 3,00,000/- per hectare for an area of 262.384 Ha of ML area put to use. Financial Assurance Plan for Guali Iron Ore Block is given in Plate no- 12.

Lessee has already submitted financial assurance for Rs. 6, 00, 54,600/- (Rupees Six Crores Fifty Four Thousand Six Hundred Only) in shape of Bank Guarantee no. 0004121BG0000019, valid up to 31.03.2025 to IBM. Refer Annexure -23.

The differential amount of Rs. 1, 86, 60, 600/- (Rupees One Crore Eighty Six lakhs Sixty Thousand and Six Hundred Only) towards financial assurance in the form of Bank Guarantee is enclosed as Annexure 23.

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