THE ODISHA MINING CORPORATION LTD

MINING LESSEE

(A GOVT. OF ODISHA UNDERTAKING)
OMC House, Bhubaneswar, Odisha

SCHEME OF MINING

(Under Rule 12 of MCDR, 1988)

INCLUDING

PROGRESSIVE MINE CLOSURE PLAN

(Under Rule 23B of MCDR, 1988)

OF

MAHAPARBAT IRON ORE MINE

Over an area of **68** hectares in villages Unchabali and Balda, PS Joda, tahasil Barbil, district **Keonjhar**, Odisha

Mine Category	Date of Grant	Period	Date of Expiry	Forest Land	Non-Forest Land	Total
A (FM)	09.06.2008	20 years	09.06.2028	Nil	68 ha	68 ha

Prepared by

S.C. NAYAK
Regn. No. RQP/CAL/211/95/A
M/s MINESKETCH Consultants (P) Ltd
A/185, Saheed Nagar, Bhubaneswar-751007
Telephone : 0674-2548607, Tele/Fax : 0674-2549508
E-mail : minesketch2005@gmail.com

PREPARED FOR A PERIOD OF FIVE YEARS FROM FY 2013-14 TO 2017-18

OMC

Odisha Mining Corporation Limited
(A GOLD CATEGORY STATE PSU)

CONSENT LETTER / UNDERTAKING / CERTIFICATE FROM THE LESSEE

01. The **Scheme of Mining** in respect of **Mahaparbat Iron Ore Mine** over an area of 68 hectares for **Iron Ore** in villages Unchabali and Balda, PS Joda, tahasil Barbil, district **Keonjhar**, Odisha under **Rule 12 of MCDR, 1988** has been prepared by RQP, Sri S.C. Nayak, Regn. No. RQP/CAL/211/95/A.
This is to request the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar to make any further correspondence regarding any correction of the **Scheme of Mining** with the said recognized person at his address below :

Sri Subash Chandra Nayak,MINESKETCH Consultants (P) Ltd,
A/185, Saheed Nagar, Bhubaneswar-751007,Phone: 0674-2548607,
Tele / Fax : 0674-2549508,E-mail : minesketch2005@gmail.com

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

02. 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 and undertake to implement **CCOM's circular no. 2/2010(addendum)** regarding system of construction & maintenance of boundary pillars within a period of six (6) months of the above.

03. It is certified that the Progressive Mine Closure Plan of **Mahaparbat Iron Ore Mine** of **The Odisha Mining Corporation Ltd,** Odisha, Bhubaneswar over an area of **68** hectares 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.

04. The provisions of Mines Act, Rules and Regulations made there under have been observed in the **Scheme of Mining** over an area of **68** hectares in **Keonjhar** districts in Odisha State belonging to **Mahaparbat Iron Ore Mine** and where specific permissions are required, the **Lessee** will approach the DGMS. Further, standards prescribed by DGMS in respect of miners' health will be strictly implemented.

05. We do hereby **undertake to complete exploration** in respect of the entire M.L area over **68** hectares **of Mahaparbat Iron Ore Mine** of **The Odisha Mining Corporation Ltd,** Odisha in a time bound manner in accordance with Ministry of Mines letter No.10/75/2008-MV dated 23.12.2010.

19.1.15

Girish SN, IAS,
Managing Director & Owner of the Mine

Managing Director
Odisha Mining Corporation Ltd
Bhubaneswar 751 001

S.C. NAYAK, M.Tech., ISM
IBM REGN. NO. RQP/CAL/211/95/A

MINESKETCH
A/185, Saheed Nagar, Bhubaneswar-751 007
Ph.: (0674)2548607 (O), Tele/Fax:0674-2549508

Letter No. : .....

Date : 22.01.2015

CERTIFICATE FROM THE RQP

The provisions of the Mineral Conservation & Development Rules, 1988 have been observed in the **Scheme of Mining** for **Mahaparbat Iron Ore Mine** over an area of **68** hectares of The **Odisha Mining Corporation Ltd,** Odisha, Bhubaneswar in villages Unchabali and Balda, PS Joda, tahasil Barbil, district **Keonjhar**, Odisha State and wherever specific permissions are required, the **Lessee** will approach the concerned authorities of **Indian Bureau of Mines.**

The information furnished in the **Scheme of Mining** is true and correct to the best of my knowledge.

Place : Bhubaneswar
Date : 22.01.2015

(S.C. Nayak)
Regn. No RQP/CAL/211/95/A

e-mail:minesketch_2005@rediffmail.com
e-mail: minesketch2005@gmail.com

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S.C. Nayak, RQP M/s MINESKETCH Consultants (P) Ltd	OMC The Odisha Mining Corporation Ltd Mining Lessee

INTRODUCTION

Mahaparbat Iron Ore area consisting of two blocks separately located as Block-A and Block-B in villages Unchabali and Balda over an area of 77 hectares was decided by the State Govt. to grant as a mining lease in favour of The Odisha Mining Corporation Ltd (herein after referred to as OMC) for iron as well as manganese ore vide letter No.8921/SM dated 27.03.2000 (ref : Annexure-2).

Mining plan over 77 hectares prepared under Rule 22 of MCR, 1960 was approved vide IBM's letter No.BBS/KJ/Fe/MP-102 dated 20.06.2001.

Subsequently, Block-A (forest land including agricultural fields etc.) was entirely deleted and lease area was reduced from 77 hectares to 68 hectares and OMC was said to submit revised mining plan over 68 hectares vide State Govt. letter No.5801/SM dated 28.06.2007 (ref : Annexure-5). On the basis of IBM's letter vide I/MP/GA(PS)/BBS-2006 dated 13.07.2007, Modification of Approved Mining Plan prepared under Rule 22(6) of MCR, 1960 was approved vide IBM's letter No.MP/MAN/40-ORI/BHU/2007-08 dated 31.01.2008 and the lease deed over an area of 68 hectares was executed with the State Govt. on 09.06.2008 for a period of twenty (20) years.

Subsequently, another Modification of Approved Mining Plan prepared under Rule 10 of MCDR, 1988 was approved vide IBM's letter No.MPM/OTFM/14-ORI/BHU/2011-12 dated 10.02.2012.

अनुमोदित
APPROVED

13/2/15

S.C. Nayak
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क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
भुवनेश्वर/ BHUBANESWAR

Therefore, Scheme of Mining is prepared under Rule 12 of MCDR, 1988 for a period of five (5) years from 2013-14 to 2017-18. Out of these, 2013-14 is completed and commencement of mining operation is not expected in 2014-15. Therefore, development and production planning etc. is prepared for a period of 3 years from 2015-16 to 2017-18 whereas exploration proposal is given for 4 years from 2014-15 to 2017-18.

The deposit reservoirs 10.603 Mt mineable iron ore (+45% Fe) which has formed the basis for production of iron ore @1 Mt/ annum. The deposit will be operated as a Category-A (fully mechanized) Mine.

As far as other statutory permissions are concerned, Lessee has obtained Environmental Clearance from the Ministry of Environment & Forest for 70,000 t / annum (ref : Annexure-14), Consent to Establish from State Pollution Control Board (ref : Annexure-13) and Surface Right (ref : Annexure-15 & Plate-I, II & III) over 64.810 hectares (out of 68 hectares excluding safety zone, nala / drain, danda / road etc.). Proposal for mining and allied activities in the scheme period of five (5) years has been projected within the surface right acquired area.

Lessee, OMC, is a Public Sector Unit. Keeping in view the growing rate of expenditures, proposition for lower rate of production @70,000 t / annum was not feasible. Therefore, mining could not be commenced in spite of available valid modification of approved mining plan and environmental clearance. However, core drilling continues as a part of mining operation.

1st Modification of Approved Mining Plan was approved and EC was obtained to produce saleable iron ore @ 70,000 t/annum. Lessee is a Public Sector Unit. Keeping in view his level of expenditure in respect of mechanization, employment, peripheral development, environmental concern etc. lower rate of production was not feasible in spite of having valid modification of approved mining plan as well as environmental clearance.

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Then, 2nd modification of approved mining plan was approved to produce saleable iron ore @ 300,060 t/annum but mining could not be commenced due to want of EC. Moreover, Lessee holds another 15 nos. mining leases having iron ore in the State and most of the leases are not under operation due to want of Forest Clearance. This Mahaparbat iron ore mine is located entirely in non-forest land and reservoirs 10.603 Mt mineable iron ore of +45% Fe. Lessee being a State Public Sector Unit is under tremendous pressure for supplying iron ore to the consuming industries that are not having captive mines. Therefore, proposal is given to produce ROM iron ore @1Mt / annum to (a) meet the growing demand, (b) utilize the resource, (c) cater the need of iron ore industries and (d) add the revenue. Lessee will apply for obtaining EC for production of ROM iron ore @1Mt/annum once this scheme is approved.

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CHAPTER-1

1.0 GENERAL

1.1 Name and Address of the Lessee

The Odisha Mining Corporation Ltd

Corporate Office	Regional Head Office
OMC House, Bhubaneswar-751001 Phone : 0674 – 2393431, 2395689, 2396421 Fax : 0674 – 2396889, 2391629 Cable : ORMINCORP Web : www.orissamining.com e-mail : Info@orissamining.com	Barbil town, Barbil District Keonjhar, Odisha. Phone-06767-275253 Fax- 06767-275257

Rule 45 registration No. : IBM/4269/2011 dated 24/11/2011.

1.2 Status of the Lessee

Lessee, the Odisha Mining Corporation Limited (OMC) was jointly established by the Union and State Governments in 1956 as the first state Public Sector Unit (PSU) in mining sector in the country for exploration, exploitation and marketing of minerals. In the year 1962, OMC became wholly state owned and today, OMC has emerged as the largest PSU in the country. A latest list of Board of Directors duly certified by competent authority along with address / contact No. is enclosed vide Annexure-4. However, the name, address & position of the Board of Directors are as follows :

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S.C. Nayak, RQP M/s MINESKETCH Consultants (P) Ltd	OMC The Odisha Mining Corporation Ltd Mining Lessee

Sl. No.	Name	Position and Address	Telephone Nos.
1	Sri Pradipta Kumar Mohapatra, IAS	Chairman, Odisha Mining Corporation Limited, Bhubaneswar	2396925(O) 2391913(O)
2	Sri Rajesh Verma, IAS	Principal Secretary to Govt. Steel & Mines Department, Odisha, Bhubaneswar	2399903(O)
3	Sri Girish S. N., IAS	Managing Director, Mining Corporation Limited, Bhubaneswar	2392778(O) 2394655(O)
4	Sri A.K. Mishra, IA & AS	Special Secretary to Govt. Finance Department, Odisha, Bhubaneswar.	---
5	Shri D K Roy	Former Chairman, OERC, Plot No. N-2/63, IRC Village, Bhubaneswar	9437049003(M) 2554462(R)
6	Sri S. N. Padhi	Retired Director General of Mines Safety Plot No. A/8, Pallaspalli, Bhubaneswar.	94373-01992 (M) 2593396 (R)
7	Sri Parag Gupta, IAS	Principal Secretary to Govt. Public Enterprises Department, Odisha, Bhubaneswar	---
8	Sri Priyanath Padhi, IFS	Principal Chief Conservator of Forest, Odisha. Aranya Bhawan, Chandrasekharpur, Bhubaneswar	2300853(O) 2300049(F)
9	Sri Deepak Kumar Mohanty, IFS	Director of Mines, Odisha, Bubaneswar	2391537(O)
10	Sri C. R Das,	Ex-CMD, Mahanadi Coal Field, Plot No. C/91, Palaspalli, Bhubaneswar.	94370-66672 (M) 2591164 (R)
11	Dr. S. Acharya	Former Vice-Chancellor, Utkal University Plot No. 155,VIP Colony, IRC Village, Bhubaneswar.	94371-31037 (M) 2554118 (R)
12	Sri G. S. Khuntia	Retired Executive Director, SAIL 21-B, Jai Durga Nagar, Bhubaneswar.	94370-71764 (M) 2571764 (R)

Authentic document with regards to the working of 10 Directors of the Board in other firms / company /organization and 2 letters one from Chairman of OMC & other from Govt. regarding nomination of remaining 2 Directors against Sri Rajesh Verma and Sri Priyanath Padhi are enclosed (ref : Annexure-6).

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Sri Girish S.N, IAS is nominated as owner of the mine as per the latest resolution of Board of Directors (ref : Annexure-5). Photo ID as well as address and contact No. of applicant / nominated owner are enclosed (ref : Annexure-6 & 7).

OMC holds / operates 11 iron ore leases, 3 manganese ore leases, 5 iron & manganese ore leases, 11 chromite leases, 1 limestone lease and 4 gemstone (semi-precious ruby / corundum) leases only in Odisha state. The details of the mining leases are, however, as follows:

Sl. No.	Name of M.L area	Mineral	Area (ha.)	District	Date of execution	Period (years)	Present status
1	Gandhamardan-A	Iron Ore	618.576	Keonjhar	21.05.63	30	RML-4.4.92
2	Gandhamardan-B	-do-	1590.867	-do-	11.07.70	30	RML-1.7.99
3	Khandbandha	-do-	366.311	-do-	30.11.63	30	RML-9.11.92
4	Tiringpahar	-do-	79.300	-do-	24.08.64	30	RML-13.8.93
5	Banspani	-do-	380.400	-do-	21.5.66	30	RML-17.5.95
6	BPJ	-do-	836.6883	-do-	27.2.70	30	RML-24.2.99
7	Daitari	-do-	1018.3085	-do-	27.1.66	30	RML-21.1.95
8	Rantha	-do-	268.8731	Sundergarh	31.12.68	30	RML-26.12.97
9	Koira-Kasira	-do-	418.355	-do-	13.10.76	20	RML-2.11.95
10	Koira-Bhanjpalli	-do-	141.235	-do-	6.4.87	30 w.e.f 7.5.82	Existing
11	Unchhabali (Mahaparbat)	-do-	68.000	Keonjhar	09.06.2008	20	
12	Roida-78	Manganese	78.711	-do-	25.4.81	20	RML-22.4.00
13	Parlipada	-do-	104.860	-do-	25.4.81	20	RML-22.4.00
14	Nishikhal	-do-	501.670	Rayagada	28.6.64	20	2nd RML-26.6.03
15	Kolha-Roida	Iron & Manganese	192.81	Keonjhar	30.12.85	20 w.e.f 8.2.77	RML-31.1.97
16	Kurmitar	-do-	651.00	Sundergarh	29.4.65	30	RML-27.4.94
17	Dalki	-do-	265.290	Keonjhar	19.11.88	20 w.e.f 7.8.76	RML-17.7.96
18	Seremda-Bhadrasahi	-do-	1734.570	-do-	30.8.86	20	RML applied on 28.8.05
19	Dubna-Sakradihi	-do-	1135.419	-do-	8.9.71	20	RML- 25.8.90
20	Banipank	Chromite	1582.833	Keonjhar	15.01.86	20	RML applied on 1.1.05
21	Bangur	-do-	139.940	-do-	02.09.75	20	RML applied on 20.8.94
22	Boula	-do-	207.360	-do-	07.08.65	20	2nd RML 28.7.04
23	Kalarangi	-do-	936.220	Jajpur	09.12.66	20	2nd RML 24.11.05
24	Kaliapani	-do-	971.245	Jajpur	08.07.67	20	RML-23.5.86
25	Kathpal	-do-	264.466	Dhenkanal	10.02.69	20	RML-5.2.88
26	Base of Mahagiri	-do-	185.810	Jajpur	09.09.70	20	RML-19.8.89
27	South-Kaliapani	-do-	552.457	-do-	22.01.80	20	RML-19.1.99
28	Saruabil- Sukerangi	-do-	23.243	-do-	29.01.81	15	RML-20.1.97
29	Sukerangi	-do-	382.709	-do-	20.09.80	20	RML-19.9.99

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30	Birasal	-do-	583.021	Dhenkanal	04.11.76	20	RML-1.11.99
31	Umpavalley	Limestone	859.99	Koraput	20.8.75	20	RML-12.8.99
32	Jillinghdhar	Gemstone	35.686	Kalahandi	1.10.92	10	RML-20.9.01
33	Hinjilibahal	-do-	57.465	-do-	14.6.93	10	RML-6.6.02
34	Budhapada	-do-	33.950	Nuapada	14.6.93	10	RML-6.6.02
35	Malipada	-do-	27.655	Kalahandi	7.9.2002	20	Existing

1.3 Mineral(s) which is / are included in the prospecting license (For Fresh grant)

Not applicable since it is an executed mining lease area.

1.4 Mineral(s) which is / are included in the letter of Intent / lease deed

Iron and manganese ore are included in the lease deed.

1.5 Mineral(s) which is the applicant /lessee intends to mine

Lessee intends to mine iron ore which is the only ore proved/established as yet though lease is granted for iron ore as well as manganese ore. M.L area is located in Singhbhum Bonai iron ore synclinorium which is associated with iron as well as manganese ore. Expecting the occurrence of iron as well as manganese ore, M.L area was executed whereas only iron ore is established till date.

1.6 Name and Address, Registration No. of the Recognized Person Together With Validity of Date/Person Employed Under Rule 42(1)(b) Who Has Prepared Scheme of Mining

Name : Mr. S.C. Nayak

Address : MINESKETCH Consultants (P) Ltd.
A/185, Saheed Nagar, Bhubaneswar-751007
Phone : 0674-2548607, Fax : 0674-2549508
E-mail : minesketch2005@gmail.com

Registration Number : RQP/CAL/211/95/A

Date of Registration : 2nd February, 1995

Renewed up to : 1st February, 2021

No. of renewals : Four (4)

S.C. Nayak
Regn. No. RQP/CAL/211/95/A

CHAPTER-2

2.0 LOCATION AND ACCESSIBILITY

2.1 Lease Details

Name of the Mine : Mahaparbat Iron Ore Mine

Latitude and Longitude of boundary pillars : Mining lease area is a part of Survey of India toposheet No. 73G/5 on a scale of 1 : 50,000 and is located within the latitudes $21^0 52'44.18"$ to $21^0 53'23.55"$ N and longitudes $85^0 25'05.48"$ to $85^0 25'37.03"$ E as per the DGPS survey conducted by Odisha Space Application Centre. In addition to this, Lessee has provided an undertaking to implement CCOM's Circular No.2/2010 and its addendum regarding geo-reference mining lease map and M.L boundary pillars (ref: Annexure-9). As per the Lease deed, boundary description of M.L area is given in the table as follows :

Pillar No.	Latitude	Longitude	Station (From-To)	Magnetic Bearing	Interior (angle)	Distance		Remarks	
						In Ft.	In.Mtrs.		
A	21°53'23.55000"	85°25'21.68940"	A – A/1	120°- 45'	70°- 15'	1000	304.800	Pillar No.2 of E.M.I Ltd.	North-Eastern Boundary
A/1	21°53'16.93536"	85°25'29.86608"	A/1 – B	---	180°- 00'	500	152.400	Pillar No.2/A of E.M.I Ltd.	-do-
B	21°53'13.72020"	85°25'33.64464"	B – C	---	151°- 00'	993	302.666	Pillar No.3 of E.M.I Ltd.	-do-
C	21°53'04.40916"	85°25'37.03188"	C– C/1	---	152°- 00'	445	133.636	Pillar No.4 of E.M.I Ltd.	Eastern Boundary
C/1	---	---	C/1– D	---	180°- 00'	1032	314.858	Pillar No.4/A of E.M.I Ltd.	-do-
D	21°52'50.08656"	85°25'34.24080"	D– D/1	---	178°- 10'	350	106.680	Pillar No.5 of E.M.I Ltd.	-do-
D/1	---	---	D/1 – E	---	180°- 00'	275	83.820	Pillar No.5/A of E.M.I Ltd.	-do-
E	21°52'44.18256"	85°25'33.15468"	E – F	---	94°- 30'	2610	795.520	Southern Boundary	
F	21°52'47.13744"	85°25'05.48220"	F – A	---	74°- 05'	4025	1226.820	Western Boundary	
F3	21°53'14.93736"	85°25'17.99904"	---	---	---	---	---	---	
---	---	---	Total	----	---	11230	.3421.2	----	---

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Date of execution of lease : 09.06.2008

Period of lease : 20 years

Date of expiry of lease : 09.06.2028

Name and Address of the Lessee : ref Para-1.1 of Chapter-1.

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

M.L area over 68 hectares falls in villages Unchabali & Balda under Joda block, Barbil tahasil, Champua sub-division of Keonjhar district, Odisha. Khesra/khata No./Plot No. has been given in the land schedule vide Annexure-2. As per the revenue department, villagewise break-up of the pre-operational land use pattern is as follows :

Sl No.	Type of land	Revenue head	Area in hectares		
			Village Unchaballi	Village Balda	Total
1	Waste land	Parbat-II	49.339	---	49.339
2	Mining area	Khani	---	17.503	17.503
3	Drain	Nala	---	0.563	0.563
4	Agricultural field	Taila	---	0.534	0.534
5	Road	Danda	---	0.061	0.061
Total	---	---	49.339	18.661	68.000

A total of 17.503 hectares land has been scheduled by the revenue department as Khani i.e Mine. Out of these, only 0.563 hectare is identified as mine / quarry during field survey.

As per the land schedule, there is no forest land in the entire lease area over 68 hectares and the entire lease area over 68 hectares is Govt. owned.

Total lease area / applied area : 68 hectares

District & State : Keonjhar & Odisha

Taluka : Barbil

S.C. Nayak
Regn. No. RQP/CAU/211/95/A

Village : Unchaballi & Balda

Whether the area falls under Coastal Regulation Zone (CRZ) : No

If yes, details thereof : Not applicable

Existence of public road / railway line (accessibility) : There is no state or national highway or railway line within lease area. Village road of Balda village exists in the M.L area. Lease area is accessible from Joda via jurudhi through 18 km long road consisting of 17 km long metal and one (1) km long all weather road. The nearest railhead is at Banspani at a distance of 14 Km from the lease area via Jururhi.

Toposheet No. with latitude & longitude of all corner boundary point/pillar : ref : Para-2.1 as indicated above.

2.3 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.

Ref : Plate-I where M.L boundaries are located on cadastral map as well as Survey of India toposheet.

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CHAPTER-3

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

3.1 Date and reference of earlier approved MP/SOM

Sl. No.	Name	Area (ha)	Rule	Period	Reference
1	Mining Plan	77 ha	22 of MCR, 1960	5 years of detailed planning	Annexure-2
2	Modification of Mining Plan	68 ha	22(6) of MCR, 1960	5 years (2008-2013) of detailed planning	Annexure-3
3	Modification of Mining Plan	68 ha	10 of MCDR, 1988	2 years (2011-12 to 2012-13) tallying with plan period	Annexure-4

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

Last Modification of Approved Mining Plan prepared under Rule 10 of MCDR, 1988 was approved vide IBM's letter No.MPM/OTFM/14-ORI/BHU/2011-12 dated 10.02.2012 for a period of 2 years of 2011-12 & 2012-13 tallying with approved plan period for (1) inclusion of outcomes of exploratory drill holes put in the M.L area in 2009-10, (2) re-estimation of proved reserves as per drill hole data, (3) enhancement of production from 70,000t/annum to 300,000t/annum and (4) change in Category of Mine from category-B Manual to Category-A (OTFM).

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

First Modification of Approved Mining plan was prepared for a period of five (5) years under Rule 22(6) of MCR, 1960 from 2008-09 to 2012-13. Subsequently, 2nd Modification of Approved Mining Plan was prepared under Rule 10 of MCDR, 1988 for 2 years of 2011-12 & 2012-13. Therefore, completed 3 years of 1st modification period and completed 2 years of 2nd modification period are reviewed.

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❖ Exploration

Commitment : In 1st modification, core drill holes were proposed @4 holes / year for drilling @20m/hole as per the following table :

Year	No. of Boreholes	Depth (m)	Total meterage (m)	Remark
1st (2008-09)	4	20m or up to end of mineralization	80	Iron ore deposit and waste dumping site
2nd (2009-10)	4	-do-	80	Iron ore deposit and proposed site services area
3rd (2010-11)	4	-do-	80	Iron ore deposit

In 2nd modification, 25 number of core drill holes were proposed to explore the entire M.L area in 5 years proportionately with an intension to prove barrenness of the proposed dumping ground by 3 drill holes as well as mineralization by remaining 22 drill holes up to the end of mineralization as per the following table :

Year	Borehole No.	No. of holes	Depth (m)	Purpose
4th (2011-12)	BH1 to BH3	3	Up to 20m	Barren proving
	BH4 to BH10	7	Up to end of mineralization	Ore proving
5th (2012-13)	BH11 to BH25	15	-do-	-do-
Total	---	25	---	---

Ore body was proposed to be proved up to the end of mineralization. For allocation of funds, depth of drilling had been considered tentatively @20m/hole for barren proving and @40m/hole for ore proving. Total length of the drilling was proposed to be 3 nos. x 20 + 22 nos. x 40m = 940m approximately.

Compliance, deviation & reasons thereof : The entire lease area is drilled during 2009-10 and 2010-11 by way of core drilling of 128 boreholes. The details of drilling are incorporated in Para-3.2.

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❖ Mine Development

Commitment : In 1st modification period, only one quarry was proposed to be developed parallel to M.L boundary between F/1 and F/2 pillars within lease area excluding safety zone. During the 2nd modification period, two quarries namely Q-1 and Q-2 were proposed to be developed simultaneously in eastern and western parts in rich iron ore zone where insitu iron ore is proved up to the end of ore zone with an aim to extract iron ore completely from one end of the lease area to obtain the exhausted part as early as possible to start reclamation work.

Compliances, deviation & reasons thereof : Development proposal could not be implemented because lower rate of production was not feasible for mining.

❖ Exploitation / Excavation

Commitment : In 1st modification, planning was done to produce saleable iron ore from 39,312 t in 1st year to 47,212 t in 3rd year as per the following table :

Year	Financial year	Production of iron ore in metric tonnes
1st	2008-09	39,312
2nd	2009-10	39,847
3rd	2010-11	47,212

Subsequently in 2nd modification, rate of production of saleable ore was enhanced up to 300,060 t as per the following table :

Year	Production of iron ore in metric tonnes		
	Quarry-1	Quarry-2	Total
4th (2011-12)	51,660	18,360	70,020
5th (2012-13)	233,100	66,960	300,060

Compliances, deviation & reasons thereof : Development proposal could not be implemented because lower rate of production was not feasible for mining and mining operation could not be commenced @300,060 t in 2012-13 due to want of environmental clearance.

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❖ Waste Generation / Excavation

Commitment : A total of 39,768m^3 waste was supposed to be generated during the last 5 years as per the following table :

Period	Year	Generation of Waste in cubic meters
1st Modification	1st (2008-09)	6620
	2nd (2009-10)	7236
	3rd (2010-11)	5352
2nd Modification	4th (2011-12)	3890
	5th (2012-13)	16670
Total	---	39,768

Compliances, deviation & reasons thereof : The mining operation could not be started due to reasons as stated above. Hence, question regarding waste management does not arise.

3.4 Give status of compliance of violations pointed out by IBM

No inspection is made under MCDR, 1988 during last 5 years of mining plan period.

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

There is no any suspension / closure / prohibitory order issued by any Government agency under any rule or Court of law.

3.6 In case the MP/SOM is submitted under rules 9 and 10 of the MCDR'88 or under rule 22(6) of the MCR'1960 for approval of modification, specify reason and justification for modification under these rules.

Not applicable since this scheme of mining is prepared under Rule 12 of MCDR, 1988.

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CHAPTER-4

4.0 GEOLOGY AND EXPLORATION

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

➢ Topography

Mining lease area is mainly dominated by the undulating hilly topography with two prominent flat topped mounds at its NW and SE part dissected by an inverted conical valley. The highest and lowest altitudes are at 608.5mRL and 525mRL. The elevation difference is 608.5 – 525 = 83.5m. Lease area slopes from north to south at 1:7.

Area constitutes 72% hilly area, 26% mining area, 1% agricultural filed and 1% nala approximately. Forest growth is observed to be sparse in the places of insitu/conga iron ore exposures and dense in float / bouldery iron ore zone. There is no forest land in the lease area.

➢ Drainage

The natural drainage system is distinct and dendritic due to hilly topography. Seasonal as well as perennial nala exist in the M.L. area. Surface run-off water flows along the natural slopes, valleys and finally in to the seasonal nalas in northern part to meet a perennial nala in southern part of the M.L area. The confluence point of this perennial nala and Baitarani river is located at a distance of 3 Km east of the area. Buffer zone (5 km radius of M.L area) falls within the catchments of Baitarani River which controls the drainages system of the region and flows due north and then east to meet the Bay of Bengal.

➢ Vegetation

There is no forest land in the lease area. A part of the lease area over 1.917 hectares (ref. Para-11.1.1) is degraded due to the development of road, old trenches, old dump / quarry and development of road. Lease area is mostly vegetated by the shrubs and bushes. Trees like Sal, Banyan and Mahul occurs sporadically.

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➢ Climate and rainfall data

The M.L. area is located in tropical region where climate is characterized by very hot summers and cool winters. The climate in the area is generally cold in water between November and February and hot is summer between March and June. The monsoon sets in late June and continues upto the end of August. Temperature shows the variation between 4^0 C to 47.5^0 C. Predominant wind direction is South-West. Area remains calm for nearly 50% of the year.

Average annual rainfall is 1400mm. The south-west monsoon lasts from mid June to mid September and the area receives more than 80% of the annual rainfall during the period.

4.2 Brief descriptions of Regional Geology with reference to location of lease/applied area.

Iron ore deposit of the M.L area forms a apart of the eastern limb of the Singhbhum-Keonjhar-Bonai belt, also known as the Jamda-Koira valley and is represented by a narrow NNE-SSW trending synclinorium of 60 km length and 25 km width. The precambrian horseshoe shaped belt is well known for its large reserves of iron and manganese ore. The general strike is north-east to north and dips are moderate to steep. The western limb of the synclinorium is slightly over turned at some places.

The belt was first reported by Jones in 1934 and has been studied in detail by several eminent geo-scientists, since then. The major litho types are metamorphosed sandstone, lithic wacke mostly in the east, BIF and iron ore fragments. Shale, lavas, volcanic, pyroclastic tuffs, phyllite and Banded Iron Formation (BIF) including Banded Hematite Quartzite (BHQ) and the Kolhan Group of rocks are exposed.

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The Precambrian rocks of this region comprising of basic lava, tuffs, banded iron formation (BIF), shales, conglomerates and sandstones etc. were mapped for the first time by Jones (1934). The stratigraphic succession established by Jones has largely been modified later by Dunn (1940) based on detailed mapping in the northern parts of the belt. Dunn recognized a new group lying unconformably over the Iron Ore Group which he named as the "Kolhan Group". The rock types of the area belonging to the Kolhan group lies to the north of the Noamundi in Bihar.

The most acceptable litho-stratigraphic succession for the belt was proposed by Murthy and Acharaya (1975). They identified different depositional facies and proposed a more detailed stratigraphic succession. They also proposed a new name the "Kolhan Group" to the rocks of Bonai-Keonjhar belt. The stratigraphic succession suggested by Murthy and Acharya (1975) is as follows :

KOLHAN GROUP	Sandstone, Conglomerate, Breccias
----------Unconformity----------	
Mixed Facies	Basic Lava, tuffs and tuffites of volcanic facies Iron, Manganese, Lenses of Iron formation, Chert, 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	Finally banded Jaspilite Member Coarsely banded jaspilite member
Volcanic Formation	Tuffaceous shale Basic Lava
Basal Sandstone	Gritty Sandstone, Quartzite, Conglomeratic at places with interbedded Lava at top
----------Unconformity----------	

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Singhbhum Granite with enclaves of older meta-basic and meta-sedimentary rocks.

4.3 **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. (Applicable for Mining Plan for grant & renewal and not for Scheme of Mining/Modifications in the approved mining plan/scheme of Mining).**

Geological mapping by the OMC Ltd over the area from the surface exposure as well as bore holes loggings have helped to understand the geology to a considerable extent. The local geology interpreted from the above has been arranged as follows:

- Lateritic Soil
- BIF with Iron Ore
- Ferruginous Shale

❖ **Lateritic Soil**

Due to weathering of rocks, presence of lateralization is a common feature affecting all the rock types. Laterite & Lateritic soil is observed on the surface as well as in the trenches which are found admixed with bouldery/float iron ore. Extensive laterite cappings are observed. These laterites are often rich in iron ore and termed as lateritic iron ore.

❖ **BIF with Iron Ore**

BHJ, a member of BIF, mixed with float iron ore is predominantly observed in the M.L area. It is an evenly laminated sedimentary rock within alternate layers of primary hematite and deep brown coloured chert with admixed dusty inclusions of hematite granules. BHJ is host rock of iron ore which strikes along N-S to NE-SW direction and dips at 45^0 due west.

Hematite variety of iron ore occurs in the M.L. area. Based on physical characteristics like colour, compactness etc. the deposits have been mapped into float, insitu & conga/recemented iron ore and BHJ with iron ore. Grade of iron ore varies from 47.22% Fe to 67.77% Fe.

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❖ Ferruginous Shale :

It is exposed in south central valley part of the M.L area. It is light brown to dark brown in color, clayey to silty in nature and exhibits the bands with 1 to 2 cm thick lamina. It strikes along NNE-SSW to NE-SW and dips moderately towards west.

4.4 Name and Address of prospecting / exploratory agency

Core drilling	Sampling & analysis
M/s Mining Associates Pvt. Ltd, Atwal Nagar, Asansol, Dist : Burdwan e-mail : Phone :	M/s Superintendence Co. of India (P) Ltd M/s Inspectorate Griffith India Private Ltd

4.5 Details of prospecting/exploration already carried out :

Documentary evidence of exploratory work done such as name of agency, order for the work, cost involved, payment details by the lessee etc is enclosed (ref : Annexure-19).

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

A total of two (2) old trenches found located in the lease area which are detailed as follows :

Name of Trench	Length (m)	Breadth (m)	Area (m^2)	Depth (m)	Lithology
Tr-1	215	20	4300	1.5	Float Ore
Tr-2	95	14	1330	1.5	-do-
Total	---	---	5630	---	---

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4.5.2 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.

Topographical survey has been carried out and quarry, dump etc has been updated. Drill holes put in field has been shown in the geological plan and geological sections.

Exploration was conducted by way of core drilling and 129 core drill holes were drilled for a total meterage of 5385.15m. As far as the nature of occurrence is concerned, iron ore is differentiated in to two types such as float ore and insitu ore. Again these ores are differentiated based on ore type from the lithology of the core drill holes such as (1) lateritic iron ore (2) hard massive ore (3) soft laminated ore and (4) conga ore. Core logging was done based on visual observations of the core and subsequently, re-logging was done necessarily using assay grades. Sampling was conducted by grinding the sample to BS-100 mesh. Samples were analyzed chemically mainly for determination of iron (Fe), silica (SiO_2) and alumina (Al_2O_3) contents. The details of core drilled holes are as follows :

No. of holes drilled	:	129 nos.
Nature of holes	:	Vertical
Type of drilling	:	Core drilling
Area Covered	:	68 hectares
Type of ore encountered	:	Insitu iron ore, Soft laminated ore, Hard laminated ore, Lateritic iron ore etc.
Total meterage of drilling	:	5385.15 m
Average depth of drilling	:	41.75 m/hole
Maximum depth of drilling (ref : drill holes No.UNB/106)	:	95.30m
Minimum depth of drilling (ref : drill hole No.UNB/38)	:	5.7m
Grade analyzed	:	45.22% to 69.72% Fe.

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Form J, the notice of sinking boreholes under Rule-47 of MCDR, 1988 (ref : Annexure-15) and details of all 129 boreholes are given in form of standard borehole logs certified / signed by the authorized Geologist of the Mine. (ref : Annexure-16).

As per the prescribed table of IBM, exploration already carried in the M.L area as indicated above is given under UNFC norms as follows :

Total lease area (ha)	Explored area (ha)			Unexplored area / other lease area (ha)	Remarks/Comments including reasons for not carrying out the exploration as per UNFC norms.
	G1 Level	G2 Level	G3 Level		
68	20.306	39.328	8.366	---	Exploration undertaken in the lease area is classified into G_1, G_2 & G_3 level of exploration.

4.5.3 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).

Sampling & analysis were executed by M/s Superintendence Co. of India (P) Ltd and M/s Inspectorate Griffith India Private Ltd.

4.5.4 Expenditure incurred in various prospecting operations.

Lessee has sunk 47 boreholes (UNB/1 to UNB/47) through his in house facility and paid Rs.1,90,36,800/- to M/s Mining Associated Pvt. Ltd for sinking of 82 boreholes (UNB/48 to UNB/129).

Documentary evidence of exploratory work done such as name of agency, order for the work, cost involved, payment details by the lessee etc is enclosed (ref : Annexure-19).

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4.6 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.

Ref : Surface Plan vide Plate-II which is prepared on a scale of 1 : 2000 with contour interval of 5m showing all features under Rule 28(1)(a) of MCDR, 1988.

4.7 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.

Ref : Geological Plan vide Plate-III which is prepared on a scale of 1 : 2000 with contour interval of 5m showing all features under Rule 28(1)(b) of MCDR, 1988 including locations of existing as well as proposed exploration, various litho-units along with structural features and iron ore zone with grade. Geo-structural information like strike, dip and dip direction are reflected in Geological plan.

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

Ref : Geological Sections vide Plate-III(A) which is prepared on a scale of 1 : 1000 at 50m interval across the lease area from boundary to boundary.

4.9 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 as in table below: -

Out of 68 hectares lease area, an area of 20.306 hectares has been explored in detail by the core drill holes at 50m interval.

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In order to explore the entire M.L area in 5 years, 98 number of core drill holes are proposed for assessing the total reserve of all economic mineral present in the lease area as per UNFC including southern portion of lease area at G1 level of exploration as per the following table :

Year	No. of boreholes (Core/RC/DTH)	Grid interval	Total Meterage @45/hole
II (2014-15)	25	50m	1125
III (2015-16)	25	50m	1125
IV (2016-17)	25	50m	1125
V (2017-18)	23.	50m	1035
Total	98	---	4410

4.10 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.

Ref : Geological Plan vide Plate-III and Geological Sections vide Plate-III(A) where area explored under different level of exploration and UNFC code for area considered for different categories of reserve / resources estimation has been marked.

Ref : Feasibility Study Report vide Annexure-1 along with financial analysis for economic viability of the deposit as specified under the UNFC field guidelines.

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4.11 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.

Exploration drilling was carried out in 2009-10 and a total of 55 core drill holes were drilled for a total length of 2144.3m at 50m to 100m interval over an area of 20 hectares. On the basis of above, , the reserve of iron ore was estimated in the Modification of approved Mining Plan by cross sectional area method by the multiplication of cross sectional area with length of influence of each sections, recovery factor and bulk density. Moreover, reserves in Mahaparbat mining lease area calculated under various categories were as follows :

Name of the Block	Proved Ore as on 01.04.2011 (t)		Cut-off Grade	Exploration Grade
	Geological Reserve	Mineable Reserve (at 90% recovery)		
Western Block	1,169,897	1,052,907	+58% Fe	58% Fe to 67.77% Fe
Eastern Block	1,576,375	1,418,738	---	---
Total	2,746,272	2,471,645	---	---

Since mining operation is not commenced, reserve is not depleted in last plan period.

In the last modification of approved mining plan approved dated 10.02.2012, 55 boreholes were taken in to consideration for estimation of mineral resources. In 2010-11, seventy four (74) number of core drill holes were put in the lease area and sampling & analysis of ore samples were not completed at that point of time. Therefore, exploration data of 74 core drill holes could not be taken in to consideration for estimation of mineral resources in the last modification of approved mining plan.

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As on date, exploration details logging & chemical analysis of 55 + 73 = 128 drill holes are available. Iron ore resources, therefore, has been re-assessed. Based on increased number of drill holes having more depth proving than that of earlier drill holes and threshold value of 45% Fe, resource / reserve is increased. Parameters considered for estimation of iron ore resources :

(a) Geological plan is prepared / updated considering the borehole data as well as surface & quarry exposures on 1 : 2,000 scale and geological sections are prepared from boundary to boundary of lease area in the same natural scale of 1 : 2000.

(b) Position of holes is located in both plan & sections and lithology as encountered in each bore hole are plotted in the sections. Litho-units encountered in the holes and analysis of core samples of drill holes are given in Annexure-17.

(c) As per CCOM's latest Circular No. 3/2010 dated 14.07.2010 regarding exploration, notified threshold value of hemataitic iron ore is 45% Fe while cut-off grade considered by the Lessee for sale is 58% Fe. Therefore, iron ore resources with +45%-58% Fe is considered as sub-economic or sub-grade ore and with +58% Fe is considered as economic ore.

(d) Litho units containing less than 45% Fe is considered as waste materials.

(e) Bulk density of +58% Fe ore is considered to be 3 t/m^3 while bulk density of +45-58% Fe ore is considered to be 2.7 t/m^3.

(f) Recovery factor is calculated to be 74% of ore zone from the borehole loggings as Σ thickness of ore / (Σ thickness of ore + Σ thickness of IW).

Method of estimation of iron ore resources :

Cross sectional area method is used for estimation of iron ore resources. Cross sectional area measured from the sections is multiplied with the strike length of influence, bulk density and recovery factor to arrive at the quantity of ore in tones. The formula implemented to calculate the ore resource is as follows :

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M	=	C x L x R X D
Where, M	=	Mineral resource / reserve in tones.
C	=	Cross sectional area in m^2
L	=	Length of influence between two conjugative sections (sum of half distances on either side of each section),
R	=	Recovery factor
D	=	Bulk density (t/ m^3)

Various type of iron ore will be mined out by the development of 6m high benches using excavator and fed to the crusher's / screen in a composite manner. Therefore, estimation by slice plan is not necessarily required since there is no proposal for mining various types of ores separately.

Category of Iron ore resources:

Measured Resource (331): Iron ore intersected by the closely spaced bore holes at 50m interval is considered under G1 level of exploration and 331 category of resource because tonnage and grade of this category has been estimated w.r.t thickness, shape, physical characteristics, grade/mineral content, bulk density and recovery factor with a high level of confidence based on detailed and reliable exploration, sampling and analysis information gathered from the drill holes.

Indicated Resource (332) : Iron ore intersected by the closely spaced bore holes at 100m interval is considered under G2 level of exploration and 332 category of resource because tonnage and grade of this category has been estimated w.r.t thickness, shape, physical characteristics, grade/mineral content, bulk density and recovery factor with a medium level of confidence based on detailed and reliable exploration, sampling and analysis information gathered from the drill holes.

Inferred Resource (333) : Iron ore intersected by the widely spaced bore holes at more than 100m interval is considered under G3 level of exploration and 333 category of resource because tonnage and grade of this category has been estimated w.r.t thickness, shape, physical characteristics, grade/mineral content, bulk density and recovery factor with a low level of confidence based on detailed and reliable exploration, sampling and analysis information gathered from the drill holes.

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Before considering the feasibility and economic viability of the mineral, total mineral resources of the M.L area are considered under measured category as per the following table :

Iron Ore Resources	UNFC Code	Tonnage (t)	Grade	Distribution (Spatial or depthwise)
Measured resource	331	6874297	+45% Fe	Spatial
Indicated Resource	332	4758448	+45% Fe	-do-
Inferred Resource	333	120357	+45% Fe	-do-
Total	---	11,753,102	---	---

As per the bore hole loggings, +58% Fe ore (saleable ore) and +45-58% Fe ore (sub-grade ore) are shown separately in the sections and estimated to be as follows :

Resources type	Total tonnage (+45% Fe)	Saleable ore (+58% Fe)	Sub-grade ores (+45 – 58% Fe)
	(t)	(t)	(t)
Measured resource (331)	6874297	6208563	665734
Indicated Resource (332)	4758448	4307799	450649
Inferred Resource (333)	120357	113664	6693
Total	11,753,102	10,630,026	1,123,076

During mining operation, a part of the mineral resources will be blocked up below (a) 7.5m wide safety zone along lease boundaries (b) 50m on either side of perennial nala and (c) ultimate pit slope. The details of non-mineable / blocked up resources are given below :

Iron Ore Resources		Mineable Reserve (t)	Blocked / Non-mineable resource (t)
Category	Quantity (t)		
Measured resource (331)	6208563	5988450	220113
	665734	629669	36065
Indicated Resource (332)	4307799	3611496	696303
	450649	373927	76722
Inferred Resource (333)	113664	---	---
	6693	---	---
Total	11,753,102	10,603,542	1,029,203

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Mineability / economic Viability of measured resource is demonstrated by the feasibility study.

Proved Reserve (111) : This category of reserve is derived from the feasibility study as well as mining reports (plan, scheme and modifications). Feasibility study report is attached with this document vide Annexure-1.

Probable Reserve (122) : This category of reserve is derived from the mining reports (mining plan, modifications and scheme of mining).

Remaining resource (211) : Blockable/non-mineable resources of 331 category left below statutory barrier & ultimate pit slope have been considered under remaining resource namely feasibility resource (211). Resource under 332 category is fully mineable.

4.12 Mineral Reserves/Resources:

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

Level of Exploration	Resources (in million tons)	Grade
G1 - Detailed exploration	6.874	+45% Fe
G2 - General Exploration	4.758	
G3 – Prospecting	0.121	
Total	11.753	

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

4.12.1 Mining method, Recovery factor, mining losses, processing loss etc.

Opencast mechanized method of mining will be adopted on 8 hourly shift basis. Loosening of the hard rock mass will be effected by the DTH drills. Excavators of 2.5m^3 capacity will be utilized for excavation & loading. Sixteen (16) tonne capacity dumpers will be utilized for transportation of ore to the crushing & screening / r.o.m stacking site and waste to the

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dumping site. Saleable ore will be dispatched through trucks / train depending upon the location of consuming industries.

Recovery factor is calculated to be 74% of ore zone from the borehole loggings as Σ thickness of ore / (Σ thickness of ore + Σ thickness of IW).

4.12.2 Cut off grade, Ultimate pit depth proposed.

As per CCOM's latest Circular No. 3/2010 dated 14.07.2010 regarding exploration, notified threshold value of hemataitic iron ore is 45% Fe while cut-off grade considered by the Lessee for sale is 58% Fe. Therefore, iron ore resources with +45%-58% Fe is considered as sub-economic or sub-grade ore and with +58% Fe is considered as economic ore.

Ultimate pit depth is proposed to be 55m (up to 492mRL) from surface level.

4.12.3 Mineral / ore blocked dues to benches, barriers, pillars, road, railway, river, nala, reservoir, electric line and other statutory barriers etc, under forest, sanctuaries etc. where necessary permissions are not available.

During mining operation, a part of the mineral resources will be blocked up below (a) 7.5m wide safety zone along lease boundaries (b) 50m on either side of perennial nala and (c) ultimate pit slope. The details of blockable resources are given below :

Reserve/ resources	Type	UNFC Code	Quantity (in million tons)	Grade
Remaining resources	Feasibility	211	0.220	+58% Fe
			0.036	+45-58% Fe
	Pre-feasibility	222	0.696	+58% Fe
			0.077	+45-58% Fe
	Inferred	333	0.114	+58% Fe
			0.007	+45-58% Fe
Total	---	---	1.150	---

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

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4.12.4 Final Presentation of Mineral Resources as per UNFC (as on 01.04.2014) :

Reserve/ resources	Type	UNFC Code	Quantity (in million tons)	Grade
Reserves	Proved	111	5.988	+58% Fe
			0.630	+45-58% Fe
	Probable	122	3.611	+58% Fe
			0.374	+45-58% Fe
Total (a)	---	---	10.603	---
Remaining resources	Feasibility	211	0.220	+58% Fe
			0.036	+45-58% Fe
	Pre-feasibility	222	0.696	+58% Fe
			0.077	+45-58% Fe
	Measured	---	---	---
	Indicated	---	---	---
	Inferred	333	0.114	+58% Fe
			0.007	+45-58% Fe
	Reconnaissance	---	---	---
Total (b)	---	---	1.150	---
Total (a+b)	---	---	11.753	---

4.12.5 Justification in respect of UNFC Codification :

Degree of confidence is defined by supporting data for the axes of UNFC and accordingly, proved reserve (111) proposed for development in scheme period of 5 years is justified as follows :

Type and code as per UNFC	Economic Axis	Feasibility Axis	Geological Axis
	E1 (Economic)	F1 (Feasibility Study)	G1(Detailed exploration)
Proved mineral reserve (111)	1) **Detail Exploration:** Core drill holes are put at 50m x 100m spacing. Meterwise samples are drawn from the cores and analyzed. A reserve of 6.618 Mt of iron ore (+45% Fe) has been estimated under this category.	Feasibility report is attached vide Annexure-1 in support of F1 under feasibility axis. 1) Geology: A total of 129 core drill holes put in the lease area give sufficient data for interpretation of ore body. UPL is marked in the geological plan as well as sections considering	1) **Geological:** Geological mapping has been done on 1:2000. Geological plan has been prepared showing the detailed topographical -cum-geological details including surface features, extent of deposit, location of quarries, core drill holes etc.

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	2) Mining Report: Mining plan and modification of mining plan are being prepared and approved necessarily. **3) Specific end-use grades of reserves :** Cut-off grade of the mine is 58% Fe. End use grades are 63% Fe and 61% Fe respectively for sponge iron and steel making. **4) Specific knowledge of forest / non-forest data:** Entire area is located in non-forest land.	the ore to be blocked under the statutory barriers and ultimate pit slope. 2) **Mining:** Open cast fully mechanized method of mining will be adopted for drilling, excavation & loading, transportation etc. The details of mining practices are described in Chapter-V. 3) **Environment:** Environmental clearance is available for the area. Water tankers fitted with water sprinklers will be provided for dust suppression on the haul road as well as loading and un-loading sites. Plantation will be done in the safety zone. Processing units will be fitted with dry fog arrangement. Ambient air, Noise & Water is / will be monitored quarterly. 4) **Processing:** There is also a proposal to operate two units of crushing / screening plant of 500tph capacity in the M.L area during the plan period of 5 years. 5) **Infrastructure & services:** Rest shelter, toilets etc will be constructed in the M.L area. Water, electricity, medical, communication and recreational facilities will be provided. 6) **Costing:** Capital cost of the project and operating cost/tonne are Rs.20 crores and Rs.650 respectively.	Geological sections have been prepared showing the quarries and lithounits. Exploration is detailed. **2) Geochemical survey:** Drill cores are sampled and analyzed meter wise. **3) Geophysical survey:** Since geochemical survey is done adequately, geophysical survey is not necessarily required. **4) Technological:** Closer spaced drilling is conducted at 100mx100m grid pattern. Density of bore holes is 100 per sq.km. Samples are analyzed systematically on laboratory scale.

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		7) **Marketing:** Iron ore of this mine will be sold mainly in the state for sponge iron and steel making. 8) **Economic Viability:** Since selling price of iron ore is Rs.3000/ tonne and operating cost is Rs.650/tonne, this mine is economically viable for operation. 9) **Statutory Provisions:** Safety measures and medical facilities will be provided to the workers. Safety zone and land used for public purpose will be left from mining and protected. Ultimate pit slope will be maintained at less than 45^0 with horizontal. Taxation will be executed by a chartered accountant strictly as per the Govt. norms.	

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TABLE–4.1 : IRON ORE RESOURCE

Category & UNFC Code	Grade	Section Considered		Cross Sectional area (m^2)	Length of influence (m)	Volume of Iron Ore zone (m^3)	Bulk density (t/m^3)	Quantity of Iron Ore zone (t)	Quantity of Iron Ore (74%) (t)	Quantity of IW (26%) (t)
Measured Iron Ore Resources (331)	+58% Fe	C_1-C_1'	150N	2292	50	114600	3.0	343800	254412	89388
		D_1-D_1'	200N	2978	50	148900	3.0	446700	330558	116142
		E_1-E_1'	250N	3206	50	160300	3.0	480900	355866	125034
		F_1-F_1'	300N	4440	50	222000	3.0	666000	492840	173160
		G_1-G_1'	350N	3776	50	188800	3.0	566400	419136	147264
		H_1-H_1'	400N	4955	50	247750	3.0	743250	550005	193245
		I_1-I_1'	450N	5448	50	272400	3.0	817200	604728	212472
		J_1-J_1'	500N	5706	50	285300	3.0	855900	633366	222534
		K_1-K_1'	550N	3730	50	186500	3.0	559500	414030	145470
		L_1-L_1'	600N	3918	50	195900	3.0	587700	434898	152802
		M_1-M_1'	650N	604	50	30200	3.0	90600	67044	23556
		N_1-N_1'	700N	118	50	5900	3.0	17700	13098	4602
		O_1-O_1'	750N	1628	50	81400	3.0	244200	180708	63492
		P_1-P_1'	800N	2092	50	104600	3.0	313800	232212	81588
		Q_1-Q_1'	850N	2279	50	113950	3.0	341850	252969	88881
		R_1-R_1'	900N	2320	50	116000	3.0	348000	257520	90480
		S_1-S_1'	950N	3108	50	155400	3.0	466200	344988	121212
		T_1-T_1'	1000N	1885	50	94250	3.0	282750	209235	73515
		U_1-U_1'	1050N	1450	50	72500	3.0	217500	160950	56550
		Sub-total (a)		---	---	**2796650**	---	**8389950**	**6208563**	**2181387**
	+45 - 58% Fe	C_1-C_1'	150N	97	50	4850	2.7	13095	9690	3405
		D_1-D_1'	200N	363	50	18150	2.7	49005	36264	12741
		G_1-G_1'	350N	587	50	29350	2.7	79245	58641	20604
		H_1-H_1'	400N	122	50	6100	2.7	16470	12188	4282
		J_1-J_1'	500N	398	50	19900	2.7	53730	39760	13970
		K_1-K_1'	550N	322	50	16100	2.7	43470	32168	11302
		L_1-L_1'	600N	1176	50	58800	2.7	158760	117482	41278
		M_1-M_1'	650N	665	50	33250	2.7	89775	66434	23342
		N_1-N_1'	700N	85	50	4250	2.7	11475	8492	2984
		P_1-P_1'	800N	83	50	4150	2.7	11205	8292	2913
		Q_1-Q_1'	850N	1074	50	53700	2.7	144990	107293	37697
		R_1-R_1'	900N	652	50	32600	2.7	88020	65135	22885
		S_1-S_1'	950N	196	50	9800	2.7	26460	19580	6880
		T_1-T_1'	1000N	178	50	8900	2.7	24030	17782	6248
		U_1-U_1'	1050N	666	50	33300	2.7	89910	66533	23377
		Sub-total (b)		---	---	**333200**	---	**899640**	**665734**	**233908**
	Total (a+b)	---	---	---	---	**3129850**	---	**9289590**	**6874297**	**2415295**
Indicated Iron Ore Resources 332	+58% Fe	A_1-A_1'	50N	2290	50	114500	3.0	343500	254190	89310
		B_1-B_1'	100N	3244	50	162200	3.0	486600	360084	126516
		C_1-C_1'	150N	2258	50	112900	3.0	338700	250638	88062
		D_1-D_1'	200N	4272	50	213600	3.0	640800	474192	166608
		E_1-E_1'	250N	128	50	6400	3.0	19200	14208	4992
		F_1-F_1'	300N	5666	50	283300	3.0	849900	628926	220974
		G_1-G_1'	350N	4385	50	219250	3.0	657750	486735	171015
		H_1-H_1'	400N	2853	50	142650	3.0	427950	316683	111267
		I_1-I_1'	450N	3848	50	192400	3.0	577200	427128	150072
		J_1-J_1'	500N	2978	50	148900	3.0	446700	330558	116142
		K_1-K_1'	550N	4302	50	215100	3.0	645300	477522	167778
		L_1-L_1'	600N	308	50	15400	3.0	46200	34188	12012

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		M_1-M_1'	650N	576	50	28800	3.0	86400	63936	22464
		N_1-N_1'	700N	580	50	29000	3.0	87000	64380	22620
		O_1-O_1'	750N	154	50	7700	3.0	23100	17094	6006
		P_1-P_1'	800N	288	50	14400	3.0	43200	31968	11232
		Q_1-Q_1'	850N	338	50	16900	3.0	50700	37518	13182
		R_1-R_1'	900N	188	50	9400	3.0	28200	20868	7332
		S_1-S_1'	950N	135	50	6750	3.0	20250	14985	5265
		T_1-T_1'	1000N	18	50	900	3.0	2700	1998	702
		Sub-total (a)		---	---	**1940450**	---	**5821350**	**4307799**	**1513551**
	+45-58% Fe	A_1-A_1'	50N	1108	50	55400	2.7	149580	110689	38891
		B_1-B_1'	100N	977	50	48850	2.7	131895	97602	34293
		D_1-D_1'	200N	140	50	7000	2.7	18900	13986	4914
		F_1-F_1'	300N	323	50	16150	2.7	43605	32268	11337
		G_1-G_1'	350N	391	50	19550	2.7	52785	39061	13724
		H_1-H_1'	400N	80	50	4000	2.7	10800	7992	2808
		I_1-I_1'	450N	512	50	25600	2.7	69120	51149	17971
		J_1-J_1'	500N	226	50	11300	2.7	30510	22577	79[illegible]
		K_1-K_1'	550N	754	50	37700	2.7	101790	75325	26465
		Sub-total (b)		---	---	**225550**	---	**608985**	**450649**	**158336**
Total (a+b)		---		---	---	**2166000**	---	**6430335**	**4758448**	**1671887**
Inferred Iron Ore resource 333	+58% Fe	A1-A1'	50N	40	50	2000	3.0	6000	4440	1560
		B1-B1'	100N	606	50	30300	3.0	90900	67266	23634
		C_1-C_1'	150N	18	50	900	3.0	2700	1998	702
		E_1-E_1'	250N	360	50	18000	3.0	54000	39960	14040
		Sub-total (a)		---	---	**51200**	---	**153600**	**113664**	**39936**
	+45-58% Fe	A1-A1'	50N	26	50	1300	2.7	3510	2597	913
		B1-B1'	100N	35	50	1750	2.7	4725	3497	1229
		C1-C1'	150N	6	50	300	2.7	810	599	211
		Sub-total (b)		---	---	**3350**	---	**9045**	**6693**	**2353**
Total (a+b)		---		---	---	**54550**	---	**162645**	**120357**	**42289**
Grant total		---		---	---	**5350400**		**15882570**	**11753102**	**4129471**

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TABLE–4.2 : IRON ORE RESERVE

Category & UNFC Code	Grade	Section Considered		Cross Sectional area (m^2)	Length of influence (m)	Volume of Iron Ore (m^3)	Bulk density (t/m^3)	Quantity of Iron Ore zone (t)	Quantity of Iron Ore (74%) (t)	Quantity of IW (26%) (t)
111	+58% Fe	C1-C1'	150N	2292	50	114600	3.0	343800	254412	89388
		D1-D1'	200N	2978	50	148900	3.0	446700	330558	116142
		E1-E1'	250N	3206	50	160300	3.0	480900	355866	125034
		F1-F1'	300N	4390	50	219500	3.0	658500	487290	171210
		G1-G1'	350N	3776	50	188800	3.0	566400	419136	147264
		H1-H1'	400N	4955	50	247750	3.0	743250	550005	193245
		I1-I1'	450N	5310	50	265500	3.0	796500	589410	207090
		J1-J1'	500N	5560	50	278000	3.0	834000	617160	216840
		K1-K1'	550N	3627	50	181350	3.0	544050	402597	141453
		L1-L1'	600N	3640	50	182000	3.0	546000	404040	141960
		M1-M1'	650N	598	50	29900	3.0	89700	66378	23322
		N1-N1'	700N	112	50	5600	3.0	16800	12432	4368
		O1-O1'	750N	1440	50	72000	3.0	216000	159840	56160
		P1-P1'	800N	1978	50	98900	3.0	296700	219558	77142
		Q1-Q1'	850N	2160	50	108000	3.0	324000	239760	84240
		R1-R1'	900N	2232	50	111600	3.0	334800	247752	87048
		S1-S1'	950N	2720	50	136000	3.0	408000	301920	106080
		T1-T1'	1000N	1698	50	84900	3.0	254700	188478	66222
		U1-U1'	1050N	1278	50	63900	3.0	191700	141858	49842
		Sub-total (a)		---	---	**2697500**	---	**8092500**	**5988450**	**2104050**
	+45-58% Fe	C1-C1'	150N	97	50	4850	2.7	13095	9690	3405
		D1-D1'	200N	363	50	18150	2.7	49005	36264	12741
		G1-G1'	350N	587	50	29350	2.7	79245	58641	20604
		H1-H1'	400N	122	50	6100	2.7	16470	12188	4282
		J1-J1'	500N	398	50	19900	2.7	53730	39760	13970
		K1-K1'	550N	322	50	16100	2.7	43470	32168	11302
		L1-L1'	600N	1131	50	56550	2.7	152685	112987	39698
		M1-M1'	650N	597	50	29850	2.7	80595	59640	20955
		N1-N1'	700N	82	50	4100	2.7	11070	8192	2878
		P1-P1'	800N	60	50	3000	2.7	8100	5994	2106
		Q1-Q1'	850N	1008	50	50400	2.7	136080	100699	35381
		R1-R1'	900N	580	50	29000	2.7	78300	57942	20358
		S1-S1'	950N	196	50	9800	2.7	26460	19580	6880
		T1-T1'	1000N	178	50	8900	2.7	24030	17782	6248
		U1-U1'	1050N	582	50	29100	2.7	78570	58142	20428
		Sub-total (b)		---	---	**315150**	---	**850905**	**629669**	**221236**
Total (a+b)		---	---	---	---	**3012650**	---	**8943405**	**6618119**	**2325286**
122	+58% Fe	A1-A1'	50N	2268	50	113400	3.0	340200	251748	88452
		B1-B1'	100N	3045	50	152250	3.0	456750	337995	118755
		C_1-C_1'	150N	1978	50	98900	3.0	296700	219558	77142
		D_1-D_1'	200N	3510	50	175500	3.0	526500	389610	136890
		E_1-E_1'	250N	128	50	6400	3.0	19200	14208	4992
		F_1-F_1'	300N	4544	50	227200	3.0	681600	504384	177216
		G_1-G_1'	350N	4050	50	202500	3.0	607500	449550	157950
		H_1-H_1'	400N	2146	50	107300	3.0	321900	238206	83694
		I_1-I_1'	450N	3138	50	156900	3.0	470700	348318	122382

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		J_1-J_1'	500N	2308	50	115400	3.0	346200	256188	90012
		K_1-K_1'	550N	2926	50	146300	3.0	438900	324786	114114
		L_1-L_1'	600N	308	50	15400	3.0	46200	34188	12012
		M_1-M_1'	650N	552	50	27600	3.0	82800	61272	21528
		N_1-N_1'	700N	568	50	28400	3.0	85200	63048	22152
		O_1-O_1'	750N	154	50	7700	3.0	23100	17094	6006
		P_1-P_1'	800N	276	50	13800	3.0	41400	30636	10764
		Q_1-Q_1'	850N	330	50	16500	3.0	49500	36630	12870
		R_1-R_1'	900N	176	50	8800	3.0	26400	19536	6864
		S_1-S_1'	950N	123	50	6150	3.0	18450	13653	4797
		T_1-T_1'	1000N	8	50	400	3.0	1200	888	312
		Sub-total (a)		---	---	**1626800**	---	**4880400**	**3611496**	**1268904**
	+45-58% Fe	A1-A1'	50N	1108	50	55400	2.7	149580	110689	38891
		B1-B1'	100N	700	50	35000	2.7	94500	69930	24570
		D_1-D_1'	200N	140	50	7000	2.7	18900	13986	4914
		F1-F1'	300N	124	50	6200	2.7	16740	12388	4352
		G_1-G_1'	350N	344	50	17200	2.7	46440	34366	12074
		H_1-H_1'	400N	65	50	3250	2.7	8775	6494	2282
		I_1-I_1'	450N	512	50	25600	2.7	69120	51149	17971
		J_1-J_1'	500N	80	50	4000	2.7	10800	7992	2808
		K_1-K_1'	550N	670	50	33500	2.7	90450	66933	23517
		Sub-total (b)		---	---	**187150**	---	**505305**	**373927**	**131379**
Total (a+b)		---		---	---	**1813950**	---	**5385705**	**3985423**	**1400283**
Grand total		---		---	---	**4826600**		**14329110**	**10603542**	**3725569**

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CHAPTER-5

5.0 MINING

5.1 OPEN CAST MINING

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

Mining lease area is executed on 09.06.2008. After the execution, exploration has been done by way of core drilling and no mining has been carried out till date. Due to illegal mining, old quarry / trenches and waste dump are developed encroaching the safety zone. Lessee has lodged FIR at the police station and also informed the Directorate of Mines, regarding the illegal mining (ref : Annexure-21). Illegal mining was stopped just after the lodging of the FIR at the police station. Therefore, no further action was necessitated by the Lessee. The said quarry / trenches was developed prior to the execution of mining lease area which is indicated in the land schedule of lease deed where 43.25 acres or 17.503 hectares is mentioned as "Khani" means quarry (ref : Annexure-2).

There exist an old quarry in western part and two (2) old trenches in northern part of lease area over 1.187 hectares. The details of the trenches / old quarry have been incorporated as follows :

Sl. No.	Name	Length (m)	Width (m)	Area (m^2)	Depth (m)
1	Old quarry	106	60	6240	3
2	Tr-1	215	20	4300	1.5
3	Tr-2	95	14	1330	1.5
Total	---	---	---	11,870	---

There also exist two (2) dumps in the lease area spread over an area of 0.683 hectare. The dump is detailed as follows :

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Sl. No.	Name	Length (m)	Width (m)	Area		Height (m)	Status
				(m^2)	(ha)		
1	Old dump	250	10	2500	0.250	5	Stable but not rehabilitated
2	Eastern side dump	228	19	4332	0.433	10	
Total	---	---	---	6,832	0.683	---	---

There exist village road as well as mine road in the lease area as per the following table :

Name of the Road	Length (m)	Width (m)	Area Occupied		Remark
			(m^2)	(Ha)	
Village Road	75	8	600	0.060	Part road between village Kalimati and Bamebari.
Mine Road	700	6	4200	0.420	Developed for mining & allied activities.
Total	---	---	4,800	0.480	---

Opencast mechanized method of mining will be adopted on 8 hourly shift basis. Loosening of the hard rock mass will be effected by the DTH drills. Excavators of 2.5m^3 capacity will be utilized for excavation & loading. Sixteen (16) tonne capacity dumpers will be utilized for transportation of ore to the crushing & screening / r.o.m stacking site and waste to the dumping site. Saleable ore will be dispatched through trucks / train depending upon the location of consuming industries.

Mining could not be conducted in plan period of last 5 years. Therefore, Quarry-1 and Quarry-2 planned for development in last plan period is proposed again to operate in this current scheme period till exhaust.

Height and width of the benches will be maintained at 6m and 12m respectively. Individual bench faces will be kept nearly vertical (80^0-85^0 angle with the horizontal) whereas the overall Quarry slope angle (the angle between the line joining the toe of bottom bench and the crest of the top bench with the horizontal) is proposed to be maintained 27^0 with the horizontal.

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Two quarries are proposed to be operated simultaneously because of the following reasons :

- Production of 1.4 Mtpa ROM ore to obtain 1 Mtpa saleable ore will be safe and scientifically feasible by operating two quarries in respect of the movement of dumpers, weighing, excavation & loading and maneuverability of the machines.
- Quarries are proposed at the two extreme ends of the deposit and crusher / weigh bridge are located centrally to avoid traffic jam and any untoward conditions.
- As far as conservation of minerals is concerned, selective mining is avoided in Quarry-1 where ore to waste ratio is 1 : 0.2 and therefore, Quarry-2 is proposed (in addition to Quarry-1) where ore to waste ratio is 1 : 0.4.

➢ 1st year (2013-14) Development

This year is completed. Development and production is not commenced so far.

➢ 2nd year (2014-15) Development

More than 10 months of the year is completed and all the statutory clearances are not expected to obtain before 31.03.2015. Therefore, no development and production proposal is given for the year.

➢ 3rd year (2015-16) Development

During 3rd year, development will be done at two places namely Quarry-1 and Quarry-2. However, the details of the development work will be as per the following table:

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Sl. No.	Particulars			Quarry – 1	Quarry – 2
1	Level	Higher adjoining ground level		595mRL	605mRL
		Lower adjoining ground level		563mRL	600mRL
		Quarry bottom level		570mRL	600mRL
2	Bench Geometry	Height		6m	6m
		Width		12m	12m
		Bench slope angle		85^0	85^0
3	Pit / quarry development	Direction of advancement		---	---
		Size of the quarry		150m x 120m	180m x 72m
		Quarry area		$18,000m^3$	$12,960m^2$
		No. of benches to be developed		4	1
		Overall quarry slope angle		27^0	27^0
		Elevation difference between higher level & quarry floor		24m	5m
4	Nature of excavation	OB / Waste		$20,650m^3$	$16,300m^3$
		ROM Ore	Sub-grade ore zone	$20,700\ m^3$	$3,150\ m^3$
			Saleable Ore zone	$132,700\ m^3$	$45,850\ m^3$
		Total Excavation		**$174,050\ m^3$**	**$65,300m^3$**

➢ 4th year (2016-17) Development

In 4th year, benches of Quarry-1 and Quarry-2 developed in 3rd year will be extended laterally as well as depthwise as per the following table :

Sl.No.	Particulars			Quarry – 1	Quarry – 2
1	Level	Higher adjoining ground level		595mRL	605mRL
		Lower adjoining ground level		558mRL	598mRL
		Quarry bottom level		558mRL	594mRL
2	Bench Geometry	Height		6m	6m
		Width		12m	12m
		Bench slope angle		85^0	85^0
3	Pit / quarry development	Direction of advancement		SW	SW
		Size of the quarry		350m x 140m	230m x 75m
		Quarry area		$49,000m^2$	$17,250m^2$
		No. of benches to be developed		5	2
		Overall quarry slope angle		27^0	27^0
		Elevation difference between higher level & quarry floor		30m	11m
4	Nature of excavation	OB / Waste		$49,650m^3$	$22,350m^3$
		ROM Ore	Sub-grade ore zone	$18,400\ m^3$	$5,250\ m^3$
			Saleable Ore zone	$189,650\ m^3$	$55,750\ m^3$
		Total Excavation		**$257,700m^3$**	**$83,350m^3$**

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➢ 5th year (2017-18) Development

During 5th year, benches of Quarry-1 and Quarry-2 developed in 4th year will be extended laterally as well as depthwise. However, the details of the development work will be as per as the following table:

Sl.No.	Particulars		Quarry – 1	Quarry – 2
1	Level	Higher adjoining ground level	595mRL	605mRL
		Lower adjoining ground level	555mRL	595mRL
		Quarry bottom level	546mRL	588mRL
2	Bench Geometry	Height	6m	6m
		Width	12m	12m
		Bench slope angle	85^0	85^0
3	Pit / quarry development	Direction of advancement	West	West
		Size of the quarry	350m x 176m	230m x 94m
		Quarry area	61,600m²	21,620m²
		No. of benches to be developed	6	3
		Overall quarry slope angle	27^0	27^0
		Elevation difference between higher level & quarry floor	36m	17m
4	Nature of excavation	OB / Waste	73,050m³	25,400m³
		ROM Ore – Sub-grade ore zone	13,650 m³	8,900 m³
		ROM Ore – Saleable Ore zone	250,550 m³	62,500 m³
		Total Excavation	**337,250m³**	**96,800m³**

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

I. Insitu Tentative Excavation

Year	Pit no.	Total Excavation (m^3)	Top Soil (m^3)	OB/SB/IB (m^3)	ROM (m^3)		Mineral reject	ROM Ore / Waste Ratio
					Ore (m^3)*	Mineral reject (m^3)		
III (2015-16)	Quarry-1	174050	---	20,650	153400	49182	---	1 : 0.23
IV (2016-17)	-do-	257700	---	49,650	208050	67018	---	
V (2017-18)	-do-	337250	---	73,050	264200	85421	---	
Sub-total	**---**	**769,000**	**---**	**143,350**	**625,650**	**201,621**	---	
III (2015-16)	Quarry-2	65300	---	16,300	49000	15823	---	1: 0.35
IV (2016-17)	-do-	83350	---	22,350	61000	19654	---	
V (2017-18)	-do-	96800	---	25,400	71400	22916	---	
Sub-total	**---**	**245,450**	**---**	**64,050**	**181,400**	**58,393**	---	
Total	**---**	**1,014,450**	**---**	**207,400**	**807,050**	**260,014**	---	1 : 0.26

* 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.

NOTE: **Mineral rejects** include all the excavated materials that do not constitute useful material, Such material may be either grade or size reject. The mineral reject may be (i) chemically sub-grade which is below the acceptable limits of specifications that is below the cut off grade and above the threshold value, (ii) materials of physical characteristics not acceptable to the market, (iii) material having deleterious constituents.

ROM constitutes the material excavated from mineralized zone and includes mineral reject and useable mineral component.

OB : means overburden capping waste

SB : means side burden waste on both hang wall and foot wall sides of the ore body

IB : means intermediate burden waste between two or more ore body.

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If bulk density of saleable iron ore zone and sub-grade iron ore zone are considered as 3t/m^3 and 2.7t/m^3 respectively based on the experience availed in other iron ore leases of the Lessee, the production schedule will be as per the following table (ref : Table-5.1, 5.2, 5.3, 5.4, 5.5 & 5.6) :

Year	Name of Quarry	Total excavation (m^3)	OB/ Waste (t)	Saleable Ore Zone		Sub-grade Ore zone		ROM Ore (+45% Fe) (t)	Total Mineral Rejects (t)
				Saleable Ore (+58% Fe) (t)	Mineral Rejects (t)	Sub-grade Ore (+45%-58% Fe) (t)	Mineral Rejects (t)		
								Col.5+6+7+8	Col.6+8
1	2	3	4	5	6	7	8	9	10
3rd (2015-16)	Quarry-1	174050	45,430	294,594	103,506	41,359	14,531	453,990	118,037
	Quarry-2	65300	35,860	101,787	35,763	6,294	2,211	146,055	37,974
	Sub-total	239,350	81,290	396,381	139,269	47,653	16,742	600,045	156,011
4th (2016-17)	Quarry-1	257700	109,230	421,023	147,927	36,764	12,917	618,631	160,844
	Quarry-2	83350	49,170	123,765	43,485	10,490	3,685	181,425	47,170
	Sub-total	341,050	158,400	544,788	191,412	47,254	16,602	800,056	208,014
5th (2017-18)	Quarry-1	337250	160,710	556,221	195,429	27,273	9,582	788,505	205,011
	Quarry-2	96800	55,880	138,750	48,750	17,782	6,248	211,530	54,998
	Sub-total	434,050	216,590	694,971	244,179	45,055	15,830	1,000,035	260,009
Total	---	1,014,450	456,280	1,636,140	574,860	139,962	49,174	2,400,136	624,034

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

The mine is not opened so far. There exists small dumps prior to execution of the lease area which will be re-handled in next scheme period.

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

Ref : Individual year wise development plans and sections vide Plate-IV and IV(A) showing pit layouts, dumps, stacks of mineral reject since it is 'A' category mine.

अनुमोदित
APPROVED
13/2/17

क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
भुवनेश्वर/BHUBANESWAR

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

This Mahaparbat Iron Ore Mine will be worked for saleable iron ore @ 1 Mt/annum with the deployment of earthmoving machines on two shift basis. Loosening of the hard rock mass will be effected by the blasting of DTH drilled holes. Shovels of 2.5 m^3 capacity will be utilized for excavation & loading of blasted rocks. Dumpers, rear dump trucks of 21 t capacity will be used for transportation of ore and waste within lease area.

The rated production of saleable iron ore will be obtained in 5th year (2017-18) and onwards @1,000,035 t / annum. Accordingly, capacity and number of machines are proposed to be deployed. Loosening of the hard rock mass will be effected by the blasting of DTH drilled holes. Iron ore deposit is mostly with friable ore & blue dust. About 30% of iron ore zone is hard which will be drilled by DTH drill and blasted.

Drilling Machines

Blast hole Parameters	DTH Drill
Burden	2.5m
Spacing	3.0m
Blasting length at single stroke	6.0m
Sub-grade drilling (10%)	0.6m
Depth of the hole	6 + 0.6 = 6.6 m
Output / hole	2.5 x 3.0 x 6 = 45m^3
Drill diameter	100mm
Drilling speed	12m /hr.
Working hours in a shift	8
Number of shifts per day	2
Annual working days	300
Expected utilization	70%
Operating efficiency	60%
Meters to be drilled/ drill / annum	12 x 8 x 2 x 300 x 70% x 60% = 24,192 m
Maximum volume of excavation / year	= 434,050 m^3
Volume to be blasted (@30% w.r.t. total excavation)	= 434,050 x 30% = 130,215 m^3
Annual requirement of holes	= 130,215 /45

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	= 2,894 Nos.
Meterage of drilling required	= 2,894 x 6.6 = 19,100 m
No. of drills required to be in operation	⇒ 19,100/24,192 = 0.79, say 1 no.

Excavation and Loading

Run-off-mine ore and waste will be excavated & loaded in the 21 t dumper by 2.5m^3 capacity excavator. The calculation is detailed as follows:

❖ Excavation parameters

Bucket Capacity	= 2.5 m^3
Swelling volume	= 50%
Swell factor	= 100/(100+50) = 0.67
Bucket fill factor	= 0.9
Utilization	= 70%
Operating efficiency	= 60%
Shovel cycle time	= 35 sec.
Swing factor	= 1
No. of working hour in a shift	= 8
No. of shift to be worked in a day	= 2
No, of working days in a year	= 300

❖ Number of excavators required

Item	Quantity
Volume required to be handled per annum	= 434,050 m^3
Volume to be handled / shovel	= 2.5 x 0.67 x 0.9 x 3600 x 70% x 60% x 8 x 2 x 300 /(35 x 1) = 312,595 m^3
Number of shovels required	= 434,050 / 312,595 = 1.38, say 2 nos.

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HAULAGE & TRANSPORT EQUIPMENT FOR ORE, WASTE & SUB GRADE ORE

❖ Haulage within the mining lease

Overburden/ waste will be dumped. R.O.M iron ore will be transported to the crushing & screening site for sizing. Average distance / lead between the quarry and disposal / unloading sites is assumed to be 1 km. However, shovel - dumper matching calculation has been made as follows :

❖ Dumper Parameters

Parameters	Quantity
Bucket Capacity of Excavator	$2.5m^3$
Bucket fill factor	0.9
Swell factor	0.67
Tonnage factor	$2.8\ t/m^3$
Tonnes per pass	2.5 x 0.9 x 0.67 x 2.8 = 4.221 t
Dumper capacity	= 21 t
No. of passes	Tonnage rating of Dumper/tonnes per pass = 21/4.221 = 4.975, say 5 passes

❖ Dumpers requirement

Loading time	5 x 35 = 175 sec.
Lead	1 km
Load travel time	(3600 x 1)/10 = 360 sec.
Dumping time	60 sec.
Empty travel time	(3600 x 1)/15 = 240 sec.
Spotting time	60sec.
Dumper cycle time	175+360+60+240+60 = 895 sec
Number of dumpers required /shovel	=Dumper cycle time /(loading + spotting time) = 895/(175+60) = 895/235 = 3.81 nos.
Number of excavators	2
Number of dumpers attached in all total with excavators	2 x 3.81 = 7.62, say 8 nos.

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❖ Transport from mine-head to the destination

Saleable ore obtained from the crusher / screen will be dispatched to the destination through trucks / train.

LIST OF MACHINERY / EQUIPMENTS

Sl. No.	Purpose	Name	Capacity	Proposed
1	Primary Drilling	DTH / Wagon drills	100mm dia	1
		Pneumatic compressor	180BHP/12.5Kg/cm^2	2
2	Rock breaking	Rock breaker	---	1
3	Excavation & loading	Excavator	2.5 m^3	2
		Loader	1.5-3m^3	2
4	Mineral processing	Crushing / screening plant	500tph	1
5	Transporting	Dumper	21 t	8
6	Leveling & road making	Dozer	---	1
7	Environmental Protection & industrial use	Water Tanker	16 KL	1
		Weigh Bridge	50 t	1
		DG Set	---	2
		Ambulance	---	1
		Four wheelers	---	2

5.1.5 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.

Yearwise development is detailed in Para-5.1.1. At the end of scheme period, status of the quarries will be as follows :

Name of Quarry	Length (m)	Width (m)	Area (m^2)	Area (ha)
Quarry-1	350	176	61,600	6.160
Quarry-2	230	94	21,620	2.162
Total	---	---	83,220	8.322

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Haul road is the lifeline of the opencast mine. Keeping in view the expected weather conditions (rain fall), largest vehicle on site, speed of the vehicles and construction practices in the region, haul road will be (a) designed in the M.L area to suit the load capacity of the dumpers and (b) maintained in good condition. Width of the haul road will be kept 3 times of the width of largest vehicles plying on the road plus 5m i.e 3 x 2.3m (width of proposed 21t capacity dumper) + 5m = 11.9m say 12m. The extra width of 5m will be provided to ensure the driver to negotiate the curve safely at a given speed. Definite turnouts, crossing points and waiting points will be designated where provision of this extra 5m width not practicable to maintain. Gradient will be maintained up to a maximum of 1 : 16 for haul road and 1 : 10 for ramp up to 10m length at one stretch. Haul road to be developed above the level of surrounding area will be provided with parapet wall / embankment having 1m top width and 2.5m bottom width and height equivalent to the diameter of the wheel of largest vehicle plying on the haul road. Warning notices and road signs will be posted along the haul roads at appropriate places like crossings, curves etc. for guidance of truck or tipper drivers. Haul road will be properly maintained by way of adequate compaction and leveling. Water sprinkling will be done on the haul road for dust suppression for road safety as well as clean environment.

Ultimate pit limit is given in yearwise development plan as well as sections. Geological sections are prepared based on boreholes data. Sub-grade ore, saleable grade ore and waste zones are plotted separately in the sections. Quantity of these different materials is calculated separately.

Saleable ore is processed in to different sizes. Sub-grade ore is not saleable at present due to its grade. Therefore, these ores are proposed to be stacked for use in future. Waste will be dumped and rehabilitated.

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5.1.6 Conceptual Mine planning upto 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.

As estimated, iron ore reserve of +45% Fe under UNFC code of 111 is 10.603 Mt (Ref : Para-4.12.4). During the scheme period, 2.4 Mt ROM iron ore (+45% Fe) will be extracted (ref. Table-5.3). Remaining reserve of 10.603 – 2.4 = 8.203 Mt iron ore will be extracted within a period of 8 years on the basis of 1 Mt / annum. Hence, life of the mine will be 3 years (scheme period from 2015-16 to 2017-18) + 8 (beyond 2017-18) = 11 years.

However, life of the mine may change depending upon the outcomes of proposed core drilling, extent of mechanization, cut-off grade and market demand.

Exploration : M.L area is explored / drilled by 129 core drill holes at 50m to 100m spacing till date under G1, G2 & G3 level. Proposal is given further in Para-4.9 for exploration of the entire M.L area within scheme period to convert the area under G2 & G3 level in to G1 level of exploration.

Mine Development : There will be only one quarry over 42.827 hectares at the end of the life of the mine. The ultimate size and extent of the quarry will be as follows :

Name of quarry	Length (m)	Breadth (m)	Ultimate extent		Ultimate pit depth (m)
			In m^2	In ha.	
Quarry-1	1130	379	428,270	42.827	40

Optimum Exploitation & Utilization of Minerals : Height and width of the benches will be kept at 6m each to (a) maintain final slope angle of the pit at around 45^0 with the horizontal and (b) recover optimum amount of iron ore at the close of life of the mine. Saleable ore obtained after crushing / screening of r.o.m iron ore will be dispatched to the steel & sponge iron ore plants.

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Individual benches will be kept at 85^0 slope angles with the horizontal. Ultimate pit slope angle will be kept at around 45^0 with the horizontal at the end of the life of the mine.

Waste Management : Saleable ore to waste ratio is 1:0.26. Therefore, conceptual generation of waste will be 4,826,600m^3 (ref : Table-3.2) x 0.26 = 1,254,916 m^3. Out of these, 207,400m^3 waste will be dumped over an area of 14,814 m^2 or 1.482 hectares in 3 terraces of 10m each. Remaining 1,254,916 – 207,400 = 1,047,516 m^3 waste will be utilized for back-filling of mined out area since 6^{th} year (2018-19 & onwards) over 104,752m^2 or 10.475 hectares at 10m thick filling from one side of the mine.

Sub-grade Management : A total of 502,300m^3 sub-grade ore (ref : Table-3.2) will be generated during the conceptual period. An area of 1.728 hectares is earmarked to stack 51,838m^3 sub-grade ore of scheme period (ref : Para-6.4) temporarily. Sub-grade ore of scheme period as well as beyond will be sold in the indigenous market due to decrease of cut-off grade day by day because of technological improvement in beneficiation plant and metallurgical industry.

Environmental Aspects

Land Degradation / Utilization : The entire M.L area over 68 hectares will be degraded/utilized conceptually for mining & allied activities. Item wise break-up of the land use will be as follows :

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Sl. No.	Type of land use		As at present (in ha)	As at the end of scheme period (in ha)	As at the end of conceptual period (life of mine) (in ha)
1.	Area under excavation		1.187	8.322	42.827
2.	Storage for Topsoil		---	---	---
3.	Overburden dump		0.683	2.165	2.165
4.	Mineral storage		---	3.529	3.529
5.	Infrastructure (rest shed office, quarters, hutting etc.)		---	0.500	0.500
6.	Roads		0.480	1.760	2.179
7.	Railways		---	---	---
8.	Green belt (safety zone along lease boundary)		---	1.500	2.500
9.	Tailing Pond		---	---	---
10.	Effluent Treatment Plant		---	---	---
11.	Mineral Separation Plant		---	0.675	0.675
12.	Township area		---	---	---
13.	Others	Weigh bridge	---	0.500	0.500
		Mineral rejects	---	3.250	3.250
---	Sub-Total		2.350	22.201	58.125
14.	Safety zone on either side of village road		---	0.140	0.140
15.	Safety zone on either side of perennial nala coarse		---	8.600	8.600
16.	Village road		0.060	0.060	0.060
17.	Perennial nala		1.075	1.075	1.075
---	Sub-Total		1.135	9.875	9.875
---	Total		3.485	31.393	68.000

Afforestation and Reclamation/Rehabilitation : There will be no reclamation of mined out land during the remaining years of 3 years of scheme period because of non-availability of exhausted quarry or part thereof. Back-filling is proposed to be undertaken since 6th year (2018-19) and onwards.

As far as post mining land use is concerned, area under excavation and overburden dump will be fully reclaimed/ rehabilitated. A part of the mined out area over 4.865 hectares will be left as water reservoir. Road will be left for use of the local people and also as fire line. Area under sub-grade stack, mineral separation plant, mineral stacking & infrastructure may also be utilized after mine life.

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A total of 106,567 saplings such as Mango, Mahul, Neem, Mahaneem, Gambhari etc. will be planted cumulatively over an area of 42.627 hectares by the end of conceptual plan period :

Sl. No.	Type of plantation	Location	Area (in ha.)	No. of saplings
1	Plantation	Safety zone along lease boundary	2.500	6250
2	Reclamation (back-filling & plantation)	Mined out area	10.475	26188
3	Rehabilitation	-do-	27.487	68717
4	Rehabilitation	Waste dump	2.165	5412
Total	---	---	42.627	106,567

Post Mining Land Use Plan : Life of the mine is 11 years. Based on the existing exploration status, ultimate pit limits have been earmarked.

Waste dump will be rehabilitated concurrently with the mining operation by way of soil conditioning, terracing, slope stabilization and plantation. A part of the mined out area will be reclaimed by way of back filling and remaining area will be rehabilitated and plantation. Post mining land use will be as follows :

Sl. No.	Name of Mining features	Post Mining Land Use	Area (ha)
1	Area under excavation	Reclamation (Back-filling & Plantation)	10.475
		Rehabilitation / Plantation	27.487
		Rehabilitation (water reservoir)	4.865
2	Overburden dump	Rehabilitation / Plantation	2.165
3	Mineral storage area	---	3.529
4	Infrastructure (rest shed office, quarters, hutting etc.)	---	0.500

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5	Road	To be left for public need, supervision of plantation site and as fire line.	2.179
6	Green belt (safety zone, along lease boundary)	Plantation	2.500
7	Mineral Separation Plant	Dismantling & removal	0.675
8	Others – Weigh bridge	-do-	0.500
	Others – Mineral rejects	Removal	3.250
9	Safety zone on either side of village road	It will remain as such	0.140
10	Safety zone on either side of perennial nala coarse	-do-	8.600
11	Village road	-do-	0.060
12	Perennial nala	-do-	1.075
---	Total	---	68.000

5.2 UNDERGROUND MINING

No underground mining operation is proposed in this lease area.

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TABLE-5.1 : SALEABLE ORE PRODUCTION SCHEDULE (QUARRY-1)

Year	Section Considered		Cross Sectional area	Length of influence	Volume of ROM Ore	Quantity of ROM Ore @ 3 t/m^3	Quantity of Saleable Ore (74%)	Quantity of Mineral rejects (26%)
			(m^2)	(m)	(m^3)	(t)	(t)	(t)
3rd (2015-16)	JJ'	500N	283	50	14150	42450	31413	11037
	KK'	550N	955	50	47750	143250	106005	37245
	LL'	600N	1416	50	70800	212400	157176	55224
	Sub-total		---	---	132,700	398,100	294,594	103,506
4th (2016-17)	FF'	300N	631	50	31550	94650	70041	24609
	GG'	350N	1199	50	59950	179850	133089	46761
	HH'	400N	403	50	20150	60450	44733	15717
	II'	450N	137	50	6850	20550	15207	5343
	JJ'	500N	902	50	45100	135300	100122	35178
	KK'	550N	273	50	13650	40950	30303	10647
	LL'	600N	248	50	12400	37200	27528	9672
	Sub-total		---	---	189,650	568,950	421,023	147,927
5th (2017-18)	FF'	300N	680	50	34000	102000	75480	26520
	GG'	350N	817	50	40850	122550	90687	31863
	HH'	400N	1413	50	70650	211950	156843	55107
	II'	450N	733	50	36650	109950	81363	28587
	JJ'	500N	811	50	40550	121650	90021	31629
	KK'	550N	244	50	12200	36600	27084	9516
	LL'	600N	313	50	15650	46950	34743	12207
	Sub-total		---	---	250,550	751,650	556,221	195,429
Total	---		---	---	572,900	1,718,700	1,271,838	446,862

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TABLE-5.2 : SALEABLE ORE PRODUCTION SCHEDULE (QUARRY-2)

Year	Section Considered		Cross Sectional area	Length of influence	Volume of ROM Ore	Quantity of ROM Ore @ 3 t/m³	Quantity of Saleable Ore (74%)	Quantity of Mineral rejects (26%)
			(m^2)	(m)	(m^3)	(t)	(t)	(t)
3rd (2015-16)	QQ′	850N	80	50	4000	12000	8880	3120
	RR′	900N	354	50	17700	53100	39294	13806
	SS′	950N	483	50	24150	72450	53613	18837
	Sub-total		---	---	45,850	137,550	101,787	35,763
4th (2016-17)	PP′	800N	207	50	10350	31050	22977	8073
	QQ′	850N	330	50	16500	49500	36630	12870
	RR′	900N	257	50	12850	38550	28527	10023
	SS′	950N	321	50	16050	48150	35631	12519
	Sub-total		---	---	55,750	167,250	123,765	43,485
5th (2017-18)	PP′	800N	296	50	14800	44400	32856	11544
	QQ′	850N	341	50	17050	51150	37851	13299
	RR′	900N	239	50	11950	35850	26529	9321
	SS′	950N	374	50	18700	56100	41514	14586
	Sub-total		---	---	62,500	187,500	138,750	48,750
Total	---		---	---	164,100	492,300	364,302	127,998

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TABLE-5.3 : SUB-GRADE ORE GENERATION SCHEDULE (QUARRY-1)

Year	Section Considered		Cross Sectional area	Length of influence	Volume of ROM Ore	Quantity of ROM Ore @ 2.7 t/m³	Quantity of Sub-grade Ore (74%)	Quantity of Mineral rejects (26%)
			(m^2)	(m)	(m^3)	(t)	(t)	(t)
3rd (2015-16)	JJ'	500N	111	50	5550	14985	11089	3896
	KK'	550N	134	50	6700	18090	13387	4703
	LL'	600N	169	50	8450	22815	16883	5932
	Sub-total		---	---	20,700	55,890	41,359	14,531
4th (2016-17)	HH'	400N	44	50	2200	5940	4396	1544
	JJ'	500N	92	50	4600	12420	9191	3229
	KK'	550N	25	50	1250	3375	2498	878
	LL'	600N	207	50	10350	27945	20679	7266
	Sub-total		---	---	18,400	49,680	36,764	12,917
5th (2017-18)	HH'	400N	60	50	3000	8100	5994	2106
	KK'	550N	19	50	950	2565	1898	667
	LL'	600N	194	50	9700	26190	19381	6809
	Sub-total		---	---	13,650	36,855	27,273	9,582
Total	---		---	---	52,750	142,425	105,396	37,030

TABLE-5.4 : SUB-GRADE ORE GENERATION SCHEDULE (QUARRY-2)

Year	Section Considered		Cross Sectional area	Length of influence	Volume of ROM Ore	Quantity of ROM Ore @ 2.7 t/m³	Quantity of Sub-grade Ore (74%)	Quantity of Mineral rejects (26%)
			(m^2)	(m)	(m^3)	(t)	(t)	(t)
3rd (2015-16)	RR'	900N	63	50	3,150	8,505	6,294	2,211
4th (2016-17)	QQ'	850N	41	50	2050	5535	4096	1439
	RR'	900N	32	50	1600	4320	3197	1123
	SS'	950N	32	50	1600	4320	3197	1123
	Sub-total		---	---	5,250	14,175	10,490	3,685
5th (2017-18)	QQ'	850N	89	50	4450	12015	8891	3124
	RR'	900N	37	50	1850	4995	3696	1299
	SS'	950N	52	50	2600	7020	5195	1825
	Sub-total		---	---	8,900	24,030	17,782	6,248
Total	---		---	---	17,300	46,710	34,566	12,144

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TABLE-5.5 : OVERBURDEN / WASTE REMOVAL SCHEDULE (QUARRY-1)

Year	Section Considered		Cross Sectional area	Length of influence	Volume	Quantity @ 2.2t/m^3
			(m^2)	(m)	(m^3)	(t)
3rd (2015-16)	KK'	550N	133	50	6650	14630
	LL'	600N	280	50	14000	30800
	Sub-total		---	---	**20,650**	**45,430**
4th (2016-17)	FF'	300N	128	50	6400	14080
	GG'	350N	162	50	8100	17820
	HH'	400N	112	50	5600	12320
	JJ'	500N	261	50	13050	28710
	KK'	550N	194	50	9700	21340
	LL'	600N	136	50	6800	14960
	Sub-total		---	---	**49,650**	**109,230**
5th (2017-18)	FF'	300N	16	50	800	1760
	GG'	350N	74	50	3700	8140
	HH'	400N	114	50	5700	12540
	II'	450N	113	50	5650	12430
	JJ'	500N	666	50	33300	73260
	KK'	550N	276	50	13800	30360
	LL'	600N	202	50	10100	22220
	Sub-total		---	---	**73,050**	**160,710**
Total	---		---	---	**143,350**	**315,370**

TABLE-5.6: OVERBURDEN / WASTE REMOVAL SCHEDULE (QUARRY-2)

Year	Section Considered		Cross Sectional area	Length of influence	Volume	Quantity @ 2.2t/m^3
			(m^2)	(m)	(m^3)	(t)
3rd (2015-16)	QQ'	850N	238	50	11900	26180
	RR'	900N	47	50	2350	5170
	SS'	950N	41	50	2050	4510
	Sub-total		---	---	**16,300**	**35,860**
4th (2016-17)	PP'	800N	29	50	1450	3190
	QQ'	850N	139	50	6950	15290
	RR'	900N	86	50	4300	9460
	SS'	950N	193	50	9650	21230
	Sub-total		---	---	**22,350**	**49,170**
5th (2017-18)	PP'	800N	156	50	7800	17160
	QQ'	850N	155	50	7750	17050
	RR'	900N	84	50	4200	9240
	SS'	950N	113	50	5650	12430
	Sub-total		---	---	**25,400**	**55,880**
Total	---		---	---	**64,050**	**140,910**

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CHAPTER-6

6.0 MINE DRAINAGE

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

Likely depth of water table is 5m below ground level (at 525m above mean sea level) in rainy season and 8m bgl (at RL522 aMSL) in dry season. Ground level is at 530 aMSL.

6.2 Indicate maximum and minimum depth of Workings.

Working depth will be up to 558m aMSL. Hence, there is no possibility of puncture of ground water table in scheme period.

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

Quarry will be of self-draining and no pumping is required. The natural drainage will be observed only in monsoon season since there is no chance of seepage of ground water. The floor of the quarry is proposed to be inclined towards the natural slope so that the direct precipitated water will be drained down the slope automatically. A catch/periphery/garland drain will be developed all around the quarry to receive and discharge surface run-off water to the 1st and 2nd order streams through settling ponds.

6.4 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 natural drainage system is distinct and dendritic due to hilly topography. Seasonal as well as perennial nala exist in the M.L. area. Surface run-off water flows along the natural slopes, valleys and finally in to the seasonal nalas in northern part to meet a perennial nala in southern part of the M.L area. The confluence point of this perennial nala and

Baitarani river is located at a distance of 3 Km east of the area. Buffer zone (5 km radius of M.L area) falls within the catchments of Baitarani River which controls the drainages system of the region and flows due north and then east to meet the Bay of Bengal. Average annual rainfall is 1400mm. The south-west monsoon lasts from mid June to mid September and the area receives more than 80% of the annual rainfall during the period. Likely quantity of rain water / annum is 68 hectares x 1400mm = 680,000 x 1.4 = 952,000m^3. Keeping in view the evapo-transpiration and seepage into sub-surface at 40%, water flow within lease area will be 952,000 x 60% = 571,200m^3 which will be drained through the perennial nala located at southern part of the lease area.

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CHAPTER-7

7.0 STACKING OF MINERAL REJECT /SUB GRADE MATERIAL AND DISPOSAL OF WASTE

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

Overburden such as shaly laterite, lateritised ferruginous shale and intermediate waste such as ferruginous shale & BHJ/BHQ will be generated in scheme period as per the following table (ref : 1st table of Para-5.1.2) :

Year	Waste (m^3)		
	Quarry-1	Quarry-2	Total
3rd (2015-16)	20,650	16,300	36,950
4th (2016-17)	49,650	22,350	72,000
5th (2017-18)	73,050	25,400	98,450
Total	143,350	64,050	207,400

However, final presentation of the facts and figures as per the prescribed format is as follows :

Year	Top Soil (m^3)		Overburden / waste (m^3)			Mineral Rejects (m^3)	
	Reuse/ spreading	Storage	Backfilling	Storage	Disposal under 64C of MCR	Blending	Beneficiation
3rd (2015-16)	---	---	---	36,950	---	---	---
4th (2016-17)	---	---	---	72,000	---	---	---
5th (2017-18)	---	---	---	98,450	---	---	---
Total	---	---	---	207,400	---	---	---

Iron ore containing less than 58% Fe which is not beneficiated and/or used economically at present by the Lessee for sponge/steel making is regarded as sub-grade ore. However, yearwise generation of these materials is anticipated to be as follows (ref : 2nd table of Para-5.1.2):

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Year	Sub-grade ore (t)		
	Quarry-1	Quarry-2	Total
3rd (2015-16)	41,359	6,294	47,653
4th (2016-17)	36,764	10,490	47,254
5th (2017-18)	27,273	17,782	45,055
Total	105,396	34,566	139,962

These 139,962 t or 51,838m^3 sub-grade iron ore is proposed to be stacked between the grids from 615 to 660 N and 500 to 600 E in an advancing method for future use in the north-central part of the M.L area over an area of 17,279m^2 or 1.728 hectares by a single terrace of average 3m height.

Intercalated waste mined out along with iron ore will be separated during mineral processing as mineral rejects as per the following table (ref : 1st table of Para-5.1.2) :

Year	Mineral Rejects (m^3)		
	Quarry-1	Quarry-2	Total
3rd (2015-16)	49182	15823	65005
4th (2016-17)	67018	19654	86672
5th (2017-18)	85421	22916	108337
Total	201,621	58,393	260,014

These 260,014m^3 mineral rejects is proposed to be stacked separately in southern part of the M.L area to the south of perennial nala leaving 50m wide safety zone along perennial nala course in advancing method over an area of 32,502m^2 or 3.250 hectares at 8m average height in two terraces of 5m height each. These rejects will be analyzed at regular interval to know its Fe content and explore its possible use in future.

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7.2 In case the waste material is to be dumped outside lease area, give justification as well as details thereof along with permissions/ surface rights from the appropriate State authorities must. The proposed dumping ground within the lease area be proved and be outside the UPL.

Selection of dumping site mostly depends upon the factors like topography, drainage, land use, mineral inventory, pit configuration, mine waste characteristics, its volume of generation and economy in transportation. Keeping in view the above physical as well as techno-economic factors, waste will be dumped to the east of existing dump over an area of 2.094 hectares which is barren (no ore bearing) and outside the ultimate pit limit.

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

As envisaged in Para-7.1, 207,400 m^3 waste materials will be disposed off between the grids from 390 to 570 N and 340 to 520 E over an area of 14,814 m^2 or 1.482 hectares in three terraces of each 10m height as per the following manner :

Year	Dump No.	Terrace No.	RL of terrace floor (m)	Height proposed (m)
2015-16	Proposed dump	Lower terrace	561	10
2016-17	-do-	Middle terrace	573	10
2017-18	-do-	Upper terrace	585	10

Dumping will be progressed scientifically in a retreating method for progressive stabilization & rehabilitation of waste dump. Slope of the terrace will be maintained equivalent with the angle of repose of the waste materials i.e. around 37^0 30′ and overall slope angle of the dump will be 28^0 with the horizontal. Floor of the terrace will be sloped inward to prevent the flow of water outside at weak zone. Water in each terrace will be allowed by making the garland drain at its toe and joined with each other to further join with nearby nala of natural drainage system.

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7.4 Quality and grade of sub-grade material available at the mine

As on date, no stack of sub-grade ore is found in the M.L area.

7.5 Proposal for Protective Works to Be Carried Out Around Waste and Sub-Grade Dumping

Retaining wall will be constructed around the waste dump, sub-grade ore stack and mineral rejects stack to retain the wash-off materials. Boulders of waste materials will be utilized for construction of retaining wall. Sand and cement will be used for the binding of the boulders. Garland drain will be developed around waste dump beyond the retaining wall to receive run-off water coming out of the retaining wall and settling tank will be made to receive the run-off water from garland drain to settle the sediments and release clean water. Floor and walls of garland drain as well as settling tank will be made up of concrete for stability and less erosion. Cross section of the garland drain and size of the settling tank are proposed to be 2m x 1.5m and 20m x 5m x 5m respectively decided based on the average rainfall data of the area. The yearwise details of the construction will be as follows :

Year	Location	Features	Length	Width	Height/depth
2015-16	Dump	Retaining wall	260m	1.5m	1.0m
	-do-	Garland drain	270m	1.0m	1.0m
	-do-	Settling tank	10m	5.0m	3.0m
	Sub-grade stack	Retaining wall	150m	1.5m	1.0m
	Mineral rejects	-do-	650m	1.5m	1.0m
2016-17 onwards	-Maintenance-				

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CHAPTER-8

8.0 USE OF MINERAL AND MINERAL REJECTS

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

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

Iron ore lumps (caliberated ore or CLO) obtained from the mine after dry processing of ROM ore will be dispatched to the nearby iron ore based industries for sponge iron as well as steel making. Friable / fines / blue dust will be dispatched / exported to the consumers as per demand. As far as grade of iron ore is concerned, Mahaparbat iron ore deposit will be suitable for sponge iron & steel making. Mine is not opened so far.

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

ROM iron ore will be crushed and screened in the M.L area as per crusher-9 to cater the need of buyers in respect of size and grade.

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

Lessee has no captive units for consumption of iron ore. However, value addition will be due to up gradation of iron ore in the M.L area by way of dry processing.

8.4 Indicate precise physical and chemical specification stipulated by buyers

As experienced from the other operating iron ore mines, specification required for the user industries will be as follows :

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Parameters	Steel Making	Sponge iron making	Pelletization
Size	+10-40mm	+5-18mm	-10mm
Grade	+60% Fe	+62% Fe	+60% Fe

8.5 Give details of processes adopted to upgrade the ROM to suit the user requirements. The useable mineral recovered from ROM may not be directly used in any industry and may need intermediate process to suit the user industry in terms of physical and chemical compositions.

Dry processing such as crushing & screening will be adopted to upgrade ROM iron ore to suit the user requirements as per the flow sheet given in Para-9.2.

Sub-grade iron ore (+45% Fe to -58% Fe) will be stacked for sale in future before or after blending depending upon the market demand. Similarly, fines generated during crushing & screening will be stacked separately and dispatched on market demand leaving no stack in the mine.

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CHAPTER-9

9.0 PROCESSING OF ROM IRON ORE AND MINERAL REJECTS

The mine is not opened so far. During the scheme period, dry crushing & screening process will be adopted in the lease area.

9.1 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.

Sub-grade ore will be stacked for sale in future before or after blending with upper grade ores depending upon the market demand. Due to dry processing there will be no generation of tailings.

Dry processing plant in the M.L area will be consisting of crushing & screening of iron ore for sizing only. Adequacy of the proposed crushing & screening plants is justified as follows :

Description	Crushing & Screening Plant
Capacity	500 tph
Working hours/shift	8 hours
No. of shifts to be worked	2
Annual working days	300
Efficiency expected	65%
R.O.M ore can be processed / annum	500 x 2 x 8 x 1 x 300 x 65% = 1,560,000 t
R.O.M ore to be processed / annum	= 1,000,035 t

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

A crushing & screening unit of 500tph capacity will be operated to process 1.48 Mt ROM iron ore / annum. Flow sheet of a 500tph capacity unit is furnished as follows :

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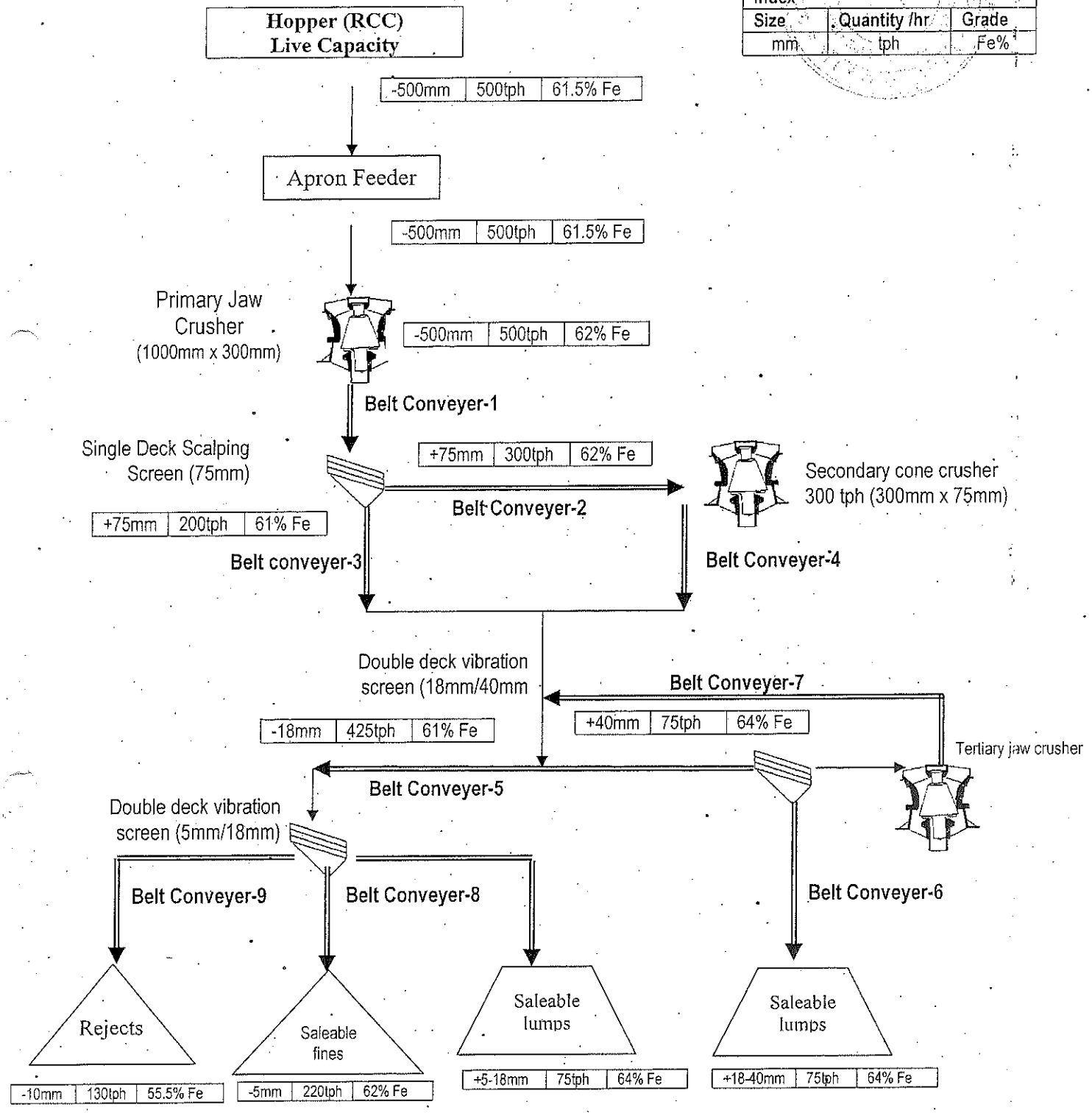
M/s MINESKETCH Consultants (P) Ltd

OMC The Odisha Mining Corporation Ltd
Mining Lessee

Index		
Size	Quantity /hr	Grade
mm	tph	Fe%



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

Due to dry processing there will be generation of fines which will be sold as per the demand.

9.4 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 due to dry processing.

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

There will be no use of any chemicals due to dry processing i.e., crushing & screening. Only water will be sprinkled for dust suppression.

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

Not applicable

9.7 Indicate quantity (m^3 / 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.

Drinking water will be supplied to the mine through water tankers. Ground water will be necessitated @6,000 liters / day for drinking and 15,000 liters / day for domestic use at the mine site. In addition to these, 45,000 liters nala water will be utilized for non-domestic purpose such as use of water for mine operation (washing of machines, wet drilling etc), water spraying for dust suppression / prevention and watering the plantation site for live & growth of the saplings. However, purpose-wise daily need of the surface as well as ground water is given in a table as follows :

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Type of Use	Purpose	Average demand (in liters)	Peak demand (in liters)
Domestic	Drinking	5,000	6,000
	Bathing, Washing, Cooking etc	10,000	15,000
Non-domestic	Dust Suppression	15,000	30,000
	Plantation	2,000	5,000
	Pit headbath	7,000	10,000
Total	---	39,000	66,000

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CHAPTER-10

10.0 OTHERS (Describe briefly the following)

10.1 Site services :

Existing Site Services : Lease area is accessible from Joda via jururhi through 18 km long road consisting of 17 km long metal and one (1) km long all weather road. The nearest railhead is at Banspani at a distance of 14 Km from the lease area via Jururhi. Local market places are Jururhi (8 km). However, full fledged market facilities are available at Joda (18 km), Barbil (32 km) and Keonjhar (112 km), the district Head Quarter. Main power line passes through the western side adjacent BPJ iron ore mine of Lessee. Drinking water is available from the borewell of BPJ iron ore mine of Lessee. Baitarani river water is used for non-domestic purpose. In addition to Health Centre of the Lessee's nearby SGBK iron ore mine, medical facilities are also available from the Dispensary at Bamebari (2 km), TATA STEEL hospital at Bichhakhundi (22 km). Govt. hospital at Joda NAC area. Education up to 7th class is available at Guruda UGME School, and High school level at Bamebari and college level, at Joda. Postal and telephonic facilities are available at Bamebary, Jururhi, Banspani & Joda.

Proposed Site Services : The statutory buildings such as rest shed, first-aid centre etc will be constructed and maintained properly. Wholesome drinking water will be provided as per need and kept in earthen pots under the shed for keeping the water cool and clean. Safety equipment and blasting sheds will be provided to the workers as per need. For day to day mine operation, facilities to be provided for various activities are as follows:

Type of Work	Facilities
Mine working	Repair, maintenance & purchase of machineries/vehicles/ equipments/accessories.
Safety Measures	Provision of helmets, gloves, spades, spectacles.
Protection of Environment	Water sprinkling, plantation and construction of retaining wall etc.
Welfare	Provision of rest shed, blasting shed, first aid facilities, wholesome drinking water & ambulance arrangement.

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Medical examination of workers shall be carried out periodically, records shall be maintained properly and treatment shall be done accordingly by the specialized Doctors.

Temporary housing facilities will be provided to the laborers within the site with all necessary facilities such as fuel for cooking, mobile toilets, wholesome drinking water, medical/health care etc.

Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure of dust and take corrective measures.

10.2 Employment potential :

Excavation and loading will be carried out by 2.5m^3 capacity excavators.

ROM iron ore will be fed into the crushing and screening plant for sizing and sized materials will be loaded by pay loader and transported further to the destination.

Keeping in view the fully mechanized method of mining, OMS has been assumed to be 25 t only.

A total of 134 persons will be employed in the mine for production and processing of 1,000,035 t ROM iron ore / annum as per the following calculation :

Maximum Yearly production	1,000,035 t
Number of working days in the Year excluding rainy days, holiday's etc.	300
Production / day	1,000,035 / 300 = 3,333.4, say 3,334 t
Production / shift	3,334 / 2 = 1,667 t
OMS	25 tones
Number of workers required	1,667 / 25 = 66.68, say 67 Nos.
Number of workers required / day of two shift working	67 x 2 = 134 Nos.

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Management and supervisory personnel will be 23 numbers. Total personnel under employment will be 134 + 23 = 157 numbers. Categories break-up of the employment are given below in Para-5.6.1 and 5.6.2.

Highly Skilled (Management & Supervisory) Persons

Sl No.	Post	Qualification	Nos.
1	Mines Manager	First Class Mines Manager's Certificate of Competency	1
2	Asst. Mines manager	First/Second Class Mines Manager's Certificate of Competency	2
3	Mining Engineer	Degree in Mining Engineering with minimum 10 years of experience as per MCDR, 1988	1
4	Mechanical Engineer	Degree in Mechanical Engineering	1
5	Electrical Engineer	Degree in Electrical Engineering	1
6	Geologist	M. Sc. in Geology with minimum 10 years of experience as per MCDR, 1988	1
7	Mining Foreman	Foreman's Certificate of Competency	4
8	Mining Mate	Mate cum-blaster's Certificate of Competency	6
9	Surveyor	Surveyor's Certificate of Competency	1
10	Personnel Officer	Degree in Personnel Management and Labour lows	1
11	Supervisor & Office Staff	Degree in Arts/Science/Commerce	4
Total	---	---	23

Total Manpower (categorywise)

Type	Percentage	Numbers
Highly Skilled	13%	23
Skilled	25%	38
Semi-Skilled	35%	54
Un-skilled	27%	42
Total	100%	157

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CHAPTER-11

11.0 PROGRESSIVE MINE CLOSURE PLAN UNDER RULE 23 OF MCDR 1988

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

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

There is no forest land in the lease area over 68 hectares which is consisting of 49.339 hectares waste land, 17.503 hectares mining area, 0.563 hectare drain, 0.534 hectare agricultural land and 0.061 hectare road as per revenue department (ref : Land schedule in lease deed vide Annexure-16 and Para-2.1). As on date, an area of 2.305 hectares land has been utilized/degraded due to old quarry / dump / trench and road as per the following table :

Sl. No.	Type of land use		As at present (in ha)
1.	Area under excavation		1.187
2.	Storage for Topsoil		---
3.	Overburden dump		0.683
4.	Mineral storage		---
5.	Infrastructure (rest shed office, quarters, hutting etc.)		---
6.	Roads		0.480
7.	Railways		---
8.	Green belt (safety zone along lease boundary)		---
9.	Tailing Pond		---
10.	Effluent Treatment Plant		---
11.	Mineral Separation Plant		---
12.	Township area		---
13.	Others	Weigh bridge	---
		Mineral rejects	---
---	Total		2.350

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).

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11.1.2 Water regime, quality of air, ambient noise level, flora, climatic conditions

Seasonal as well as perennial nala exist in the M.L. area. The confluence point of this perennial nala and Baitarani river is located at a linear distance of 2.5 Km east of the lease area. Buffer zone (5 km radius of M.L area) falls within the catchments of Baitarani River. Water table is at 5m below ground level (at 525m above mean sea level) in rainy season and 8m (at RL522 aMSL) in dry season. Ground level is at 530 aMSL. Source of drinking water for the lease is bore-wells of adjacent BPJ iron ore mine of the Lessee. Baitarani river water is mostly used for non-domestic purpose. Due to the absence of township or industry nearby, water pollution is negligible. Tree density is appeared to be around 0.1 in southern side of M.L area. There are no valuable trees in the mineable area of scheme period except shrubs & bushes. Therefore, impact on flora & fauna due to mining / excavation, dumping etc. will be negligible. The region around the M.L area is also dotted with a number of quarries which were / are operated for iron as well as manganese ore.

There is no industry within 5km. radius of the M.L area. Therefore, air pollution in the area is negligible.

The source of the noise in the core (M.L area) and buffer (5km radius) zone is due to the movement of vehicles and the noise level is felt to be below 75 dB (A).

There is no forest land in the lease area. A part of the lease area over 1.917 hectares (ref. Para-11.1.1) is degraded due to the development of road, old trenches, old dump / quarry and development of road. Lease area is mostly vegetated by the shrubs and bushes. Trees like Sal, Banyan and Mahul occurs sporadically. Endangered / extinct species of flora & fauna do not exist in the M.L area. Balda forest, Dandadihi forest and village forest exists in 5km radius of the M.L area. In addition to these, four reserve forests namely Naibuga R.F, Pidhapokhari R.F, Baitarani R.F and Champakpur R.F are located at a distance of 5.5 Km, 7 Km, 7 Km and 7.5 Km respectively from the lease boundaries.

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The M.L. area is located in tropical region where climate is characterized by very hot summers and cool winters. The climate in the area is generally cold in water between November and February and hot is summer between March and June. The monsoon sets in late June and continues upto the end of August. Temperature shows the variation between 4^0 C to 47.5^0 C. Predominant wind direction is South-West. Area remains calm for nearly 50% of the year. Average annual rainfall is 1400mm. The south-west monsoon lasts from mid June to mid September and the area receives more than 80% of the annual rainfall during the period.

11.1.3 Human settlements

There is no human settlement in the M.L area. People of the buffer zone are mostly engaged in mining, agriculture and forest produce. Village site with their respective population is earmarked in Key Plan (ref : Plate-V).

Socio-economic condition thirteen (13) villages selected within 5 km radius of the M.L area has been assessed as follows :

❖ **Population Distribution pattern (ref : Table-11.1)**

Male to Female ratio is 1000 : 987. Area around the mine is dominated by the scheduled tribes. However, the population distribution pattern is as follows:

- No. of villages studied = 13
- Total population (as per Census of India, 2011) = 12,768
- Male = 6,424
- Female = 6,344
- SC = 908 (7%)
- ST = 7,741 (61%)

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TABLE-11.1 : POPULATION DISTRIBUTION PATTERN

Sl. No.	Name of the Village	Population			SC	ST
		Male	Female	Total		
1	Balda	628	684	1312	46	1096
2	Belda	475	468	943	7	575
3	Bhandaridihi	171	185	356	10	176
4	Dabuna	703	693	1396	383	496
5	Jagannathpur	229	223	452	---	451
6	Jalapaposi	166	158	324	---	97
7	Kunaposi	527	537	1064	83	669
8	Namira	335	319	654	24	281
9	Palasa (Ka)	817	864	1681	194	914
10	Palasa (Kha)	678	616	1294	26	766
11	Purunadihi	424	362	786	128	416
12	Sialijoda	690	664	1354	4	1093
13	Unchabali	581	571	1152	3	711
---	Total	6,424	6,344	12,768	908	7,741

❖ Literacy Level (ref : Table-11.2)

Total population and literates are 12,768 and 5,529 respectively. Overall literacy level is 43%. Highest & lowest level of literacy is observed at village Dubuna (57%) and village Palasa (Kha) (35%).

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TABLE-11.2 : LITERACY LEVEL

Sl. No.	Name of the Village	Total Population	Literacy			
			Male	Female	Total	%
1	Balda	1312	296	173	469	36
2	Belda	943	246	180	426	45
3	Bhandaridihi	356	84	73	157	44
4	Dabuna	1396	485	308	793	57
5	Jagannathpur	452	135	73	208	46
6	Jalapaposi	324	108	62	170	52
7	Kunapòsi	1064	311	186	497	47
8	Namira	654	152	95	247	38
9	Palasa (Ka)	1681	416	274	690	41
10	Palasa (Kha)	1294	309	149	458	35
11	Purunadihi	786	234	110	344	44
12	Sialijoda	1354	420	201	621	46
13	Unchabali	1152	276	173	449	39
---	Total	12,768	3,472	2,057	5,529	43

❖ Status of Employment (Ref : Table-11.3)

People of the area are mostly engaged in mining, forest produce and agriculture for their livelihood. The details of the status of employment is as follows :

- Main workers = 2,680 (21%)
- Marginal workers = 2,348 (18%)
- Total workers (Main + Marginal) = 5,028 (39%)
- Non workers = 7,740 (61%)

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TABLE-11.3 : OCCUPATIONAL STRUCTURE

Sl. No.	Name of the Village	Total Population	Working Population			
			Main workers	Marginal workers	Total workers	Non workers
1	Balda	1312	85	363	448	864
2	Belda	943	203	112	315	628
3	Bhandaridihi	356	118	43	161	195
4	Dabuna	1396	452	143	595	801
5	Jagannathpur	452	95	89	184	268
6	Jalapaposi	324	80	108	188	136
7	Kunaposi	1064	140	233	373	691
8	Namira	654	6	153	159	495
9	Palasa (Ka)	1681	147	511	658	1023
10	Palasa (Kha)	1294	427	21	448	846
11	Purunadihi	786	393	2	395	391
12	Sialijoda	1354	251	476	727	627
13	Unchabali	1152	283	94	377	775
---	Total	12,768	2,680	2,348	5,028	7,740

11.1.4 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 importance.

11.1.5 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).

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

11.2.1 Land area indicating the area likely to be degraded due to quarrying, dumping, roads, workshop, processing plant, tailing pond/dam, township etc.

An area of 22.201 hectares will be degraded/utilized at the end of scheme period as per the following table :

Sl. No.	Type of land use		As at present (in ha)	As at the end of scheme period (in ha)
1.	Area under excavation		1.187	8.322
2.	Storage for Topsoil		---	---
3.	Overburden dump		0.683	2.165
4.	Mineral storage		---	3.529
5.	Infrastructure (rest shed office, quarters, hutting etc.)		---	0.500
6.	Roads		0.480	1.760
7.	Railways		---	---
8.	Green belt (safety zone along lease boundary)		---	1.500
9.	Tailing Pond		---	---
10.	Effluent Treatment Plant		---	---
11.	Mineral Separation Plant		---	0.675
12.	Township area		---	---
13.	Others	Weigh bridge	---	0.500
		Mineral rejects	---	3.250
---	Total		2.350	22.201

Mineable area of scheme period does not have valuable trees. Shrubs & bushes will be cleared prior to mining. Therefore, impact on flora due to mining will be negligible.

11.2.2 Air quality

As far as air pollution is concerned, fugitive dust (SPM) pollution is predominant over the others such as NO_X, SO_2 etc. Mining unit operation such as excavation, loading & unloading, movement of dumpers and haul roads, no doubt, will generate the fugitive dusts which are localized and there is no chance of transport of this pollutant in to the nearby villages because of (a) their distance from the M.L area (b) hilly topography and (c) surrounding forest growth.

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NO_X emissions from trucks (during transportation) will be dispersed and diluted over a wide area without causing any harm to nearby villages.

11.2.3 Water quality

Impact on Surface Water : A perennial nala exist in southern part of the lease area which flows from west to east and then south. The surface run-off water during rain follows the seasonal nala and hill slope of natural drainage system. Seasonal nalas discharges water to perennial nala which mainly in rainy season will be subjected to some degree of impact due to mining and waste dumping in higher contours. Storm water during heavy rain may increase the silt content causing the chocking of nala course for which suitable measures has been suggested in Para -11.3.5 & 11.3.6.

Impact on Ground Water : The downward movement of the toxic substances from the stack, dump and exposed quarry faces during seepage and percolation of ground water normally affects the ground water quality adversely in mining area. The water table in the area is comparatively at a greater depth (5m to 8m below ground level) which will not be touched during the scheme period as well as during the life of the mine. Therefore, the chances of ground water pollution will be nil.

11.2.4 Noise levels

Noise level is expected to increase marginally due to drilling, blasting, excavation, ore processing and transportation. However, the increase in noise levels will be confined to the day time only because of one shift working. Work zone noise levels & exposure to the operators will be less than 90dB(A) as they will be sitting either in closed cabins or will wear earplugs.

11.2.5 Vibration levels (due to blasting)

There is no human habitation within core zone. Therefore, impact of vibration due to blasting will be negligible.

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11.2.6 Water regime

The downward movement of the toxic substances from the stack, dump and exposed quarry faces during seepage and percolation of ground water normally affects the ground water quality adversely in mining area.

In general, iron content of the water is marginally higher in iron ore zone because of presence of iron in the host rocks. However, this does not cause any impact on human health. Water table is far below the ultimate pit limit. Therefore, there is no possibility of ground water puncture even after the exhaust of ore.

Though there are no perennial water bodies near the work zone, water pollution is expected marginally due to only the suspended solids in the surface run-off water during rainy season. Ore as well as waste material does not contain any toxic elements and precipitated water passing through the quarry floor will not contaminate surface water. There is possibility of chocking of nala course due to flow of loose sediments.

Drinking water will be supplied to the mine through water tankers. Ground water will be necessitated @6,000 liters / day for drinking and 15,000 liters / day for domestic use at the mine site. In addition to these, 45,000 liters nala water will be utilized for non-domestic purpose such as use of water for mine operation (washing of machines, wet drilling etc), water spraying for dust suppression / prevention and watering the plantation site for live & growth of the saplings. However, purposewise daily need of the surface as well as ground water is given in a table as follows :

Type of Use	Purpose	Average demand (in liters)	Peak demand (in liters)
Domestic	Drinking	5,000	6,000
	Bathing, Washing, Cooking etc	10,000	15,000
Non-domestic	Dust Suppression	15,000	30,000
	Plantation	2,000	5,000
	Pit headbath	7,000	10,000
Total	---	39,000	66,000

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11.2.7 Acid mine drainage

Since iron ore and associated rocks like laterite and shale will be handled in scheme period, generation of acidic substance is not expected to cause acid mine drainage.

11.2.8 Surface subsidence

Opencast mining is proposed in the M.L area. Hence, question regarding surface subsidence does not arise.

11.2.9 Socio-economics

It is a fact that, this iron ore deposit is located in backward areas where the general living condition of the people is below the poverty line. Agriculture has not been developed in the region to the extent it should have been. Therefore, mining operation in this area will have a positive impact on the living condition of the local inhabitants.

As proposed in Para-10.2, there will be direct engagement of 157 persons for mining activity. Indirect engagement may be two to three times. Purchase facilities, general awareness etc. will also be improved due to improvement in socio-economic condition of the local people by direct and indirect engagement.

11.2.10 Historical monuments etc.

There will be no impact on historical monuments as they are not found located within 5 km radius of the M.L. area.

11.3 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.

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

The land to be degraded by way of mining/excavation conceptually and reclamation to be done against the land degradation are as follows :

Land Degradation/ Rehabilitation	As at the end of scheme period (ha)	As at the end of conceptual period (ha)
Land under mining / excavation	8.322	42.827
Reclamation	Nil	42.827

Back-filling and plantation of back-filling area will be carried out concurrently from 6th year onwards if the next proposals (Scheme of Mining etc) including progressive mine closure plan is prepared and implemented scientifically with due systematic exploration, exploitation and exhaust of iron ore.

11.3.2 Topsoil Management: The topsoil available at the site and its utilization may be described.

There is no topsoil in the mineable area.

11.3.3 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.

There is no proposal for commissioning of beneficiation / washing plant in the lease area. Therefore, slimes/tailings are not expected & construction/ management of tailing dam is not necessitated.

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

Acid mine drainage is not expected (ref : Para-11.2.7) and mitigative measures is not necessitated.

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

The information on protective measures for reclamation and rehabilitation works year wise may be provided as per the following table.

11.3.6 Summary of yearwise proposal

The information on protective measures for reclamation and rehabilitation works year wise may be provided as per the following table :

Items	Details	2015-16	2016-17	2017-18
Dump management	Area to be afforested (ha)	---	---	---
	No of saplings to be planted	---	---	---
	Cumulative no of plants	---	---	---
	Cost including watch and care during the year (Rs.)	---	---	---
Management of worked out benches	Area available for rehabilitation (ha)	---	---	---
	Afforestation done (ha)	---	---	---
	No of saplings to be planted in the year	---	---	---
	Cumulative no of plants	---	---	---
	Any other method of rehabilitation (specify)	---	---	---
	Cost including watch and care during the year	---	---	---
Reclamation and rehabilitation by backfilling	Void available for Backfilling (L x B x D) pit wise /stope wise (ha)	---	---	---
	Void filled by waste / tailings (ha)	---	---	---
	backfilled area to be afforested	---	---	---
	Rehabilitation by making water reservoir	---	---	---
	Any other means (specify)	---	---	---
Rehabilitation of waste land within lease	Area available (ha)	2.5 ha	2.0 ha	1.5 ha
	Area to be rehabilitated	0.5 ha	0.5 ha	0.5 ha
	Method of rehabilitation	Plantation	Plantation	Plantation
Others (specify)	Retaining wall (around dump)	260m x1.5mx1m	Maintenance	Maintenance
	Garland drain (around dump)	270m x 1m x 1m		
	Settling tank (near dump)	10m x 5m x 3m		
	Retaining wall (around sub-grade)	150mx1.5mx1m		
	Retaining wall (around mineral rejects)	650mx1.5mx1m		

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

As far as the nature of deposit & method of mining is concerned, there is no possibility of land slides and subsidence. Flood is not expected since M.L area is located at higher levels.

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 was severe.

Therefore, tailing dam is not necessarily required (ref : Para-4.6) and the question of failure of tailing dam does not arise.

Disaster management and risk assessment will be undertaken in respect of an accident causing loss of life or serious bodily injury or a permanent collapse of any part of the working or dump as applicable to opencast mine.

Fire extinguisher will be kept in the office premises in consultation with fire department to prevent the office from fire.

Small scale fire, if happens in the office/quarters/machines, will be extinguished by fire extinguisher. Lessee is capable to handle the such eventualities and also need the help of nearest state fire department located at Joda for rescue if any high risk accident occurs in the area which will be adequate for the above employment potential.

The mine is not under working as present. Employment will be done as per Para-5.6 to run the mine. The designation and address of the persons with respective responsibility is stated as follows in respect of disaster management and risk assessment :

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Sl. No.	Designation	Address	Responsibility
1	Mines Manager	Mahaparbat Iron Ore Mine Barbil town, Barbil District Keonjhar, Odisha. Phone-06767-275253 Fax- 06767-275257	Disaster control, sounding the alarm at danger / accident and information to the Lessee regarding the situation.
2	Assistant Manager	-do-	-do-
3	Foreman	-do-	Labour management & mob control. Information to the security personnel to evacuate all the persons from the area in case fire or any disaster except the fire brigade personnel.
4	Mate	-do-	-do-

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

Lease area is planned to operate for iron ore continuously over a period of 11 years till date. However, during the course of mining, there may be temporary discontinuance due to unforeseen causes such as:

- Court order
- Statutory Requirements
- Accidents in the Mine
- Natural Calamities
- Local issues
- Any other unforeseen circumstances

Therefore, an emergence plan is necessary to re-open the mine which will include:

- Intimation to local mine and legal administrative authorities concerned (IBM, DGMS, Directorate of Mines, Circle Mining Office etc.) regarding temporary discontinuance.

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- Explanation to the local community regarding the cause of temporary discontinuance and possibility of reopening of mine in future.
- Listing and proper storing of the Machines, Materials, Assets and Documents.
- Care and maintenance of machinery as per the machine operating manuals.
- Employment and tightening of the security for proper watch and ward to keep the machine and materials in safe and secure.
- Repair and maintenance of haul road.
- Regular monitoring of Air, Water, Noise etc. in the permitted area.
- Monitoring of status of mining operation in respect of bench height, width, individual bench slope angle, overhang, undercut, noise levels or any other parameters whose levels either in form of higher side or lower side is dangerous for further mine working.
- Preparation of plan and sections of discontinued mining operation.
- Projection of benches in plan and sections which is safe for further working.
- Formation of safe benches as per plan and sections.
- Repair of vehicles, maintenance of machinery etc. which is risk free and not dangerous for further working.
- Intimation to the concerned authorities for reopening once the mine is risk free.

11.6 Financial Assurance:

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

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S.C. Nayak, RQP
M/s MINESKETCH Consultants (P) Ltd

OMC The Odisha Mining Corporation Ltd
Mining Lessee

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

Sl. No.	Type of land use		Area put on use at start of plan (in ha)	Additional requirement during plan period (in ha)	Total (in ha)	Area considered as fully reclaimed & rehabilitated (in ha)	Net area considered for calculation (in ha)
1.	Area under excavation		1.187	7.135	8.322	---	8.322
2.	Storage for Topsoil		---	---	---	---	---
3.	Overburden dump		0.683	1.482	2.165	---	2.165
4.	Mineral storage		---	3.529	3.529	---	3.529
5.	Infrastructure (rest shed office, quarters, hutting etc.)		---	0.500	0.500	---	0.500
6.	Roads		0.480	1.280	1.760	---	1.760
7.	Railways		---	---	---	---	---
8.	Tailing Pond		---	---	---	---	---
9.	Effluent Treatment Plant		---	---	---	---	---
10.	Mineral Separation Plant		---	0.675	0.675	---	0.675
11.	Township area		---	---	---	---	---
12.	Others	Weigh bridge	---	0.500	0.500	---	0.500
		Mineral rejects	---	3.250	3.250	---	3.250
---	Total		2.350 (A)	18.351 (B)	20.701 [C = (A+B)]	--- (D)	20.701 [E = (C-D)]

"---" is mentioned where the land is not used in the above categories.

Since it is a Category-A Mine, financial assurance is Rs.25,000/ hectare or Rs.2,00,000/- which is in higher side under rule 23F(2) of MCDR, 1988. Therefore, financial assurance here for the scheme period is 20.701 x Rs.25,000 = Rs.5,17,525/- (Rupees five lakh seventeen thousand five hundred twenty five) only.

अनुमोदित
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13/2/15
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REGIONAL CONTROLLER OF MINES
खान भवन
भुवनेश्वर

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The above mentioned actions have been taken to be stated clearly in the mine closure plan. A certificate duly signed by the lessee to the effect that said closure plan complies all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. have been taken into consideration and wherever any specific permission is required, the lessee will approach the concerned authorities. The lessee may also give an undertaking to the effect that all the measures proposed in this closure plan will be implemented in a time bound manner as proposed.

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TABLE-11.4 : PLANTATION SCHEDULE

Year of Scheme	Financial Year	Location	No. of Saplings proposed	Area Earmarked (ha)	Name of the saplings suggested
3rd	2015-16	Safety zone	1250	0.5	Mango, Mahul, Teak, Gambhari, Seemarua etc.
4th	2016-17	-do-	1250	0.5	-do-
5th	2017-18	-do-	1250	0.5	-do-
Total	---	---	3,750	1.5	---

N.B:

1. Saplings will be planted at 2m spacing.
2. Watering and manuring will be done periodically.
3. Post plantation care such as soil working, pruning etc will be conducted.
4. Casual replacement will be done effectively.
5. Insecticides will be spread for pest control.
6. Proper watch and ward will be there to save the trees from cattle and fire.

S.C. Nayak
Regn. No. RQP/CAL/211/95(P)

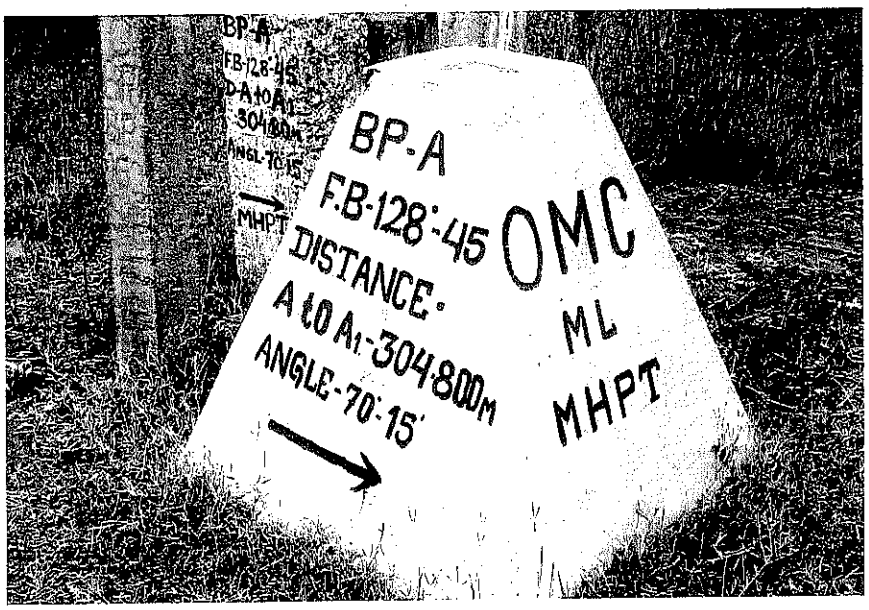

PHOTO-1 : Boundary pillar 'A'

PHOTO-2 : Boundary pillar 'B'

S.C. Nayak
Regn. No. RQP/CAU211/95/A

PHOTO-3 : Boundary pillar 'E'

PHOTO-4 : Boundary pillar 'F'

S.C. Nayak
Regn. No. RQP/CAL/211/95/A

भारतीय गैर-न्यायिक

एक सौ रुपये

₹. 100

सत्यमेव जयते

Rs. 100

ONE HUNDRED RUPEES

भारत INDIA

INDIA NON JUDICIAL

ଓଡ଼ିଶା ओड़िशा ODISHA

G 951009

Form No. _____

The Regional Controller of Mines,
Indian Bureau of Mines,

Dear Sirs,

Guarantee No. 547BGIP615059 0002
Amount of Guarantee Rs. 5,17,525/-
Guarantee Period from 06.02.2015 to 31.03.2018
Last date for lodgment of claim- 31.03.2018

This Deed of guarantee executed on 6th Day of February, 2015 by SyndicateBank constituted under the Banking Companies Act having its central office at Manipal. Karnataka State and amongst other places, a branch at Nayapalli, Bhubaneswar (hereinafter referred to as the bank) in favour of the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar (hereinafter referred to as the Beneficiary) for an amount not exceeding Rs.5,17,525/- (Rs. Five akh Seventeen thousand five hundred twenty five only) at the request of M/s Odisha Mining orporation Ltd. (hereinafter referred to as the Contractor/s)

This guarantee is issued subject to the condition that the liability of the bank under this guarantee is limited to maximum of Rs5,17,525/- (Rs. Five lakh Seventeen thousand five hundred twenty five only) and the guarantee shall remain in full force up to 31.03.2018 (date of expiry) and cannot be revoked on or before 31.03.2018 (last date of claim) by the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar in writing.

SUBJECT TO AS AFORESAID
(Main guarantee matter may be typed hereafter)

कृते सिंडिकेट बैंक
For SYNDICATE BANK

वरिष्ठ शाखा प्रबंधक/Senior Manager
नयापल्ली शाखा/Nayapalli Branch
भुवनेश्वर/Bhubaneswar-751012

For (Bank) कृते सिंडिकेट बैंक
Seal For SYNDICATE BANK
Branch Manager
(Nayapalli Branch)

Contd.2

BANK GUARANTEE AND CO-ACCEPTANCE BOND

1. Agreement on production of a Bank guarantee for Rs.5,17,525/- (Rs. Five lakh Seventeen thousand five hundred twenty five only) under rule 23F of MCDR, 1988.
2. We SyndicateBank (bank name), at the request of Odisha Mining Corporation Ltd (lessee) do hereby undertake to pay to the Regional Controller of Mines, Indian Bureau of Mines Bhubaneswar or any other officer/authority nominated by the Controller General, Indian Bureau of Mines an amount not exceeding Rs.5,17,525/- (Rs. Five lakh Seventeen thousand five hundred twenty five only) against any loss or damage caused to or suffered or would be caused to or suffered by the Government or towards non compliance of provisions of Rule 23A,B&23E of MCDR, 1988 i.e. Mine closure plan/progressive mine closure plan approved in respect of the mining lease for Mahparbat Iron Ore Mine, (ore/ores) over an area of 68 Hects. granted by State Government to Shri/Ms Odisha Mining Corporation Ltd (lessee) vide letter no. III(A) SM-5(99/6373/SM dt. 11.6.2003 situated in Unchabali, Mohaparbat & Balda SOI T.S.No.-73G/5 Village of Champus sub-division/Taluka of Kenjhar District Odisha State by reason of any breach of the said lessee of any of the terms or conditions contained in the Mine closure plan/progressive mine closure plan.

सिंडिकेट बैंक
For SYNDICATE BANK
Branch Manager
नयापल्ली शाखा/Nayapalli Branch
भुवनेश्वर/Bhubaneswar-751012

सिंडिकेट बैंक
For SYNDICATE BANK
(Bank) Seal
Branch Manager
Chief Manager
Nayapalli Branch

Contd.3

3. We SyndicateBank, Nayapalli Branch do hereby undertake to pay the amount due and payable under this guarantee without any demure, to the authority merely on a demand from the Regional Controller of Mines, Indian Bureau of Mines Bhubaneswar or any other authorized by the Controller General, Indian Bureau of Mines stating that the amount claimed is due by way of loss or loss of damage caused to or would be caused to or suffered by the government by reason of breach by the said lessee or any of the terms or conditions contained in the mining plan/mining scheme or by reason of lessee's failure to perform the said mine closure plan/progressive mine closure plan. However our liability under this guarantee shall be restricted to an amount not exceeding Rs.5,17,525/- (Rs. Five lakh Seventeen thousand five hundred twenty five only).

4. We undertake to pay to the authority on a demand from the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar or any other officer authorized by the Controller General, Indian Bureau of Mines or Govt. of India any money so demanded notwithstanding any dispute or disputes raised by the lessee in any suit or proceedings pending before any court or tribunal relating thereto our liability under this present being absolute and unequivocal.

   The payment so made by us under this bond shall be valid discharge of our liability for payment there under and lessee shall have no claim against us for making such payment.

5. We SyndicateBank, Nayapalli Branch, further agree that the guarantee herein contained shall remain in full force and effect during the period up to the end of the Mining plan/Scheme of Mining period of five years that would be taken for performance of the said Agreement and that shall continue to be enforceable till all the dues of the Govt. under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged till Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar or any other officer authorized by the Controller General, Indian Bureau of Mines certifies that the terms and conditions of the said progressive mine closure plan/final mine closure plan have been fully and properly carried out by the said lessee and accordingly discharge this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before 31.03.2018, we shall be discharged from all liability under this guarantee thereafter.

6. We further agree that Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar or any other officer authorized by the Controller General, Indian Bureau of Mines shall have fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said lessee from time to time or to postpone for any time or from time to time any powers exercisable by Regional Controller of Mines, Bhubaneswar against the said lessee and to forbear or enforce any of the terms and conditions relating to the said agreement, we SyndicateBank shall not be relieved from our liability by reason of any such variation or extension being granted to the said lessee or for any forbearance, act or omission on the part of Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar or any indulgence by Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar to the said lessee or any manner or thing whatsoever which under the law relating to sureties, would but this provision have effect of so relieving us.

(Bank) Seal

For SYNDICATE BANK

Branch Manager
Nayapalli Branch

Contd.4

सिंडिकेट बैंक
For SYNDICATE BANK
Manager
Nayapalli Branch
Bhubaneswar-751012

7. This guarantee will not be discharged due to change in constitution of he bank or lessee.

8. We, SyndicateBank , lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar in writing.

9. Notwithstanding anything contained herein :

   a) Our liability under this Bank guarantee shall not exceed Rs.5,17,525/- (Rs. Five lakh Seventeen thousand five hundred twenty five only)
   b) The bank guarantee shall be valid up to 31.03.2018.
   c) The period of bank guarantee submitted is valid for the period of the proposals given in the mining plan/Scheme of mining/PMCP etc. We are liable to pay the guarantee amount or any part thereof under this Bank guarantee and only if served upon us a written claim or demand on or before31.03.2018.

10. If the bank guarantee is to be en-cashed through the court, in that case the Bhubaneswar (city where Regional office, IBM is located) court will have jurisdiction.

11. In witness whereof, the bank through its authorized officer has set its hand and stamp on this 6th Day of February 2015 at Nayapalli, Bhubaneswar.

सिंडिकेट बैंक
For SYNDICATE BANK
Branch Manager
Nayapalli Branch
Bhubaneswar-751012

सिंडिकेट बैंक
For SYNDICATE BANK
(Bank) Seal
Branch Manager
Nayapalli Branch

FOLLOWING POINTS NEED TO BE CONSIDERED WHILE SUBMITTING THE BANK GUARANTEE

a) The bank guarantee should be made on stamp paper with minimum value of Rs. 200/- in Maharashtra or as per respective states Stamp Act.
b) Each page of bank guarantee should be signed by two bank officers indicating clearly their name, designation and code number.
c) Item No.2 of the bank guarantee should clearly indicate the name of the Mine, ML No., Survey.No./Khasra No., Village, Taluka, Dist. and State etc.
d) The period of bank guarantee should be such that it is co-terminus with the period of approved proposals in the mining plan/scheme of mining as the case may be.
e) Original bank guarantee should be submitted separately with the forwarding letter while submitting final bound copies of MP/SoM/PMCP and a photocopy should be kept in each bound copy of PMCP.
f) Every page of the bank guarantee should be signed by the Bank Manager under his seal.

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